NEW MUSIC COMPOSITION FOR LIVE PEFORMANCE AND INTERACTIVE MULTIMEDIA

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by

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Thesis Certification

CERTIFICATION

I, Thomas A. Fitzgerald, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Doctor of Creative Arts, in the Faculty of Creative Arts, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Thomas A. Fitzgerald

23rd October 2004

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Abstract

The focus of this DCA thesis is the development of original creative audio and audio-visual work. Central to this is a study of the nature of interactivity and sonic relationships between electroacoustic and acoustic music, extended further by the application of sonic and visual interactivity.

This written documentation accompanies the major part of the DCA submission, a folio of five original works. Its purpose is to clarify, document and contextualise the creation of these works and to illuminate the aesthetic underpinnings and compositional techniques that I have developed during the period 2000 – 2004. The structure of this documentation is in three parts which support the research methodology of reflective investigation. This process begins with an introductory overview (Chapter 1). This is extended in the second part, (Chapters 2–5), an observation of the effect of the culture, contemporary musical environments and related creative practice in my work.

The third part, (Chapters 6–10), details the nature, and techniques utilized in the development of the new works. These developments have also embraced the combination of live projected interactive visual imagery with acoustic and electronic instrumentation. Finally, I have investigated the role of sonic spatialisation and texture as expressive and structural devices in music composition.

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Chapter One

Introduction

> 'My fight for the liberation of sound and for my right to make music with any sound and all sounds, has sometimes been construed as a desire to disparage and even to discard the great music of the past. But that is where my roots are. No matter how original, how different a composer may seem he has only grafted a little bit of himself on the old plant. But this he should be allowed to do without being accused of wanting to kill the old plant. He only wants to produce a new flower…'
>
> - Edgard Varèse. (Cope 112)

Approaches to Invention, Discovery and Development

The interplay of virtual entities, instruments, performers, and composers has opened up a new world of sonic phenomena, detail, sonic treatments and combinations. (Winkler 3). These form extended and expanded languages when fused with electroacoustic environments to produce new sounds, instruments and musical behaviour. The exploration and development of my creative approach to this new paradigm and the creation of original works that articulate this new world of sound is an important area in this DCA thesis.

The new compositions embrace electroacoustic resources and various aspects of sonic and visual interactivity. This takes place in both multimedia and integrated intermedia contexts.

Each of the five works I have created explores different aspects, applications and intensities of electroacoustic interactivity in various musical contexts. These range from solo instruments and small ensemble, to chamber orchestra and full symphony orchestra resources. In this way the creative folio proceeds to articulate innovative ways to form expanded artistic and musical depth.

In addition to the creation of the works, this thesis also endeavors to examine the development of my creative process and integrate reflective research into aspects of inventiveness. This include integrating the expanded role of intuition, imagination, individual and collective cultural memory, improvisation and artificial intelligence processes, as well as examining spatiality, sonic density and resonance. The expansion of these processes has led to new uses for pitch materials (horizontal and vertical), as well as temporal and pulsitile rhythmic concepts, particularly when applied to interactive music activities. The American composer Todd Winkler clarifies this activity succinctly:

> Interactive technologies may suggest a new musical genre, one where the computer's capabilities are used to create new musical relationships that may only exist between humans and computers in a digital world. (Winkler 8)

The articulation of this new genre is extensively applied in my own original approach to the electroacoustic sound world, forging new work in this emerging frontier area.

In this thesis *interactivity* is defined in an expansive sense, and applied in different ways according to the nature of the compositional process for each individual work. I use the term

interactivity to include pre-digital as well as post-digital sonic environments. This also recogises the types of interactivity that developed with the invention of audio recording. In exclusively live acoustic performance environments the levels of interactivity are extensive, performers interacting with the instrument, the other musicians and the audience. The recording and broadcast mediums radically changed the listening experience and communication environments. Music could now be presented as an object, captured and instantly available without the single performance limitations. Subsequently, many performers developed a recording career in addition to a live performance career. Some performers, like the Canadian classical pianist Glenn Gould, abandoned live performance completely, preferring to create his performances as recorded versions only, working exclusively in the recording studio. In this situation he could edit several recorded versions and combine parts of them in order to create a more exact version of the composition. The effect of this kind of activity led to new doctrines of exactitude and authenticity and the conceptual value of the perfect performance. (Lipman 166). Performance art was haunted by this credo, often to the detriment of creative and imaginative interpretation. Performances became increasingly referenced by superhuman recorded versions of musical works, created away from the concert hall and often enhanced and assembled from many complete and part-recorded segments.

The crucial distinction between these activities is that the live concert performance is created, and listened to in a linear dimension, in real time. The recorded version is created and listened to in different ways, involving the possible repetition of the performance and the addition of a wide range of audio enhancements to the captured sound. This can result in

the creation of a version of the music that is impossible to recreate in a live concert hall performance. The recording studio became a powerful creative environment that also produced many works that could only be conceptualised and realised in a multi-track recording studio. These works include the early music concrete analogue tape pieces, from the 1950s, through to the complex digital computer works of the current era.

Each environment allows for different types of interactive music making. Recent softwares and computer interfaces have developed a natural extension of these interactive activities allowing for the performer and/or audience members to affect music being generated by computers. The relationships between the computer and the performers can be precisely defined in a predetermined score, or randomly improvised to various degrees. The parameters for interactivity may be reduced to a single entity such as pitch, or involve complex processes to allow for several parameters to be significantly altered by the actions of the performer or the computer. (Winkler 5)

In my folio works I explore different types and intensities of interactivity. The more complex processes involve longer and intricate techniques to create the required sound world. Other pieces employ simpler techniques such as trigger devices to playback pre-recorded materials and blend them into the work at random intervals. These works also contain music that does not involve computer interactivity. Rather, the sonic effects of this referenced interactivity inform and influence them. For example, this is a characteristic of the *Multimedia Suite* work, where improvised techniques with signal treatment devices are employed in a realtime performance context.

This study also embraces an allied development in creative process. The five major creative works that this written thesis supports are the result of a four-year process of deep investigation. I have examined my own individual creative concepts and the development of new directions in my creative output. These directions pursue areas of innovation and experimental work. In my music this has focused on the exploration of electroacoustic sonic environments, aspects of interactivity and how these intersect with each other. Further elements of fusion explore electroacoustic contexts, and developing relationships between modern popular song based music and the extended structures of contemporary art music.

The new works are also referenced by the contemporary post-modern era. They are further contextually referenced by the conscious recognition of a legacy of the avant-garde and modernism movements of the twentieth century. This acknowledgment of the achievements of many referential compositional solutions and developments has assisted my own research and experimental work.

Aspects of shared cultural and creative theory are clarified and integrated as powerful shaping forces in my works. These include searching for effective ways to integrate new uses for tonal, atonal and semi-pitched materials, as well as approaches to time and pulsitile rhythmic concepts. This is a shared artistic area of contemporary compositional activity. Several significant Australian, North American and European composers have explored this difficult area of contemporary music. These include the Australians Richard Meale, Roger Smalley, Carl Vine and Ross Edwards (Ford, ABC Music Show1), each of whom experienced considerable challenge in exploring these new contexts for tonality and time. Similarly, Georgy Ligeti, and Kristof Pendereski have radically changed direction in their later works

that embrace new uses for tonality and time. Many North American composers such as Phillip Glass, John Adams, John Corigliano and Steve Reich have also forged innovative solutions to the articulation of new compositional language that extend beyond previous modernism concepts.

Cultural and Artistic Influences on my Creative Work

As the last decades of the twentieth century unfolded, some of the dislocation and 'shock of the new' became almost a parody of itself. The social changes and credo of independence, 'do your own thing', have evolved to include an interdependent awareness of complex inter-relationships not only in the arts, but also in the natural world. Environmental awareness had become a major concern for many societies in the late twentieth century, prompting considerable change in the ways to balance the impact of mankind on the Eco-system. (2.) The American sociologist Stephen R Covey, expresses the following sentiment that clearly illustrates the pre-requisites for recognition of effective collaboration:

> Interdependence is a choice that only independent people can make. Unless we are willing to achieve real independence, it's foolish to try to develop human relations and skills… We won't have the foundation to keep things together. (Covey 2)

The awareness of interdependence principles, and implied individual wholeness, is partially reflected in the World Wide Web musical environments. This new medium extends across the entire process of music making, facilitating integration by any individual, as a shared and interactive experience; one that embraces composer, performer, and audience in a collective consciousness.

Consequently the electronic and computer age have exponentially increased the myriad ways of this sharing and interactivity. The continuing development and integration of artificial intelligence software, and hardware/computer instruments and interfaces, allows for further interdependence and more fluid ways of creating and experiencing music. One of the natural consequences of this new environment is an amalgam of simultaneous styles, where the fusion of seemingly incompatible materials and concepts form new ways of relating. This is observed in detail in part two of this thesis, the folio of creative works. In fact, it is this dizzying diversity of directions, styles and musical languages that are the salient feature in this post modern era. (Ford 218)

The juxtaposition of seemingly opposite compositional and creative styles and approaches, now inform new relationships and expressive dimensions. It has formed a fluid and vibrant sound world, profoundly informed by the dominant mediamatic culture of the last decade. It is an era that resonates with the sounds of a multi-faceted electroacoustic environment. Steve Reich, the American composer, describes his view on this contemporary activity, in an interview with Richard Kessler in 1998:

> At that time, (around 1968), the American composers were under the "downtown influence"

of John Cage, or the "uptown influence" of Boulez, Stockhausen, Berio, and company. But the sad fact is that musically, everybody was under the influence of music that was not "pulsitile", [not with a regular beat].You can't tap your foot to either Boulez, or John Cage, nor could you know where you were tonally. The idea of cadence, any kind of tonal center, melody in any sense of the word, including even some in Schoenberg, was pretty hard to put your ear on. So I felt sort of out of it and very much alone… (Kessler 6)

Reich is even more succinct about this area in a radio interview, February 8th, 2003. This is an extract from the interview from 'The Music Show', on the Radio National Network of the Australian Broadcasting Corporation:

Andrew Ford: 'Do you think if we look back at musical history, it's so easy with the benefit of hindsight to see the directions that music appeared to be taking. Do you think that music has a direction any more?

Steve Reich: 'When I was a student back in the late 50s, early 60s,there was one direction only, and that was a direction of Stockhausen and Berio. In a sense, John Cage and others here in America whose styles had differences, their similarities completely outweighed their differences, which was that there was no perceptible rhythm, where you couldn't tap your foot and there was no harmonic centre; one didn't know where one was in the music. Now it seems to me that we are living in an almost diametrically opposed kind of period when there are many, many different directions. There are people who compose the way that I do and continue to compose in this way. The people that start these things are always doing just fine. There are people that write like Mahler and new romanticism, and since then, John Adams has become like that. There are also people who are basically taking off from pop music , rock 'n' roll, bass and drums, and that's becoming a new direction. I think there are aspects of pop music in all good 'classical' music. So we're living in very diverse times in terms of musical style.

> Whether one is better than the other I can't say. The advantages of living under a totalitarian regime that I grew up in are that it's very clear what you could push against in terms of asserting your own direction. I think now it's kind of like what ever you do everyone sort of says "Oh, that's just fine" and it has advantages and perhaps disadvantages.' (Ford, ABC Radio National).

In this time of relativism and fluid change, the syntax and meanings of new music creative work are less defined and more than ever subject to misinterpretation and confusion. It is the creative approach to sonic materials, and temporal structures, that form the core of my work. In a way, everything is 'derivative' and related to older musical syntax in various degrees in the broad sense of time and vibration. However, the conscious awareness of innovation in artistic parameters and associated new aesthetics of the individual work can focus intrinsic meaning and value in the creative process. The American composer David Cope expresses this sentiment well in his book, 'New Directions in Music':

> Certainly there is no progress in music or art; that is while an individual composer may get better with time, newer music with its complex new instruments for creating much more diverse sounds is no better than older music, or any worse for that matter.
>
> (Cope 109)

Chapter Two

Interdependent Cultural and Creative Environments

In the twenty-first century, powerful desktop computer systems are commonly encountered and continue to evolve to become even more powerful and affordable. This current situation, with increasing access to samplers and software, has given new freedom to creative experiment and realisation. The increased power of the computer and associated electronic technologies has enabled the creation and exploration of the most complicated sonorities. The sonic manipulations available in this computer environment include flexible sampling techniques, software plug-in signal treatments, microtonal tunings, sound synthesis and surround sound mixing. These creative activities are multi-dimensional, linear and non-linear, whilst simultaneously allowing for possibilities in the development and control of the finest nuances of the sonic domain. This depth of application and attention to detail in sonic manipulation and the very fluid, affordable environments, were simply not available before 1980, let alone previous eras. They form a new paradigm for creative endeavor.

The scope and powerful effect of this electronic environment is enhanced further when combined with the additional internet dimensions of shareware, online recording collaborative projects, and MP3 broadcast and dissemination. It has inspired and empowered the developments in a multitude of musical, political

and economic areas, and it is evolving into new genres of integrated music and sound-art creations. Further, it challenges the notion of what a musical instrument really is these days, how we make and share music, or 'patterns of organised sound in time', that describe the sonic languages and genres more accurately.

The ramifications are integrated in myriad ways by a diverse response from the current, on-line era. Various delivery formats, for example, *MP3* and *Quicktime* files, are increasingly flexible and effective in disseminating audio and video across cyberspace. The art of performance is similarly affected by the concept of sound production often imitating the idealised 'perfect'studio sound aesthetics. As noted in the previous chapter, the American pianist and critic, Samuel Lipman, perceptively observes that recording technology has reformed the art of interpretative performance during the twentieth century. The two associated doctrines of exactitude and historical authenticity became an artistic credo, often inhibiting and confusing creative imagination and performance/interpretative originality. (Lipman 156)

In addition, recording technology has created a fluidity of stylistic collage; omnipresent music from every era and genre being easily accessible and embedded into our media-saturated urban environments. These ubiquitous sonic environments also shape the ways that sound is listened to and valued.

Personal Musical Values and Techniques

In addition to these cyberspace environments, my creative process and original works are informed and referenced by a rich legacy of individual and collective

artistic achievement. The various integration and synthesis genres of music composition that have been created by three generations of composers over the last three decades inform the new millennium environments. The current era expands these legacies of the past, as we continue to integrate and form our musical languages to express the inner visions and sound worlds. Simultaneously, we are increasingly witnessing a recognition of what Howard Gardiner has termed 'Multiple Intelligences'. (Gardiner 39)

The integration and use of intelligences that utilize other parts of the human body and brain as a primary way of processing ideas and feelings, leads to a new appraisal of the non-rational and the mysterious aspects of the creative process. These processes have another kind of 'methodology' and 'logic' that are integral components in developing new compositional approaches.

Cultural Influences

The informative legacies from the avant-garde and experimental music movements of the mid-late Twentieth Century, Western classical music tradition embrace a mix of philosophies and aesthetics. They include ultra-rationalist ways, as well as non-rationalist ways, of approaching the creation of new music. They reflect a time when the theories of new music were breaking free from concepts and techniques that defined and limited the expression of music. The new sounds would not fit into previous concepts of music where the materials of music were applied in various systems, serial, modal and tonal. These traditional twentieth century compositional styles and methods were too limiting for many new music

directions, especially those that combined with Eastern and other non-Western philosophies and traditions. The diverse nature of new music has given this present era a heightened awareness of other dimensions in creative practice.

The development of integrated music was a strong movement during the 1960s in the US.A. Composers such as La Monte Young, Terry Riley, John Cage and Christian Wolff radically interpolated Eastern and Indian philosophical and musical techniques into a more meditative, more intuitive musical approach. In what some see as the present Aquarian age, this music has partially evolved into minimalism, new sacred music and synthesized new age music. James D'Angelo has described this genre of music as 'New Consciousness Music', and notes that much of it relies on intuitive sonic approaches that bypass the rational mind. (D'Angelo 121)

The development of an expanded consciousness is a part of Cage's great legacy, and it is a fundamental element in many contemporary creative techniques. It is a direct contribution that continues to inform many compositional decisions in my own work.

Individual Cultural Influences on my Creative Processes

There are many composers that have been a strong referential influence in my creative work. However, the six composers discussed below have been fundamental figures in affirming the process of discovery and articulation of innovative musical directions. I have noted some of their specific techniques or philosophies that have shaped my approach.

Steve Reich and Phillip Glass have been innovators in new approaches to the uses of time and pitch. Their works draw upon Western, Indian and African musical traditions and transform them into new languages and directions. They interpolated elements of rhythmic development techniques that require rhythmic motifs or cells, to modulate through a cyclic process. This became a fundamental technique in the evolution of minimalism. Their music has influenced my own explorations with pulsitile music concepts, especially in the use of rhythm as a structural element. Both composers have utilized pitch and specifically modal and tonal materials in innovative ways. Their solutions to various musical and artistic problems, the formation of new composition languages, and the need to work with their own performance ensembles, is especially interesting in the light of my own creative folio.

Steve Reich

Reich's development of rhythmic techniques and the fusing of jazz syncopation, and dynamic propulsion of asymmetrical and symmetrical sub-beats, continued from works like the Ghana inspired work, *Drumming* , and continued through to *Music for Eighteen Musicians* . His subsequent development of relationships between speech rhythms, and instrumental contrapuntal writing, continued a fascination with rhythmic relationships, human speech and vocal sounds, that continues in his most recent work, the video opera *Three Tales*.

In this work speech rhythms are incorporated as a structural device between the visual and musical relationships, as well as being core source material for melodic and rhythmic developments.

Reich has a continuing interest in transferring and translating electronic sonic elements into acoustic instrumental music. This resulted in the transfer of the electronic phasing works such as *Violin Phase* and *Piano Phase* into the completely 'unplugged' sound world of the acoustic environment. It continues to translate in the later works such as *The Cave*, *Three Tales* and the instrumental *Triple Quartet* of 2002.

The rhythmic, timbral and textural harmonic densities have references to the electronic sonorities. However in Reich's music, sonic influences from the electronic music world are mixed into a fundamentally acoustic musical aesthetic. Even though the electronic additions are essential to the works, their effects are focused and limited to certain signal treatments and very specific sonic processes. Reich is fastidious with the detail and balances in the aural mix. He often requires a soundworld that can only be created via the microphone, where sounds that are inaudible in a non-amplified environment are made audible, and so made available for creative expression.

This is his foundation for works such as the *Triple Quartet* and *Three Tales*. In these pieces, Reich uses the microphones to get acoustical detail into the concert hall. He also uses amplification to create balances in the orchestration that are impossible to achieve acoustically. Further, amplification is employed to unify the sound source of the entire ensemble so that it is a spatially placed sonic mix– coming from carefully positioned and tuned loudspeakers.

I have found that this focused inclusion and development of a few electronic signal treatments and modulation techniques is a very effective formal process and structural device. For example, in the opening section of the *Lament* from my folio work *Multimedia Suite*, I limit the use of the electronics to the two concertante solo electric violins, and the amplification of the digeridoo and electric bass guitar. The violins develop pitch material in canonic imitation of each other in a series of evolving harmonic arpeggios, high on the G string, near to the bridge. They improvise the duration of the phrases, but not the repetitions and resultant sonorities from the delay lines, which are preset for a known parameter. The result is that the harmonic overtones blend in ways that would not be possible, nor audible, acoustically. In addition, the amplification of the digeridoo allows for a melding of rich bass notes from the bass guitar, and the solo violins, that are in an effective balance with each other, modulating in and out of focus as the music requires. Techniques such as these in electroacoustic music are allowing the discovery of new combinations of sounds with orchestration that is both innovative and effective.

The process of finding something new, and then discovering that it related to earlier musical practice, became evident to Reich in the contrapuntal writing that he developed in his works that utilise phase techniques. These techniques are a form of canonic writing that relates back to the contrapuntal techniques employed by the Baroque and Neo-Classic forms of earlier eras. The understanding of the techniques from previous eras has guided Reich in refining and confirming his innovative directions, and providing reference points. This thesis is a part of a

related creative process, with observations about previous creative work referencing and informing my own development.

Phillip Glass

Glass perceived that there were many connections between Indian traditions and his own music, discovering that the rhythmic structure of a musical work could become the overall structure. This structural use of rhythm was a new element, not part of the Western musical tradition, which prior to this late twentieth century era, was primarily concerned with the relationships between melody and harmony. Even the advanced serial developments of composers like Pierre Boulez and Milton Babbitt, did not relegate rhythm to the same structural level.

Indian music, especially the music from Northern India, creates tension between the melody and rhythm, not between melody and harmony. The complications that the cyclic rhythmic structures can produce, together with the effects of this on melodic development, opened up a whole new approach to thinking about music for Glass. He gradually developed pieces that combined ratios and cycles of rhythm and melodic cells. The overlapping cycles created new rhythmic patterns that modulated to the point where they naturally come together again.

The evolution of the music into larger forms with commissioned works and operas changed this practice entirely, as did the demand for performances, and the increase of dedicated performance ensembles for his music. In the large operatic works, such as *Einstein on the Beach*, Glass expanded his musical techniques to

create works that unfold gradually, with very intricate cyclic processes over several hours. In his subsequent works *Low Symphony* (1988) and *Symphony 5* (2000), Glass explores the inclusion of elements from popular music, as well as more dramatic use of syncopation and more chromatic harmonic structures.

Luciano Berio

Luciano Berio's work continues an Italian lyricism that is deeply intellectual in process as well as being expressionistic in character. This is illustrated in his orchestral work *Sinfonia* (1968) in which complex textural processes combine with the dramatic narrator, and the lyrical popular music influences of the small choral ensemble, The Swingle Singers. The theatrical gestures of his work, especially for vocal and theatrical compositions, have been a radical extension of many operatic traditions, whilst simultaneously a related departure from them. In his early works such as the electronic piece *Visage* , (1955), and *Recital(1969)*, Berio takes familiar everyday sounds, such as sighs, humming and spoken word fragments, and combines them with the vocal gestures of the traditional operatic soprano voice. His seminal orchestral work *Sinfonia*, goes even further in combining dualities and finding relationships between materials.

Berio's methods in building connections were based more on utilising patterns of lyrical, textural, and rhythmic motifs in phrase construction, as well as imitative procedures, that included enormous detail to dynamic nuance. His textures avoid distortion by developing elements from various parameters of dynamic change,

pitch harmonic density modulations, and the employment of a formal concept of resolution of gestures, and structural phrases.

Berio's preoccupation with musical theatre has inspired some innovative and extraordinary developments in vocal techniques. In works such as *Visage, Sequenza III*, and *Recital*, the composer explores the new aspects of vocal expression. His fascination for new sounds continued in these works where speech is explored for its sonic dimensions, rather than for the literal meaning of the words.

He often selects a limited number of compositional strategies that are combined and superimposed in different ways. Berio's aesthetic and creative processes combine intuitive with highly rational ways of composing. His blending of emotional and intellectual approaches has produced sonic environments with an assimilated parametric musical process.

Berio's methods grew out of a time of stylistic eclecticism. He employed from his second period, 1960 onward, a structural application of the various musical parameters by establishing one or more sets of musical parameters–a parametric technical process. This is a functional approach to process and transform the initial material. In creating coherent works, musical structure is conceived as a result of process and this provides a perspective as to why events occur and also where they occur in the piece.

The need to establish new methods of organisation dealing with tone colour and texture as primary structural elements was extended by Berio's relationship techniques. It allows for a way of organising non-pitched and pitched parameters as primary structural determinants. It also allows at a micro level the linking of rhythmic and pitch interval set elements. In his *Sequenza* series of solo works,

Berio's techniques establish coherency and a unified structure. When employing pitch relationships, he utilises a concept of referential sonority that focuses on patterns of interval sets, or frequency of types of intervals and harmonic structures. When working with the non-pitch processes and non-traditional pitch processes, he utilizes very subtle dynamic propulsion, register, textural densities, and rhythmic progression as contrasting elements. By establishing a hierarchy of expressive parameter processes, Berio creates a language that develops the inner dynamics of the sonic material in a syntax that has an inner structural logic. This linking of the once disparate elements gives coherency, as the sonic environments have a musical framework that is fused with a series of functional associations.

As Reed Kelly Holmes has observed (Holmes 10), Berio has three areas of activity that operate interdependently. Firstly, Berio employs a compositional approach consisting of process and transformation sonic ideas rather than applying formalistic moulds. Secondly, Berio utilizes significant musical ideas that have developed out of a system of inter-relationships in progress. Thirdly, Berio's creative practice embodies lyricism and dramatic qualities that contribute to his works being very expressive and directly appealing.

John Adams

In his works *Shaker Loops*, and *Harmoniere* , Adams extends the harmonic depth of minimalism and further develops a more varied approach to rhythmic

processes. His work embraces modal and tonal progressions that relate to functional tonality within new contexts of structure and texture.

Adams and many other composers have returned to tonal and modal pitch resources and utilized them in innovative ways. The use of tonal material empowers these composers to express their musical visions, with these materials and tonality concepts that refer to earlier eras. Artistic freedom requires that composers must be given liberty to compose in any idiom, style, or language, that they wish to. (Ford, p.xxx). Theoretical objections to the return of tonality often restrict the essential freedom required for artistic invention. New ways of utilising tonal materials have inspired considerable creative activities and an integration of older techniques.

The music and creative techniques of John Adams will be further discussed later in this chapter in the light of the new tonality innovations that infuse much of his work. The utilization of tonality is a potent resource that I employ and explore in my own creative work.

New-Tonality Concepts and Integration

Music was, and continues to be, composed in a wide range of older and more modern genres, styles and languages, none of which is hermetically sealed.
(Ford 219). Serialism continues to hold fascination for some, and indeterminacy, minimalism and modal music, remain vital approaches for others. What seems to be very clear is that music has moved on to re-integrate older aesthetics and languages, and to transform them into new dimensions. The initial fears inherent

in some of the atonal artistic theories, that any use of tonality again would be anti-art, reactionary, and become merely a meaningless repetition of the familiar, has been proven groundless. (Laurie 2) So many composers, even by 1980, and certainly by the year 2000, have incorporated tonality as a vital and innovative and fundamental sonic resource to create with. (Ford 220)

These notions and debates, of what constituted really innovative creative composition raged throughout most of the twentieth century. The embracing of the philosophy, 'everything goes', is now so observably inclusive, that we have no real 'mainstream' rivers of innovation, but rather a plurality of vibrant directions, simultaneous and vital.

As Andrew Ford observes:

> By the last decade, Cage suggested, the river had become a delta, with all that that implied: a multiplicity of streams, dividing and subdividing, sometimes rejoining each other, one or two of them flowing back on themselves.
>
> (Ford 218)

The 'death of the avant-garde' (Cope 209), is really a transition away from an earlier concept of 'shocking' innovation, and extends concepts of what constitutes creativity in the arts. Inspite of techniques and genres expanding in a multiplicity of directions, due in part to the advances in technology, there is an additional change in fundamental aesthetic concepts. These new concepts inspire much of this

integration and transformation of the sonic materials from the past. Creative theory has evolved to embrace greater flexibility and many directions. In addition, the synthesis and integration of older techniques and materials is facilitated.

This artistic momentum is well described by the American composer and author David Cope:

> Many composers have retrenched and re-examined the music of ages past where subtle hierarchies, and nuances of musical structure, predominated and individuality emanated from personal statements within styles, not from the shock of new styles. (Cope 210).

This attention to nuance and personal statements within styles embraces integration as an intrinsic element. The integration of previously disparate styles and genres has become a major component in current creative practice, for example, in the convergence of popular and serious music elements.

My own work reflects and further develops this direction of integration and finding new applications of expressive nuance. This is illustrated in my folio work *Chitter Chatter*, for clarinet, cello and tape, where the minimalist rhythmic cells are interfused with my own version of syncopated rhythmic and dynamic propulsion nuances. The dynamic propulsion of the contrapuntal lines is combined with the repetition of the rhythmic and melodic cells so that as they modulate across the beat, they create a unified coherent structure.

The post-minimalist works of John Adams, *Nixon in China, Violin Concerto*, and *El Dorado*, were an important influence in approaching new flexibility in textural development, and the transformations of modal and rhythmic activity. He has a

creative development process related to my own, so it was a confirmation for me that my new explorations were on solid footing in this developmental context.

John Adams has successfully incorporated richer harmonic variety in his reworking and development of the minimalist cyclic techniques. In addition, he has evolved a very flexible rhythmic approach, and a passionate melodic lyricism. These are related technical processes to my own creative work. Adams developed these techniques in a series of works beginning with *Phrygian Gates* (1977) and continuing through *Shaker Loops* (1983), to the present era in the Film/Opera, *El Nino* (2001).

Inside these reworked sensibilities, he modulates the tonal centres, weaving the melody in pantonal and modal directions that are innovative, lyrical and generating a powerful expressive effect. Melodic development in his post-modernistic creative process also explores a range of jazz-related, syncopated rhythmic techniques, which are often combined with the multi-layering of contrapuntal minimalist textures.

The result is a more flexible and less process driven sonic progression. Adams has stated that he wanted to create a body of work that built on the 'genetic information code of minimalism'. He wanted to construct a musical language that was 'far more expressive than and less rigour bound than minimalism.' (Adams, BBC interview 1). The early breakthrough works such as *Phrygian Gates* and *Shaker Loops* (String Septet version–1978, and String Orchestra version–1983), achieved solutions to combining the high-energy textures of minimalism with a fundamental lyricism and intensive detail to parametric nuance. This gave to the

transformed musical language a structure and emotional energy that was very different to the classical minimalism process and aesthetic.

Instead, he is more fluid using dynamic fades in and out, to introduce new rhythmic and melodic materials. In *Shaker Loops* he extended the expressive qualities inherent in continuous music genres, by introducing more varied rates of change within shorter time frames. Consequently, the music is less rigid in its cyclic progressions and employs far more dynamic and harmonic contrasts.

This twisting of tonal focus, via dynamic diminution in several keys simultaneously, is not at all new in itself. However, the development of the concept, embedded into the textures and rhythmic progressions of this approach to contrapuntal development, is innovative. These techniques are very effective on emotional, intellectual, structural and technical levels.

I have discovered that many of my own solutions to textural development were similar to Adams' technical approach in establishing relationships, and then developing variations on pitch material. This was particularly useful with material that initially would not work with minimalism techniques of full cycle progression of melodic cellular material.

In contrast to Adams, my own work proceeds along a different rhythmic direction. I am more interested to explore the dynamic and syncopated momentum. I use micro-nuances, such as the divisions and dynamic interplay around the beat pulse, and macro-levels, such as how to connect the structure with the longer time envelope. This is very much the case in the folio piece, *Electric String Quartet - 1*. This work employs the propulsion inherent in the crossing of the beat with sub-beat accents allied with dynamic contrasts. The language is my

version of new ways to integrate some of the jazz and rock rhythmic language into an interconnected pantonality.

This is a very different approach to this exploration of time and dynamic nuance than the areas that composers, such as Steve Reich, utilise in works like *Different Trains*. This was composed in 1988, and is based on sampled speech pitch and rhythm patterns. His *Triple Quartet*, 2001, is concerned with aspects of syncopation, exploring the interplay of symmetrical and asymmetrical beat patterns. Reich integrates the jazz syncopations and contrasting hard-rock beat patterns with a rich repetitive contrapuntal structure. My quartet goes in a different direction, exploring the variations of dynamic propulsion around modulations of the juxtaposed phrases, rather than canonic formal development. My own approach is to take a similar direction of pulsitile beat concepts into more detailed rhythmic variation, and in doing so create new sounds, textures and dynamic nuance. In this more flexible approach to nuance, and freedom in regard to the ways of developing rhythmic cycles, tonal and atonal pitch areas, and their various relationships, I have endeavored to extend these shared directions of Adams, Glass and Reich. In my folio works for music theatre incorporating projected images, multi-media and film, I have been especially aware of the various techniques used by John Adams and Steve Reich.

John Adams often explores rhythmic ratios as a unifying technique. This is very evident in his Opera *El Nino*. As the opera unfolds, three simultaneous media weave a new sonic, kinetic and visual language. The choreography, the two electronic screens and the live music performers construct expressive dimensions

that are interdependent. They achieve an intensity and clarity that is much greater than the individual parts alone.

The opera's director, Peter Sellars, utilizes these combined resources as component elements of innovative multimedia syntax. In this enriched sensory environment a framework is constructed to include many voices.

The multi-faceted dimensions of simultaneous film, ballet, and operatic performance are unified by the sonic relationships in the musical score. The music is constructed on a rhythmic cell process foundation. There are layers of cellar cyclic modulations repeating over and over throughout the score. They repeat in different ratios, meters and tempi. They also explore a wide range of dynamic and pitch tessitura as they progress. Kent Nagano conducted the premiere performance of this work and he describes the technical demands of realising the precise synchronisation inherent in this music:

> There is considerable difficulty with the nature of the precise syncopations and the many layers of rhythm. When it is right the music sounds simple and balanced. The music then sounds like this is the only possible way to play it.
>
> (Kent Nagano, *el nino,* DVD notes)

Additionally, the use of very slow motion layers of rhythmic progression, and the juxtaposition of expressionistic contrapuntal phrases, gives the music greater textural flexibility, as well as emotional depth.

Performance Art

Contemporary performance practice has evolved to include new visual media and innovative sonic resources of electronic and computer music. These have been combined with electroacoustic resources to extend the range of sonic possibilities and expressive dimensions. This has led to radical change in the nature of composition and performance as described above for contemporary musical theatre. The genres have re-invented themselves and previous concepts and previous descriptions are not adequate any more. The film and video operas of John Adams and other composers, such as Steve Reich, *Three Tales* , 2002, and *The Cave*, 1995, and Meredith Monk, *Atlas* , defy categorisation. These radical new works are moving musical theatre into expanded directions that are responding to evolving technical possibilities.

The momentum contributing to this development has been created in part by new developments in the musical genre, 'performance art', even though this term is, at best, very limited in its inference. Exponents of this genre include two very influential creative spirits who have been prominent artists for the last two decades, Meredith Monk and Laurie Anderson. They represent the highly creative nature of this discipline, and their aesthetic and creative approach has
been an important reference for my own work, as represented in folio work 5 - *Multimedia Suite.*

Meredith Monk

Following her breakthrough works in the mid-1960s, *16 Millimeter Earrings*, and *Juice* , Meredith Monk explored solo performance. In the late seventies she formed

her own vocal group. These activities resulted in her developing her own musical vocabulary, one that makes use of a triadic approach to tonality and a modified repetitive minimalism. She uses the rhythmic cellular motives in a less regimented manner than many other composers. There is a strong sense of impressionistic and sustained open-voiced harmonic textures in her work, and she blends this lyrical melodic approach with symmetrical beat patterns and motifs that add momentum and contrast to her scores. These technical and aesthetic approaches affirm the exploration of nuance and fusion in the construction of longer works with basic sonic materials.

Monk's interest in utilizing extended vocal techniques, both in solo and ensemble contexts, has referenced works of mine like *I Can Hear You Now* and *The City of Yes and No.* These two works have a resonance with her operatic works that develop new textures for ensemble voice, with sections that are improvised and at other times very strictly defined, and notated. Many of her compositions for voice(s) are wordless, and when language is employed, it is often used as a sound texture, as much as for the meaning of the words. This is an extension into solo and ensemble areas that Luciano Berio pioneered with his works, some of which were pieces for acoustic resources, (*Sequenza 3* – for solo soprano voice),

The flexibility and resonance of sound, and especially the voice, are important elements in Monk's creative process as she explores a very wide range of sonorities and tone colours in her search for a more centralised emotional integration.

Monk's music often employs solo, duo and trio combinations, using modal and tonal resources and often alternating these open, block-voiced textures with the overlapping of five-voice, polyphonic textures, contrapuntal textures that are

derived from various kinetic body-movement rhythms of the individual singers and dancers. The sonic patterns link very closely with the physical dance movements, relationships strengthened by a wide range of lighting colours and densities.

This concern for integration, and establishing relationships between the visual, kinetics and sonic materials, is a theme that I have explored in different directions in the works that I have created for my ensemble *One Earth Multimedia Orchestra*. I wanted to experiment with the effect of light, sound and image in the concert space, and how they could relate to each other to create a deeper and more intimate artistic communication.

Laurie Anderson

In her 2003 concert at the Perth Festival Laurie Anderson's solo recital concert reflected a scaling down of technology in her new performance work *Happiness.* This development is highlighted in a fascinating interview and discussion, in March 1997, with Phillip Glass, (Powell 2). In this interview Laurie Anderson expresses her concerns about the potential for technology to engulf the creative process, suggesting that innovation has been transferred to technical inventions rather than being fueled by the imaginative sonic realm. Further, she states that experimentation is in danger of being relegated to the trade show concept, where the equipment is featured as an entity in itself, rather than being a part of a larger creative vision. Glass and Anderson regard technology as a tool that serves the creative process. While this is true for my own approach, I feel that it is important

to be aware of the possibility for artificial intelligence, or the hardware and machines themselves suggesting sonic possibilities 'by accident', as one works this very powerful and versatile medium.

Laurie Anderson's multimedia work reflects this spirit, and I find that in works like the *Lament* section of my *Multimedia Suite*, an awareness of interaction is an effective improvisation technique. For example, where the digeridoos and operatic solo tenor voice are contrasted with the harmonic overtone counterpoint, a process is shaped by the ways that they interact with the delay line signal treatments. This kind of sonic texture would not be possible without the technology being worked into the electroacoustic mix. The sounds are a blend of acoustic sounds and treated electronic sounds from the two electric violins. The amplification provides greater detail of bow noises, and finger movement along the strings, as well as allowing the harmonics to sound with more volume and tone colour. Because the tenor and the digeridoo are also amplified, the sounds can be mixed and balanced to discover new sonic possibilities.

This kind of invention is as rich in context and possibility as were the earlier post-1960 experimental movements. When asked by the interviewer, Alison Powell, (Powell 1), whether it is still possible to 'shock people', Glass and Anderson both express a concern that to 'shock people' is not, and never has been, the issue in their creative processes. The real issue for them is, as it has always been, inventiveness and creativity.

This is a philosophy that John Cage pioneered in his chance-determined music that inspired a new approach to the creative process. As is well known, he was especially concerned with illuminating ways to heighten the awareness and

integration of art and living everyday life. Cage deliberately introduced concepts of non-attachment from his Zen Buddhism experiences into the cultural discourse of the West. Anderson, and especially Glass, also follow the Zen philosophical and spiritual paths and these integrate with their musical visions. They have a direct connection to the earlier musical discoveries of associated Feldman, and Christian Wolff.

Glass and Anderson are wary of the growing appetite for technology, especially when it becomes an end in itself. For both it is the intention that guides the use of technology and the approach to invention with it, as is illustrated in the following discussion between Laurie Anderson and Phillip Glass:

> LA : … You're just wandering around. I love things that just wander around.
>
> PG: Isn't the speciality we've developed the combining of sound and image? Or [is it] 'discombining' them?
>
> LA : Yes. It's a tricky thing, because – at least for me – it's a process that often doesn't work the way you think it's going to.
>
> PG : Oh, I know. The worst thing is to go in knowing what you're going to do. But I don't think that we have that problem, do we, Laurie? [laughs].
>
> (Powell 1)

This sense of discovery and creative development is a vital element in my own aesthetic and artistic activity. It relies on a sense of trust on a voyage into the unknown. This kind of creative work activity embraces intuition, improvisation and new time structures in my work and also Laurie Anderson's approach.

The balance between structure and free improvisation is important in Anderson's work as a composer-improviser-performance artist. She works

intuitively, often in a very focused area. Anderson's fundamental preoccupation is with time and the events that travel in time segments. This has led to works that are very beat and rhythm-orientated, for example her 'pop' hit *Superman*, to works that are without any pusitile momentum at all, as in the opening of *The Nerve Bible*. Anderson's bedrock is how time is utilised in her multimedia environments, how time is stretched, compressed, 'turned into a couple of ice cubes, spread it all over the place, or turn it into air'. (Powell 3)

Anderson's innovative approach to performance transforms the concepts of the concert and musical theatre, for example, the three large video screens that are such a strong presence on the stage of the set for her work *Halcyon Days: The Nerve Bible.* These screens change the context alternating time zones and narratives with the live performance.

Anderson's use of laser technology, lighting and music inspired some of the sound and music innovations that I have developed. My own *Multimedia Suite* forms relationships between the visual and sonic elements that lead to a more intimate and coherent sensory experience. My intention in these works has been to empower the perceptions of the audience by creating links between the visual and the auditory processes.

Laurie Anderson's works have been an important reference for my creative work in this frontier genre. The creative process of finding new ways of using old technology, such as layered and looped vocal filters, and the invention of new technical devices and instruments, have affirmed my own directions in finding solutions in my new work.

Anderson has been concerned with nuance and discovery, taking technology into imaginative areas that have the potential to form new musical syntax. Her use of electronics often amplifies sonic details, sometimes fusing these details into complex new sounds. Her current five string electric violin allows control of each string with individual equalization and frequency responses. This allows for great subtlety in the use of overtones and components and levels of the sound. For example, the sound of the horsehair scraping over the steel strings becomes more audible and visible. Consequently, the range of expression is extended considerably, and this is an approach that I have further developed in my electroacoustic string works. In my electric violin sonata *Sonic Code*, the *String Quartet*, and the *Multimedia Suite*, the details of the sonic materials rely on the amplification and signal treatments of certain acoustic violin,viola and cello sounds. Sounds and textures that are completely non-existent, or almost inaudible in the acoustic realm, come into aural focus and form a new electro-acoustic sound world. I have been interested to develop new sounds and techniques to form my own individual sonic directions, combining and balancing to produce new sonorities.

Laurie Anderson's creative work over two decades is responsible for some of the impetus in my own process of innovative development. Her eclectic and imaginative approach to the creative process is an important reference for ways of finding solutions in composing with new materials, techniques and mixed media. Some of the most interesting and inventive aspects of her work feature the integration of older technology with extended parameters. This is highly effective, for example, with the layered textural counterpoint of the re-invented analog tape

violin bowing with the spoken voice and altered vocal sounds, in the middle sections of *The Nerve Bible*.

Anderson has introduced techniques that achieve a deeper integration and expressive flexibility in her compositions, especially in the second phase of her output, post-1985. In this lyrical adaptation of the looping and cellular cyclic process techniques of minimalism, she has part of an aesthetic that forms the basis for much of the current direction in creative process. The new millennium embraces a range of artistic theories of integration and inter-relationships that extends from the earlier approaches inherent in the work of Boulez, Stockhausen, Berio, Reich, Glass and Adams.

In the cutting edge frontier area of interactive multi-media and electroacoustic integration Anderson has formed a coherent language. In her sound world, textural elements, such as vocal chanting loops (e.g. the vocal rhythms that introduce *O Superman*), interweave with non-textural elements, structured with inter-related sonic events that function to form an interplay of materials. This is done in similar ways to the previous modulation of major-minor key systems, and melodic themes, to form musical structures. Laurie Anderson's work embraces the diverse and the incongruous, not only in her literal text messages, but also in the juxtaposition of genres, especially challenging cultural modes between popular music and contemporary classical music. In her embrace of beat patterns, silence, enormous dynamic range, longer formal structures and deeper approaches to tone colour that extend sonic dimensions, she has created significant momentum that resonates in my own work, and provides an affirmation and reference.

Chapter Three

The Impact of Technology and Popular Music in My Recent Work

An important direction in my recent creative work has been the integration and development of the emotional energy, rhythmic and textural techniques, and some of the cultural effects of the genres of popular music, especially the jazz idiom. In this study I have extended some of the rhythmic and dynamic concepts that are often restricted in the mainstream popular and jazz music environments. The convergence of so-called 'serious music', and 'popular music' is a major music activity these days, and the boundaries between the two music genres have changed to the point where often they are interpolated as one music, each tradition enriching the other. (Ford 242)

Definitions of 'popular music' generally refer to the canon of popular song and dance genres of the recording industry. This commercial industry relies on product sales and has, from circa 1920 up to 1995 or so, dictated artistic theory and activity to artists who wished to use the electronic and broadcast media. Traditionally, popular music as 'an industry', refers to the creation and mass marketing of recordings–generally of about three minutes duration. These song and dance forms

have been mostly vocal and instrumental, and only very occasionally purely instrumental. This paradigm has recently changed and we are presently, in 2004, in the midst if a process of accelerating format change and broadcast crisis. (Ford 242) The initial advances in technology that created recording and broadcast mediums have now evolved into a new, democratized cyberspace environment. In this arena the information superhighways are almost impossible to control, and are beyond the commercial impositions and limitations of product and content design.

The profound effects of this economic liberation of sound recording and broadcast in our internet age are multi-dimensional. The pre-internet music business era, broadly from 1920–1995, relied on the commercial electronic broadcast, distribution and control of product (recordings) availability. This environment has been challenged by the internet revolution, and the music business is in the midst of a profound shift in the entire nature of the recording and dissemination process. A number of factors have converged to effect this radical change.

The internet and the associated development of affordable, private desktop recording studios have been among the most important factors in a revolutionary change within political and economic areas. Previously these two forces were able to control many of the creative parameters and distribution of popular music. Economic considerations for music design were dictated to musicians and audiences, the profit factor motivated decisions as to what would be played on air, how often, and at what kind of 'prime time' broadcast.

Recent advances in internet broadcasting have librated these restrictions by creating a new electronic communication environment. This on-line, information

superhighway, has given unprecedented freedom to the ways that composers can create, record, mix and master a stereo, or a surround sound audio CD, CD ROM, or DVD. Composers and musicians have the ability to transmit their work in audio file formats, such as the ubiquitous 'mp3' format, that has enabled the free downloading of songs and music across the internet, a practice that has caused further crisis in the recording business.

The controversial closing down of the mp3 internet download site, 'Naptser' in 1998, was supposed to control free sharing of recorded music. However, the nature of the internet is such that as soon as one site is closed, another can easily be created with the same service and opportunity, in another country, if restrained by domestic litigation. This saga of epic proportions continues, and questions ethical issues such as, should music be a commodity, or, perhaps a free, shareware resource? Is there a context for partial sharing of new creative work as an incentive to purchase more, following an introduction to the new work? Currently, there are many moral, ethical and economic dimensions to this debate and the forming of legislation around these activities. Whatever legal framework is eventually adopted, the fundamental environments for recorded audio and video have been radically transformed into this internet forum, a democratized communication environment, where the independent artist has more artistic and production control over what is available to be created with, for whom, when and where.

One of the associated advances contributed by this new technology paradigm has been a greater affordability, fluidity and accessibility to music of all types and genres. The soundscapes that accompany our modern big city environments include an omnipresent mix of background music samples in electronic media

broadcasts and as well in subliminal playback music environments, for example musak systems in various supermarket, elevator and waiting room environments of modern life. This auditory overload has accelerated and conditioned a convergence of music so that music from any style, genre, or era, is readily accessible. Significantly, it has led to a fusion and convergence of styles as well as new combinations of creative techniques.

Consequently, the convergence and interdependence of popular and serious art music genres has been accelerated by technology, rapidly expanding this activity. It is significant that folkloric, popular music fusion with (for want of a better terminology), serious art music, has a long history over at least three centuries. The popular songs and dance forms being the basis for many of Bach's instrumental works, for example the dance suite forms. Similar integration continued in the operas of Mozart, the scherzos of Beethoven, the mazurkas of Chopin, Ravel's incorporation of blues and jazz elements, and integration of popular and folk music elements in various significant works of Stravinsky, Gershwin, Ellington, Bartok, Berio, Reich, Glass and Adams.

The post-1990 to 2004 period has produced new genres of popular musicians and composers reversing this process. The interaction of popular music elements and Western Classical music elements has been significantly innovative from the popular music field and the boundaries between serious and popular genres have become confusing and indistinct. This very facile new direction, is a kind of underground fusion of serious and popular genres. It has created a hybrid

composition movement, one that reflects the fluidity of the superhighway and an on-line consciousness. (Ford 219)

This has been a gradual development, the flow of new ideas in the 1960s being largely one way, with the classical avant-garde inspiring many popular musicians. Musical innovators like Karlheinz Stockhausen, Pierre Henry, Steve Reich, La Monte Young and Terry Riley, inspired a wide range of ideas and techniques that translated into experimental and mainstream rock, jazz and fusion music groups. The boundaries and distinctions between the two worlds of pop and art music consequently became less distinct. The differences between the intuitive, improvisatory and the exactly notated, interpretative traditions began to interfuse into each other.

A very wide range of works emerged from this cross-fertilization of creative innovation. Rock and jazz groups were perfoming new music with symphony orchestras, while symphony orchestras were performing jazz and hybrid fusion rock inspired song forms with rock and jazz groups and soloists. Composers like Gunther Schuller promoted the concept of a dedicated genre approach, which became known as 'Third Stream' music. (Cope 77). This describes a formal approach to recognize the fusion of jazz and Western Classical composition as a genre to be supported in dedicated ensembles and orchestras. These include 'The Los Angeles Composers Orchestra', 'The Mahavishnu Orchestra', 'Oregon Ensemble', and 'The David Baker String Ensemble', to name a few of many.

In addition, there was a continuing interest in this kind of music from more established traditional orchestras and ensembles. Many symphony orchestras and ensembles have commissioned and performed a wide range of works that embrace

the convergence of popular and serious musical ideas, techniques, aesthetics, and performance practices. These include famous examples of artists like Elton John and the Melbourne Symphony, Metallica and the San Francisco Symphony, Frank Zappa with the London Symphony and the IRCAM ensemble of Paris (conducted by Zappa), Jimi Hendrix and the Kronos String Quartet, Elvis Costello and the Bronsky String Quartet, Paul Mc Cartney and the London Symphony. There are many more instances of this type of genre, ranging down to amateur and community music activities.

This volatile mix has inspired a prolific output of creative activity, one that transcends any economic motivation that might be associated with popular and commercial music influences. Beyond commercial considerations, there is a genuine artistic interest and desire to create new music in this rich meeting place of the two once opposing forces. (Ford 243). There has been so much activity, and more than a few masterworks, that continue to gain momentum and support from musicians, composers and audiences.

There are so many contrasts and opposites that continue to evolve into fusion forms. Acoustic orchestras are being orchestrated to reflect electronic textures and harmonic concepts. This is very evident in many works, for example Glen Branca's orchestral works, the *Symphonies 7/8/9 and 10*, as well as in smaller ensemble pieces, such as Jimi Hendrix's *Purple Haze* and John Zorn's *Cat O' Nine Tales* for the Kronos String Quartet. The use of electronic sound sources, techniques and forms, (i.e. modulations of surround sound as a formal structural principle), continues to be incorporated in this electroacoustic sound world. This practice extends the expressive dimensions of the traditional acoustic and the

purely electronic possibilities, especially in the merging of the pop and art music genres.

Recent activities have witnessed the interchange momentum flowing the other way, from the Western art music concert halls into the popular music world. In the last two decades the popular music creative practice has embraced and pushed the development of musical technology and compositional innovation, often breaking free from the restrictions imposed by the commercial dictates of the song music business. In works such as the *The W'* by hip hop Wu-Tang Clan, *Kid A* from Radiohead, samples and loops of orchestral music, ambient street sounds and a wide range of electronic sonic treatments and sounds combine. They form a hybrid genre that has almost nothing to do with popular music syntax and modes.

The same is true of many works that sample Western concert hall repertoire and use the sampled material as core sonic source for compositional development. This is a technique much utilized by the composer and sound artists, John Oswald and London-based John Wall. Despite the legal complications of copyright restrictions, this practice (which Oswald has described as 'plunderphonics', (Wolfson 3)), is a development that has historical references to an older acoustic 'quotation', and 'on a theme by', compositional practices.

The construction of electroacoustic work based on previous works of other composers has been an effective basis for William Orbit's version of Barber's *Adagio for Strings*, Massive Attack's *Unfinished Sympathy*, and Sonic Youth's *Goodbye Twentieth Century*. Steve Reich's works have inspired numerous reworkings and arrangements by groups such as The Orb, Howie B, Andrea Parker, Coldcut, and Aphex Twin. In addition to these extensions and

developments, the more radical pop underground is active in producing experimental electronic music utilizing sonic combinations that combine the latest laptop and sampler techniques. They produce rhythmic and microtonal sonic works that have more relationship to the stochastic textures of Xenakis, and sound worlds of early Stockhausen, than to anything in the popular genre. (Ford 214).

This incendiary fusion of traditions is a significant creative practice that informs my work. These influences are also drawn from the Satie, Varese and John Cage discoveries as well as the extension and integration of the minimalist and new complexity composers. Within these approaches there is a linking tradition of discovery, based on finding new relationships between sounds, both new and sometimes both new and old.

The popular embrace of the music of serious art music composers such as Glass, Reich, Anderson, Goreki and Bryars, is partly due to a convergence of art and popular music aesthetics and rhythmic propulsions in their work. In addition to rhythmic links there is a direct relationship between the developments in France in the 1950s, when Pierre Schaeffer and Pierre Henry created 'music concrete', and current music sampling techniques. Entire genres, such as 'rave' and 'hip hop', have been based on the concepts and techniques of re-composition with found sonic objects, scratchings and sonic manipulation of sound samples.

There are major works by classical composers, such as Phillip Glass, (*Low Symphony*), Laurie Anderson and Louis Andriesson, as well as emerging composers such as Thomas Ades and Matthew Hindson, that utilize popular music elements as core materials for their work. Simultaneously, there are popular music composers that continue a growing tradition of composing for the art music

tradition. These include Frank Zappa (chamber orchestra), Billy Joel (solo piano), Paul McCartney (oratorio, symphonic poem), Gil Evans (orchestral suites), Blue Gene Tyranny (opera), Glen Branca (symphonies), Bruce Springsteen (opera) and Lou Reed (opera). These are works that transcend the notions and restrictions of genres and further explore a very fluid musical language and sound world. They reveal new ways of finding relationships between sonic materials, acoustic and electronic environments, approaches to structure and the nature of improvisation and interpretation in performance and compositional ideas and techniques.

My own creative approach is referenced, confirmed and inspired by this artistic theory of intuitive discovery and fusion of elements. Sonic exploration, formation and integration of the new techniques and sounds, empowers synthesis, uniqueness and identity. It can assist the imaginative access to innovative use of familiar sonic material, bypassing former restrictive practices of functional and non-functional pitch and temporal theory.

Chapter Four

The Role of Improvisation in Electroacoustic Environments

> Everything in the world has a spirit, and this spirit becomes audible by its being set into vibration.
>
> - John Cage (Cage *Silence* 10)

Improvisation

The reawakening of improvisation as a prominent contemporary art performance and composition practice is a vital activity in the new millennium and it is an important part of my own creative process. If improvisation can be defined as 'spontaneous composition', then a good part of the compositional process may be considered as 'reflective improvisation'. The practice of improvisation has a tradition that was dislocated from the Western Classical music mainstream in the early part of the twentieth century. The legacy of extemporization, as practiced in the Baroque era with the figured bass and the classical concerto cadenza traditions, faded out in Western Classical Music, as performance values changed to enshrine new values and doctrines of exactitude and historical authenticity above all others.

As discussed earlier, the invention of recorded sound has shaped considerable cultural change resulting in inhibited interpretative and performance

spontaneity–according to at least one commentator, Samuel Lipman, the American pianist and critic. (Lipman 85) The result is an aesthetic and performance tradition that strives for goals like 'perfection', rather than a process of shared discovery and creative interpretation. The creative interpretative performer is ideally involved in the improvisation of at least some aspects of tone colour, rubato, dynamic propulsion, articulation, phrase shaping, and modulations of momentum as an original artistic vision.

Improvisation has been a very useful technique for many composers, in popular music and increasingly for classical performers, partly because it creates flexibility and an engagement with spontaneity and the intuitive mind. It is a technique that I employ as a discovery process with a variety of acoustic and electronic instruments. As musical ideas evolve in real time I record them onto tape or hard disk, to use as reference or source materials later. I have also been aware of my potential to repeat the familiar in this improvisation activity, and I have attempted to develop a perception of any patterning in my own musical mind. This is similar to the awareness that Cage pioneered with his integration of Eastern meditative techniques, as applied with his chance music and *I Ching* composition approaches. (Cage–Duckworth 65)

However, my approach is different to these specific Cage-inspired techniques. In my works that require solo and group improvisation I specify the parameters that are improvised, and sometimes the materials. Such is the case in *Multimedia Suite, The City of Yes and No*, and several parts of the *String Quartet*, where the music limits the improvisations to rhythmic choices, sometimes in a pulsitile setting and at other times in a non-metric free time context. The controlled

application of materials gives a certain textural and harmonic predictability to the music that would be very difficult to notate, and extremely complicated to read. This has been an effective technique in realizing the intricate mix of individual musical effects and ensemble textures that these pieces require.

Other works follow a need for very precise synchronized timing and phrasing, and improvisation cannot be a part of such an exact musical idea. I have found that the awareness of composition being able to achieve things that are impossible to improvise is an important principle. For example, it reinforces that one of the most interesting aspects of timing, (as opposed to time), is the interplay of improvised sonic elements against notated music. (Feldman 63) It allows for combinations that extend the Conlon Nancarrow player piano concepts of metric combinations and formal ratios that are too complex for human performers. (Duckworth 43) I have utilized this technique in several of the folio works, especially where I have combined operatic voices and very fast sequenced music as a textural accompaniment. This occurs in the closing *Benediction* section of my folio piece *The Seeming Insanity of Forgiveness* and also in the middle sections of the work for solo electric violin, *Sonic Code*..

The post-minimalist era has embraced the listening practices of many Eastern and Indian musical traditions, in which the music is perceived as a linear stream of consciousness. Each sonic event is an entity that is complete in itself, an aesthetic concept that informs my own work. It is a rejection of the strict systemised processing of Schoenberg, and the European Second Viennese school. My work reflects an engagement with sonic resonance and tone colour from a Debussian 'sound as entity' concept, in which harmonic densities and qualities

are entities in themselves, and not as a part of a functional harmonic progression syntax. (Crossman 36)

Modern and avant-garde jazz improvisation techniques have been an important force in this process, but I have found the modes and conventions of jazz and the 'spontaneous now' goals to be too restrictive and often not precise enough for more intricate and defined interactions. Many of the musical processes that I have been developing are too complex in structure and synchronization for improvisation. They also require a more flexible approach to conventional rhythmic concepts of 'swing'. However, I do utilize the jazz influenced principles of dynamic momentum and syncopation in my melodic and structural techniques. (Mehegan 24)

Interactive Electroacoustic Environments

The relationships between creative impulse and realization continue to be very fluid and demand increasing resourcefulness. Electronic and electroacoustic environments expand in our Western culture at a dizzying rate. Eighty-six percent of all musical instruments sold worldwide in 1999 were electronic in construction, either in a purely electronic design or in an electro-acoustic design. (Cope 209) People living in the first world countries now have easy access to personal computing, and musicians are thus enabled to download free software recording studios, such as Digidesign's *Pro Tools Free*, as well as virtual sound modules, virtual instruments, signal treatments, samplers and samples. Online

collaborative projects are commonplace as the Internet connection data pipes advance in their speed and power. As already noted earlier in Chapter One, in this new environment neither location, distance, nor time delay restricts the virtual studio musician. This vast digital zone is a deep cyberspace, where musicians embark on creative journeys into new sonic environments, without known models or map references to guide them.

As previously discussed, in my own creative work the practice of improvisation is an essential activity in finding solutions to creative problems of integration, and also to unravel intricacies of new sounds and processes. The collaborative experience of other composers' works in this electroacoustic area has also been fundamental to the affirmation of new directions in my work, and also to consider their creative processes in handling this new medium. For example, attending a performance of Steve Reich's video opera,*Three Tales*, was an important experience for me in February 2003. This work was a real affirmation of direction as an innovative new media opera. Reich's opera was composed over four years and first performed in May 2002, at the Vienna Music Festival, and subsequently in New York and then Perth. Described as a 'Video Opera', this work breaks new ground in the development of relationships between sampled and treated voice recordings and their musical development. It also creates new ways of synchronizing film and projected image with the sonic elements by linking the image in rhythmic patterns with the music. This work is further discussed later in this chapter. Similarly, my pieces investigate relationships with film and projected images, in that new solutions to combining voices, electronic sound sources and image are being explored. However, my

work is different from Reich's work in that I use more electronic and treated acoustic sounds than he does, and further, my development techniques involve different dynamic and rhythmic propulsions.

The development of electroacoustic opera and multimedia is rapidly evolving into an important area, extending to ballet with works like *Wild Swans* by Elena Kats-Cherwin (2003), and the opera *The Possessed*, by Julian Yu, also composed in 2003. Both of these Australian new music works utilize projected images as an integral element of the structure of the work. The electronic screen is a visual medium with a language embedded into the contemporary consciousness in a post-Marshall McLuhan context. The presence of the screen in performance is a metaphor for our windows to the manipulated reality of the virtual world. Its appearance in the live music theatre involves another dimension of communication, the screen image contrasting with the live performance and vice versa. One of the most powerful elements available in this mixed media theatre is the creation of intense intimacy, as the projections and the live performers interact with each other. This transcends the earlier media concepts such as 'the medium is the message' (McLuhan 63), and creates a more interactive and flexible medium. The development of intensity in artistic intimacy with the incorporation of film image is an area explored by the Australian Composer, Andrew Schultz, in his opera film *Black River*, and also in his the multimedia aspects of his live performance opera *Going into Shadows*. Schultz expresses this desire for increasing the level of intimacy with film in an ABC radio national interview with Julian Day on *NewMusic Australia* . (Day-Schultz 1).

This same awareness has led to Reich's innovation with linking speech rhythms, music, and film in *Three Tales*. As noted earlier, this is a continuation of his earlier work employing recorded human voice samples as a primary sonic resource. The musical explorations of early works of the 1960s, *Come Out*, *Violin Phase* and *Piano Phase,* were extended in *Three Tales.* The invention of new sampler instrument technology allowed for the sound and voice samples to be available as a musical element, one as fluid and as flexible as the chromatic scale. Sampling techniques revolutionized Reich's musical approach so that the sound sources could be reshaped, inverted, extended, re-tuned to match harmonic instrumental environments and combined with each other in ways that were not at all feasible, or in many instances not even possible, prior to the sampling developments.

Reich's discovery, to intricately combine the speech melodies and instrumental doublings, led to the creation of the Grammy award-winning work *Different Trains* in 1988. This profound work explored the relationships between the way speech melodies were linked and transformed into musical instrumental textures. The work also suggested a new way to create opera in which video images are visible, and at times synchronized, with live musicians and singers playing/singing their speech melodies, and to further take this as the basis for subsequent musical development. Subsequently this direction led to the creation of Reich's large-scale 'documentary video opera', (Packett 1), *The Cave* in 1993, and later *Three Tales* in 2002.

These epic works dissect and reform elements and episodes of performance art, every day sounds, as well as vocal and speech fragments, into a profound

communication of intellectual and spiritual concepts. In both *The Cave* and *Three Tales*, science and religion grapple with some of the most demanding issues of the new millennium, such as, whether of not we are to be held responsible for our actions, and further in *Three Tales*, what is the moral and spiritual framework for accelerating the implosion and explosion of new technologies into the human condition. Reich and his co-creator, Beryl Korot (video artist), examine the effects of fragmentation in the application of scientific endeavor into people's lives. The need for a deeper consideration and caution are underlined by a historical observation of the effects of arrogance without scientific humility. Some of the scientific attitudes in the final act of *Three Tales* are intensely looped visually and sonically, as sounded by Richard Dawkins, whose pronouncements that 'Man is a machine', ring the alarm that the effects of the unknown still require an integrated and holistic sensitivity.

The paradox of utilizing new advanced media tools to warn of the dangers of arrogant applications of new scientific discovery are resolved by the sensitivity of the interrelationships formed in this work between the technology and music. As the live performers, (ten instrumentalists and five singers), interact with the sampled soundtrack and video projections in a fluid and cohesive syntax, the advantages of sensory extension and the potential perils are expressed on a metaphorical and musical level. When Reich manipulates sound by flexibly stretching or compressing sound bites, a term that he calls 'slow motion sound', (Packett 2), a new sonic realm is opened up for the listener. It is especially effective in this work due to the very close electro-acoustic links that he creates in

the translated speech rhythm instrumental melodies and patterns of the live ensemble.

The dizzying rate of change as technology reforms paradigms and extends our sensory perceptions has the usual associated artistic promises and cautions. In these early years of the twenty-first century the sensitivities and perceptions of the acoustic legacy affect how composers relate to new sonic possibilities opened up by the resources of new technologies, such as the internet and sampling. The potential for the omission of the former non-electronic sound world, and its depth of sonic nuance, is a substantial reality if the sampling environments merely produce sonic copies of the acoustic originals. The sensitivity to depth of dimension in sonic expression is paramount and it is this awareness of perception that can be amplified and extended by the electronic realm, so that sonic details of overtones and breath etc. are made audible, instead of hidden. However, the same kind of amplification processes can over-amplify, distort and obscure sonic nuances so that our perceptive range is reduced by the new technology. As in science, it all depends on the considered perceptions guided by intense awareness.

The qualities of sound sources and speaker fidelities are so often compromised by computer systems that are constructed without the sensitivity to sonic awareness that our culture has drifted into. It's one of the consequences of sonic desensitization and selective deafness in our modern cityscapes that are increasingly noisier. These urban environments are often accompanied with the ubiquitous background music tracks that fade in and out of audible range, music that is designed to be heard but not listened to. This background music

phenomenon is counteracted by the opposite auditory amplified (often pop) concert practices, where the sound levels are so loud that all other sounds are inaudible. It's a situation of extremes for our sensory challenged times that has many ramifications for electroacoustic music environments, especially in the consideration of balance and timbral depth, in the design of speaker and acoustic instrument layouts in concert environments.

Perceptive awareness that empowers our sensitivities is essential to the integration of new technological discoveries. It allows for an expanded expressive world that offers greater artistic possibilities, proceeding into the new with a recognition of change, informed and guided by an awareness that something new is forming within an interdependent cultural environment. The present on-line computer era is one of expanded access, convergence, increased flexibility, and depth of communication. Online recording and electronic studio environments have converged so that things that were once solid are now digitized and available as software plug-ins, often available as a free share from the net.

As this new media shapes and alters our culture so that there is a networked consciousness, humans and machines are forming new relationships. The massive increase in processing power of personal computing has enabled a practical application of artificial intelligence with data manipulations that include automatic quantizing, as one records in real time to auto tune pitch corrections in the editing phase of the mixing process. Some contemporary observers suggest that the computer can be seen as a media hybrid, which crossbreeds with electricity to create a totally new medium of communication. Media that were once separate entities are united in a shared form. (Cable Green 9).

> One of the main effects of digitization is to make liquid everything that is solid.
>
> Anything that can be digitized can be translated into anything else that can be digitized.
>
> (Derrick de Kerckhove 148)

Increasingly, the convergence of everyday items becomes more fluid, the computer now routinely functions as a television, radio, telephone, mail centre, share broker, calculator, fax, photocopier, scanner, book, cinema, global newspaper, resource center, multi-track recording and sound editing studio, film image editing studio, and word processor. In the sonic dimensions digital data translates sound into a medium with a wide range of possibilities for sound synthesis, capture, editing, mixing, sampling and manipulating into new sounds that were not at all possible before this computer environment evolved to its powerful current format.

The use of artificial intelligence to assist compositional procedures, and to suggest other sonic possibilities, has been another allied development. This shared phenomenon in other disciplines has produced some miraculous inventions that now place technology inside the body. This medical area offers a range of often life saving enhancements, for example computer assisted heart beat regulators, electrodes in the brains of Alzheimer's patients, cochlear implants to improve auditory senses, and LASIK eye surgery. (Cable Green 6)

The extension of the human senses has been taken to such a level of modification that the traditional sensory extensions, such as optical glasses, outside the body, seem inadequate. As the incorporation of microcomputer chips into the body continues to expand, at what point is the body no longer an organic person but a mechanical construction? It's a question that media observers such

as Ray Kurzweill answer with another question, 'Who will refuse the enhancements?'. (Cable Green 7)

The history of composing machines and artificial intelligence procedures is considerable, dating back to the utilization of mathematical sequences and musical dice inspired number matrixes from the eighteenth century. This kind of music making *Musickalisches Wurfelspiel*, was employed by many composers of the Classical period, (Cope 159), such as Mozart and Haydn, and in the twentieth century many software programs have been based on similar algorithmic principles. Joseph Schillinger devised an entire mathematical system and designs for the composition of his works by special machines, for example the *Rhythmicon*, which created sets of rhythmic patterns, in 1948 in the USA. Contemporary software developments, in programs such as *Videodelic, Metasynth*, and *Max*, allow for considerable input of computer created sounds and signal treatment processes. (I have employed these programs in my works, and their application is detailed later in this thesis.)

It is significant to note that the application of artificial intelligence is not necessarily inclusive of other intelligences, such as emotional, physical or spiritual intelligences, even with the simulated virtual reality constructs of acoustically perfect sampling techniques. Further, the values and characteristics inherent in the technologies often dictate the cultural contexts. Even though the abilities of machines and their specific intelligences, (e.g. mathematical and data processing), exceed the human range of abilities, the infinite permutations and inventions of other integrated intelligence outside this data dimension are beyond the possibilities of computer assisted composition at the moment. In my works the

use of artificial intelligence is governed by this realization and also guided by other human intuitive, conscious and subconscious creative processes.

Chapter Five

Interactivity, Multimedia and Spatial Music.

> Sound sculptures inhabit space and time, oscillating through the visible and the invisible, the real and the virtual.
>
> - Ros Bandt (Bandt 116)

Interactivity and multimedia have a rich legacy in the genres of both purely acoustic and electroacoustic music. For example, in a natural acoustic environment many sound sculptures are made from ancient and constructed materials, 'performed' without the inclusion of electricity by wind, tide, solar or similar environmental energies. These represent a true multimedia nonetheless, combining visual, sonic and often tactile media. These allow rich interactions with audience members to develop as they move through the sonic and sculptural environment, in both linear and non-linear contexts.

In the electronic, computer and internet realms, interactive experience is extended to include additional materials and media. These often involve more sophisticated hardware, software and often specific sound design. The consequent design of surround sound environments has evolved into a very effective and expressive new media area that gives the added dimensions of textural counterpoint, sound mass shaping and allied aspects of spatiality including sonic momentum. I have explored this area in my folio work 1 – *Insanity of Forgiveness.*

In these sonic designs the interaction of various elements is crucially dependent on the effectiveness of the interface between the various components, as well as to the relative sensitivity to the overall acoustic environment. This includes fine tuning and balancing the placement of loudspeakers, adjusting the acoustic resonance and speaker equilization as well as amplitude spectrums.

The nature of such interactivity is multifaceted, often requiring several kinds of interface between media, performer and audience. The interactions may be passive or dynamic, the audience often discovering that they are performers as well, as they engage with the interactive elements of the performance space. New sonic relationships and language result from many interactive processes, and these not only challenge known paradigms, but also require time and sensibility to be decoded and integrated by the audience. Fortunately, many sound sculpture environments often allow for extended, non-linear and repetitive visits allowing enhanced and deeper communication.(Bandt 117)

The evolution of interactivity and multimedia has been very rapid. The abundance of innovations in electroacoustic interface technologies has created new sonic habitats, each uniquely formed. Additionally, performance contexts increasingly transcend time and place, in physical and virtual, online cyberspace environments.

As already noted earlier in this thesis, the microcomputer revolution gained real momentum after 1990, and there has been an associated avalanche of invention producing many new electronic interactive hardware and software instruments and techniques. These include interrelated mechanical, electronic and

optical interactive transactional systems. They embrace keyboard, instrumental and the human body, as well as infrared sensor and light-based trigger systems.

The exact nature of the interactivity may, or may not include the composer, performer and audience involvement in real time. There is an unlimited flexibility in the various levels of interactivity in terms of engagement and complexity. This allows for deep expressive modes to be developed as required by the artwork. Consequently, in creating the work it is important to be specific in defining the type of engagement with the performers and/or audience. Effective integration of the interactive parameters is facilitated by comprehensive and defined design, but the importance of this principle has shifted as new trends emerge.

Our obsession with screen-based multimedia over the past decade has inadvertently reduced the dimensions of interactivity. As the Australian composer Ros Bandt observes, this process has led to a phenomenon of confusion and narrowing of the term 'interactive' during the last decade. (Bandt 116). This has been an era of reduction of physicality in multimedia concepts. Recent multimedia has been focused on electronic and screen-based formats and on the interactivity of software designs. Bandt perceptively makes the point few of these screen based works 'achieve the complexity of sound sculptural art works embracing three-dimensional form and time.' (Bandt 78) She further confirms many of these sculptural and 'interactive' systems should be regarded as responsive systems, or sensory and interactive environments, because they rely on physical engagement, not just mental participation. My folio work, *Insanity of Forgiveness,* is part of a

recent movement that combines these different types of interactivity; this is detailed in the following chapter.

The distinction between the two-dimensional interactivity and the three-dimensional environment highlights some of the reduction and exclusion inherent in the solely screen-based environments. Even in the mediums of virtual reality and internet-based formats, this reduction process shrinks the sensory syntax. In doing so, a considerable amount of the physicality, as well as a sense of subtle modulation of extra-sensory information, is missing.

Beyond Screen-Based Multimedia

These issues contributed to the exploration of a new area for my work, one combining sound and sculpture and dance as a multimedia collaborative installation. The result was the creation of the folio work *Seeming Insanity of Forgiveness*, a 65-minute electroacoustic composition in a 7.1 surround sound design. As discussed, sound sculpture environments engage an enriched sensory and multi-dimensional experience. They allow the audience to move through, in and around the artwork with the aspects of smell, touch, movement, body posture changes and proximity. The audience flexibly engages with not only sight and sound, but also a richer and complete physical environment.

These elements shaped the context for this work, which formed part of a larger collaborative art work entitled *Horrific Hankies – The Irish Linen Memorial* by the Irish-Canadian visual artist, Lycia Trouton. In this inter-disiciplinary work the dimensions of sensory experience explored time, three-dimensional space, cultural memory

references and a mix of intercultural music quotes and references. These were further extended by the spatiality and momentum of sonic activity in the three dimensional environment. In addition, the audience was included in the sound design. Six infrared sensors were positioned throughout the installation space and as people intersected with these sensors, various sound bites and pre-recorded sequences were activated. This produced a very wide variety of random and contrapuntal sonic textures that simultaneously sounded with the pre-recorded surround-sound sonic field. The software Max, on a G3 Apple computer platform controlled interactivity. Various sonic parameters such as pitch, amplitude and tempo, were affected by the variety of types of movement in the installation space.

As this sensor-activated interactive playback system involves the listener in a very dynamic way, a transformation of role takes place. The engagement extends the previous role of observer and passive listener to include aspects of performance and improvisation. The translation of physical movement shifts the energies as the activated space is directly referenced by the audience members. This reinforces one of the primary intermedia relationships between the visual artwork's *name texts* and the sonic treatments of these same names, additionally articulated as a kind of activated presence by the interactive system.

As these sensor-activated interactive playback systems translate the physical motions of the audience into control signals for the computer, the multi-channel sounding space is affected in random and indeterminate ways. These intersections have significant structural and artistic roles in the design of the work, which I have detailed in the description of the structure of the work. The combination of these

visual and sonic elements synthesizes to form a unique and unified language. In this specific new media context the individual sonic and visual elements inform and react with each other as one integrated artistic work.

As the interactivity and the sound design are constantly changing, the comfort zones of the audience are stimulated and provoked. The physicality of the moving sounds revitalizes the sonic field as it highlights and engages with the visual components of the artwork. These shifting temporal layers form an enriched sonic field of sound in an extensive variety of textures and contrapuntal movements. In this kind of environment sound can metamorphose from one state to another, often co-existing in a variety of forms, often simultaneously.

A transformative process occurs in this installation work between the sounds of the texts, and the written words. The words are the names of the deceased, printed on the hundreds of white linen handkerchiefs, which are an integral part of the sculptural textile work. This migration of sensory syntax forms a subtle coded language that is multifaceted, including how the sounds of the words relate to the visual components, even when these sounds are incomplete, reversed, slowed down, sped up, inverted and altered with a variety of signal treatments and audio processors. The question arises, does it matter that the expressions of the spoken voice become expressive sound objects that have no literal meaning anymore? These and other sonic processes stimulate and provoke the comfort zones of the audience as it journeys through the recognisable to the unknown, creating fluid relationships for layers of individual artistic experience.

The sounds produced by the interactive process change constantly. One of the consequences of this is a revitalization of the sonic field. As the sonic events are highlighted and then obscured, predicted, recapitulated and varied, they are also being reinvented as new combinations of mixed sounds. Further, they intersect with the pre-recorded surround sound mix in random patterns forming a kaleidoscope of textures and timbral variations. This kind of activity forms a sonic field with a unique language system that is gradually experienced as the information codes change and evolve. These are multi-layered processes, both conscious and subconscious. The audience is stimulated, extended and illuminated by the shifting textures and sonic energies of the work, as the contrapuntal layering of sound on sound shifts the focus around the sonic environment. The physicality of the sounds as they intersect with the audience, reflects an expression of a deep interconnectedness. This process intensifies the intent of the installation to engage the audience and the art installation directly.

Multimedia

As in the collaboration installation described in the last section, the exploration and application of a personal approach to multimedia in my compositional work comes form my desire to expand the limits of various expressive dimensions. In the folio works I have investigated various resources from solo, to small ensemble, to larger ensembles and the electronic surround sound environment in a sound sculpture context. This has resulted in the invention of new sonic codes, contexts and

spatial-audiovisual relationships between the various expressive dimensions, materials and processes.

Five decades of multimedia activities reference these endeavors. This tradition has produced various artistic theories and innovative techniques embracing and interrelating to developments in new technologies. The initial experiments with sound and moving image in the 1950s and 60s, relied on analogue processes and limitations. Even though the sound and film mediums often required considerable amounts of money to produce and present completed works, hundreds of substantial works were produced and they informed many aspects of my initial approaches to working in multimedia. These works include numerous works by John Cage in collaboration with choreographer Merce Cunningham, the visual artist Robert Rauchenberg, as well as *Poem Electronique,* Egar Varese, (1958), *Landscape Journey*, Donald Scavarde, (1963), Morton Subotnick's *Ritual Electronic Chamber Music* (1968), and *Souvenir*, Donald Erb, (1970).

In these early works of the genre, various sensory experiences were often combined without preconceived notions of importance. All of the senses were regarded as being potentially important and equal to each other. John Cage expresses a salient guiding insight in his book *Silence,* (p.30), where he states that it is very limiting to engage in the 'imaginary separation of hearing from the other senses'. I am also aware of the types of listening and associated links between active and passive listening as well as chosen non-listening states, a kind of selective deafness that pervades modern urban and city life. This general principle has informed my own work in the ways that I approach the linking, focusing and balancing of the

various multimedia elements. It is a process assisting the ways that they effectively interrelate, forging an effective new media language.

Multimedia may be considered to have three forms. (Cope 115) First, the term *multimedia* defined as a loosely combined composite form. Secondly, there is the genre of *mixedmedia* where the elements are more integrated. The third genre is that described as *intermedia* where the various elements are deeply integrated often in quite defined and controlled ways. In my folio of creative works three pieces explore the modulations between these three genres, often combining the different types of multimedia, informed by cultural precedent and practice.

Multimedia as a random sequence of non-random events, (where order and combination were random, but the components were not), was a feature in many of the early works of this genre. In loose media constructs the combination of visual, three-dimensional kinetic dance elements and sonic environments were often indeterminate and not at all precisely controlled. It is a technique that is still powerful and very useful today. I have incorporated and extended this technique in my folio work *Seeming Insanity of Forgiveness*, combining it with an intermedia textural relationship. Furthermore, I have utilized elements of mixed media techniques with the evocation of sounds from textile manufacturing, linen laundry and ironing.

This use of the three genres of multimedia has references in many works by composers in the concert and rock music areas. Recent concert and operatic works in this field have been discussed in the previous chapters on Steve Reich, Phillip Glass,

John Adams and Laurie Anderson. Rock performance traditions have also evolved to include a complete theatrical experience, utilizing many elements. These include movement, dance and sometimes mime (David Bowie), elaborate computer and midi-synchronized lighting designs, enormous electroacoustic amplification systems and often video screen integration.

In the mid-1960s *The Velvet Underground* toured with Andy Warhol's *Multimedia Show* with works like *The Exploding Plastic Inevitable*. Another notable incorporation was the performance of Pink Floyd's *The Wall*. Here multi directional speaker systems, complicated lighting and projections formed an integrated new media language that synthesized and transformed the various sonic and visual sensory information into a powerful new form.

There were many other innovative rock concerts that featured multimedia elements such as laser lighting devices and projections. Rock groups such as Led Zepplin, Kiss, Alice Cooper, Towering Inferno, and notably Jean Michel Jarrè, explored new creative frontiers. Jarrè's multimedia concerts for Houston and Paris in 1992 were events that extended the scale of performance events to involve enormous physical resources – such as entire skyscrapers and much of the inner city precincts for laser projections and loudspeaker stack platforms. This kind of large-scale multimedia projected massive sound fields around these city environments. They were examples of a new physical extension outward to embrace the external environment as a massive sound sculpture and multimedia event.

Projections and multimedia transmissions into space via satellite and cyberspace are also important directions developed in these initial years of the new millennium. Satellite, internet and virtual reality override geographical distance and even physicality, as the sonic and multimedia theatres evolve with new technological advances. These are examples of emerging new multimedia techniques and intermedia environments where often one or more artistic elements are allowed to dominate or integrate with the other. In many instances multimedia elements combine in a variety of techniques, sometimes loosely controlled and at other times in very strictly controlled ways.

As discussed earlier in this thesis, the works of artists like Laurie Anderson and Steve Reich explore intermedia intersections in precise and integrated ways, the visual rhythms being synchronised and translated into sonic rhythmic, pitch and textural patterns. This is evident in the Reich video opera *Three Tales*, (2002), in the final act *Dolly,* where the speech and video rhythms are developed extensively. Anderson's performance art piece *The Nerve Bible,* 1995, also has very precise combinations of sonic and visual materials and gestures, interfaced with virtual instruments and body sensors.

As intermedia and mixed media techniques evolve it is common for there to be fewer elements rather than many, relative to earlier works. This can apply to pieces that focus on audio signal treatments with limited or no visual activity where the use of sonic treatments is the area of interactivity, intensely focused on audio sensory experience. This is demonstrated in Reich's *Violin Phase*, IRCAM composer Marco Stroppa's *little i*, for solo flute and six channel surround sound (1999) and many

other works. The extension of interactivity to embrace audio signal treatments and contexts can also incorporate lighting changes, as in one of my folio works, the *Multimedia Suite*. In this work the relationship between the visual and sonic is extensively explored using interactive software, audio signal treatments and lighting changes. This creation of a more expressive and integrated sensory environment was very effective and inspired my later applications of innovative techniques with spatial music, described in the next section.

Spatial Electroacoustic Music

Many recent multimedia contexts have involved computer-controlled music systems operating interactively with elements of the performance environment. As previously discussed, these elements include object and people movements, as well as performer and audience locations. The research and evolution of various computer hardware and software in dedicated centres such as IRCAM in Paris, EMS studios in London, and many American University institutions, has been fundamental to the advance of these and other multimedia applications. In addition, many of the independent software companies, such as Digidesign, Avid, Steinberg, Coda technologies, and Emagic have produced powerful, adaptable and very flexible products for multimedia creative work that compliment the more specific and research software such as *Super Collider, Puredata* and *Max/MSP*.

In my work I have employed a range of softwares to develop different aspects of my pieces. These include *Pro Tools, Max/Msp, Cubase, Logic, Halion, Kontact, Sound Forge, Metasynth,* and *Video Delic.* The sonic materials used in these programs range from analogue music concrete to electronic synthesis and digital sound sources. I chose these not only for their innate expressive qualities but also for their potential sonic combinations in ways unique to each context.

Spatial music and spatial modulation (where the sound is moved in kinetic patterns around a physical location) has thus been empowered by this vast array of software invention and integrated speaker designs. This has become a new frontier for the recording and sound production studio environments, with new mix-down formats extending to 5.1, 7.1, and 10.1, up to 20.1 and beyond. (Liquid Architecture 2) These environments are a considerable extension of mono, stereo, or even quadraphonic final mastering formats. The evolution of sound as a multi-dimensional reproduction sonic environment is already filtering down to domestic 'home theatre' listening environments, where surround sound amplifier and speaker systems becoming affordable and readily available.

Many software programs supplement these intricate spatial designs. A range of modulations and treatments is increasingly possible with programs like *Max/msp*, *Spat, Diphone, Audio Sculpt, Modulays, Puredata* and *Super Collider* software. These have informed my surround sound mixes in the folio works.

The *ProTools* software program, with the surround sound plug-in, (on a TDM hardware system), has been an effective mixing format enabling a considerable depth

of programming, sonic momentum and spatial modulation. It has been extensively utilized in the construction of my new work in spatial music.

Historical Legacies

Spatial music as a concept was traditionally a feature of acoustic environments with very resonant spaces, like large cathedrals. The acoustic qualities and sonic possibilities of these large interior spaces have fascinated composers throughout the last 500 years. Choral music for multiple choirs placed in various locations around the listening space, inspired Late Renaissance composers, such as Giovanni Gabrielli, Claudio Montiverdi and the Early Baroque Venetian School, to explore the expressivity of spatial placement of sound. One of their most famous places for this kind of music was the Cathedral of San Marco in Venice. In addition, Mozart, Verdi, Stravinsky, Peter Maxwell-Davies, Varese, Berio, Stockhausen, Reich and hundreds of other 20th century composers have also explored aspects of sonic placement in physical locations in creating their music. Unlike their predecessors, composers who use the new technology are no longer dictated to by the physical acoustic properties of architectural designs. It is possible to transcend these limitations with discreet and dedicated speaker playback systems for a wide variety of contexts, interior and exterior, as well as from high in the atmosphere or from underground or even underwater environments. I explored some of these possibilities for spatial music in the folio work *Seeming Insanity of Forgiveness.*

In this piece I wanted to explore the expressive qualities of surround sound as a textural multi-dimensional field, transcending the limitations of mono and stereo image concepts. I felt that in this collaborative media work there was an instrinsic need for a spatial sound design sympathetic to the three dimensional language provided by the sculptural elements of the physical installation. Spatial music can also be sculpted, shaped, and moved in a kind of kinetic counterpoint. In this genre momentum patterns and dynamic modulations propel and shape the syntax beyond the pitch relationships of older musical languages. Spatial music can be transformed into any number of continuums as it engages with height, width, depth and time. (Bandt 116) It can also modulate from any sound type to any other sound, from analogue and music concrete to digital sound sources.

These new sonic habitats have changed the paradigms and distinctions between virtual and physical concepts. There is an inherent need for sensory attunement and immersion to enable accurate perception and integration of the often subtle and micro changes in the sound environment.

In my work *Seeming Insanity of Forgiveness* the sounds move through the installation space in a variety of patterns and directions. Non-pitched sounds and voices align with pitched sounds and other sonic materials to form new horizontal and vertical relationships. These relationships vary in intensity depending on the location of the listener in the acoustic space. This is reinforced by the nature of much of the material being patterned in a wide number of relationships of interval type, augmentation and diminution, canonic and contrapuntal devices as well as this use of drones and digital feedback loops as structural resonance.

The interactions of the sounds and audience movement, the spatial designs and the speed of the various movements affect the sonic field in an indeterminate series of improvised variations, kaleidoscopic patterns and directions. This extension and expansion of sonic dimension is directly referenced from the centuries-old traditions that have evolved from the late Renaissance and continued to embrace and be informed by electroacoustic and interactive computer interfaces.

My surround sound folio work is part of a long Australian tradition that began with the free music experiments of Percy Grainger and Bernard Cross and extends to at least another 200 sound sculpture works created since the 1950s. (Bandt 134) These works are all highly individual and each has a unique identity in its application of various sonic materials, spatial music, interactivity, random processes, indeterminate procedures and their relationships to the formation of the overall soundscape. They invert concepts of scale from the micro to the macro, sometimes simultaneously embracing a global community of dozens of nations, or in other works restricting the world to the interaction of single fish in a small glass sphere.

The random movement of a fish swimming in a bowl was the controlling agent for a 1989 installation work by Chris Mann at the Australian Centre for Contemporary Art in Melbourne. The interface was a video-based system, Veitch's *3Dis,* that translated the fish movements into triggers mapped into designated areas on computer screen. Pitch, amplitude and sound varied according to the location of the fish in the bowl. (Bandt 131)

Works of a grander scale include various global satellite projects that connect the designing of space with sonic and sculptural aspects engaging the entire planet in

different ways, some fixed and some flexible. For example, works like Martin Wesley-Smiths *Night Satellite*, composed in 1983, utilized three Fairlight computers in simultaneously three different countries, (Japan, Canada and Australia), to send sounds across the Pacific Ocean via satellite. In this work distance and speed of transmission were used as sound processing phenomena, based on the delay and echo effects due to time lags in transmission signal exchange. (Bandt 130)

Other global satellite projects have been similarly astonishing in their scope and inventiveness. *Rivers and Bridges* (1996), was a vast work, involving people from 20 countries over a three-day period. This work dissolved many of the boundaries and continuum limitations of location, space, dimension, physicality as it enabled a synchronicity of many spaces and concepts.

Another remarkable transglobal transmission occurred in 1997 with Ros Bandt's work

A Global Bridge for Percy. This real-time composition was a 60 minute collaboration with the Frankfurt sound artist, Johannes S Sistermanns in a 60 minute embracing of the earth. This was made possible by a double ISDN link, performed in front of a live audience and recorded live to air by the ABC Classic FM radio network. The audience sat under a sonic bridge, with the sounds from Australia in front and those from Frankfurt behind, forming sonic dialogues. This real-time, interactive radio work also exists as a continuous sound installation on the internet, on the ABC Listening Room web site. (Bandt 133)

The physical flexibilty as well as the temporal and spatial arrangement of sound is of paramount concern in these emerging new media environments. They incorporate

new syntheses of the visual and the sonic realms. These fusions form unique and often idiosyncratic interrelationships that become an integral part of the artwork. In these works deeper expressive nuances of spatial music communicate to the conscious and unconscious perceptions and sensibilities that are a part of a vibrant frontier of artistic endeavour.

The sounding environments become richly informed worlds, with inherent intimate relationships between space, non-linear and linear time and innovative kinetic momentum reforming location within that space. (Bandt 116)

Chapter Six – Work 1:

Seeming Insanity of Forgiveness

Title of the Work: *Seeming Insanity of Forgiveness*

Medium : Electroacoustic interactive surround sound installation

Duration : 65 minutes ~(continuous looping)

Introduction

This work was conceived as a new media collaborative installation exploring the mediums of sound and sculpture. My intention was to investigate new intersections of sonic and visual elements in original ways in this new artistic frontier of time and space. This process has necessitated the invention and combination of sounds into unique combinations and contexts. These are detailed below.

The discussion on the conception, artistic intentions and aspirations of the work is followed by a description of the structure and sectional substructures. The technical processes are discussed in relation to the nature of the expressive sonic materials, as well as to the spatial and kinetic aspects inherent in a surround sound environment. The new media aspects of the work are discussed and the various ways that individual elements are transformed by these events are examined.

Background

The initial conception, development and creation of this work aimed to integrate sonic and visual elements in a collaborative sound and sculptural installation. This was situated in an indoor art gallery environment in which textile visual art media were installed. The acoustic properties and the physical dimensions of the gallery space, and the textile works, guided the sound design and the location of the interactive and surround sound speaker systems.

This intermedia work was conceived as an artistic response to themes of conflict, violence, intolerance and tragic loss and the empowering processes of forgiveness, healing, peace and transformation. The initial theme was suggested by the publication of the book *Lost Lives,* by Irish authors, McKittrick, Kelters, Feeney and Thornton. Since its publication in 2000, it has been a significant voice in the almost impossible task of finding ways to peace. This substantial literary work broke a traumatic silence and clarified the depth of loss, as it chronicled the details of every one of the 3,638 victims of the devastating 'Troubles', a confused and violent sectarian violence that raged in Northern Ireland from 1966 to 2000. The profound depth of human tragedy expressed in the book, as well as the futility and insanity of war, inspired the exhibition *Horrific Hankies The Irish Linen Memorial.* The art installation aimed to express not only the darkness and sorrow, but also to empower and renew a passion for peace, and the ending of violence.

Sadly, world history illustrates the opposite trend in the last three years. After September 11th 2001, the escalation of violence has increased exponentially. In our haunted new millennium the threat of horrific violence and terrorism is

omnipresent. Contemporary societies worldwide have adopted heightened attitudes of continuous alert, as evidenced by new codes of security for air travel and even mail delivery. We are witnessing trauma and shocking disbelief on a new global scale. In this changed environment the Western World as a whole, now shares with the Irish Nation, Israel, Palestine, several African states and much of the Middle East, the loss of trust, peace, tolerance and an entire way of life. In our changed cultural landscapes, notions of divine, sacred violence binds religious groups as a defining ritual, in some cultures replacing traditional sacraments as a way to paradise. In a densely exclusive 'gravitational field of activity' suicide bombers are an everyday horror somewhere in our global village, and the electronic media inform us immediately. These are decisive shifts in the core of our humanity, new fanatical actions in a war that is motivated by complex forces. As Renee Gerard and Gill Bailey point out (Gerard 1), in addressing these issues as acts of warfare there is at least a three-part basis to this violence - a religious and anthropological basis, a political agenda and an economic reference. There is not scope to digress into further detail on these complicated areas, but these issues have profoundly affected the creation of this work, and widened the resonance to include at least an awareness of the terrorism that is no longer confined to Northern Ireland.

The emotion of this complicated and multi-dimensional human tragedy is reflected in the choice of materials and processes used in the visual and sonic works. The vast textile sculpture created by Lycia Trouton, consisted of hundreds of white Irish Linen handkerchiefs, and linen bandage rolls, suspended in grid

patterns. Each handkerchief lists some of the names of the 3,368 victims of the Irish Troubles (1966-2000).

Like the shoes in the exhibition about Jewish Holocaust victims by Christian Boltanski, each handkerchief is a poignant reference to a dead person, the tearful relatives left behind in their grief, the long tradition of the Irish linen industry and the sheer magnitude of the tragedy. The installation also included a modern dance theatre component in which three dancers performed an elaborate 20-minute piece created specifically by the Australian dance master, Elizabeth Cameron–Dalman, OAM.

I refer the reader to the accompanying DVD, composition score, and audio CD of this installation opening, which occurred on November 2nd, 2002 at the University of Wollongong in the *Cloisters Gallery*. I have mixed this work to a 7.1 surround sound format, which gives some idea of the sonic momentum and spatial aspects of this work. The interactive elements have been simulated and mixed into this version as the most suitable way to present them.

Elementary Components

This electroacoustic work utilizes a diverse range of sound sources and techniques. Some of these sounds are non-pitched, some semi-pitched and some of defined pitch. The sound design was based on these sonic materials and how they could interact with the discipline of a surround sound format. Spatially composed sound has a multi-dimensional physicality that is missing from mono and stereo formats. In this format sounds can be designed to inhabit a three-dimensional environment addressing continuums such as height, depth and

width of sonic dispersal amongst the loudspeaker diffusion. The resultant field of sound can be then modulated in a variety of ways. For example, the location, speed and type of sound can change places with each other in a kind of shifting counterpoint that is unique to this context of spatial multi-speaker sonic environments. The relationships between the various sound spaces can be further manipulated in any number of ways. In this work I have explored types of sonic movement as structural devices, each section of the work being developed as a kind of kinetic textural entity, sometimes motionless and sometimes moving around the physical space.

The creation of this level of detail in sonic movement patterns necessitates that new techniques be developed. Although sonic spatiality is a centuries-old tradition, the detailed nuances possible now in software and hardware is a relatively new area, requiring the development of an individual approach in my work. In a way this is an innovative three-dimensional contrapuntal discipline that contrasts momentum, textural density and location of static sound as much as traditional pitch and rhythm contrapuntal techniques. Stretto, augmentation, diminution and canonic devices are translated in terms of speed and movement of sound from one, two, three or more locations. The shifting temporal layers co-exist simultaneously in a variety of forms. Many elements are transformed in the process. For example, amplitude transposes into a variety of physical proximity phenomena; timbral details fuse and interweave as sounds travel through the sonic environment and as the sounds change places with one another homophonic textures become polyphonic.

The microtonal combination of sounds forms a massive sonic palette in this work that develops and manipulates sounds from a diverse range of materials. These materials include the following:

- polar wind samples
- spoken voices and readings from nine countries
- streetscape sounds of Belfast and Derry, Cathedral bells
- choirs and religious services, from Belfast, Northern Ireland, Melbourne, Australia and Vancouver, Canada
- non-verbal human utterances shrieks and body sounds
- sounds of guns, bombs, rockets and military vehicles
- flapping of birds' wings
- tears, rain, and running water
- howling dogs at night and the opening and closing of various doors.

Other semi-pitched and pitched sounds include:

- samplers, synthesizers
- electric and acoustic violins, violas, celli, and bass
- harp, sampled and acoustic concert flute
- a large selection of percussion, acoustic and electronic instruments
- piano, organ
- choir, and a solo soprano as well as an operatic tenor soloist.

Structure

The structure of this work is based on the two systems described below: 1. the non-interactive 65-minute pre-recorded surround sound work and 2. the interactive components that intersect with this sound field. They develop new combinations of sounds each time the audience interfaces with them so that the work is always re-forming its own new variations and versions.

1. The Interactive System - *Inside Tears*

This section forms a separate work within the larger work. Entitled *Inside Tears,* this work is built on the collected sounds of falling water, including the sounds of external human body sounds such as teardrops and dripping blood. Sonic samples were also collected of falling blood and water from inside the human body. In addition, sonic fragments of the spoken voice readings of the names of the dead, church bells, and the loading of bullets are also mixed into this sonic tapestry. These sounds link the visual metaphor of the hundreds of white handkerchiefs that soften and comfort a recognition of profound grieving. In creating a secular requiem and memorial I have attempted to express a collective subconscious and conscious need for healing, comforting and transformation.

The interactive system interfaces with the audience presence and movements in designated ways. Six infrared sensors were set up in the long rectangular gallery space. Each sensor, custom made by engineer Jim Sosnin of *Quantum Plus*,

was given a specific area of the gallery environment to monitor temperature and movement changes. Essentially, these interfaces are motion detecting sensors, triggering sound files that are controlled by the *MAX/MSP* software on a computer and projected out to the loudspeaker system. *MAX/MSP* is a real time graphical programming environment for live and interactive computer music. It was created by Miller S Puckette, a former research staff member at IRCAM, in Paris, and currently a staff member of the University of California at San Diego. The software enabled the interfaces to effectively trigger a range of audio sound files in real time as the audience passed through the gallery space. As discussed previously, these sounds were water drops as well as parts of the spoken voice samples of the victims' names, killed in the Irish Civil War, 1966–2000. These names were treated and processed in a variety of ways, being filtered, sped up, slowed down, edited into parts of names, delayed, retrograded, inverted and repeated in various patterns. Additional treatments involved the voices being sampled into Steinberg's *Halion* software sampler, for further pitch transpositions and amplitude modulations. The audio recording accurately simulates a version of this interactive contrapuntal activity. I refer the reader to the Appendix 1, for a graphic display print of the Max patch for this work.

These sounds intersect and weave a sonic fabric with the larger 65-minute prerecorded sound field, mixed in a 7.1 format. The result is one where random real time contrapuntal activity contrasts with the fixed predetermined playback sounds. These roles also partly represent the worlds of the interactive living (audience), and the non-interactive dead (the named victims of the Irish Troubles).

2. The Non-Interactive System

The non-interactive sound component is constructed as a continuous looping work, sixty-five minutes in duration. It is in eight main sections, grouped into four movements. Further this component has pitch, textural and spatiality relationships to assist in the cohesiveness and balance of the work. These sections are detailed in the accompanying score and audio CD of the work. However, this broad outline describes the inherent creative processes and artistic intentions.

I wanted to create a sense of timelessness and sensory shutdown in beginning and ending this work. I therefore selected the random modulations of white and pink noise frequencies of the frozen winds of the north and south polar ice caps. They sometimes fight each other and at other times blend so perfectly that a surreal harmonic resonance is clearly audible. The triggered vocal sounds are sounded against this icy windscape, forming an introduction of five minutes duration. In this opening the textures and spatial movements of the winds travel randomly, changing location momentum slowly at first, then quickly and finally slower again. They form a loose, three-part structure underpinned with dynamic changes, from soft to loud, with sudden sforzando bursts of sound within each section.

Each of the eight sections has a specific physical and temporal arrangement of sounds. Additionally, the movement design for each section is shaped for the various textures of these individual sections.

My artistic intention was to express the devastation, the numbness of shock, the inability to make any sense of the absolute horrific terror that inhabits the insanity of violence and in particular, long-term violence. The polar wind sounds represent those irreconcilable representations of the human conflict, deep within the Irish psyche, the sounds of nothingness, a frozen and shocking numbing of the senses and the need to find some kind of voice, expression, even perhaps a way to end the tragic cycle of violence.

In order to express a dimension of healing, from trauma to transformation, audio samples were collected and recorded from several first nation peoples, and European folkloric traditions, as well as from more industrialized cultures. Some of this source material was also collected and recorded by the collaborative visual artist in this installation, Lycia Danielle Trouton, in North America in October 2002. A Buddhist nun of Irish descent, Chung-Do Sunim, assisted her in this work.

These were combined together with the other collected and sampled materials, into a unified expression of many languages, melodic, harmonic and rhythmic variations, and cultural influences.

These included:

- music of the Aboriginal people of Australia, from the Melbourne *Wurrinjeri* people
- Gaelic songs of Ireland, performed by Canadian/Irishman Kevin McFadden
- American First Nation Peoples- Musqean band, Chief Ian Campbell
- Hawaiian Indigenous music

- Korean Buddhist prayer chants, organised by converted Irish-Catholic American citizen Geraldine Finegan-Chong Do Sunim
- Australian Cathedral Choral traditions-from St.Paul's Cathedral (Protestant) and St.Patrick's Cathedral (Catholic), in Melbourne, Australia
- African chants
- Australian secular solo vocal traditions
- Vietnamese folkloric traditions
- Protestant and Catholic traditional liturgical music.

I have also included various spoken word and poetry recitations of works by the English poet Wilfred Owen and the Irish poets Seamus Heaney and William Yeats. These voices were included to express some of the traditional and contemporary attitudes around this violence, in both a direct literal sense of the language and meaning of the words, and also indirectly, when the words are employed as pure sonic fragments.

Design

The overall design considers the interactive effect of an audience moving through a spatial sound environment. The non-interactive component of this sound work is structured in four main parts as linked continuous movements, over 65 minutes and then looped for continuous play, for the duration of the installation of the art work in the gallery space. This non-linear, infinite form represents the circular continuity of the life cycle, in contrast to linear time

concepts - the conceptual relentlessness of time passing, acknowledging that this concept of linear time varies from culture to culture.

Against this formal and pre-recorded structure, the interactive sound elements intersect in random contrapuntal ways, depending on the number of people and their types of movement in the installation space. These sounds come from a wide variety of sources, as discussed, including excerpts of spoken voices reading the names of the victims, various vocal and non-verbal sounds and cries, sampled sound bites from linen laundries, the tearing of linen cloth, and the flapping of wings. The sonic material was then further treated with various types of filters, reverberation, and delay lines. In addition, they were developed with techniques of augmentation, diminution, retrograde, inversions, truncated and layered with each other and combined with each other for a random pattern of multi-channel playback across the various spatial locations.

The sounds intersect with the pre-recorded soundtrack in indeterminate ways throughout the installation time; they stop only when there is no activity in the gallery space. This process underlines the randomness of the victims' deaths, most of whom were innocent people in the wrong place at the wrong time. Many of the interactive sounds appear and disappear in a similar fashion, out of sync, time, and tune with the pre-recorded tracks. This characteristic is very effective in the opening, closing and transition sections where floating names and sonic fragments form an eerie contrapuntal texture against the sustained samples, modulating in various spatiality patterns.

The detail of these sounds, unpitched, semi-pitched and pitched, is set out in the accompanying score of this complex work. They are organised into movements and sub-sections as follows.

The four movements each have different functions reflecting the various themes inherent in each part. While this is not program music in a descriptive sense, the themes addressed in each do affect the way that the music has been designed. For example, the third movement focuses on the loss of innocence, of children. The sounds and use of time, momentum and rhythm are very different to the second movement when the themes of violent conflict are expressed by associated sonic and rhythmic treatments.

The movements are structured into a number of sections, each having linking relationships within. Due to the spatial nature of this work, as well as the very texturally rich semi-pitched and non-pitched harmonic sections, I decided to use specific intervals in contrapuntal textures rather than denser harmonic textures. Instead of chordal progressions there are a number of melodic and intervalic relationships between the various sections. The work concentrates on shifting modalities and pentatonic resources to evoke the traditional Celtic associations. These melodic and harmonic progressions are also detuned and altered, becoming ambiguous for greater expressive effect.

The piece begins and concludes with the unpitched white and pink noise modulations of the sampled polar winds, sounds that contain all frequencies of the audible pitch spectrum of sound. The intervals of the minor third, major second and tritone, feature throughout the work linking the various melodic and contrapuntal developments of the individual sections.

The horizontal and vertical pitch relationships are structured inside formal and informal tonal and atonal zones. In addition, various modal key centres are explored such as the Dorian, Aeolian and Lydian modes. There is a relentless instability in the way that these key centres are used in this work, and even more so in the semi and atonal areas, for example in the opening of the fourth movement. Here, indeterminate elements interpolate with the G dorian mode melodic fragments played on a Conch Shell. The sounds of bullets travelling in a three dimensional 7.1 surround sound mix, white noise winds, bomb blasts, the loading of ammunition, combine to form shifting and restless textural elements. They contrast with the shifting time signatures and atonal melodic sequences of the rapid flute phrases.

This work employs a variety of contrapuntal techniques, including canonic, free imitative counterpoint, as well as augmentation and diminution devices. The form of the work is defined further by the spatial sonic movement patterns, which are defined for each section in the score.

Sometimes the subsections utilize a more traditional approach to the application of little sub forms of binary, ternary and variations form, with conscious awareness of the balance of energies; there is also a strong sense of momentum and repose in the construction of the form of the piece.

Time, rhythm and momentum have been utilized in a number of contrasting ways, often combined in non-measured and measured contexts. A great deal of rhythmic variety has been created with the random interactive sounds intersecting with the pre-recorded sounds.

Each movement employs the type of rhythmic texture and change of rhythmic type to create a distinct and individual expression. Sometimes the rhythmic textures change very gradually as in the opening sections of the first movement. At other times, the rate of rhythmic change varies from static to rapid rates of change, for example in the flute and harp sequences in the third movement and at the beginning of the fourth movement. The spatial movement of sound throughout the installation space reinforces the changes in rhythmic textures; this is a technique that I have experimented with in this work. As the sound moves physically around the three dimensional space, in various directional combinations, another factor, the use of dynamic change, becomes very important.

In my previous multi-channel surround sound works I had explored the location of sound sources as an expressive and structural component. However, these works were limited in the ways that fine graduations and nuances of change could be applied to the surround sound mix. Recent developments in both computer hardware and software technologies have empowered these areas and allow for greater depth of dynamic graduation and sonic movement. As the sounds move through space the dynamic treatments have a significant impact on the perception of the sound in a way that is different to sounds that project from a fixed and static sound source. The use of depth of sound assumes additional roles as the various sonic elements are balanced and mixed together. For this reason I used a variety of reverberation sound treatments to bring sounds in and out of aural focus. These reverberation treatments included *digidesign* digital

software plug-ins, as well as contrasting analog reverberation hardware, such as the *lexicon pcm* series.

The *digidesign spatilizer* software plug-in was used to program the spatial movements from speaker to speaker, as designated in the score of the work, (see folio score). This software allowed for a very flexible approach to the ways that sound movements could be patterned together, allowing the structure of the work to be strengthened by these spatial movements of sound as an additional contrapuntal voice. I had not really considered sonic movement as an active and dynamic contrapuntal device prior to this work, so it became an obvious new area to further develop in other works and in other mix and speaker design formats.

New Software

New software has enabled my work to explore contrapuntal sonic movements in this work, and develop new musical environments. The recent technology that informs the present frontier of spatiality, as discussed earlier in this thesis, provides the flexibility and depth of nuance that extends this tradition further.

The combination of these new techniques and older traditional material has appeared in recent recordings and live performance concerts of solo soprano saxophone improvisations of saxophonist Jan Garbarek, and an *a cappella* male voice quartet, *The Hilliard Ensemble.* This inspired combination of traditions created a surreal effect that was powerful and engaging. The ECM recordings and the live performances employ subtle sound amplification and additional reverberation signal treatments. Although spatial modulation is limited to an

almost static surround sound mix format, the extension of the sound world is considerable.

In My Work

The extension and synthesis of traditional materials, (such as modal key centres and the incorporation of the formal Latin mass requiem texts), are also empowered by the spatial aspects of the surround sound environments. They create a very physical and focused context for experiencing the music. The linking of disparate elements is evident in the opening and closing sections of the work; the wind and interactive vocal elements gradually forming an awareness of pitched sounds and shifting key centres. The work begins with a low C natural, three octaves below middle C, in the Aeolian mode. The work concludes in the key area of A Dorian minor, on an unresolved, sustained E natural, fading into the unpitched wind and voice sonic textures. The tenor soloist has implored for peace, intoning 'donna nobis pacem', seven times on the same octave ascending motif, to a high A natural, his voice being moved around the speakers in a gradually decelerating and fading momentum. These incantations are modulated into the recapitulation of the opening polar wind textures that close the work as well as link it in a seamless loop connection to the beginning of the piece. This work sounds continuously during the installation time.

Chapter Seven – Work 2:

Amplified String Quartet No 1 – *Fast Travel*

Title of the Work: *Fast Travel*

Resources: Amplified String Quartet

Duration: 24 minutes

Introduction

This five-movement work is for an amplified string quartet - two violins, viola and cello. In this work I have explored the intricacies of amplified string sonorities and textures. The amplified acoustic quartet is a very different sonic resource compared to the electric string instrument sonorities of my other folio works, *Insanity of Forgiveness, City of Yes and City of No*, and *Sonic Code*. The string instruments in these other works are of a solid body construction and rely completely on embedded transducers that send signals to signal processors and the amplification system. These electronic instruments have no acoustic properties at all.

The amplified acoustic string instruments employ an inverse sound world, with the amplification of the sound waves emanating from a wooden resonating chamber (the instrument body itself). Amplification of this acoustic sound environment is not excessive, being only moderately louder than the acoustic sound.

However, this extends and magnifies the range of audible dimension so that the finest gradations and nuances of detail become fully audible. The purpose of the amplification is to reveal detail and magnify this expanded sonic realm of the amplified sound environments, a dimension of sounds that are inaudible to audiences in the non-amplified context. This is especially true of textures that employ very low volume articulations, for example in the side ways bowing along the strings of the third and fourth movements and the percussive bowing of the fifth movement of this work.

Each movement explores a different type of sound world and sonority. The first movement explores rhythmic displacement and contrapuntal melodic development. The second movement, more lyrical and introspective, explores timbre, harmonics and harmonic sonorities. The third movement develops softer textures, noises and articulations. The fourth is concerned with rhythmic syncopation and mixed meters. The final movement explores rock music rhythmic textures and subsequent atonal textural contrasts as expressive devices.

The pitch areas for the works are organised on modal centres, with atonal semi-pitched and unpitched materials and textures combining to form a hybrid personal language. The microtonal and vertical harmonic structures are linked and related to each other through various key and intervalic relationships. Furthermore, most of the movements utilize pulsitile rhythmic approaches. The working of time, momentum and a sense of beat patterned rhythms and sub-rhythms are explored with an intention to increase the intensity of expression. I have developed both symmetrical and asymmetrical rhythmic patterns that utilize dynamic propulsion and flexible syncopation. The use of what I have termed

`micro dynamic propulsions' is an important element in my development of rhythmic syntax and it is highlighted by the associated employment of asymmetrical dynamic micro-variations that give intense cohesion and depth of contrast to the musical fabric. The attention to detail at this `cellular' level gives strength and potency to the compositional process. Overall, the relationships are created out of the initial material of each movement and it does not follow a process of superimposition of a pre-formed system such as a pre-determined mathematical system. This work, like all of the other works in this research, explores new ways of organising and developing sonic and musical expressions and ideas that rely on a sense of discovery and shaping of intuitive and rational compositional processes.

In this way I have explored the expansions of a flexible approach in the organisation of time and pulsitile rhythmic disciplines. Pulsitile rhythmic processes in which time is dictated to inflexibly as defined rhythmic patterns modulating through sequences and cycles, have been expanded in this music to be less rigid. The music here is not about `process' development as much as finding new ways to connect disparate elements. In doing this, parts of the rhythmic processes are combined with other parts of textural repetitions and developments. One example of this is the development of the pulsitile rhythmic sequences in the opening and final movements. In these two examples rhythmic patterns are stated and then contrasted with other different rhythmic material to increase the effect of the differences in the initial material. The two rhythms then play out against each other as the music develops. The relentless rhythms are developed further to be

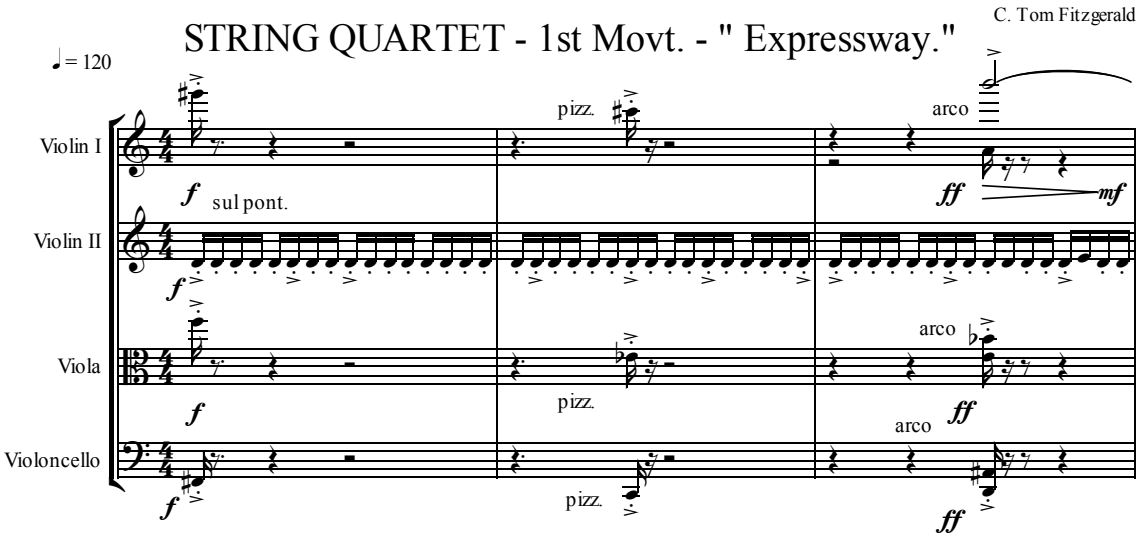
out of symmetry, even when the music is repeating the same note, as is the case in the opening of the work.

The entire quartet is an exploration of momentum and flexible time base energy. There is a desire to develop pulsitile flexibility and balance. This is a direction informed by the opposite non-pulsitile application of time, another concept of liberation of the beat, in which there is no measured time, and no sense of beat. The differences between these two approaches occur in each movement in various contrasting sections and contexts.

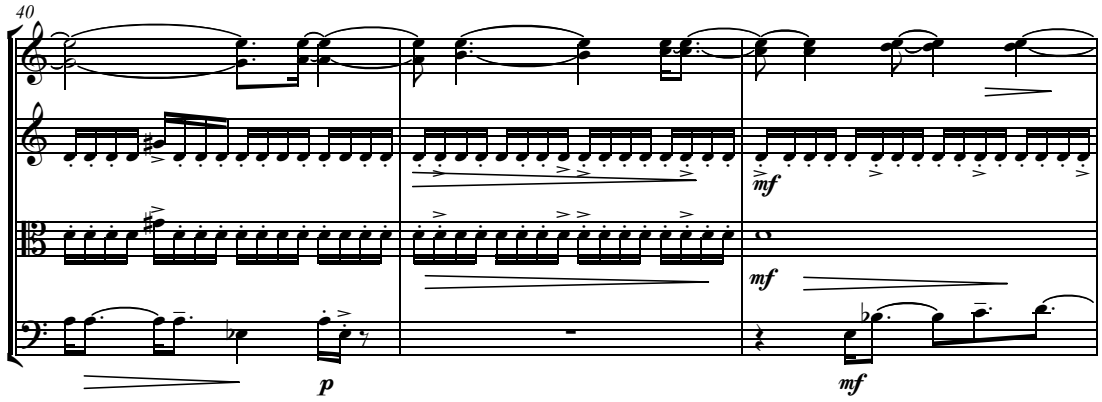
First Movement

The first movement is based on the contrasting energy of the static harmonic chords and of single note horizontal melodic directions. The rhythmic propulsion, beat shifting and timbral modulations combine to gradually develop the melodic elements as well as the harmonic dimensions. The melodic developments explore a sequence of asymmetrical accent shifts across the beats, in an almost random manner. There are however, time displacement patterns in the cross rhythms; in bar one the first and third semiquavers, in bar two, the second and third semiquavers, in bar three, the first, third and fourth semiquavers, and in bar four, a complete pattern derived from the North American fiddling traditions. This pattern is obscured by the relentless single note melodic motif which reappears, gradually breaking down the various patterns that emerge in this movement.

The duality of symmetrical and asymmetrical rhythmic patterns forms the momentum for this process of exploration. This movement works its way through a series of pitch centres and free atonal sections from the D Aeolian minor opening to the A minor/major key centre at bar 40. The intervals for the slower contrasting melodies from bar 40 are derived from the initial harmonic pitch material in the opening few bars:



See below for Bar 40 excerpt:



The amplification in this first movement serves to extend the detail of the dynamic propulsion and bowing articulations that create the central issue of this movement, the interplay between formal and static energy and rapid momentum. This movement is structured into six parts as follows –

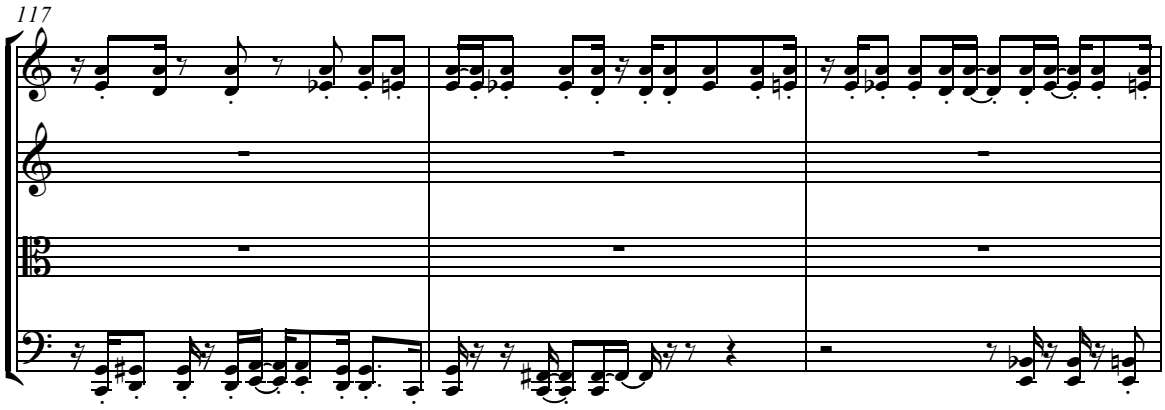
- A – bars 1 to 64
- B – bars 64 to 82, a duet between the second violin and the viola
- C – bars 82 to 105, a development of shifting textural variations between cello, first violin and mixed time signatures
- D – bars 105 – 138, the cello develops the initial rhythmic materials with contrapuntal imitations in the first violin
- E – bars 138 – 161, introduction of contrasting asymmetrical rhythm materials forming variations of the initial materials. For example, in bar 144, the minum triplet figures contrast with bar 148 with tremolo patterns in different bowing speeds and the slower tremolo textures from bar 152
- F – bars 161 – 179, this final section reworks the initial semiquaver patterns simultaneously in all four voices in a freely atonal ascent to the high pitch range of the quartet, the bowing articulations accelerating to as fast as possible tremolo in dense and relentless polyphonic textures

Second Movement

This is a slower, quieter, and more introspective movement, in contrast to the first movement. It is constructed in three main sections. Further, there is an exploration of resonance, sonority and tone colour, illuminated by the amplification of the quartet. Once again the static qualities of repetitive tones are explored, this time in a different manner to the first movement. Here the repeating notes are augmented into quavers, beginning in bar seven in the second violin. The key areas of E minor and E major dominate the first section from bars 1 to 84, when the tempo increases (con moto), and the modulation to A dorian minor introduces the second section. In this part there are stronger contrapuntal lines weaving antiphonally against each other as the material develops.

This activity modulates into very fast jazz-inspired figures in the first violin, an activity that continues until bar 124 and the return of the initial tempo (tempo primo).

See excerpt below:



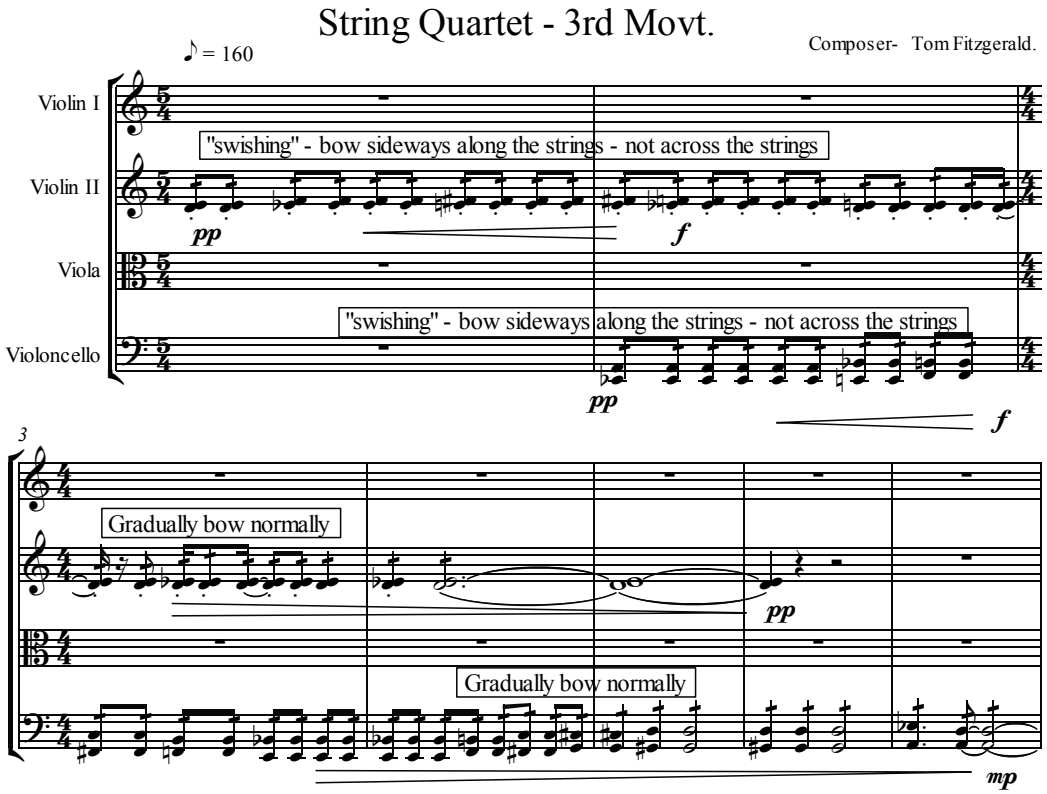
In the final section of this movement the opening material is restated and further developed. The second violin repetition of the repetitive E natural is alternated with large interval displacements of thirteenths and eighteenths. This expansion is continued in the first violin and gradually in the viola and cello. The open-voiced textures conclude this movement in a disguised E minor and A minor sonority.

Third Movement

I introduced an unusual bowing technique to open this movement, one that only really works effectively in electric or amplified instrumental ensembles. I have termed this technique 'swishing'. This is a way of bowing along the strings instead of the traditional bowing across the string at a right angle. The sounds produced are radically different to the standard bowing sonorities and are

unpitched and semi-pitched white noise sounds. In addition it is possible to bring soft sounds of definite pitch in and out of focus by reducing the sweep angles of the bowing**.**

See excerpt below :



This technique partly derives from some of the folk music traditions of Hungarian gypsy violin techniques as well as from the American bluegrass fiddle bowing techniques. In these two folk music traditions the bow is often used in unorthodox ways to create special sound effects. These imitate bird calls, dogs barking, chickens, horses and, especially in the American bluegrass traditions, the sounds of steam trains and railway construction. For example, the celebrated

fiddle music standard 'Orange Blossom Special' features a traditional opening section that imitates the sounds of a steam train engine by employing a circular bowing pattern along and across the strings, instead of the orthodox bowing techniques parallel to the bridge.

I decided to develop this type of bowing further in this and the next movement of this quartet. I have extended it to utilize the bowing in a sweeping pattern that allows for a precise control of dynamic and articulation. This new bowing technique requires amplification for its full sonic dimension, as it is too soft for much of the sonic detail to be heard in an unamplified context. In addition, I explored the sounds of combinations of the amplified string quartet utlizing this technique, with varying speeds and articulations bringing the pitched and unpitched sonic dimensions in and out of aural focus.

Techniques like these reveal new sound worlds as part of an exploratory and experimental process to find sounds to express the new creative vision. This activity is one of the great joys of electroacoustic music creative activity. A similar illumination and sonic extension occurs in the application of simultaneous signal treatment types that are very closely related, such as delay speeds and depths, reverberation dimensions and timbre filters. This area is explored in the 'Multimedia Suite' pieces more than in this amplified string quartet medium that focuses on extending the sounds of the acoustic instruments.

The formal design of this movement is a small four-part structure, the first and last sections being closely related in material and the middle sections concerned with extension, development and contrasting the initial ideas.

These sections are as follows:

A bars 1 to 31
B bars 32 to 51
C bars 52 to 65
D bars 66 to 87

The pitch materials consist of augmented sets of intervals and textural groups of sound. The interval groups consist of major seconds, tritones, and perfect fourths. I have organised time and rhythm metrically with a loose, rubato sense of pulse. In part A, 5/4 and 4/4, in part B, 4/4, in part C, 5/4 and in part D, 5/4 and 4/4 again. Throughout the movement the rhythms explore and interplay the symmetrical and asymmetrical, both in syncopated and non-syncopated gestures. This is extended by the use of a wide range of articulations and timbral effects, *arco, pizzicato, col legno, sul tasto, sul ponticello* and the *swishing* bowing techniques that begin and conclude this movement.

Fourth Movement

This movement explores areas that are unresolved in the first three movements. It evolves into the defined repetitive rhythmic patterns reminiscent of the first movement, here developed into cellular patterns and melodies. The final movement takes this rhythmic process further still. In the design of this movement the viola and cello begin with sounds of indefinite and non-pitched textures in a sequence of phrases that are joined by the first and second violins playing natural harmonics, soft spiccato and further swishing textures.

The movement is constructed in two parts, the first a slower introduction and the second a faster contrapuntal section that utilizes triadic harmonies of C major. These modulate in and out of key by the introduction of random chromatic notes.

I employed a melodic development of two rhythmic ideas in this section. The first, a rhythmic pattern which alternates groups of four semiquavers with two groups of three semiquavers. The second, an arpeggiated triadic figure which appears first in the cello and then at the end of the sequence in the first violin. I interrupted the rhythmic patterns and melodic sequences with melodic material and rhythmic displacements that initially seem very misplaced for such a triadic, apparently simple cellular idea. This technique allows the music to move into more complex harmonic, rhythmic and melodic areas. Unexpected things happen, so that even when the 'predictable' melodic and harmonic material returns there is little stability. The use of simpler harmonic material and rhythms allowed for more flexibility in the developing of the contrasting energies between predictability and asymmetry, the simple cellular motifs giving more scope for rapid changes in regularity and irregular rhythmic change.

Fifth Movement

The exploration of dynamic propulsion and integration of rock music based rhythmic development and modulation is the basis for this movement. It is constructed into three main sections, section A from bars 1 to 37, section B from bars 38 to 97 and section C from bars 98 to 140. The rhythmic process here introduces a backbeat rock music rhythmic texture in a sequence of keys G major, F major and E flat major. As the phrases develop the rhythm becomes less defined, the articulations less marcato and precise and by bar 38, section B, a more legato and lyrical texture has evolved. The transition to the semiquaver textures begins in bar 52 with the introduction of the new major second double stop motif. This gradually develops and is sounded by all four instruments in a very dense and atonal conclusion to the work. The dynamic propulsion and syncopation in section A has been eroded by the *sul ponticello* dense and repetitive atonal counterpoint of the final section, the amplified rhythmic accents and bowing timbre sul ponticello giving added momentum to this finale.

Chapter Eight – Work 3:

Low Traffic Symphony

Title of the work: *Low Traffic Symphony*

Resources: Symphony Orchestra, Aboriginal Percussion and Didgeridoo Ensemble, and Pre-recorded sounds on audio CD, Computer/*Videodelic* interactive software, mixing desk.

Duration –32 minutes

Introduction and Artistic Goals.

I composed this work to explore several artistic goals. The main objective of the work was to explore how to create new ways to express an artistic goal of new relationships between ancient and modern sound worlds, cultures, and to find ways for these different elements to inform and enrich each other. This artistic vision was inspired by a gradual realization that we are connected to the Aboriginal musical instrument, the didgeridoo by the sound worlds of our cars and highway sounds. I began to be fascinated with the drones of the long exhaust pipe drones of traffic, especially at intersections where vehicles engines idle. This highway intersection environment became the impetus for the work.

The filtering of sensory information is a commonplace activity for our sensory overloaded environments. We hear ambient audio sounds but in a semi conscious fashion. We don't give the accompaniment of the chosen sonic languages of our days attentive listening. This selective listening has an inherent risk of gradual

desensitization. In addition to this, the work is concerned with the themes of resensitisation, an examination and development of sonic environments – such as discovering relationships and expressive dimensions in traffic sounds.

This work is referenced by a continuing Australian Symphonic tradition that dates back to early works of the twentieth century such as *The Warriors(1916)* by Percy Grainger's, *Corroboree(1946)* John Anthill, a large number of works by Peter Sculthorpe including *Kakadu(1988),* and a growing interest in the new millennium in combining Aboriginal instruments with Chamber Orchestra and Symphony Orchestra. I am exploring and contributing to this direction by including interactive multimedia elements to this Orchestral/Aboriginal tradition.

Structural Design and Materials.

The work proceeds from the introduction of modular materials grouped in separate modules initially. The form of the work develops in a linear and non-linear series of modulations between these initial materials. I explored the dramatic development in juxtaposing these "conflicting " elements and ways of relating the various sounds, textures and rhythms to each other. These materials achieve a fusion that is intensified by the interactive visual projected video images.

The sonic materials are grouped into four textural modules. The first of these is a prerecorded montage of bird songs and calls from the Melbourne natural environment-Wedge Tail eagles(Bungil – sacred bird to the Wurundjeri people of Melbourne) and Magpies, Aboriginal percussion, chanting, and didgeridoo drones on D flat two octaves below middle C. The second of these modules is another prerecorded sequence of sounds, this montage being the sounds of car exhaust pipes

and traffic at different degrees of complexity, and recorded at different times of the day and night. The third textural module is an ensemble of ten didgeridoo and percussion performers. Finally the fourth textural module is constructed from the Symphony Orchestra's sonic resources.

In addition there are two other component elements in the construction of this work. One is the role of the sound mixer who mediates the balance and creates spatiality movements of sound around the auditorium and with the live performers. The other element is made up of the visual projections that extend the sensory dialogue to include direct interactive relationships between the sound and vision.

There is an underlying narrative to this work of a programmatic nature. The theme of cultural dislocation between the Aboriginal and non-Indigenous Australians is at the heart of this work. The drama of the work progresses from an evocation of the ancient sound world of the Aboriginal Culture - before white settlement, and the modern sound world of the present day post-industrial era.

These two cultural expressions are at first presented as distinct and separate elements in the prelude of the work (the playback of Aboriginal sounds in the external areas of the auditorium and if possible in the underground carparks, in a variety of volume levels from very soft to moderately loud) and the first section of the work – the performances of the Orchestra and the Aboriginal ensemble. In the middle sections of this work the two cultural groups combine and compete with the prerecorded traffic sounds that increase in volume dominating the sonic environment at the climax of the work. The resolution of this impasse forms the final sections of the piece where the contrasting elements form a contrapuntal and more integrated blending of sounds.

Each section requires a sound mix that is adjusted by the sound mixing desk operator. This mix also includes a spatiality design that the operator performs at the sound desk. I use eight speakers in this work placed around the extremities of the auditorium on two metre high stands. The sound-mixing desk that I have composed for is the *Yamaha O2R*, which is a digital instrument with scene memory capabilities. The prerecorded sounds are panned to various locations in the room via this desk.

The prerecorded traffic sounds and aboriginal are played back from two media sources, one a stereo cd version and the second a laptop computer *Protools* eight channel sound file. The latter allows for live panning during the performance. The pre-recorded sounds are played into the auditorium extremities, underground car parks, and auditorium foyers, are from the stereo c.d. formats. The sounds panned during the performance are played back from the computer multitrack files.

Each of the ten-didgeridoo performers requires a wireless radio microphone that is patched into the mixing desk. This not only allows for the players to be very mobile during the middle sections of the work, but also gives the potential for magnification of sonic detail as well as dynamic balance with the other elements of the work.

Finally the projection of the two video sources requires two projectors that project onto one large screen above the Orchestra. The Orchestra utilizes light sconces because the work requires semi darkness for the projections to be visible.

The Prelude section of this work is a twenty-minute series of sounds from the ancient sound world of the didgeridoo and the contemporary car exhaust pipe – a different kind of drone instrument that ubiquitously accompanies our times. These

sounds crescendo and diminuendo in and out of aural focus, in a random pattern that I chose to prerecord rather than employ an interactive generative technique (for example via a *Max* software patch). These dynamic cycles are mostly barely audible, but at times increase in volume for brief moments, the longest of these being sixty seconds in duration, and the shortest being ten seconds in duration. As the audience enters the darkened auditorium the didgeridoo ensemble is already performing long drones interspersed with the longer traffic prerecorded phrases. The Orchestra is preset as well and begins ten minutes after the doors are opened to allow the audience to their seats. The *videodelic* interactive projections accompany this transition from *the Prelude* to the beginning of the orchestral score. The conductor cues the sound mix operator to adjust the sonic levels to *piano* and the notated orchestral score begins this is described in the section below.

This single movement work is composed for full symphony orchestra, Aboriginal percussion and didgeridoo ensemble and pre-recorded sounds. The orchestral textures are blended with the collected acoustic samples as well as with the electronic sound textures. In addition, these new sonic materials serve to extend the colour and rhythmic depth of the traditional orchestra. The orchestral forces are utilized in a number of unusual orchestrations that reflect the expanded sound world, instrumental and harmonic voicings exploring new combinations of contrapuntal lines and registers. In this work I have also explored employing rhythmic motifs and combinations of atonal textures, tonal and modal key centres.

The work explores new relationships between interactive video images that are generated by sonic modulations. These are projected in real time onto a screen above the Orchestra. A series of prerecorded film sequences of various traffic and highway

scenarios are also projected. The convergence of technologies employed in this work requires a live sound mixing desk operator to interact with the live performers and "perform" the sound mix and computer video interactive elements through a series of guided improvisations. I decided that this was the best solution for integrating the many modulations and complex degree of intricate change in volume levels, tone colour and overall balance-between the prerecorded, interactive elements and the live performers.

I did consider employing further control of these parameters with deeper intersections of artificial intelligence and technological systems, however these are not sufficiently advanced enough to accurately achieve the artistic objectives. I did consider for example the use of interactive software like *Max/Msp* and *SSEYO Koan,* however both programs are not flexible enough to interface adequately for the demands of this work. This is because the sounds from the live orchestra, spatially located aboriginal musicians and the prerecorded sounds require constant and intricate monitoring and adjustment.

Computer control of the interactive visual projections resolved many problems in this desire to integrate sonic and visual elements.

The notated orchestral score:

The notated orchestral movement is in an arch form ABCDA structure, beginning with static textures moving into rhythmic and contrapuntal textures and returning to the static textural activity once again. The sonic material consists of collected traffic samples and Aboriginal digeridoo samples that have been significantly

altered with signal treatment delay, overlapping and canonic looping patterns, together with a variety of reverberation types.

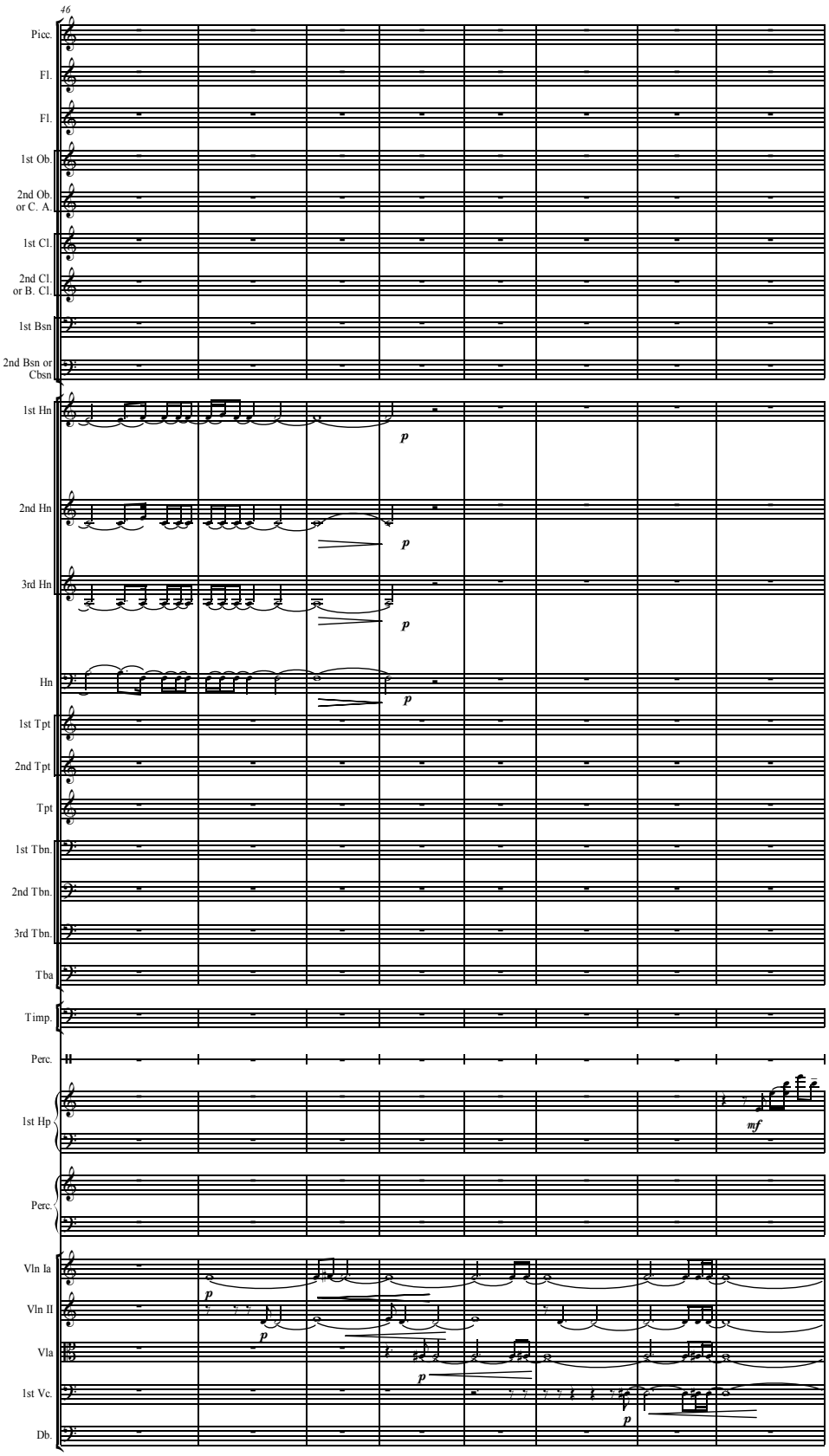
I became aware of the complexity of ambient, low-rumble sonic textures whilst walking along major roads. The atonal and sometimes vaguely key centered sonic environments from dozens of engines created a constantly modulating combination of low, mid-range and higher pitched truck, bus, small and large passenger car, and motorbike engine sounds. Traffic light intersections were recorded in stereo, on a *Sony* mini disc recorder, and also on a portable laptop directly onto hard disc. For these recordings I used a *Rode* stereo condenser microphone. The traffic rumblings have been treated with equalization, reverberation and some delay treatments. I imported the recordings into a *Pro Tools* multi-track recording environment, which was then mixed down to a stereo format. I chose the stereo format because I wanted the pre-recorded sounds to blend into the symphony orchestra sonic mix, without spatial displacement. The first and last sections of this movement reflect my desire to sound the traffic as a reflection of Aboriginal digeridoo sounds, which is further imitated and developed in the orchestration of the low strings, low brass and bassoons.

Additionally, I was interested in exploring the phenomenon of selective deafness. This is an increasingly unconscious coping activity in the growing sonic clutter and increasing decibel levels of modern urban culture. The highway environment is a modern phenomenon, embracing each separate car's internal environment together with the shared external environment. In these two zones all kinds of sonic mixes occur simultaneously. This movement reflects some of this unconscious sonic world. It does so by mixing the initial external sounds of the car engines with the low

register canonic loops in the orchestra initially in the celli, bassi, tuba and basson. The three middle sections develop faster rhythms and shorter phrases to reflect the internal sonic environments.

Refer to the score excerpt on the following page for an example for initial textures:

First section – bar 46, initial drone textures



The woodwind and percussion sections lighten the static sustained textures that are omnipresent throughout this movement. They provide a textural contrast over a four-octave range with a range of articulations and sense of surprise as these sections are partly improvised. Each performer is given a set of pitches, duration and dynamics. The players are given these elements that allow them to order the given pitches in their own way and with a choice of duration. The result is an unpredictable set of melodic variations, the texture being restricted to the given materials. This is very different to the slow moving and continuous string textures which are almost static in nature.

I developed a technique that I have termed 'tilting' the pitch by moving the pitch of the entire ensemble tutti one quarter tone ascending and descending, before returning to the original note. In addition the various falling glissandi passages in the strings diffuse the key centres inherent in the brass chorale passages. This highlights the 'distressed' qualities of these chorale sections, significantly altering the sonority of the traditional phrasing and rhythmic designs. The chorale sections are not precise, nor of a stable rhythmic pattern. Instead they become increasingly unpredictable in design and these elements add depth to my artistic intention.

Conclusion:

Low Traffic is a music theater work that enriches the experience of attending a live performance of symphonic music by integrating electroacoustic resources and playback technology with multi media elements. The physical location of the concert hall experience has also been extended to include the external environments, in both the exterior and interior zones of the orchestral auditorium. This expresses an aesthetic dimension to embrace the background listening habits of our culture and integrate them into the notion of extending the boundaries and compartments that characterize contemporary concert rituals. The addition of interactive video and film projections into the work further extends the sensory language to include close relationships between image and sound.

Chapter Nine – Work 4 :

Instrumental Music Suite

1. ***Sonic Code*** – for electric violin and playback sounds
2. ***Double Rainbow –*** for electric flute and two delay samplers
3. ***Blues for the Avant Garde. –*** amplified piano
4. ***Chitter Chatter -*** for amplified cello and clarinet
5. ***Chika's Transformation –*** for amplified shakuhatchi and playback sounds

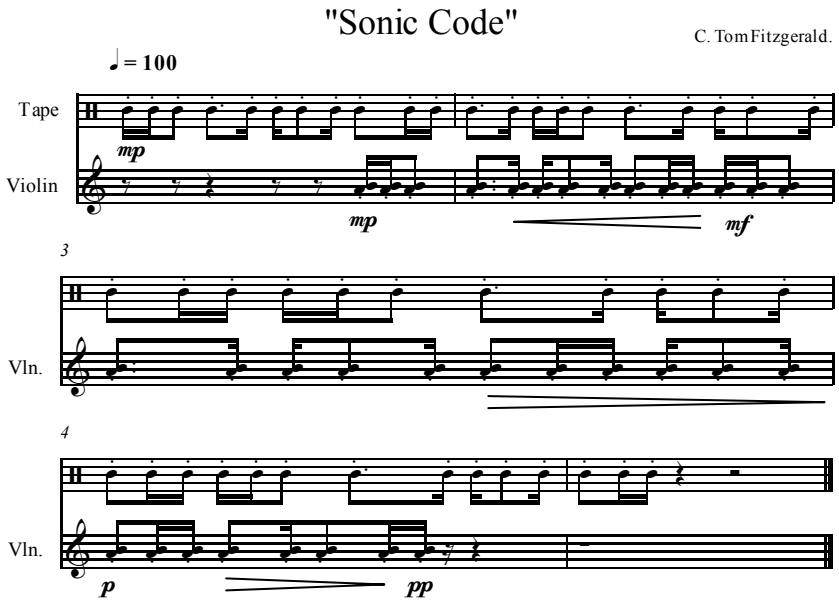
1 . Title of the work: *Sonic Code*

Resources: Solo Electric Violin, Samplers and Pre-recorded Playback Sounds

Duration: 12 minutes

This work is for solo electric violin, samplers/delay signal treatments and pre-recorded playback sounds. It explores the sounds of coded processes, such as digitization of various data over the internet and the concept of rhythm as series of patterns or codes. The notion that human languages can be digitized and translated into numerical binary code also inspired this work. It explores micro codes and macro codes that become recognizable patterns and it is further informed by relationships between embedded inaudible human body codes such as the silent mathematics of the genome code and the aural patterns of heartbeat codes. This exploration takes place in the interaction between the pre-recorded sounds (e.g. heartbeat patterns) and the rhythmic variations that the electric violin develops around these materials. Please refer to the following score excerpt from

the beginning of the piece, illustrating the close relationship between the pre-recorded and live materials:

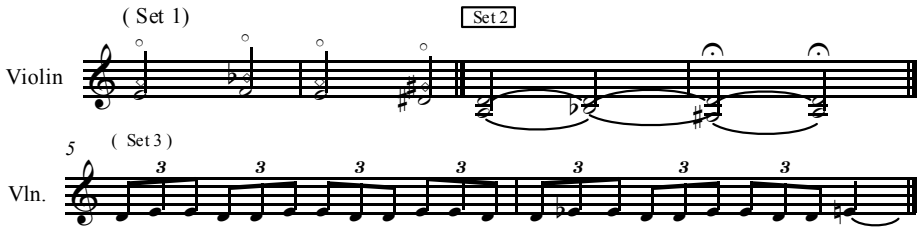


Other sonic languages and translations of language into numbers and audio patterns, such as morse, radio, television and internet codes, also provide rich sonic material that was collected and manipulated with *ProTools* software and mixed down from twelve independent tracks to two. This sonic material accompanies the live solo electric violin that interacts with this soundtrack. The work is constructed in two sections, a free fantasia introduction, followed by a very fast and pulsitile rondo - that explores the rhythmic patterns of the various codes, developing relationships and transformations between them. The music is scored for a solid body four-string electric violin made by *ZETA* in the USA (1998).

This work explores electronic extension and amplified detail of timbral changes and articulated rhythmic propulsions. The electronic extensions of the electric violin sounds are achieved through the use of two sampler and delay modules. These are hardware samplers made by *Roland* and *Line 6*. The electric violin signal

is sent to these two devices in a parallel patching. This allows for the signal to be processed in many different ways, including simultaneous or delayed processing where the sampled sounds are captured live in real time, during the performance of the work. It is a process that also allows for flexibility in the creation of cyclic loops and delay times while exploring patterns, codes and unusual textures.

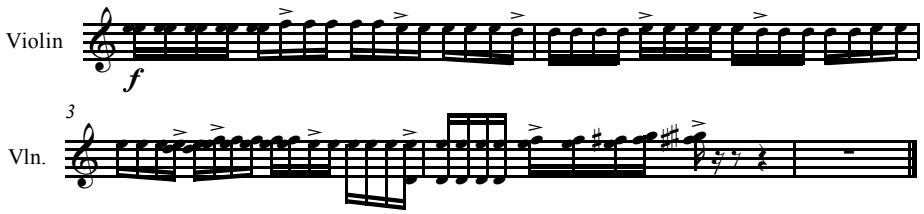
The sonic codes also develop out of rhythmic and pitch materials sounded in the initial violin introduction and the pre-recorded sounds on the stereo CD that accompanies the electric violin. The pitch materials are organised into interval sets that are modulated through the low, middle and high registers of the violin.
Refer to the score example below:



Throughout this work the coded melodic and rhythmic patterns are developed in two ways. Firstly, they are notated in a series of cellular developments. Notes and rhythms are sequentially moved through progressions of beat and shifting accent displacements. This achieves a logical mathematical series of relationships. For example, the accents shift from beat to beat in an organised pattern. Four

example, 1 plus 4 (a five semiquaver sequence that modulates through the four semiquaver beat metric structure), shifts the patterns across the beats.

Refer to the example below:



The other way that the material is developed is via improvisation. In these improvised sections the electric violin player sets up a series of loops with the two samplers and then improvises given melodic and rhythmic material over these looped phrases. This interactivity achieves a spontaneity that is unpredictable, an opposing process to the former notated sections. The contrast is reinforced further by the formal design of the work. The opening and closing sustained textures are quasi-improvisational and static. In contrast, the middle section is very much the opposite, being very metric and pulsitile. The work concludes with a combination of the two concepts, the notated and pulsitile sections combining in long phrases that repeat and fade into silence.

The pre-recorded sounds provide a wider pitch range and greater harmonic complexity than the electric violin resources. In addition, these rhythmic patterns and collected sounds are combined in ways that are far more complex and

intricate. The pre-recorded sounds provide an enriched sonic dimension that frame the violin part, as well as interacting in imitative patterns with the violin material. In this way relationships are developed between the two and the work forms a coherent and reinforced structural design.

2. Title of the Work:

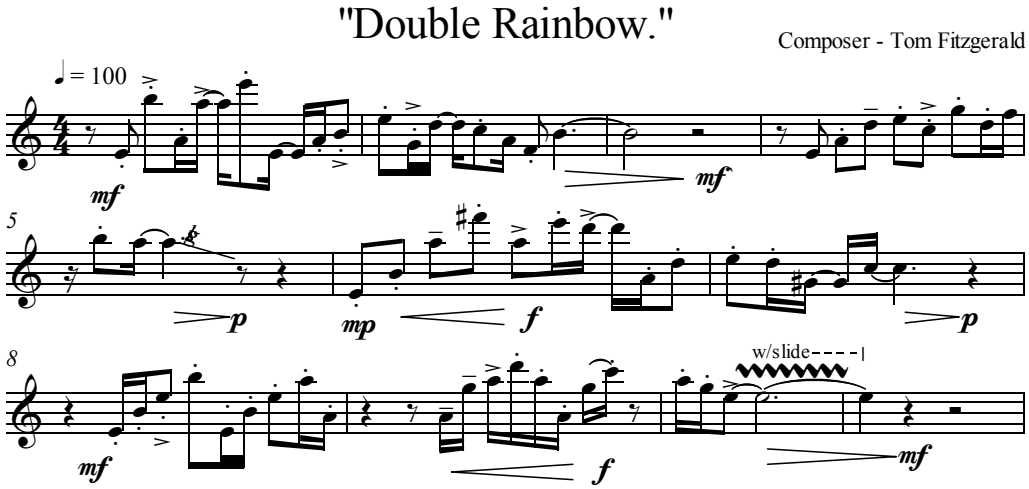
Sonata Electric Flute and Samplers – "Double Rainbow".

Resources: Amplified acoustic concert flute, two delay signal treatment modules.

Duration: 8 minutes.

Scored for a solo amplified concert flute and two real time delay signal treatment modules, this work explores the contrasting nature of disjunct and conjunct melodic figures. These two types of horizontal melodic activity are combined with the canonic repetition of the sample and repeat digital delay signal treatments. The application of the delay line signal treatments provides a harmonic and textural complexity to the work based on the initial materials as sounded in the solo flute part. This provides structural and thematic cohesiveness, the materials being repeated and layered with direct links each other.

This is illustrated in the following musical example from the opening section of the work:



The work is based on quartal harmonic and melodic materials that are based around the key centre of A dorian minor. The melodies are introduced in a series of wide interval arpeggiated figures that are interspersed with silence at the end of each phrase.

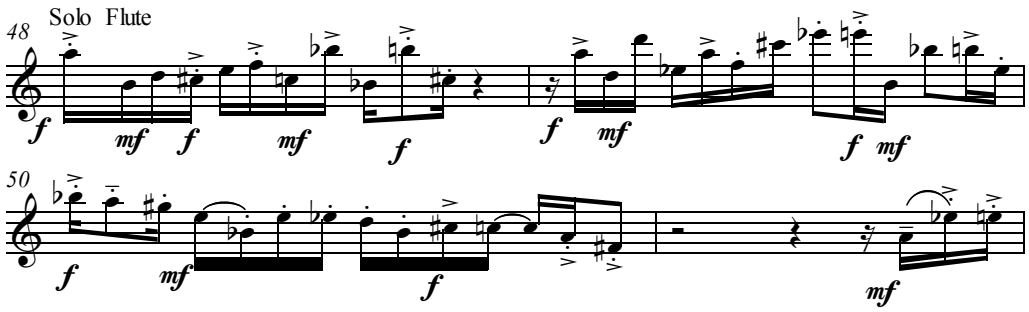
This pattern of alternating activity and inactivity forms the basis for the entire formal design of this work. At bar 17 the second melodic type of melodic material is introduced as long sustained adjacent tones in a six-bar sequence. The introduction of the delay signal treatment at bar 10 begins to gradually build a polyphonic textural complexity that expands to dominate the second part of this movement.

The work is divided into three sections:

Section A	bars 1 - 45
Section B	bars 45 - 64
Section C	bars 64 - 94

In section one the basic materials are introduced, in the second section the melodic material is developed in a series of phrases that now lie in a very restricted pitch range. The texture is reduced to the solo flute line only, as rhythmic complexities are developed. This reduction of texture enabled a greater focus on the rhythmic displacement activity in the melodic line as different parts of the beat are accented. This dynamic propulsion is constructed in an asymmetrical way that gives momentum and unpredictability to the music.

Refer to the excerpt on the following page:



I reintroduced the signal treatments at bar 54 to create a reference into the next section, as well as creating contrast with the previous phrases. At bar 62, a second delay signal treatment is added, this one being slightly softer than the first delay line and also longer in length of repeat--at eight seconds decay time, the first delay line being set at four seconds decay time. This reflection of the first delay line creates dense harmonic textures with a rich contrapuntal quality. This re-echoing of the first delay is a second aural refraction of the initial flute sounds and gives the work its title with the reference to the visual phenomenon of a double rainbow, each an exact canonic and arpeggiated 'white light' refraction.

The work concludes with a codetta that extends the pitch beyond the playable range of the flute in a series of semi-pitched and non-pitched phrases. These gradually fade to nothing and so conclude the piece.

3.Title of the work:

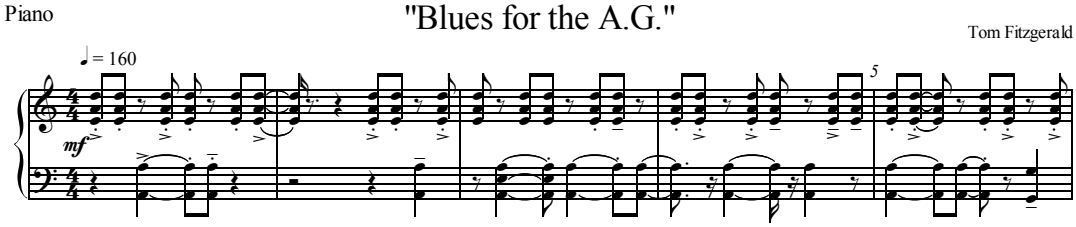
Blues for the Avant Garde

Resources: Amplified acoustic grand piano, reverberation signal treatment unit

Duration: Six minutes

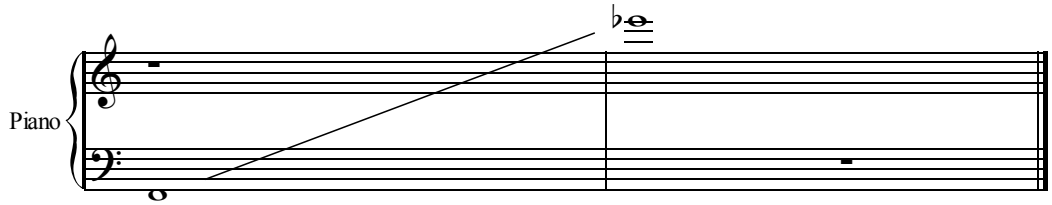
This short piece for solo acoustic piano explores the sounds and rhythms that are referenced by electronic phase rhythms and textures. In addition, this work explores repetitive rhythmic cell patterns in a flexible way that simultaneously develops change in several parameters, dynamic, rhythmic, harmonic and textural. In this piece I explore repetitive processes and gradual harmonic change as well contrasting the rhythm, dynamics and pitch modulations.

The changing rhythmic modulations reflect a longer process of phased change; only in this miniature work the effects of displacement are explored in a miniature form as structural and expressive device.



This movement uses minimal musical material in both pitch and rhythm and employs a ritornello/variation design to develop the structural framework. The reference to minimalist techniques such as the process of gradual change over a long period of time, as developed by Reich, Glass and others, and are only partially utilized here. Instead of the established tradition of repetition, the process is interrupted. Other development procedures are engaged in this work, these include faster rates of change and asymmetrical phrase structures. These elements create a quality of unpredictability, a desired outcome, achieved by the unorthodox application of minimalist techniques of the 60s and 70s, and further reinforced by a faster rate of change and development.

The tessitura is focussed entirely in the middle register of the piano keyboard over a three-octave range, from F natural -- two octaves below middle C, up to E flat -- two octaves above Middle C.



This restricted pitch range intensifies the gradual changes in rhythm and dynamic. I did not want to distract from this middle register as the repetition creates an increase in overtone resonance. The sustain pedal is depressed for long periods in this work, especially when there is little harmonic change. The sustain

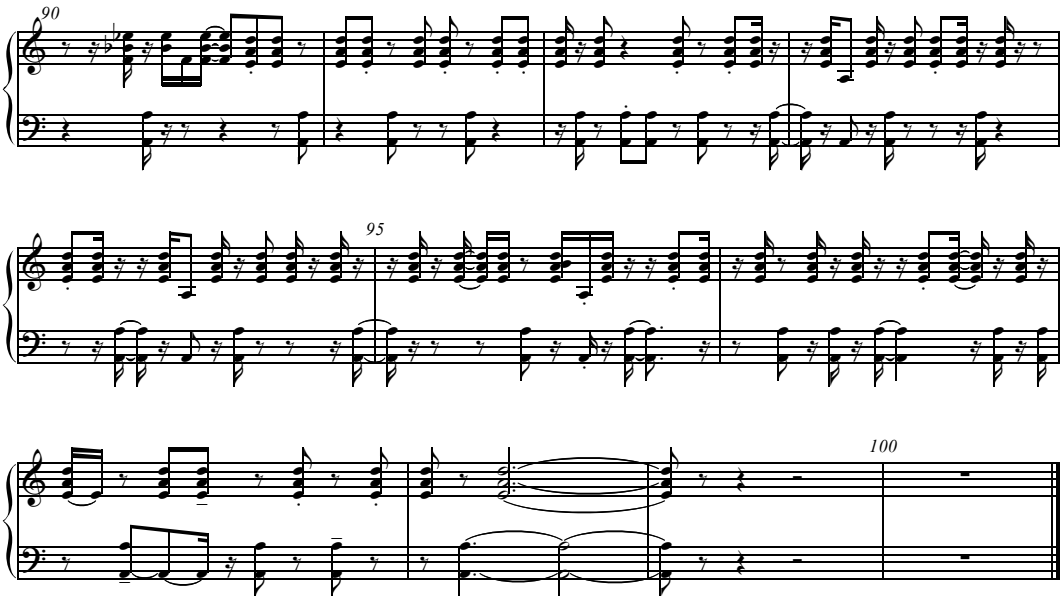
pedal facilitates a gradual build up of overtones, a process that adds deep resonance to the aural texture. Resonance is further enhanced by the employment of moderate amplification and signal treatment reverberation. I set the envelope decay time to 3.5 seconds. I utilized a reverberation hardware unit manufactured by *Yamaha* model SPX II.

In the close voiced quartal and cluster chords, various densities and consonance-dissonance contrasting harmonies are explored. This process of exploration forms the structure of the ritornello/variation form of the work.

There is a three-part structure overlaying the variation form as well, as follows:

Section A	bars 1-30
Section B	bars 30-55
Section C	bars 55-91
Codetta	bars 91-100

Throughout these broader sections the initial A minor ritornello theme/motif returns in various phrase lengths. For example, at bars 38-42, at bars 50 –55, at bars 65-67, at bars 75-77 and in the codetta bars 91-100. The final sounding of the theme is stated in transformed rhythmic patterns. These achieve a more fluid language, less locked than in the opening. Refer to the score excerpt below:



The pitch materials are organised in the context of the standard equal temperament tuning system. As already noted they are set in the middle register of the piano over a three-octave range. Within this pitch range I have constructed chords based on intervals of a perfect fourth to create a quartal harmonies. There are harmonic qualities in this type of chord that create very consonant and rich overtone resonance in the sonic fabric, reinforced by the repetition and the dynamic crescendo swells in the opening section. I have also included cluster and stacked chords of various types to create dissonance, contrast and harmonic momentum amongst the more static harmonic progressions. For example, this process begins at bar 22, where a chromatic transition passage leads into the second section at bar 30 where the rhythmic modulations begin. Similar transitions occur leading into the third section, at bar 55, where the chord density is greater and the rhythmic activity more varied. This is the climax of the work forming new

relationships within the initial material and leading to the reformed statement of the theme at bar 91, which concludes the work.

4 Title of the work:

Chitter-Chatter

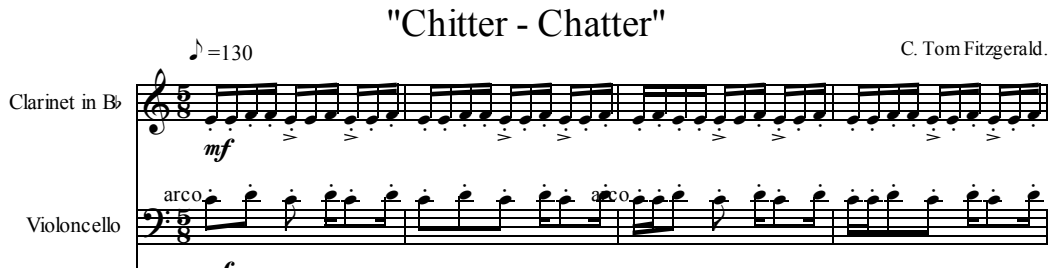
Resources: Amplified Clarinet and Amplified Cello

Duration: 5 minutes

There are several versions of this work, one for amplified string quartet (fourth movement), one as a miniature piece for acoustic clarinet and acoustic cello, and a third version for amplified clarinet, amplified cello, electronic and sampled sounds and multimedia projections.

All three pieces explore different developments of a ten-note melodic cell pattern

(see below).



The first of these, the version for string quartet, explores the material within the resources of the amplified string quartet environment, extending the material to include a wide range of harmonics, and semi-pitched materials. This work has already been discussed earlier in this thesis in Chapter 8.

The second variant of this work is a miniature treatment that explores the melodic cell in a rondo dance form that is constructed as follows – A, B, A, C, A, over a five minute duration. The material is a set in 5/8 time and develops extensive beat displacement patterns and rhythmic syncopation in the episodes B,and C .

The form is as follows:

Section A	bars 1-14
Section B	bars 14-27
Section A2	bars 27-39
Section C	bars 39-50
Section A3	bars 50-80

The return of the A section features a counter melody in the cello and then repeated by the clarinet in the final section. These A sections are less varied and very repetitive in contrast to the B and C sections which feature free chromaticism and irregular rhythmic treatments. This gives the work a strong contrast to the symmetry of the first patterns and elements of unpredictability. There are additional chromatic notes in these middle sections that clash with the established C major tonality and the simple harmonic progressions of the tonic/dominant/subdominant/submediant pattern. These chromatic notes are powerful elements that create momentum and textural/rhythmic contrast in this short work.

This piece is primarily concerned with rhythmic momentum, dynamic propulsion and contrapuntal textures. It deliberately employs very simple harmonic triad structures and modal harmonic progressions to delineate the rhythmic changes and sense of momentum.

The asymmetrical mixed meter patterns are explored in a dance rhythm character. *Staccato* and *marcato* articulations are used throughout to embody the dance spirit and also to further propel the additional syncopations and cross accenting within the time meter. This is a study of rhythmic and dynamic propulsion in a small form.

5 Title of the work:

Chika's Transformation

Resources: Amplified Shamisen, Amplified Solo Soprano Voice, Amplified Solo Shakuhatchi and delay, reverberation signal treatments

Duration: Seven minutes approximately

This work is constructed in two distinct parts. Both are part of a larger new media live performance work and radio broadcast version of the same piece. The larger work is based around the true story of a recent event that occurred in Melbourne (1992 –2002).

A miscarriage of justice occurred when a 1992 Japanese tour group was arrested and later jailed for allegedly possessing heroin on an incoming flight to Melbourne. The group of six tourists included one 35 year old woman, Chika Honda, who was deported to Japan in December, 2002 after serving a 10 year sentence in a regional jail at Geelong, outside Melbourne. Her case is currently being investigated by Australian and Japanese law firms. They are attempting to clarify the reasons and legal process for why she was judged as a group entity along with the other five members of the tour, rather than being considered as an individual person with access to an adequate interpreter.

This work deals with the emotions around this tragic event. The plight of an individual unjustly incarcerated is portrayed in these two movements that deal with a theme of inability to cope, and in the second movement a transformation from despair to acceptance and transformation. In real life Chika did attempt

suicide and she later moved through this despair to a realisation that there was a purpose for her life, as she states:

> I tired to kill self. I cut my wrist two hour, many time, and
> put in a water. But I can't. I think God give me more life.
> Not your time yet. I think God said, not time yet.
> You need life more longer… (Kanamori 19)

Both the first and second movements are deliberately short, intense and employ a range of subtle variations and gestures that create momentum in the music. Neither work utilises time in a measured metric sense. Instead, in order to create a feeling of timelessness and non-linear sense of time and place I explored the use of phrase variation and improvisation. Furthermore, the first movement is purely electronic; it involves the treatment and looping of pre-recorded samples and phrases that were combined as audio materials in a montage of fragments and bits of sound.

The core materials for this work were audio recordings that I captured on a hard disc recorder (Apple G3 laptop), during a workshop rehearsal in Sydney with the Koto/Shamisen/Soprano, Japanese virtuoso Satsuki Sadukura. I recorded directly into a hard disc recording program *Cubase,* and later manipulated and treated the audio recordings with a variety of procedures.

I wanted this short introduction movement (2.30 min), to convey a sense of sonic confusion and despair. I combined the koto, shamisen and vocal tracks into a multi-track file that was treated with a range of reverberation times and delay treatments. I achieved a sense of circular time by combining three five and eight

second loops with tracks that were not looped, but instead had a very deep reverberation time (six second decay), as well as a one second delay effect which doubled the sound immediately. The vocal fragments appear at the mid-point, at 60 seconds into the work, at first evenly mixed in balance with the other audio elements, and then at 1.30 seconds a little louder in volume, as an anguished cry. These events are all incessantly accompanied by a percussive effect of the koto string being struck with a wooden stick. This audio fragment has been equilised to reinforce the mid-range and higher frequencies in order to create a sharper attack. I then repeated this loop throughout the movement as an asymmetrical rhythmic device to impart momentum, propelled by the variation in dynamic level and depth of reverberation treatment. I refer the reader to the audio recording of this work in Appendix Two.

Second Movement

A more traditional and extended sonic world is created in this movement for amplified solo shakuhatchi and audio treatments, reverberation and delay. This work contrasts with the previous movement in other ways as well. The first movement is one continuous envelope of continuous sound; the second utilizes silence between phrases. Further this second movement requires a live performer who improvises phrase variations, momentum and pitch embellishments.

The score in Appendix One illustrates the framework for the improvisation; the pitches and melodic phrases are constructed with definition. However, there is no

metric pulse for this work, a fantasia to be performed with an improvisatory spirit. The performer has three variations of the same set of notes, each variation becoming more intricate in the number of ornamentation, dynamic and microtonal variations. The last variation begins in a more agitated and louder dynamic than the more subdued first variation.

I was pleased to combine the rich acoustic and traditional shakuhatchi sonority with the added dimension of amplified breath, finger noise and mouth articulations. These sounds are at times the most dramatic elements, especially when combined with the incessant reverberation (a 4.5 second delay time), and a 0.5 delay treatment. This short delay time means that only some sounds (shorter duration sounds) are affected, while the more sustained longer tones absorb the delay envelop into themselves. It became a very subtle and effective technique.

Chapter 10 – Work 5:

Multimedia Suite

1. ***I Can Hear You Now -*** for large electroacoustic ensemble and prerecorded sounds

2. ***The City of Yes and No -*** for large electroacoustic ensemble and signal treratments

3. ***Lament -*** for multimedia ensemble and interactive multimedia

4. ***Ensemble Riffs -*** for multimedia ensemble and interactive multimedia

5. ***Chika -*** for multimedia ensemble and interactive multimedia

Introduction

I composed a series of eight works in 2000-2004 to develop new directions between music and multimedia. The new works were composed for an ensemble that was specifically formed to realise them. In a series of three concerts, at the *Chapel-off-Chapel Arts Centre* in Melbourne, the ensemble performed large ensemble (eighteen players), smaller ensemble (eleven performers) and solo works. Some of these included extensive intermedia and multimedia interactivity. Other works concentrated on sonic interactivity with group improvisations and experimental audio signal treatments.

I have chosen five of these new works for electroacoustic performance ensemble and multimedia elements to discuss here. In these works I wanted to integrate a new interactive software program, *Videodelic*, with sonic and visual material. In addition, I wanted to explore ways of articulating and developing vocabulary

between live and pre-recorded material. I also wanted to explore the nature of interactivity, both in audio signal treatments as well as visual/sonic media areas. Most importantly, I wanted to create new electroacoustic new media work, and combinations of sounds with the rich resources of this unusual ensemble.

The articulation of these artistic goals led to a defining of creative process and the integration of technology. I decided to limit and focus the application of technology to specific areas, such as specific audio signal treatments-delay, tone filters, octaviders, and gated reverberation. In a similar manner there are defined parameters for the interactive video software, *Videodelic*, the visual interactivity being interfaced by audio signal captured by microphones. This software program is explained in the following excerpt from the program instruction manual:

> *Videodelic* is a tool for creating dynamic visual performances from still images, *QuickTime* movies and live video input. It provides dynamic special effects and filters which can be applied in real-time to create responsive live video art. *Videodelic's* effects can move, scale, distort and remap visual input to create astonishing performances from simple sources. In performance, *Videodelic* can respond to audio input, MIDI, the computer keyboard, mouse movement and more. It also features the Montage Room, an environment for creating *Videodelic* compositions, which can be either performed in real time or rendered as a *QuickTime* movie. *Videodelic* has a wide range of applications. It can be used as a realtime instrument for performing live visual accompaniment to music. It is also possible to create standalone installations or full-length multimedia compositions, and further use it to create special effects and title sequences for video post-production. (*Videodelic* software notes 3).

These works evolved after a conceptual period of exploration of this new software, *Videodelic,* and manifested in the already mentioned three concerts at the experimental arts centre, *Chapel-off-Chapel*, in Melbourne during 2001 and 2002. The initial exploration period informed the new compositions and the ensemble with a number of possible directions to follow. These included refining the textural and rhythmic balance by adding four additional hyper-cardioid condenser microphones (*Neumann* model U87) to the four that were already in place, adjusting the equilization over the entire ensemble at the mixing desk, and keeping the internal dynamic levels low. This last factor is crucial for the incorporation of electronic instruments, amplified percussion and acoustic instruments and singers. The experimental and rehearsal periods suggested how to structure improvisation and defined areas of interactivity (amplitude and rhythmic triggers) as well as aspects of focus between the visual and the sonic dimensions (tone colour/pitch registers and visual elements of colour and pattern change). I also explored the blending of musical elements with lighting and dynamic levels, for example softer dynamic levels with muted lighting, and intense primary colour lighting to highlight important musical transition sections.

Each concert explored different aspects of new media environments, building on the discoveries of the earlier events. There were successes and failures in each event and these informed the development for each subsequent concert. For example, the first concert was successful in developing electroacoustic sound combinations between operatic and popular singing and ensemble sounds. However, the improvisation elements were difficult to integrate and retain structural cohesion. The music for the first concert was composed for a hybrid

ensemble of seventeen musicians. This electroacoustic chamber orchestra comprised of the following instrumentation:

- amplified piano/electric solo violin
- four amplified ensemble violins
- three amplified ensemble celli
- one amplified solo flute
- one amplified acoustic guitar
- one electric bass
- two percussionists
- four singers

In this concert the main exploration focused on musical areas, such as orchestration, improvisation, dynamic and timbral balance. The visual elements were restricted to the traditional white concert lighting that is standard for many serious music event presentations and a more traditional visual context for the presentation of this kind of new music concert. The first two works discussed below detail the outcomes of this kind of work.

The second concert explored the addition of visual interactivity linked by an audio interface, the microphone. A lighting design was created that utilized a range of colour and intensity of light to increase the sensory experience for the audience. This lighting design was loosely based around the primary colours red, blue, and yellow as well as the neutrals, black and white. These were mixed and filtered to produce a wide range of expressive visual effects, from entire ensemble washes of light to solo sections with coloured pencil spotlights. This use of varied lighting and sound was given a new context when it combined with the projections of integrated still images and interactive image patterns. These required a subdued

lighting and the use of various focused spotlights on the live performers to enable the screen visibility.

This second concert event used a reduced ensemble that incorporated a more extensive use of electronic signal treatment of the individual instruments. This smaller hybrid ensemble of eleven performers had the following instrumentation:

- amplified piano/electric violin-viola
- one electric violin
- one amplified viola
- one electric flute
- two percussionists
- one electric bass
- amplified digeridoo
- three singers.

The smaller ensemble explored textures of solo, duo, trio and quartet instrumental combinations, as well as large ensemble orchestration in the electroacoustic realm. This experimentation produced some very unusual and effective voicing and tone colour mixes that relied on the amplification and equalization to produce the dynamic and textural balance demanded by the musical design, for example, when the amplified digeridoo is combined with the harmonics of the electric violins in the opening section of *Lament* . The use of specific lighting design further enhanced the musical experience and proved to me that careful use of light, including reducing the light, is an important sensory factor in this kind of multimedia and new music event. This is used in a new context when combined with interactive projections as the visual colour changes and types of activity modulate with each other. They also interact with the sound forming

new sensory dialogue, enhancing the sense of intimacy and sonic detail. It also intensifies awareness of the rhythmic, textural and dynamic parameters of combined new media resulting in a fusion of the sonic and visual elements. When these elements are working effectively with each other, the sensory experience is greatly empowered. The art forms a new media language that addresses the dominant cultures of our time, television, film and mediamatic culture, in an integrated live performance and screen interactive event.

The scope of these discoveries was enhanced by the incorporation of improvisation into the structured scores. This is detailed in the discussion that follows on each individual work and I was very conscious of the extension of the late Baroque and early Classical chamber orchestra traditions of combining strictly notated music with improvised sections, and/or soloists. These were at a zenith in the *concerto grosso* forms, solo, concertino and textures being combined with extensive improvisation sections. Masterworks from the Venetian late baroque period (1700-1750) are good examples of this activity and include works by Vivaldi (e.g. *Four Seasons*), Corelli (e.g. *Christmas Concerto*) and Albinoni (e.g. *Concerto Grosso in G minor*). The reawakening and extension of this tradition works very effectively in the electroacoustic chamber orchestra medium. The structured sections and notated parts give a focus and definition of intensity to the improvisation.

The Five Individual Works

These five works form a *Multimedia Suite* that explores some of the different dimensions of this vast new media genre. The sonic information is interfaced into a computer, in this case an *Apple Powerbook G3* model, and projected onto a large screen, in real time.

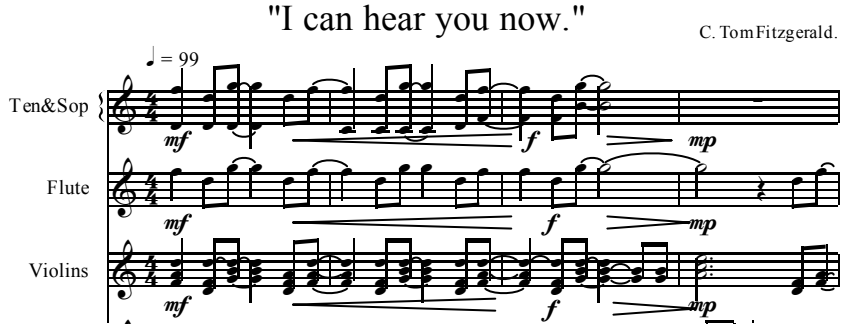
I used *Videodelic* as a real time interactive element in two of the works discussed here. The use of less interactive projections and blank coloured screen panels also formed a reference for modulating sensory attention and focus. This is very different to the earlier works *I Can Hear You Now* and *City of Yes and No*, which are performed without interactive visual media. The focus in these two works is on the sonic activities and textures in bright white stage lighting. The three later works, *Lament*, *Ensemble Riffs* and *Chika*, explore the effect of direct interface to the visual elements via audio input. These are detailed in the individual discussion of the works as follows.

I Can Hear You Now

In this piece I explored rhythmic and contrapuntal textures. This involved combining syncopated and backbeat jazz/rock rhythms with more symmetrical on-beat rhythmic patterns. In addition, I utilized the melodic and timbral clarity of the string section (4 violins and 3 celli) to create contrasting textural counterpoint with the percussion, bass and piano. This work also combines and extends a number of performing and stylistic traditions by building new relationships in this hybrid electroacoustic chamber orchestra ensemble, as listed below:

- Operatic and popular singing traditions combined with jazz and rock back beat rhythmic gestures
- Improvisation combined with strictly notated music
- Noise and semi-pitched materials combined with key centers and major/minor tonal languages
- Symmetrical rhythms and phrases combined with asymmetrical time elements
- Collected sound samples of telephone noises and voices combined with looped rhythmic chants
- Acoustic sounds blended together with electronic textures.

Although there are at least three decades of related hybrid ensemble tradition, as outlined earlier in this thesis, in Chapter 4, this ensemble explores interactivity and electroacoustic sound resources in new ways. These include combining digeridoo, opera singers and electric string instruments with interactive audio and visual media. The result has been an eclectic mix of dynamic and unpredictable music articulating my artistic intention to combine this wide range of elements. I have used pulsitile driving beat textures often as a unifying element to links the many disparate materials. In addition, I have varied the density of texture and dynamic contrast and modulation to create variation and focus in this music.



This process allowed me to develop well-known, less familiar and new orchestrations, voicings and pitch materials into a coherent piece. The combination of operatic traditions and popular music elements with new media and electroacoustic textures presented a series of new possibilities. These were essential in the creation of this work – one that explores a contemporary story of family breakup and government agencies, in this case "The Child Support Agency".

This piece employs four singers who are engaged with mobile telephone calls to an Australian Government Department, the Child Support Agency. In contemporary Australia, 2004, the incidence of family breakdown is disturbingly high, with more than one in three marriages resulting in breakdown and divorce. (Relationships Australia)

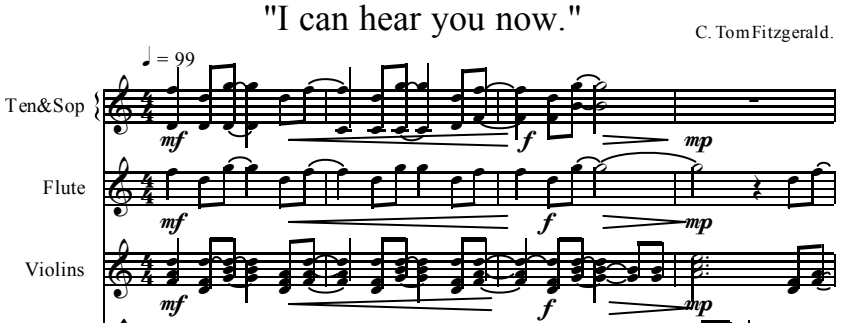
The four singers are involved with this very common social activity, one of the singers is negotiating with the Child Support Agency, via a telephone call. Two of the other singers (both non-operatic mezzo soprano voices) are on telephone "hold and wait", the other two singers (one operatic soprano voice and one operatic tenor voice), are in conversation. In fact these last two operatic singers were once married and are now in dispute. Their telephone lines becoming 'crossed' exacerbating this acrimonious situation, and they gradually become aware that they are in conversation with each other. This narrative underpins the structure of the work.

I would refer the reader to the printed score (see appendix 1) and the DVD film (see appendix 2), of a performance of this work. The electroacoustic chamber orchestra consists of the following instrumentation:

- amplified piano/electric solo violin
- amplified ensemble violins
- three amplified ensemble Celli
- one amplified solo flute
- one amplified acoustic guitar
- one electric bass
- two amplified percussionist
- four amplified singers.

The orchestration combines with prerecorded elements – mixed to a stereo CD that accompanies the live performance and is mixed in and out of the score by the sound-mixing desk. These are the sounds of telephone sonic environments as well as loops of adult and children's voices. The pitch and rhythmic materials are constructed from three syncopated cell rhythmic motifs that are contrasted with sections of improvisation in the middle sections of this piece.

Cell 1 --



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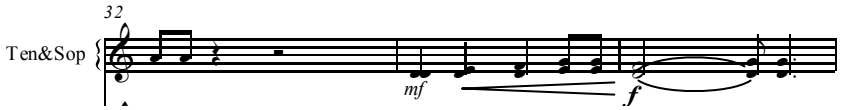

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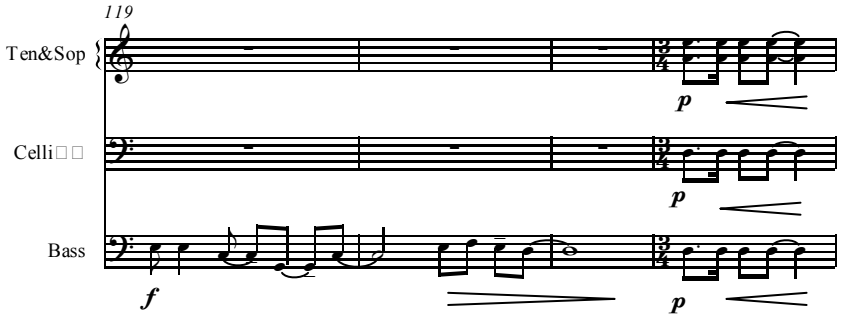


This work is constructed in four sections:

Section A	bars 1 - 33
Section B	bars 33 - 61
Section C	bars 61 - 106
Section D	bars 106 - 140

Each section deals with a different aspect of the development of the piece. Section A – introduction, the initial rhythmic cell is presented within a four bar

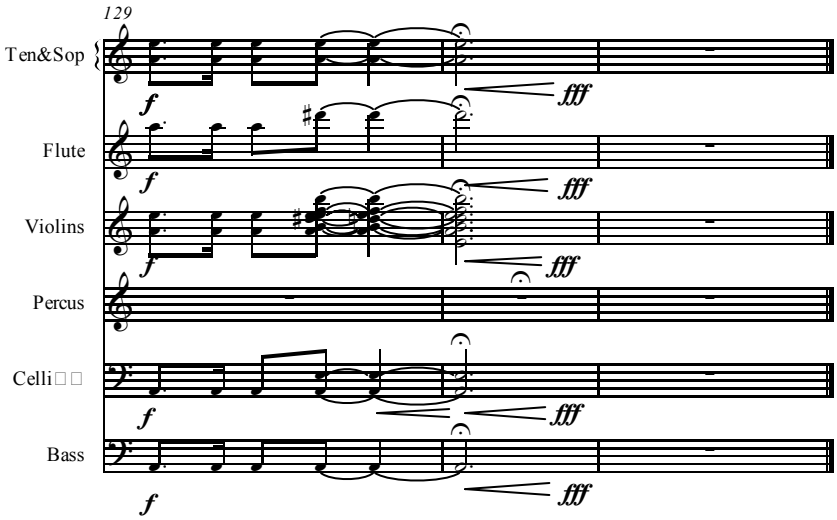
syncopated phrase that repeats, (loops), ten times. This rhythmic cell is based on the speech rhythms of the singers lyrics 'hello, hello'. Each repetition introduces a new element so that by the end of this section a very dense texture has evolved. The four voices are then introduced together as an ensemble, with a chant motif in 3/4 time, and a speech rhythm based on the lyrics, 'bu-sy, bu-sy', develops. This plays across the 4/4 beat gradually becomes louder in this next four bar phrase which is also repeated ten times. The four repetitions of this phrase introduce the initial instrumental rhythm with the vocal line and text/lyric, 'hello, hello', in the operatic voices, (soprano and tenor), while the other two singers freely improvise the previous lyric, at a softer dynamic level, crossing the antiphonal melodies in the soprano and tenor, in unpredictable ways.

At bar nine the focus is on the two opera voices, the other two voices fading out to allow the duet (conversation), between the soprano and tenor, to further develop. It does so by gradually increasing the motif length so that by bar 33 a more lyrical melodic context has developed.

In this B section the soprano and tenor alternate in a slowly ascending D aeolian minor scale over eight bars. At bar 41 the tenor voice climaxes in the extreme top end of his register - almost two octaves above middle C. In a sequence of three descending four bar phrases he sings a new triplet rhythmic motif, with a new speech rhythm based on his lyric/text, 'I can't keep living like this'. This triplet sounds against the relentless 4/4 beat patterns semi-improvised by the guitar, bass, piano and percussion. The following phrases to bar 61 return to the initial rhythmic material, only now with a new text, and the build up of rhythmic complexity with the fading in of the 3/4 chanting in the two mezzo-sopranos, the 'bu-sy, bu-sy' motif

Section C, is a parody of the ubiquitous telephone "on hold" music environments where very often, predictable, repetitive music patterns and genres are mindlessly looped incessantly. In this section the iconic music evocation consists of instrumental improvisations in the acoustic piano, and the electric bass, interspersed with a return of the operatic voices between the two solos. In this section the prerecorded sounds of adult and children's voices fade in and out at random, improvised by the sound mixer. In addition, there are notated parts for the string section and the solo electric flute that contrast the improvisation solo parts.

The final section D consists of a gradual increase in texture and volume. The four singers return to the 'bu-sy, bu-sy' chant, increasing in volume and fading out three times until finally increasing in volume, different speeds and random pitches. This activity is reflected in the orchestra and the work concludes in chaos, on a sustained single atonal harmonic cluster chord.



The amplification of the acoustic sound is an important factor in this piece. It allows for a very wide range of tone colour and expressive detail to be a part of the sonic fabric. Detail that would remain inaudible, such as the breathing of the

singers becomes an important sonic resource in this work. The role of amplification in this work serves also to blend the acoustic and electronic sounds at both soft and loud dynamic levels. It creates a more balanced mix of sonorities, especially between the individual voices of the vocal quartet and the interspersed interactivity with the electronic sounds. This is a piece with an enormous dynamic range, dynamic propulsion and articulation nuances, all of which require the use of balanced amplification that is mixed in real time by the sound desk operator. In this sense the mixing desk is an additional musical instrument, a vital component of the orchestral ensemble.

2.Title of the work: The City of Yes and The City of No

Resources: two non-operatic mezzo-soprano voices, strings, flute, electric bass and percussion

Duration: 7 minutes

I based this piece on fragments of a poem by the Russian poet Yeveny Yevtushenko, which gives this piece its title. The duration of this work is seven minutes, making it a slightly shorter work than the previous piece : *I Can Hear You Now* . It is structured into three distinct sections, ABA ternary form, and scored for two non-operatic mezzo-soprano voices, strings, flute, electric bass and percussion. The two vocalists improvise half-sung and spoken phrases in a *sprechstimme* tradition. Their voices are amplified by several microphones -- some of which are extensively treated with signal processors (delay, reverberation, notch frequency

filters and octave dividers). In this way their vocal sounds can be radically altered simply by the change of microphone. In addition to the semi-pitched sections, the two singers also improvise on given melodic phrases that are based on the initial arpeggiated melodies in the strings and flute.

The first section of this work creates a contrast between the two free improvised voices and the rigid, E dorian minor modal melodic and harmonic materials, that are sounded in the staccato strings and amplified flute. These figures continue to slightly change as they repeat, leading into the second B section of the work. Only the cello has a lyrical legato melodic line, one that is developed further by the flute at bar eighteen. The first section based on the three bar melodic phrase that gives momentum for the remainder of the work.

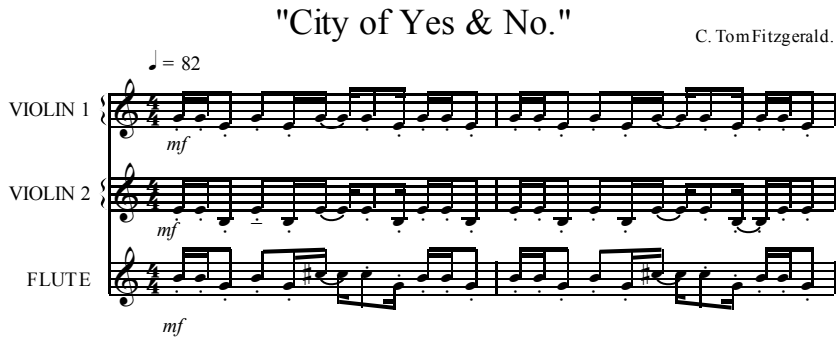
Section B introduces the percussion and electric bass. Their semi-improvised parts are variations on the initial three-bar motif, the rhythm patterns being repeated in the snare drum and the electric bass figures. In this section I combined altered pentatonic and eight note jazz based blues and diminished scales, developing a series of contrapuntal sequences with the flute and the upper strings. The two vocalists continue their improvisations throughout this section, with a build up in intensity and melodic activity.

The work concludes with a return to the motor rhythms of the opening textures, a repeat of the first section with a diminuendo to no sound at all. This repeat of the initial material is by the long middle section, which gives additional focus to the more rigid and locked textures of the opening, being so contrasting to the mellifluous B section. The singers reduce their improvised phrases gradually becoming quieter and less frequent in activity. The signal treatments are also

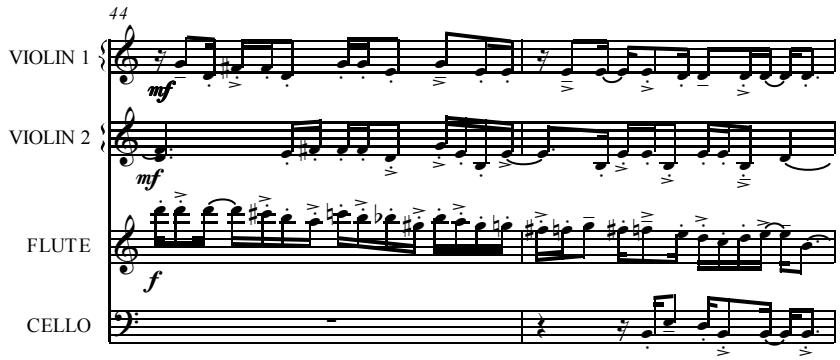
reduced to a single reverberation (of approximately 4.5 seconds decay time), so that they are placed out of aural focus in the sound mix.

In this work the words and syllables (sung and half–spoken by the two singers), are used more for their sonic qualities than for their literal meaning. In the rehearsals leading up to the performance I explored ways to approach this aspect of musical expression. It allows for the incorporation of non-pitched, and semi-pitched sounds to be easily integrated by the performers. I also discovered that not only was this approach more effective when performed in a structured improvisation design, but it also was an effective contrasting gesture against the precise rhythmic figures in the strings and flute parts.

The blend of melodic cells and freer chromatic materials also led to some interesting harmonic sonorities and contrapuntal textures in the middle section of this work.



Example 2 – middle section cell development.



In the exploration of contrasts and opposites, of acoustic and electronically altered voices the music revealed many new sounds within this electroacoustic ensemble.

3. Title of the work: ***Lament***

Resources: amplified tenor voice, electric violin 1, electric violin 2, electric viola, electric flute, amplified didgeridoo, six-string electric bass, amplified percussion/vibraphone, drum kit.

Multimedia projections

Duration: 7 minutes

…..This work explored some very new areas in my work and in the field of electroacoustic chamber music, performed in the second concert of this new multimedia ensemble. It embraces the concept of zoned improvisation activities as a kind of interactivity within the music and the performance ensemble. This is an extended application of improvisation, especially in this work, *Lament,* because here the improvisation is with the sounds produced by signal processors, in this case several individual delay machines. These produce contrapuntal textures of various sonic patterns that result as the signal input materials are processed. This produced some unusual sounds and textures that were very effective.

This work also articulates a dialogue between the Aboriginal and Western musical cultures. I collaborated with an Aboriginal elder, Gary Hunter(tribal name - *Murrundindi*), from the Melbourne *Wurundjeri* people,who also performed in this work on an amplified didgeridoo. In designing this work I wanted to utilize the rich bass tones of the didgeridoo without falling into gestures that would distract from the new musical directions of the work. I decided to create minimal gestures and a transparent series of 'textural fields', in several keys and chromatic overtone clusters that evolved into a formal structure similar to a rondo form. This particular rondo relies on tone colour and texture as much as pitch, on register and sonority more than melodic development.

Lament is an elegy based on a theme of loss and difficulty of reconciliation between the indigenous Aboriginal people and non-indigenous Australians. It is scored for an electroacoustic chamber ensemble consisting of two electric violins, one electric viola, one electric flute, one percussionist (drum kit), one amplified vibraphone percussionist, one electric bass and one solo operatic tenor voice. The three string players, the flute and the bass each have individual delay machines (*Roland digital/sampler delay model DSD-2* and *Yamaha* multi effects unit, model SPXII, - both models are programmable machines), and reverberation lines that process their individual parts. This was essential in creating the textures specified in the music, and produced some innovative sonic results.

The work opens with the two electric violins in a series of canonic melodic figures, which are semi-improvised and timed as the delay machines process the material. The score instructs, (see Appendix One), the performers to perform harmonic overtone arpeggios high on the G string and to fade out and resume as the delays interact with the second violin canon at the unison unfolds. The blend

and clash of the very high overtones combine with the audible noises of the bow hair gliding along the short string in a *sul ponticello* bowing technique. These sounds would not be possible without this electroacoustic context and when combined with the amplified vibraphone, electric flute, bass and didgeridoo, constructed a new sonic world.

It is constructed with an open textured approach. The delicacy of the overtone textures and the focus required by the two more traditional gestures, operatic tenor voice and digeridoo, necessitated a minimal amount of textural and rhythmic activity. This allowed for clarity and balance to be maintained throughout the piece. The work unfolds in a series of textural gestures, or small sections. As the two electric violin sound their G major overtone phrases, they blend with softer E flat sonorities in the vibraphone and bass.

This activity is interrupted when the low E natural pedal tone is sounded by the amplified digeridoo. The overtones are significantly enhanced by the amplification and signal treatment processing, in this case reverberation depth and timbral equilization, being added to the basic digeridoo sound. These materials alternate with each other developing a rich tapestry of contrapuntal melodic fragments that build to include the electric flute and the iconic melodic theme in the solo tenor voice. The text for this melody is made up of a series of Aboriginal words that combine to form an evocation to the Aboriginal spirit world. The solo tenor sings the following lyrics 'Kungullan' - thoughts the most powerful influences in our lives, 'Nungeena' - mother nature, 'Yarra' – the river, 'Woonan' - home, and 'Wandjina' -creative spirits, the elements of earth, water, fire, earth and seasons. In a series of short two and three bar phrases this tenor melodic line ascends to a high-sustained high A natural. It is the climax point of this piece, the didgeridoo

and electric violin textures modulating through sequential sections to conclude this work.

Many of the individual sounds and textural combinations revealed new sonic areas as well as ensemble combinations. I had not attempted to combine this kind of electroacoustic orchestration previously, and the result was effective and informative. The careful balancing and tonal tuning of the amplification and speaker system created a sonic environment that was well suited to subtle delay and dynamic nuances, as well as enabling overtone materials to fully revealed. This is a significant area of activity for this kind of extended ensemble, exploring and revealing sounds and textures that have not existed in this instrumental setting. When combined with traditional indigenous instruments and operatic soloist gestures, a powerful syntax is developed and available to realise new musical expression. There are several places in this score, which highlight this innovative activity. Firstly, in the opening of the work with the electric violin harmonics and the amplified didgeridoo tones, the electric flute delay figures combining with the amplified vibraphone melodic fragments and the digeridoo combining with the pizzicato and delay treatment violin figures

The use of multimedia screen images in this work was restricted to projected still images and static abstract patterns created by Ron Eden, a Melbourne based multimedia artist and photographer. They formed a series of subdued visual commentaries that enhanced and focused the musical activities, sometimes in half-light and at other times in a fully visible light. They informed the work with images that were another visual dimension, stimulating the multimedia activity, and intensifying the sensory experience. The stage lighting was selected from a

series of colour washes as well as designated small spotlights, designed to highlight the textural changes and developmental processes of this piece.

4 Title of the work: *Ensemble Riffs*

Resources: amplified vibraphone, amplified didgeridoo, electric bass, percussion, amplified piano, electric violin and electric viola

Duration: ten minutes

This work explores improvisation and intermedia. The composition is structured as a theme and variation form, employing jazz elements especially in the syncopated melodic lines and harmonic structures. Although it is centred in the key centre of A aeolian minor, there are atonal and polytonal sections worked into the variations. The variations are developed in a series of light textures to enhance the sonic interface, facilitated by microphone line signals and routed to the computer via the sound-mixing console.

The sounds trigger the software program *Videodelic* in real time interactivity in chosen parameters. These parameters are relationships between visual patterns/colour and how these are affected by volume, pitch areas and rhythm. A direct link is set up between these projected visual elements and sound and the sensory environment is intensified to synthesize a new media genre, one in which the individual elements combine to form a empowered syntax.

The second section is slower alternating amplified didgeridoo sounds with the shorter phrases that follow in the solo flute. In this section the interactive software program is triggered and affected by the dynamics and pitch parameter inputs via

microphone signal which is digitized by the computer and decoded by the *videodelic* software. In addition to this visual activity on the screen I experimented with colour washes coloured pencil spotlights to intensify the audiovisual communication. The use of light in this way assists in focus and highlights musical process.

5 Title of the work: *Chika*

1. *Overture*

2. *Chika's Release*

3. *Black Holiday*

4. *Black Holiday 2*

5. *Why Me*

6 *I Tried to Kill Self*

7. Chika's Release 2

8. *Cat Music*

Resources: amplified soprano voice, amplified shakuhatchi, 2 bass Taiko drums, amplified piano, string section - 8 violins, 4 violas, 4 celli, high pitched temple bells, Koto, *Fairlight* computer.

Duration: 50 minutes.

These works are companion pieces to the last two works of the previous Chapter 9 (Solo Works), forming the music for a new media work entitled "Chika". Expanding further to the earlier description of this work, Chika is a contemporary story, which incorporates recorded sounds and notated music, visual arts and live

performance. This collaborative work fuses the work of Australian and Japanese artists in extended and reinvented traditions. The result is a new media work that combines sound, projected still and moving images, recorded interviews with dance, live narration, and live musical performance to tell the story of *Chika Honda.*

As previously described, the protagonist of this work, Chika Honda, returned to in Japan in November, 2002. However in 1992 she was one of five Japanese tourists arrested at the Melbourne International Airport, and charged with drug trafficking. Chika spent the next ten and a half years in a Victorian prison, even though she has pleaded her innocence throughout this ordeal. She was released on parole and deported, and is currently working with a legal team in Japan in an attempt to prove her innocence.

This work follows Chika and her four fellow travellers through their arrest, cultural misunderstandings during the ensuing legal process, her suicide attempt and recovery in jail, and finally her return home to Japan. Central to this work is a questioning of multiculturalism and notions of identity and immigration. The work also explores how in the new millennium era, cultural differences and social justice "travel a thin line between understanding and being misunderstood". (New Media Board – Australia Council Information Booklet, 2004)

This story unfolds on several simultaneous levels that form a new media dialogue. The immediate story unfolds using live narration, recording of interviews with Chika, as well as lawyers, police, politicians and companion prisoners who form part of her story. However the dimensions of the inner world of the protagonist are related via sound and music as well as projected images and a solo Japanese Butoh dancer. The music combines electroacoustic sonic materials and explores textural combinations, rhythms and structure, further extended by

signal processing and recording studio sampling and mixing techniques. My intention was to build a sound world that combined not only the multicultural elements but also a sense of time and place that shifts from memory of the traditional and personal, to a shared ancient and modern musical language contexts.

This production is artistically influenced by slide shows, documentaries and contemporary multimedia performances that utilize projection. There is also a strong relationship to the ancient Japanese story telling tradition *Kami shibai,* or paper performance. This is a form of entertainment from the Edo period in Japan.(1603 – 1867).Images were shown on the *shoji* screen as artists held pinhole devices in candlelight to tell a story. In modern times *Kami shibai* has developed into a form of story telling utilizing images framed by a box, and individually displayed as the narration unfolds. (New Media Board 2004)

Chika illustrates the emotional power of cross-cultural communication, including performance traditions, unscripted words and body language. I refer the reader to the DVD recording of this work in the Appendix 2 of this thesis. The production also exists as an adapted work for radio and in this format received two ABC Radio National Network broadcast performances in March and April, 2004.

Notes on the individual works.

-Chika's Release

Resources: amplified soprano voice, amplified shakuhatchi, 2 bass Taiko drums, amplified piano, string section - 8 violins, 4 violas, 4 celli, high pitched temple bells, Koto, *Fairlight* computer

Duration: three minutes approximately

Chika's Release is an electroacoustic studio work that cannot be performed in this version as a live performance. It is presented here in two formats, an audio realisation of music only, and secondly as a DVD recording with the addition of multimedia elements to the music track. This reflects the two different types of realisation of this work, the first for an ABC radio national broadcast for 'Radio Eye', broadcast in February 2004, and the second for a live new media presentation scheduled for 2005-2006. I refer the reader to the recorded discs in Appendix Two of this documentation.

As previously described, the music reflects a narrative concerning the release of a Japanese woman, Chika Honda, who served a ten-year jail term for a crime many believe she did not commit. My intention in creating this opening music of liberation was to capture the profound sense of transition - from the totally restricted prison environment to the opposite, a return to a free life where one can exercise some choice in one's daily life schedules and activities.

I also wanted to explore a technique of momentum without any metric patterns or sense of beat. To achieve this I constructed different dynamics and shifting

densities of sound, as well as tessitura. This variation and modulation of elements created the vague sense of timelessness and sense of awakening that I required for this transition.

The orchestration reflects the two cultures of Japan and Australia. The ensemble was recorded in a series of instrumental sessions in Melbourne and Sydney, on a *Protools TDM* platform and then transferred to a *Fairlight* computer music system at the ABC Ultimo studios in Sydney. The Japanese musical traditions are represented with the Shakuhatchi flute, Taiko drums and Kotos. Australian and European musical traditions are represented with the solo soprano, string section and the amplified grand piano. The high-pitched temple bells belong more to Eastern than Western culture, however they are utilized in ways that cross over both traditions, as notes of indefinite pitch for textural elements and also as semi-pitched bell melodies in the latter part of this piece.

Although this is a piece of three minutes duration, it is quite complex, with a number of intricate processing and mixing techniques involved in the creation of the work. Each of the 48 tracks required individual reverberation treatments, considerable equilization for tonal balance, compression for ensemble dynamic balance and the creation of multiple doublings of the strings and the Koto glissandi loop-patterns and phrases. In addition, the strings and koto tracks required careful mixing so that the sonic texture and resonance of different sections proceeded without conflict or distraction. Paramount to this piece was an intention to create a sound world that remained static and ethereal while simultaneously containing a sense of considerable momentum, depth and subdued power. I was also concerned with aspects of the Eastern and Zen concepts of awareness of simplicity within complexity.

The piece is constructed in a loose binary form that begins and ends with the deep bass tones of the Taiko drums. These were sampled and doubled at the octave. Further the addition of different compression, delay and reverberation treatments to each of the single note envelopes added a variety and colour to the introduction and closing sections. The strings were used to create a series of overtone harmonic glissandi arpeggio figures on separate different strings, and in a variety of registers. These figures were improvised by the individual players in various glissandi speeds, with a *sul ponticello* bowing articulation. These tracks were then doubled for depth of texture.

This kind of signal treatment technique was also effective with the creation of the four Koto glissandi tracks that swirl in and out of dynamic and textural focus throughout the work. The tonal centre for this piece is A, although there are significant atonal textures in the bells, strings, and Taiko drums. The momentum provided by the textural interplay, as well as the various simultaneous levels of rhythmic activity relieves this static pitch area. The principal melodic elements are the shakuhatchi flute and the soprano vocal lines that propel the piece forward. The microphones illuminate a wide range of acoustic detail, that rely on a focused use of many different types of signal treatment, especially with the addition of reverberation, for the musical intent to be successfully realised.

The restriction of pitch materials (almost entirely based on A major pentatonic scale), and the absence of any sense of meter assist to highlight textural and dynamic/timbral momentum. These give the piece new sonorities that transform the familiar materials into new areas of discovery. Further, these techniques are effective with and without multimedia elements, being self contained as a purely

aural radiophonic piece and expanding to form a different dialogue with additional visual elements.

Overture

Resources: Electric Violin and Two Digital Sampler/Delay Units

Amplified Koto and Bass Koto, Soprano Voice.

Duration – Seven Minutes.

In addition to this opening music, the live performance version of this work is preceded by an overture. This is a duet for electric violin/delay /sampler and amplified Koto and Bass Koto. Constructed in three parts the music is scored in a rubato style, I created the music in this way to allow for a degree of improvisation with the duration of notes and phrase as well as in the development of dynamic phrase shaping. The Koto harmonics are alternated with non-harmonic tones requiring careful balancing of the amplification between the contrasting continuous sustain in the electric violin part. The folk song performed by the buhto dancer is a Japanese unaccompanied melody that recurs three more times in the 50-minute piece as an emotional and musical memory for the protagonist, Chika Honda.

I composed several other works for this multimedia project; some of the music is composed for solo koto, string quartet and piano in the middle of the work, *Black Holiday 1 &Black Holiday 2,*(DVD Tracks 3 & 5). In the first version of the music the string quartet plays a *col legno* articulation of the syncopated rhythmic material in an A Dorian minor mode. The alternating triplet figures in the cello created an

effective counterpoint against the simple duple time figures in the violins and viola. In the second version of this piece, *Black Holiday 2,* the articulation is *modo ordinaro,* utilizing a spiccato articulation in the vicinity of the bridge. This dry, harsh staccato articulation is combined with A minor pentatonic canonic figures in the acoustic piano and koto, expressing the dangerous cultural confusion, of this part of the on screen drama.

However, I would like to highlight the two-buhto dance segments that explore new textures and sounds. These are *Why Me* (DVD track 5) and *I Tried to Kill Self* (DVD track 6). For further detail of the music pieces discussed below I once again refer the reader to the Appendix One – for printed score information and also to Appendix Two for DVD audio/visual information. The third DVD of Appendix Two – *Chika,* is a complete version of this multimedia work. I have highlighted the relevant music pieces with numerical track markers and on screen music titles, for easier location of the individual pieces. However for a complete understanding of my artistic intention, these works require to be listened as a part of the entire work, as well as taken out of context individually.

The eight pieces are as follows on the DVD:

1. *Overture*

2. *Chika's Release* - (at 6 mins 40 secs)

3. *Black Holiday* - (at 13.58)

4. *Black Holiday 2*, (at 18.13)

5. *Why Me* (at 27.45)

6 *I Tried to Kill Self* - (at 34.47)

7. Chika's Release 2, (at 46.42)

8. *Cat Music* - (at 48.56).

The buhto dance segment, *Why Me, (DVD track 5)*, is the second of the three dances for Solo Buhto dancer. This work is designed into two parts, the first being very agitated and the second more restrained. In this piece I explored some unusual textures between the electric violin and the amplified koto. These include combining two octave fortissimo glissandi in the electric violin part with staccato bursts of scraping the koto strings in various registers. The delay signal treatments create a quasi-siren effect, as pitch centers are found and immediately abandoned. In addition the koto player is also required to employ a cello bow on the lower strings, at times hitting the strings - *col legno* and with force.

This gesture of employing the cello bow is also a reference to the violence of the cultural clash between the East and West in this work, in addition to the expression of trauma in the mind of the suicidal protagonist. The Buhto dancer further extends these themes. The aggressive instrumental gestures modulate through a series of phrases and pitch areas, building in intensity and speed of rhythm to resolve on two unisons the A natural and later E natural in the violin part -- which falls into quarter tone variations as the music builds to its sudden *sforszando* conclusion of section one of this piece.

I introduced silence, of approximately seven seconds duration, to bridge the two sections, the second section being a series of sustained harmonics in the electric violin part and isolated melodic fragments in the koto part. Both instruments employ fragments of pentatonic scales that are interspersed with the other semi-pitched and non-pitched sonic materials. The delay/sampler signal treatments are analogue devices made by the *Roland* corporation, model DD2. (Refer to the score in Appendix One) They are employed with the electric violin to create

electroacoustic textures that go in and out of phase with each other. It also expanded the harmonic density of the texture when combined with double stop chords. These materials interfuse with the koto gestures to produce new sounds that express the confusion and cultural trauma as portrayed in the text, film and dance.

The final music piece and dance segment, *I Tried to Kill Self,* explores the sonic environment of an electronic keyboard sampler and the amplified acoustic koto. These two instruments, which were both made in Japan, represent in this piece the duality in contemporary Japanese culture of simultaneous layers of antiquity and modernism.. In a series of extended theme and variation forms, textures are developed from repeated sequences of F sharp two octaves be low middle C in the sampler part. The interplay of semi-improvised, very rapid and slower ratios of looped patterns in both parts propels this piece. I based these pitch materials on the D Aeolian and E flat Lydian modes as well as pentatonic scale fragments in based on these modes and random sounds. The use of random sounds in the electronic and acoustic koto glissandi figures created a wash of harmonic densities that crescendo in and out of focus. These glissandi are performed at different ratios of tempo that combine very slow, moderately fast and very rapid figures in juxtaposed voicings.

This technique led to a number of new sonorities in the merged sampled and amplified koto textures. The keyboard sampler is a *Yamaha model-MI*, employing playing techniques that require extensive use of the sustain pedal and joy stick for microtonal pitch variations. (See score in Appendix One). In addition both instruments were processed through reverberation signal treatments, in this performance I used a *Yamaha SPX–II* model. The settings for the amount of

reverberation are guided by the performance space acoustic resonance and carefully adjusted to create a balanced depth of texture to the overall sound.

This final dance explores transformations of sound and rhythm in textural sequences that crescendo and decrescendo in and out of focus. I wanted to explore the possibilities for new sounds by combining the use of contemporary electronic sampler treatments with the ancient sound world of the Japanese koto. The transformations of sound have an effective resonance with the transformations that simultaneously develop in the dance and film elements of this multimedia production.

Chapter Eleven

Conclusion

> Everyone has to write music that, in a way, is who they are. If they try to do otherwise, then in the long or the short run, they will fail. But there are composers who adopt the "style-of-the-month"….. The bottom line is that it doesn't work! It doesn't work because whatever it is that people have inside of themselves, that's really joined to some emotional and intellectual perspective on music – that's what people want. They want the real you and they know when you're not giving it. How? I don't know how, but it works…
>
> - Steve Reich (Kessler 34)

The discovery and development of new sonic resources and intensified creative expression has enabled me to create new sounds in the realm of electroacoustic music. New technologies have offered innovative ways to communicate this enriched musical language as the boundaries and depths of aesthetic relationships were explored in the folio works. Some of this has employed linear and non-linear interactivity, exploring the convergence and intersection of artificial intelligence/technological and living systems.

This digital, analogue and electroacoustic counterpoint mediates the boundaries between a wide range of technologies employed in these works, embracing the

familiar, the new and the emerging frontiers of immersion. I have also been conscious of an ongoing personal desire for dialogue and contextualisation of these new technological frontiers, and how they can inform and reveal sonic discovery in already familiar resources and technology. This has enriched the electroacoustic sound world and led to the discovery and fusion of unusual orchestration and sounds.

In the four years of study towards the DCA I have attempted to explore these new directions in compositional technique enabled by the investigation of technologies and aesthetics. Extending rhythmic and temporal concepts in the forming of relationships between pulsitile and non-pulsitile music led to an expansion of time structures and designs. This produced work in which time, dynamic and shifting nuances and propulsions interrelate in new ways. Relationships between once familiar materials, such as symmetrical phrasing and an eclectic mixture of tonal and atonal materials, have been combined to form a musical syntax. The fluidity of this direction has enabled me to find and refine an approach to developing rhythmic techniques with relatively simple pitch materials.

In addition, spatiality and interactivity have been explored and developed in a number of folio works, especially in the new media area. The forming of integrated relationships between light, image and sound has produced enriched performance and compositional directions. These are reflected in the approach to forging electroacoustic textures, modulations and performance techniques. Some have been specifically developed to realise the musical demands of these new sonic areas, for example in the use of the amplified and electric string bowing techniques, used to

articulate the semi-pitched and harmonic textures that are required by several of the folio works. These and other techniques, such as metric modulation and beat shifting have highlighted the role of dynamic propulsion and balance in these new scores.

The folio works explore these areas in a wide range of contexts, from full symphony orchestra, to chamber orchestra, chamber ensemble, duos and solo instrument orchestrations. The sonic dimensions of these ensembles have been extended and informed by the incorporation of electronic and electroacoustic resources. Further, this has been combined with real-time interactivity in live performance, which has resulted in expansion, as well as the extension of traditional improvisation concepts and practice.

During the four year period (2000-2004) of my research and creative work there has been an intensified interest and prolific activity in new music and interactive multimedia. Festival programs around the world increasingly feature new work that embraces sound and projected visual imagery. As technology becomes more affordable and powerful, the possibilities for new media extensions and fusions of aspects of body movement, sound and visual projection continue to empower discovery in many uncharted frontiers. Media convergence and digital virtuosity being further enhanced by a deeper range of musical gesture and expression.

Electroacoustic environments inform each other in my folio works, employing aspects of spatiality as a powerful and flexible musical language. Several of the folio works were empowered by spatial aspects, especially the installation work *Seeming Insanity of Forgiveness*, *The City of Yes and No* and *Double Rainbow*.

The five folio works explore different ways to interrelate and fuse areas of compositional activity and concentrate on focused detail, articulating new language in my creative work. They do so with a renewed personal creative direction that has forged some effective techniques for realisation and communication of artistic vision. Further, these works also embrace the redefinition of possibilities through development and application of new technologies, and celebrate an enriched creative process.

Appendix 1

Folio of Musical Scores:

1. *Insanity of Forgiveness* – for interactive surround sound installation.
    - Notes for construction of the work
    - Working processes
    - *Max* software patch construction
    - Loudspeaker location design
    - Sensor and computer sensor location design

2. *Fast Travel* – for Amplified String Quartet

3. *Low Traffic* – for Symphony Orchestra, Aboriginal Ensemble, Playback Sounds and Interactive Multimedia.

4. Instrumental Music Suite
    - *Sonic Code* – for Electric Violin, samplers and Playback Sounds.
    - *Double Rainbow* – for amplified flute and delay processors.
    - *Blues for the Avant Garde* – for amplified piano.
    - *Chitter Chatter* – for amplified cello and clarinet.
    - *Chika's Transformation* – for samplers, computer and amplified

shakuhatchi and reverberation /delay processor.

5. Multimedia Suite

- *I can Hear You Now* – for electroacoustic orchestra
- *The City of Yes and the City of No* – for electroacoustic orchestra
- *Lament* -- for small ensemble, live interactive computer projections
- *Ensemble Riffs* -- for small ensemble, live interactive computer projections
- *Chika* -- for small ensemble, live interactive computer projections

Appendix 2

Audio and DVD recordings of original works

1. Audio CD –

CD 1 *Insanity of Forgiveness* – realisation in a stereo format

CD 2 *Low Traffic* – prerecorded sounds stereo format

CD 3 *Fast Travel* – for amplified string quartet, stereo format

CD 4 *Instrumental Suite* – stereo format

CD 5 *Chika* – stereo format

2 . DVD film and audio recordings, stereo format

DVD 1 *Insanity of Forgiveness* – realisation in a stereo format

DVD 2 *Multimedia Suite.* – realisation in a stereo format

DVD 3 *Chika* – realisation in a stereo format

DVD 4 *Low Traffic Film/video sequences* – realisation in a stereo format

Appendix 3

Dates of Composition of Original Works

1. *Insanity of Forgiveness*
   – Composed in 2002 -2004

2. *Fast Travel*
   – Composed in 2000 – 2002

3. *Low Traffic*
   – Composed in 2003 - 2004

4. *Instrumental Suite*
   – Composed in 2002 - 2003

5. *Multimedia Suite*
   – Composed in 2000 - 2002

6. *Chika*
   – Composed in 2003 - 2004

Appendix 4 :

Performers and Dates of Performances of Original Works

1. ***Insanity of Forgiveness*** - for Surround Sound and Playback Sounds

   - This work does not have any live performers.
   - Installation at The University of Wollongong, Cloisters Gallery, November 2nd – 11th, 2002.
   - Installation at The Canberra Festival of Arts, National Arts and Craft Centre Gallery, Canberra, ACT. January 30th –February 12th, 2004.

2. ***Fast Travel*** – for amplified string quartet.

   - This work was performed at "Music House" Recording Studios in Melbourne, on August 28th and 29th, 2004.
   - Performed by Attila Kuti – Violin 1, Thomas Fitzgerald – Violin 2, Zoltan Balazs – Viola, Karolina Kuti, Cello.

3. ***Low Traffic*** - for Aboriginal Ensemble, Symphony Orchestra, Pre-recorded Sounds, and Interactive Multimedia Projections.
   (- This work has not been performed.)

Appendix 4 : Performers and Dates of Performances of Original Works (continued)

4. *Instrumental Music Suite*

Sonic Code for Solo Electric Violin and Playback Sounds,

- Performed/Recorded on August 8th, 2003,
  At the *Sonic Connections Festival* Opening Concert,
  University of Wollongong, Creative Arts Auditorium.
- Perfomance by Thomas Fitzgerald – Electric Violin.

Double Rainbow for Solo Flute and Two Delay Signal Treatment Machines.

- Performed on September 15th, 2003,
  at The Toorak Uniting Church, Melbourne.
- Performed by Jean Penny – Flute.

Blues for the Avant Garde for Solo Amplified Piano.

- Performed/Recorded at Music House Recording Studios,
  Melbourne, May 15th, 2004.
- Recording Studio Performance by Thomas Fitzgerald – Piano.

Chitter Chatter for Amplified Cello and Clarinet.

- Performed on 15th, June, 2003 at the "Side On Café"
  New Music Concerts, Newtown, Sydney.
- Recorded/Broadcast by "New Music Australia", Australian
  Broadcasting Corporation Radio National, 2003.
- Performances by Julia Ryder – Cello and Roslyn Dunlop – Clarinet.

Chika's Transformation for Solo Shakuhatchi, and Playback sounds.

- Performed/Recorded at Metropolis Recording Studios,
  Melbourne, September 30th, 2003.
- Recording Studio Performance by Anne Norman – Shakuhatchi

Appendix 4 : Performers and Dates of Performances of Original Works (continued)

5. *Multimedia Suite (continued)*

I Can Hear You Now
for large electroacoustic ensemble and prerecorded sounds

- Performed/Recorded on 3rd August, 2000
- At the experimental arts centre, *Chapel-off-Chapel*, in Melbourne.
- Performed by "One Earth Orchestra" -
  Director/amplified piano/electric solo violin, Thomas Fitzgerald,
  four amplified ensemble violins,Attila Kuti, Nimrod Kuti,
  Dougal Scott,Stephen Took,
  three amplified ensemble celli – Julia Ryder, George Thaler,
  Karolina Kuti, one amplified solo flute- Megan Kenny,
  one amplified acoustic guitar – Marc Van Camp,
  one electric bass – Evripides Evritidou
  two percussionists – David Jones, Elvis Aljus
  four singers – Lawrence Allen – Tenor, Margaret Allen – Soprano,
  Lindy Ferguson – Soprano, Genevieve Fitzgerald – Mezzo Soprano.

The City Of Yes and the City of No for electroacoustic chamber ensemble

- Performed/Recorded on 3rd August, 2000
- At the experimental arts centre, *Chapel-off-Chapel*, in Melbourne.
- Performed by "One Earth Orchestra" -
  director, Thomas Fitzgerald,
  four amplified ensemble violins, Attila Kuti, Nimrod Kuti,
  Dougal Scott, Stephen Took,
  three amplified ensemble celli – Julia Ryder, George Thaler,
  Karolina Kuti, one amplified solo flute- Megan Kenny,
  one electric bass – Evripides Evritidou
  two percussionists – David Jones, Elvis Aljus
  Two singers - Lindy Ferguson – Soprano,
  - Genevieve Fitzgerald – Mezzo Soprano.

Appendix 4 : Performers and Dates of Performances of Original Works (continued)

5. *Multimedia Suite (continued)*

Lament

for multimedia ensemble

- Performed/Recorded on 27th October, 2002
- At the experimental arts centre, *Chapel-off-Chapel*, in Melbourne.
- Performed by "One Earth Orchestra"
  Director/amplified piano/electric solo violin, Thomas Fitzgerald,
  electric violin – Tamil Rogeon, electric viola – Rodney Edwards
  one amplified solo flute- Megan Kenny,
  one amplified acoustic guitar – Marc Van Camp,
  six-string electric bass – Evripides Evritidou
  percussion/vibraphone – Craig Beard,
  amplified tenor voice – Lawrence Allen,
  drum kit – Gordon Pendelton, amplified didgeridoo – Murrundindi,

Ensemble Riffs

for multimedia ensemble.

- Performed/Recorded on 27th October, 2002
- At the experimental arts centre, *Chapel-off-Chapel*, in Melbourne.
- Performed by "One Earth Orchestra"
  Director/amplified piano/electric solo violin, Thomas Fitzgerald,
  electric violin – Tamil Rogeon, electric viola – Rodney Edwards
  one amplified solo flute- Megan Kenny,
  one amplified acoustic guitar – Marc Van Camp,
  six-string electric bass – Evripides Evritidou
  percussion/vibraphone – Craig Beard,
  amplified tenor voice – Lawrence Allen,
  drum kit – Gordon Pendelton, amplified didgeridoo – Murrundindi,

Appendix 4 : Performers and Dates of Performances of Original Works (continued)

6. *Chika*

Overture for Electric Violin and Two Digital Sampler/Delay Units
Amplified Koto and Bass Koto, Soprano Voice.

- At the experimental arts centre, *Chapel-off-Chapel*, in Melbourne.
- Performed by
  electric solo violin/delay samplers, Thomas Fitzgerald,
  Amplified Koto and Bass Koto – Satzuki Odamura
  Soprano Voice - Yumi Umiumare
- Broadcast on Radio National, Australian Broadcasting Corporation,
  21st, February, 2004.

Chika's Release
for multimedia ensemble

- Performed/Recorded on 2nd December, 2003
- At the experimental arts centre, *Chapel-off-Chapel*, in Melbourne.
- Performed by "One Earth Orchestra"
  amplified soprano voice – Lindy Ferguson
  amplified shakuhatchi- Anne Norman
  2 bass Taiko drums, high pitched temple bells – Toshi
  Koto - Satzuki Odamura,
  amplified piano –Thomas Fitzgerald,
  string section –Matthew Bruce, Thomas Fitzgerald - violins,
  John Philp -4 violas, Martin Peniker 4 celli, (pre-recorded)
  Fairlight computer – prerecorded playback sounds
- Broadcast on Radio National, Australian Broadcasting Corporation,
  21st, February, 2004.

Black Holiday
for solo koto, string quartet and piano

- Performed/Recorded on 2nd December, 2003
- At the experimental arts centre, *Chapel-off-Chapel*, in Melbourne.
- Performed by Koto - Satzuki Odamura,
  amplified piano –Thomas Fitzgerald,
  string quatet –Matthew Bruce, Thomas Fitzgerald - violins,
  John Philp – viola, Martin Peniker cello,
- Broadcast on Radio National, Australian Broadcasting Corporation,
  21st, February, 2004.

Appendix 4 : Performers and Dates of Performances of Original Works (continued)

6. *Chika (continued)*

Black Holiday 2

for solo koto, string quartet and piano

- Performed/Recorded on 2nd December, 2003
- At the experimental arts centre, *Chapel-off-Chapel*, in Melbourne.
- Performed by Koto - Satzuki Odamura,
  amplified piano –Thomas Fitzgerald,
  string quatet –Matthew Bruce, Thomas Fitzgerald - violins,
  John Philp – viola, Martin Peniker cello,
- Broadcast on Radio National, Australian Broadcasting Corporation,
  21st, February, 2004.

Why Me

for electric violin, two Delay samplers and amplified koto

- Performed/Recorded on 2nd December, 2003
- At the experimental arts centre, *Chapel-off-Chapel*, in Melbourne.
- Performed by electric solo violin/delay samplers,
  Thomas Fitzgerald,
  Amplified Koto and Bass Koto – Satzuki Odamura
- Broadcast on Radio National, Australian Broadcasting Corporation,
  21st, February, 2004.

I Tried to Kill Self

for electronic keyboard sampler and the amplified acoustic koto

- Performed/Recorded on 2nd December, 2003
- At the experimental arts centre, *Chapel-off-Chapel*, in Melbourne.
- Performed by electric keyboard sampler,
  Thomas Fitzgerald,
  Amplified Koto and Bass Koto – Satzuki Odamura
- Broadcast on Radio National, Australian Broadcasting Corporation,
  21st, February, 2004.

Appendix 4 : Performers and Dates of Performances of Original Works (continued)

6. ***Chika (continued)***

Chika's Release 2

for multimedia ensemble

- Performed/Recorded on 2nd December, 2003
- At the experimental arts centre, *Chapel-off-Chapel*, in Melbourne.
- Performed by "One Earth Orchestra"
  amplified soprano voice – Lindy Ferguson
  amplified shakuhatchi- Anne Norman
  2 bass Taiko drums, high pitched temple bells – Toshi
  Koto - Satzuki Odamura,
  amplified piano –Thomas Fitzgerald,
  string section –Matthew Bruce, Thomas Fitzgerald - violins,
  John Philp -4 violas, Martin Peniker 4 celli, (pre-recorded)
  Fairlight computer – prerecorded playback sounds
- Broadcast on Radio National, Australian Broadcasting Corporation, 21st, February, 2004.

Works Cited

Adams, John. Transcript: BBC Radio Interview. 16 March, 2003.
http://www.bbc.co.uk/radio3/classical/adamsinterview.shtml

Adams, John. Phrygian Gates. C.D. Albany 38, 1978.

Adams, John. Shaker Loops. C.D. New Albion 14, 1978.

Adams, John. Shaker Loops. C.D. New Albion 014, 1987.

Adams, John. Harmonielehre. C.D. EMI 55051, 1985.

Adams, John. El Nino. C.D./DVD. ArtHouse Music 100220, 2000.

Adams, John. Violin Concerto1993. Shaker Loops 1983.
C.D. Nonesuch 79360-2, 1998.

Anderson, Laurie. Live in New York: September 19-20.2001
C.D. Nonesuch 7559796812.

Anderson, Laurie. The Nerve Bible: Four Women Composers.
Melbourne: SBS Television Broadcast, July 20, 1999.

Anderson, Laurie. The Hip Surgery Music Guide.
http:www.hipsurgerymusic.com/AndersonLaurie

Ankeny, Jason. Laurie Anderson: All Music Guide.
http://www.allmusic.com/cg/amg.dll?p+amg&uid

Atkinson, N. and E. Wood. Creating Your Own Rules. Pub.Atkinson, 1989.

Bandt, Ros. Sound Sculpture: Intersections in Sound and Sculpture
in Australian Artworks. Sydney: Craftsman House, 2001.

Bandt, Ros. Sounds in Space: Windchimes and Sound Sculptures.
Victorian Arts Council and the Council of Adult Education, Melb., 1985.

Berio, Luciano. Visage. L.P., Candide: CE 31027 , 1967.

Berio, Luciano. Sequenza 3. L.P., Candide: CE 31027 , 1967.

Berio, Luciano. Sinfonia. L.P., CBS Masterworks: SBR 235754. 1968.

Branca, Glen. Interview with William Duckworth,
Talking Music. New York: Simon & Schuster, 1995. 429.

Cage, John. Silence:Lectures and Writings. Middletown,Connecticut: Wesleyan
Univeristy Press, Crary, J. and Kwinter S. Eds., 1992.

Cope, David. New Directions in Music. Waveland Press. 7th ed. 2001. 348-349.

Cope, David and Galen Wilson. Interview with Pierre Boulez.
Composer 1, no. 2, Sept. 1969, 831-832.

Copland, Aaron. Music and Imagination. New York: Mentor, 1959.

Copland, Aaron. What to Listen for in Music. New York: Signet-Penguin, 2002..

Covey, Stephen R. The Seven Habits of Highly Effective People.
New York: Simon and Schuster, 1989, 185- 186.

Crossman, Bruce. Towards a Pacific Identity.
Diss. University of Wollongong, 1999.

Curtis, Natalie. Editor. The Indians' Book. First pub. 1907& 1923, Harper
and Brothers. Paperback edition, New York: Dover, 1968.

Dallin, Leon. Techniques of Twentieth Century Composition: A Guide to the Materials
of Modern Music. – Third Edition. Dubuque, Iowa: W.C.Brown, 1974.

D'Angelo, James. Paper: New Consciousness Music.
London: International Symposium on Contemporary Music, 1990.

Day Julian, New Music Australia, National FM radio,
Australian Broadcasting Corporation, May 10th, 2003.

Day Julian, Andrew Schultz: New Music Australia, National FM radio,
Australian Broadcasting Corporation, April 16th, 2003.

De Bono, Edward, Simplicity. London: Viking-Penguin Books Ltd., 1998.

Dekerckhove, D. Connected Intelligence: the arrival of the web society.
Toronto: Somerville House. 1997.

Duckworth, William. Talking Music. New York: Schirmer, 1995. p.330.

Duckworth, William. Talking Music. New York: Schirmer, 1995. Introduction p.xii .

Feldman, Morton. Essays. edited by Walter Zimmermann. Koln: Beginner Press, 1985.

Ford, Andrew. Composer to Composer: Conversations about Contemporary Music. St. Leonards, Australia: Allen, 1993.

Ford, Andrew. Illegal Harmonies: Music in the Twentieth Century. Sydney: ABC.2001.

Ford, Andrew. The Music Show. Radio National 621, Australian Broadcasting Corporation,February 2th & 8th, 2003, November 2003, December 2003, February 28th, 2004, interviews with Richard Meale, Roger Smalley, Ross Edwards, Carl Vine, Peter Sculthorpe, Steve Reich, and Laurie Anderson. www.abc.net.au/rn/music/mshow/s780640.html

Forte, Allen. The Harmonic Organisation of the Rite of Spring. New Haven: Yale UP, 1978.

Gardiner, Howard. Creating Minds: An Anatomy of Creativity. NewYork: Basic Books, 1993.

Gardiner, Howard. Frames of Mind: The Theory of Multiple Intelligences. New York: Basic Books, 1985.

Gerard, Renee and Gill Bailey. First Person:Radio National. Sydney: ABC am 621, September 3rd., 2003.

Glass, Philip. Glassworks. C.D. CBS Masterworks. SMK 73640.

Glass, Philip. The Essential Phillip Glass. C.D. Sony Masterworks. SK 64133.

Glass, Philip. Symphony No 5. C.D. Nonesuch 7559-79618-2

Green, Cable. Analysis of McLuhan and Kurzweil: Ground vs. Figure. The Ohio State University. http://jac.sbs.ohio-state.edu/cable/papers/mcluhan_report.htm

Hindemith, Paul. The Craft of Musical Composition. Oxford: OUP.

Holmes, Reed Kelly. Luciano Berio: Phd. Dissertation. Texas: U. of Texas.

I.R.C.A.M. Research and Development.1998. www.ircam.fr/department/recherche.html

Jarré, Jean Michel. Cities in Concert:Houston, Lyon. C.D. Drefus 487377 2.

Kanamori, Mayu. Chika:Script, Ultimo, Sydney: ABC Radio National, 2003.

Kosko, Bart. Heaven in a Chip. New York: Three Rivers Press, 1999.

Kostelanetz, Richard. Writings on Glass: Essays, Interviews, Criticism. Berkeley: University of California Press, 1997.

Kessler, Richard. Steve Reich Interview.New Music Box. www.newmusicbox.org/archive/firstperson/reich/index.html July,1998.

Lang, Paul, Henry. Editor. Problems of Modern Music:The Princeton Seminar In Advanced Musical Studies. New York: Norton, 1962.

Laurie, Victoria. Roger Smalley: Messenger of the New. Weekend Australian Newspaper, April 12-13, 2003. R15.

Liquid Architecture 4:Sound Arts Festival, Bernard Parmegiani: Melbourne, 2003.

Lipman, Samuel. Music After Modernism. New York: Basic Books, 1979.

Maycock, Robert. Glass, a Portrait. London: Sanctuary, 2002. 173.

Mehegan, John. Jazz Improvisation 2: Jazz Rhythm and the Improvised Line. New York: Amsco – Simon and Schuster, 1962.

McLuhan, Marshall. Understanding Media: The Extentions of Man. Cambridge: MIT Press, 1994.

McKittrick, David, Seamus Kelters, Brian Feeney and Chris Thornton. Lost Lives: The stories of the men, women and children who died as a result of the Northen Ireland troubles. Edinburgh: Mainstream, 1999.

Messiaen, Oliver. The Technique of My Musical Language. Trans. John Slatterfield. 2 vols. Paris: Leduc, 1956.

Monk, Meredith. Turtle Dreams. C.D. ECM 21240, 1983.

New Media Board. Survey of Funded Works - 2003, p.12, Australia Council for The Arts, Strawberry Hills, Sydney, 2004.

Nyman, Michael. Experimental Music: Cage and Beyond. New York: Schirmer Books, 1974.

Packett, Kila. Three Tales by Steve Reich and Beyrl Korot.
Pop Matters Music. 2002.
http:// www.popmatters.com/music/concerts/r/reich-steve-021019.shtml

Powell Alison. Interview with Phillip Glass and Laurie Anderson.
New York: eqmag, March 1997.
http:www.eqmag.com/news/news65.html

Randell, Michael, Don. Editor, Harmonics, The New Harvard Dictionary of Music.
Cambridge, Mass: Belknap, 1986.

Reich, Steve. Writings about Music. NewYork: New York, 1974.

Reich, Steve. Triple Quartet. C.D.Nonesuch 7559-79546-2

Reich, Steve. Different Trains: Kronos Quartet. C.D. Nonesuch 7559-79394-2.

Reich, Steve. Drumming. C.D. Nonesuch 79170, 1971.

Reich, Steve. Music for 18 Musicians. C.D. Nonesuch 79448-2, 1976.

Reich, Steve. Three Tales. C.D.& D.V.D. Nonesuch 7559798352, 2002.

Reich, Steve. Violin Phase. C.D. E.C.M. new series 1168, 827287-2, 1980.

Reich, Steve. Come Out. C.D. Electra Nonesuch, 979169-2, 1987.

Relationships Australia. Statistics on Relationships in Australia, Melbourne, 1998.
http://www.marriage-relationships.com/divorce_statistics.html

Salzman, Eric. Twentieth Century Music: An Introduction. Ed. H. Wiley-Hitchcock,
2nd. Edition, Englewood Cliffs: Prentice-Hall, 1974.

Schaefer, Peter. Dualities of Culture and Content within Creative Work: 1987-1997.
Diss. University of Wollongong, 2002.

Schafer, R. Murray. Composer in The Classroom.
Toronto: BMI Canada Ltd., 1965.

Schafer, R. Murray. Ear Cleaning: Notes for an Experimental Music Course.
Ontario: BMI Canada Ltd., 1967.

Schafer, R. Murray. The Tuning of the World: Towards a Theory of Soundscape Design.
Philadelphia: University of Pennsylvania Press, 1980.

Schneider, Daniel E. The Psycho-Analyst and The Artist. New York: Mentor, 1962.

Schoenberg, Arnold. Fundamentals of Musical Composition. London: Faber, 1970.

Schoenberg, Arnold. Theory of Harmony. Trans. Roy E. Carter, London: Faber, 1978.

Schwartz, Elliot and Barney Childs. eds. Contemporary Composers on Contemporary Music. New York: Holt, Reinhart and Winston, 1967. 201.

Schwartz, Steve. John Adams. http://www.classical.net/music/rees/reviews/n/non79360a.html

Schultz, Andrew. Going into Shadows: the Making of an Opera: Articles and Analysis. London: Guildhall School of Music, 2001.

Stanhope, Paul. The Music of Ross Edwards: Aspects of Ritual. Diss. University of Wollongong, 1994.

Stravinsky, Igor. Apropos Le Sacre Printemps, Columbia Records ML – 5719.

Scource Magazine. San Diego: USC, 1974.

Vella, Richard. Musical Environments:A Manual for Listening. Improvising and Composing. Sydney: Currency Press, 2000.

Weems, Marianne and Keith Gallasch. Building Performances, Making Worlds. Sydney: Real Time 57, Open City pub., November, 2003. P. 28.

Winkler, Todd. Composing Interactive Music: Techniques and Ideas using Max. Cambridge, MA: MIT Press, 2001.

Wolfson, Richard. Shock of the New. 24 Hours. Magazine. Sydney: ABC, April, 2001.

Xenakis, I. Formalised Music. Bloomington: Indiana University Press, 1971.

Zorn, John. Cat O' Nine Tails. C.D.Kronos Quartet. Electra Nonesuch 9 79310-2.