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THE ELECTROACOUSTIC AND ITS DOUBLE

DUALITY AND DRAMATURGY IN LIVE PERFORMANCE

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DECLARATION

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Guy Harries

ABSTRACT

Live electroacoustic performance juxtaposes and superimposes two main elements: the real, present and physical, against the simulated and disembodied. In this sense, it is a liminal form which negotiates two different worlds on stage. In this dissertation I will address some central aspects of performance that have been reshaped and problematised by the use of the electroacoustic medium in a live context.

I will investigate in particular three main dualities: the performer's body / electroacoustic sound; physical space / electroacoustic space; and performance / audience. I will also discuss a generalised duality common to all three: presence / absence. Rather than regarding these dualities as indicators of discontinuity, I will suggest that they can help develop a *continuum* of connections and relationships between performance elements. These connections can be designed as part of the composition process.

By investigating these dualities, this research addresses the main elements of the *live event*. The central guiding principle here is that the live electroacoustic mode is a *performance* discipline, and therefore requires a dramaturgical approach that takes into consideration the elements of the live event: performer, audience and use of space. I will suggest that such an approach should guide the creative process, starting at the initial composition stages, through rehearsal and the actual performance.

CHAPTER 1

INTRODUCTION

It all started with one simple question: why do I find electroacoustic performance exciting? And then came another: why does some live electroacoustic performance leave me cold, feeling bored and unable to engage? I wanted to find a method of looking at this performance discipline in its various guises not just for the sake of curiosity: as a composer and performer in the field I wanted such a method to inform my work and aesthetic choices. The main questions that I found could guide this search were:

- How is electroacoustic technology used in live performance?
- How can this technology be integrated into live performance and serve a function that is essential and meaningful to its dramaturgy?
- What connections can be made between the live electroacoustic form and performance practice in general? How can this form become essentially *performative* and related to the live event?
- What approaches, used in my work and the work of other artists, are successful? What makes them work?

This journey begins in 1998, which is when I decided to start making live electroacoustic music. I was attending a concert of pieces by students from the composition department at the Royal Conservatory in Holland where I was studying. Composer Daniel Landau had written a piece for piano and electroacoustic sound titled *She is Looking* (CD1 Track 1).

FLASHBACK:

On stage, the pianist plays a prepared grand piano, and already at the outset we hear the sound of human breathing. The sound is louder than we expect and clearly not coming from the pianist's direction. Who is this? Is it supposed to be the piano 'preparing for action'? The breathing is heard at beginnings of

phrases and followed immediately by virtuosic, highly rhythmic passages played by the pianist, as though an unknown, invisible entity is involved, initiating and controlling the live playing. This disembodied breathing presence, though probably played from a CD, is not a typical machine – it is essentially human and expressed in the most human sound indicating life: breathing in and out.

This uncanny feeling is extended further by manipulated piano sounds: sounds that are stretched in time, growing in intensity rather than decaying; chords that are 'initiated' by the pianist but sustained much longer than 'naturally' possible and manipulated further; phrases that are sped up, reversed, looped obsessively with abrasive digital glitches rather than smooth enveloping; a non-linear rapid cut-up of phrases, and a very soft eerie repetition of the pianist's playing.

There is something visceral about these uncanny sounds: the source of sounds, both on stage and in the studio, is the physicality of the pianist. The physical character of the human/machine duo is created by the evident effort exerted by the pianist who, with the assistance of a click track on headphones she is wearing, is struggling against very strict timing, her body disciplined and manipulated by the machine.

I can still remember the excitement I felt after the three and a half minutes of this rollercoaster of a piece. What was it about that performance? I think it was the fusion of highly physical performance with an uncanny, intriguing part that was obviously not human but a redefinition, re-moulding and an impossible extension of what was clearly human. This ambiguity works against established expectations, redefining causalities and mobilising the eeriness of the embodied- turned-disembodied. Technology served to extend a human physicality, drawing on the presence on stage and emphasising it rather than eliminating it.

But this is not always the case with live electroacoustic music. All too often, several connections are severed: between the performer and the sounds we hear, between the stage and the audience, and between the imagined and the real. These connections are then not always re-established or given a context or rationale that can allow an audience to form a coherent picture or meaningful experience. In such cases we might ask ourselves: why are we here? Why is there a performer on stage? What is the added value of the *live* experience? I feel there is a problematic aspect in live electroacoustic performance that very often is not addressed: it is not approached from a performative perspective focusing on the live event in which it occurs. I will examine how the relationships of performance are redefined in the context of the electroacoustic medium, locating some problematic areas as well as the potential of reshaping and exploiting the unique potentialities of live electroacoustic performance.

A central concept that will serve as a lens through which I will be examining live electroacoustic performance is the notion of a *gap*: certain rifts or dissonances which are typical of this performance mode and have redefined connections that are part of the more familiar live performance tradition. Examples of obvious rifts are the lack of physical causality or the absence of contextual frameworks that can connect disparate performance elements such as bodies, sounds and spaces. Such rifts do not necessarily need to be viewed in a negative light; rather, they open up opportunities for designing and reshaping connections, thereby defying long-established expectations or creating new ones. I will maintain that where some electroacoustic works fail is in *ignoring* the gap as part of this performance mode.

THE SIMULATED AND THE REAL – GAPS AND CONTINUUMS

Central to the discussion of this gap is the negotiation of the 'real' and the 'simulated'. The difference between them is most evident in live performance where there is a working of different sensory modalities, mainly sound and vision. When there is a strong correlation between the modalities, it is easier

to perceive a performance as 'live', whereas an incongruity between the two can weaken that impression. With the ubiquity of recorded and broadcast media, it seems that we are more immune to such incongruities. Still, if we are to speak of 'live performance' a dramaturgy needs to be developed in which there is a rationale for the presence of the performer and audience. Why are they both here? What makes this moment unique? What is its social significance? How do we go beyond *representation* of the live?

The 'real' consists of physical presences: the space, the props, the instruments, the audience and most noticeably – the live performer. These presences are potentially manifest in all sensory modalities: sight, sound, and possibly touch, smell or even taste. The 'simulated' in our present case is electroacoustic sound. Though also physically manifested through the vibration of loudspeakers, air molecules and the listeners' bodies, this 'simulation' works mainly in one modality: sound, with the other modalities 'represented' rather than physically present.¹ Discrepancies between the 'physical' and 'simulated' make us question the connection between the 'real' entities and the sounds we hear. And when the sound refers to other bodies, images, locations, or an invisible cause of their existence, we can even talk of a discrepancy between a physical 'real' on stage and a 'simulation' of a complete other reality in the electroacoustic sound. An audience needs to establish a conceptual connection between the two, and the composer or performer can facilitate this in creative, unusual ways.

I will consider three main gaps that are central to live electroacoustic performance and occur between three dualities:

1. The performer's body and electroacoustic sound

¹ For the sake of clarity, in the context of this thesis I use the term 'simulation' to indicate a perception that is a representation of or a reference to a thing without truly being that thing. For instance, in Daniel Landau's piece, the sound of breathing is a simulation of human presence. The lack of connection to a visible human agent (it is obviously not the sound of the pianist breathing) makes us realise that this is only a simulation of human presence. A possible dramatic implication could be along the lines of 'the piano is breathing' (a simulation of a hybrid being – human + piano).

2. Physical space and electroacoustic space
3. Performance and audience

I will show that in the negotiation of these gaps, we can consider the space between the two sides of each duality as a *continuum*. Within this continuum there is a range of possible connections, transformations and hybrid forms of the two elements of the duality. The idea of the continuum is key to this discussion, as it addresses the problem of the separation and disparity between certain elements of performance and the various ways they can be connected. In this sense, the duality serves to indicate two poles on a continuum, rather than a fixed separation. I will be addressing the various continuums in the context of the duality introduced in each chapter.

Useful to our discussion of the real and simulated is Baudrillard's notion of simulation/simulacra. Baudrillard views the contemporary world as pure simulation, stating that there is no 'real' as such and any exchange is via simulacra.² Paul Hegarty (2004, p. 49) explains:

[F]or Baudrillard, there has never been any unmediated reality... [J]ust like the ordinary real, it is never present, *here*. It has always gone missing. So, instead of a true reality, we get various types of simulacra, which present themselves as real.

Even if we do not accept the idea that we experience the world as total simulation, we must acknowledge that a vast part of how we communicate is mediated, represented and unreal. The rupture of the body from its direct manifestation, indicating the breakdown of causality and the continuity of time and space, all have to do with the fact that we are dealing with various degrees of simulation and transferences from a possible 'original' to the copy and its altered versions. Our experience of reality is a combination of the

² It is important to bear in mind that Baudrillard does not suggest the idea of simulation as a *replacement* of the 'real'. As Rex Butler (1999, p. 47) points out, simulacra are actually crucial to the experience of the real itself, as it is through them that we interact, communicate and perceive the world.

simulated and the real. Within such a combination, simulacra can be manipulated and reshaped, thereby influencing the total perception.

Baudrillard lists the stages of simulacra as they proceeded through history, and seems to indicate a gradual shift away from the representation of the 'real' (Baudrillard 1983, p. 11):

Whereas representation tries to absorb simulation by interpreting it as false representation, simulation envelops the whole edifice of representation as itself a simulacrum.

These would be the successive phases of the image:

1. It is the reflection of a basic reality
2. It masks and perverts a basic reality
3. It masks the *absence* of a basic reality
4. It bears no relation to any reality whatever: it is its own pure simulacrum

I propose using the idea of various orders of simulacra as *a tool for examining the relationship between the physical 'real' category and the 'simulated' electroacoustic*. In live electroacoustic performance we encounter all the stages of simulacra with the sound functioning as either a reflection of the physical reality on stage (acoustic, 'live' sound), a manipulation of it (diffusion, sound processing), or, finally, a complete departure from it becoming a sound world in its own right bearing no resemblance to a physical sound 'origin'.

Auslander (1999/2008, p. 43) addresses the relationship between the 'real' and the representations of the 'live' that are represented through electronic media ('mediatised'):

Live performance... has become the means by which mediatized representations are naturalized, according to a simple logic that appeals to our nostalgia for what we assumed was the im-mediate: if the mediatized image can be recreated in a live setting, it must have been "real" to begin with. This schema resolves (or rather, fails to resolve) into an impossible oscillation between the two poles of what once seemed a clear opposition:

whereas mediatized performance derives its authority from its reference to the live or the real, the live now derives its authority from its reference to the mediatized, which derives its authority from its reference to the live, etc.

A confusion occurs, and distinguishing the live from its representations is almost impossible. In electroacoustic performance ambiguities of the live and the simulated can occur within the sound modality – when we cannot tell whether a sound is produced by a live performer. Ambiguity can also occur in the relationship between sound and other modalities – for instance, when it is not possible to tell how a visible action on stage is truly connected to a sound.

There is an ongoing debate regarding performances in which technology is used adding ‘mediatised’ elements or simulacra, as Dixon (2007, pp. 116-126) points out. How ‘live’ is a performance in such a situation, and is this important? While Auslander sees the integration of new technology in performance as a historical stage in which the ‘mediatised’ becomes dominant, infiltrating the live performance discipline, Pavis and Phelan see technology as politically charged, representing a contaminating threat that indicates socio-economic-technological domination threatening to marginalise the live art form. In my current discussion I will not place my argument within one side or the other, but rather integrate elements from both: accepting ‘mediatisation’ as part of contemporary performance practice, while looking at possible social implications of electroacoustic performance as a discipline in its own right. I will examine how the technological can be integrated within performance in a way that is essentially *live* in a shared space and time, with a *reciprocal* engagement between audience and performer. In this sense, the simulacra and absences are connected to the live presence of the performer, and serve his/her dramaturgy. In this context, technology becomes a tool within live performance rather than a ‘force’ that wipes out the live.

A central approach in the current thesis concerns the relationships and connections between elements of performance. By discussing certain

dualities of real / simulated I illustrate characteristics that are specific to the domain of live electroacoustic performance. Rather than presenting a dichotomy, I suggest that we could consider the dualities as a **fluid continuum or negotiated hybrid form** in which various possibilities of connection exist. Seen in this light, a rich palette of combinations and relationships is formed. Physical and electroacoustic space could become a mixed perception of an ambiguous, 'elastic' space. New and unexpected models of relationships between a performer and sound or between a performance and its audience can be created. And finally – the ambiguous nature of the combination of embodied and disembodied sound could have a strong poetic, dramaturgic effect. All of these will be explored in depth.

FIELD OF RESEARCH

The main focus in this work will be on the live electroacoustic performance form in which the performer and audience are co-present in space and time. This includes all types of electroacoustic performance: interactive environments and instruments, mixed pieces for live instruments and a fixed soundtrack, live processing, live coding, multimedia works. I will discuss the way in which uses of technology influence music performance not only in sound creation but also interaction in the use of interfaces, networks, control of robotic instruments and data diffusion. I will not be focusing on the technology itself, as I do not believe that it dictates performance practice in a determinist way. Rather, it is absorbed, adapted, subverted. Andrew Feenberg proposes a world view according to which the way technology is *engaged* with is more important than the technology itself³:

The lifeworld of technology is the medium within which the actors engage with the computer. In this lifeworld, processes of interpretation are central. Technical resources are not simply pre-given but acquire their meaning through these processes. As computer networks developed, communication functions were often introduced by users rather than

³ <http://www-rohan.sdsu.edu/faculty/feenberg/ctt.htm>

treated as normal affordances of the medium by the originators of the systems.

I will look at the way certain uses of technology have influenced the *relationships* in performance (between musicians and the sounds they play; performers and the space they perform in, and the performance and its audience), as well as bringing about new ones.

Placing the discussion of live electroacoustic performance within a broader frame of performance theory, I will occasionally discuss the context of ritual and ancient performance modes which have informed theorists such as Schechner and Pavis and enriched the language of the stage in contemporary production practice.

Though the focus in this thesis is on live performance, I will also discuss modes of engagement and ‘liveness’ in other art modes, some of which use new technologies: (interactive) installations, network performance, games, danceclubs as well as acousmatic-only works. Though not completely ‘live’, these other forms are essentially performative as they form an exchange between a creator and audience via a work at a dedicated place and time. Also, certain aspects common to these other art forms and live electroacoustic performance can demonstrate some pertinent points that are relevant in the live situation.

I will be concentrating on works and approaches in which *performative* aspects are central. This reflects my interest in theatricality, text and narrative as part of electroacoustic performance, in my work and in the work of others. This approach is also part of my view, expanded here in detail, that *any* electroacoustic performance needs to take into account not just sound composition, but the way it is presented to an audience in the context of the live event – its dramaturgy.

DRAMATURGY

With the actual performance event as the starting point, I will be focusing on the *dramaturgy* of electroacoustic performance. 'Dramaturgy' has been used broadly in the field of performance, and it would be useful to pinpoint the sense in which I will be using the term in this thesis. Drawing on the framework laid by Aristotle's Poetics we can derive some main points of emphasis: **time, place, action** as well as **structure and inner workings of drama** and the **perspective of the spectators**.⁴ Using a dramaturgy-focused framework I will be looking at the relationships that occur *at the moment a work is performed*: between the performer and the sounds, between the audience and the performance, as well as the space of performance – both physical and simulated. The choice to focus on a dramaturgical approach reflects my personal interest in theatricality within my performance work, as well as audience communication strategies and issues of presence, co-presence and cultural context. In this context, I will be looking at different aspects of live electroacoustic works: creation and performance as well as perception and interpretation. I firmly believe that sound composition does not need to be separate from the composition of the *interaction* and the live *situation* and trust that such an approach can inform both the analysis of live performance and the creative/compositional stages.

As well as focusing on several relationships within the *live performance event*, I will also examine another aspect of dramaturgy: poetics and affect. Drawing on the general theme of embodiment and dis embodiment discussed throughout Chapters 2-4, in Chapter 5 I look at how this juxtaposition can evoke certain poetic meanings and perceptions. I will use the terms 'presence' to indicate manifest physical entities in performance such as the performer's body or physical space, and 'absence' to indicate entities that are not fully physically manifested such as sounds that indicate an invisible source, or a concept guiding performance such as a deity or ritual. It is through the

⁴ From Schroeder 2009, which also provides a useful overview of dramaturgy, as well as its potential use in designing network performance.

relationship between the two, of ambiguity, dissonance, or unexplained connections, that poetic affect can arise. I will discuss two such affects that are widely used in critical studies and are applied to art and literature: the uncanny, which is a strangeness that arises from a combination of the familiar and the unfamiliar, and the sublime, which marks the limits of our understanding and indicates a way of imagining or sensing what lies beyond those limits.

STRUCTURE OF THE PRESENT WORK

In each of the chapters in this work I will discuss a different duality at play in the course of live performance, covering different parameters of performance.

Chapter 2 is a discussion of the first and most obvious duality – the relationship between **the performing human body and electroacoustic sound**. I will first look at some relevant themes that have been used in performance, ritual and music, focusing on risk, cruelty and empathetic processes of identification. I will then discuss how technologies have been influential in altering our perceptions of the body, creating extensions, projected selves and machine/human hybrids. Focusing on the electroacoustic case, I will examine different approaches to the human/machine connection: instrument/interface design, anti-effort aesthetics, incorporation of technologies into a ‘hosting’ human body, sound connections and hidden integration of technology into a performance. I will discuss the work of artists such as Stelarc, Kraftwerk, Laurie Anderson, Michel van der Aa, George Lewis, Andrew Schloss, Kaffe Matthews as well as writings by Gillespie, Evens and Futurists Pratella and Marinetti. I will also suggest the term ‘friction’ as a metaphor for physical engagement and exertion in performance. Such ‘friction’ is a way of establishing an evident link between the performer and the sound-producing technology.

In Chapter 3 I focus on the duality between the **physical space of the performance and the virtual electroacoustic space**. I will discuss

performance space from three different angles (inspired by Lefebvre): social, 'objective'-physical and poetic. Relevant here is the work of Xenakis, Christopher Small's discussion of the space as social construct in the context of the symphony concert, Bachelard's poetic spaces, and Peter Brook's and Patrice Pavis's ideas regarding theatre spaces. I will then focus on the duality of physical and electroacoustic spaces, drawing on Denis Smalley's discussion of 'space-form' in the context of acousmatic works and extending it to include live electroacoustic performance. I will be looking at points of intersection between electroacoustic and physical spaces: diffusion systems, the performer, localisation, formal structures, context and extra-musical aspects, and the ambiguity of the real and the represented in the 'perfect copy'. Both the physical and the electroacoustic space types can act dynamically – through movement (or its representation) or the transformation of spatial identities. I will demonstrate this in the context of the works of John Cage, Huba de Graaff, Bill Fontana and Marcos Novak. I will end this chapter by discussing another expressive use of space: relative spatial position manifested in proximity, orientation, territoriality and movement.

The relationship between the performance and the audience is the focus of Chapter 4. I will examine the way recent technologies have been used to affect modes of dissemination, performance materials and interactivity. I will then look at different types of performance, discussing aspects such as: interpretation, participation and community. Some forms which could be considered performative, such as online performance or games, redefine the role of performer and audience, blurring the boundary between the two and challenging the actual definition of 'performance'. Relevant to this discussion are the participatory works of Janet Cardiff, Christina Kubisch, Max Neuhaus, and Achim Wollscheid; the adoption of the game model as a structuring principle in the work of Cristyn Magnus; the interactive disco club devised by Ulyate and Bianciardi; and networked performance works such as Pedro Rebelo's *Netrooms*. I will also refer to the writings of Lev Manovich on new media, Kaprow and Schechner's discussion of the Happening and

participatory performances and events, Eskelinen & Tronstad's discussion of the relationship between Happenings and gaming and the discussions by Manuel Castell and Rene Lysloff of networked community.

As I have indicated, in Chapter 5 I depart from the discussion of specific dualities and look at poetic meaning and affect arising from the gap between the physical ('real') and the non-physical (represented, simulated) in a more generalised sense, referring to the two categories as 'presence' and 'absence'. I will focus on poetic meanings of this dissonance such as the uncanny and the sublime (as discussed by Nicholas Royle and Philip Shaw respectively), and distinguish between several types of 'absence': evoked absentees, partial absences, doubles, processes in which the familiar leads to the unfamiliar and representation of the 'absent' sublime in the sound medium itself. I will refer to Peter Brook's 'holy theatre', Chion's 'acousmètre' and phantoms in cinema, Stan Link's discussion of silence in music and Katharine Norman's notion of sound as a metaphor for immeasurable space. I will show how 'absences' have been created and used expressively in the works of David Lynch, Morton Feldman, Charles Dodge, Bob Ostertag, Steve Reich, John Cage, George Crumb, Marko Ciciliani and Hiromi Ishii.

Salter (2010) and Dixon (2007) have proven to be very valuable overviews of technology in performance – in the 20th and 21st century in the case of the former and the past two decades in the latter. I refer to both throughout the thesis.

This work contributes to a parallel journey I have taken both in practice and in theory. It is a discussion of issues that are of special importance to me, and which I hope will continue to inform my musical work. This thesis is also the result of a series of compositions and performance situations in which I have explored these ideas. This is reflected in the way I structured the thesis: each of the main chapters is concluded with a brief overview of the main ideas explored, followed by a discussion of one of my compositions in which these

ideas are put into practice.⁵ As a way of concluding the entire thesis and reviewing its main themes, I will discuss the most recent work included in my composition portfolio.

To demonstrate the practical application of the ideas in this thesis, I will be referring to my own work (included in the portfolio, or other) as well as work by other artists. Audio excerpts of some of these works are included in the sound example CD.

The title of this work is a nod to Artaud's *The Theatre and Its Double*, a collection of writings originally published in 1938 that reflects his main ideas for a theatre that would shatter existing conventions, working with a totality of media – movement, light, costumes as well as *sound* played on musical instruments that 'need to act deeply and directly on our sensibility through the senses', sounds that 'invite research into utterly unusual sound properties and vibrations' including 'unbearably piercing sound or noise' (Artaud 1964, pp. 73-74). I believe that by adopting a dramaturgical approach we can, and need to, create live electroacoustic performance which is such a theatre of *all* the senses. After all, musical performance is not just about sound: it is transmodal. We interpret performance through our experience of the world, which is never confined to one sense. Performance is also a social event, and we are aware of other human presences and the space we share with them.

The 'double' in the title of Artaud's book might refer to the 'shadows' that he mentions in the preface⁶:

Every real effigy has a shadow which is its double... the true theater has its shadows too, and of all languages and all arts, the theater is the only one left whose shadows have shattered their limitations. From the beginning, one might say its shadows did not tolerate limitations... [T]he

⁵ The compositions in my portfolio were inspired by the concepts discussed in this thesis, and also, in turn, provided new insights and informed further development of these concepts.

⁶ <http://artsci.wustl.edu/~marton/Artaud.html> – from Grove Press 1958 edition, trans. Mary Caroline Richards

true theater, because it moves and makes use of living instruments, continues to stir up shadows where life has never ceased to grope its way. The actor does not make the same gesture twice, but he makes gestures, he moves; and although he brutalizes forms, nevertheless behind them and through their destruction he rejoins that which outlives forms and produces their continuation.

Artaud points out the power of the live event that is unique and never repeated in the same way. It is dynamic and fluid, and defeats the fixity of form. He speaks of 'shadows' that enable theatre to break limitations. Could the electroacoustic 'shadows' or simulacra enable us to break traditional limitations of performance and experience intriguing unknowns? I hope this thesis is a step in exploring this fascinating shadowland of doubles.

CHAPTER 2

PERFORMING BODY / ELECTROACOUSTIC SOUND

The most evident duality in electroacoustic performance is between the physical presence of the human performer and the sound. Electronics in performance can blur the link between the body of the performer and the sounds we hear, thereby diminishing presence through one of its main performed signs: agency/causality. In a concert, where music-making is the focus of the event, we expect body and sound to be a reflection of one and the same thing. The sound is an ‘utterance’ of the musician's body – a direct result of physical action, and virtuosity. In the more familiar case of acoustic instrument players and vocalists there is an unmistakable connection to the sounds produced: there is no delegation of functions to a machine automatically making decisions or to an electronic/electric device producing the sound vibrations. Using an acoustic instrument does indeed rely on other machinery – resonating bodies, strings, levers and tubes – yet the performer is the cause of the sounds we hear, controlling timing, pitch, volume and timbre.

In electroacoustic music, some rifts occur. Simon Emmerson (1994, pp. 95-101) points to three dislocations of the acousmatic:

1. **Dislocation in time** through recording
2. **Dislocation in space** via telecommunications and recording
3. **Dislocation of mechanical causality** via electronic synthesis, recording and telecommunications

The connection between the performer and the sound is broken both in the aspect of *co-presence* in time and space, and in direct *causality*. Emmerson suggests an approach in which the performance capabilities of the human body are extended, rather than subsumed, in two respects:

1. Extending **sound production** via *apparent* formal and material causes
2. Extending **human control functions** via the *apparent* efficient cause

This modelling of the *apparent* – in which the *impression* of causality, either actual or ‘fake’ – implies an approach which takes the performer’s actions as well as the audience’s impression of them into account, and in a sense suggests a dramaturgy of the connection between the human body and the sound. I will address a range of very different approaches towards the design of dramaturgies of engagement between body and sound in section 2.3. First, however, I will look at meanings embedded within the notion of the body and the way technologies have influenced them.

2.1 EMBODIED MEANINGS

The body is at the core of social activity. Through our bodies we experience the world, interpret it, and interact with each other. Some aspects of our social, cultural and personal lives rely mainly on the experience of the body: birth, death, pleasure, risk-taking. Our perception of the body is used as a regulating concept in society: with governing powers offering shelter and protection or punishment via confinement or pain. Performance incorporates these personal and social resonances, making use of a premise that is known to anyone human as a common language embedded in one's body.

Many bodies are present or represented in live performance: the bodies of the performers or the audience, and references to absent or imaginary bodies. Pavis (1996, p. 59) refers to the 'indices of presence' in theatre: 'The actor's task, which is not strictly speaking a 'task' as such, is to be *present*, located here and now for an audience, a human being presented 'live' and without any intermediaries.' We usually expect the performer's body to act as the cause of the main apparent actions and distinguish these actions from the other activities in the space via social convention or status and the clear location of the stage – a defined territory. A performer is also usually singled out for virtuosity, expertise or charisma.

Through actions that manifest the physical presence, the performer enables us, as an audience, to interpret and comprehend the event through the experience of our own bodies. This empathetic process creates an underlying premise for communication, enabling an audience to detect the performer's signs of pain, effort and pleasure in facial expression or movements, as well as in body sounds such as breathing or vocalisation. We might feel uncomfortable when we hear a hoarse, forced voice, experiencing some strain in our own throat. In order for this empathetic process to occur in performance the body needs to be central, significant and visible. In the theatrical tradition, an actor learns how to reproduce and possibly simulate these known traces and signs of the body.

RISK, SACRIFICE, CRUELTY

Performance is essentially a situation that is separate from everyday life, and an opportunity for a community or individual to reflect on their daily routine and challenge it. There is a wide range of themes that can be addressed via the performing body: pain, death, pleasure, survival, gender, eroticism.⁷ I will discuss one such theme, *cruelty*, in depth, and demonstrate how this works in performance in general as well as the live electroacoustic case.

Our fascination with *risk* is often reflected in the performance situation. L. B. Meyer (in Juslin & Sloboda 2001, pp. 351-3) draws attention to the ambiguity we have towards uncertainty in performance: usually, we try to fight uncertainty in our everyday routine, but on the other hand we do cultivate it in the arts and other ‘playful’ activities. He ascribes this difference in approaches to a ‘*positive* belief in the competence, integrity, and creativity of the artist and, above all, in the significance of the works of art.’ It appears that the performing artist has the special status of a select representative, creating empathy in an audience who trusts the performer’s special powers. Sometimes such risk-taking can go much further: performance artists in whose work the body is central (such as Vito Acconci, Marina Abramovic and Stelarc) induce *real* liminal situations in which they challenge their body by putting it through painful and extreme states. The artist goes beyond the experience familiar to the spectator, driving the empathetic process beyond certain limits, to pain unknown.⁸

In a way, the performing artist acts as a representative ‘sacrifice’. Sacrifice, be it an inanimate object, an animal, a human being, or reflected in an irrevocable act inflicted on the body, is the representation of a process that the participants of a ritual all go through. Bataille (1998, p. 68) stresses the

⁷ An interesting discussion of the erotic in musical performance is Rebelo (2006) – in which Bataille’s notion of eroticism and transgression is applied to the relationship between performer and instrument.

⁸ An extreme example of this is Stelarc’s work from the late 1970s in which the artist was suspended over streets of big cities by means of meat hooks inserted into his flesh.

importance of sacrifice for the continuity of a society, by offering a situation which is an outlet for controlled violence:

Sacrifice is heat, in which the intimacy of those who make up the system of common works is rediscovered. Violence is its principle, but the works limit it in time and space; it is subordinated to the concern for uniting and preserving the commonality. The individuals break loose, but a breaking-loose that melts them and blends them indiscriminately with their fellow beings helps to connect them together in the operations of secular time... the community is saved from ruination. The *victim* is given over to violence.

We actually witness a form of sacrifice in performance as well. A performer has a feat to accomplish: standing with a lion in the circus ring, remembering his or her lines, playing the musical score accurately. The body's limitations of strength, agility and memory are contested, and the audience is there to watch the act, to monitor its authenticity and its 'liveness'. The end of the story is unknown: we are aware of what is *supposed* to happen. But will it really happen this time round? There is always the chance of a fatal mistake, resulting in injury or shame. Sacrifice has an aspect of irrevocability that indicates its singularity as a live event. Actions cannot be taken back: the performer could make a mistake which cannot be corrected, or conversely give the performance of a lifetime, never to be repeated in the exact same way. There is a certain *cruelty* in performance. It is part of the framework of the live event, embedded in the tacit rules guiding it. In musical performance 'cruelty' can be found in the tension of the performer confronted with a piece of music or a live audience. The nerves, the agonising pre-performance tension, the uncertainty, the imminent assessing gaze of the audience – all of these lend the situation an ominous touch. But the show *will* go on and the performer will go through with the actions to varying degrees of success. The performer needs to develop self-discipline of mind and body in order to proceed in an unrelenting fashion. Other 'sacrificial' strategies can be more deliberate in situations such as the extremely-loud rock concert. Electric

guitarist Marc Ribot (2000, p. 233) speculates: 'When acoustic pain occurs in the theater of rock...the pain of the audience is compensated for by their pleasure at the spectacle of the sacrifice of musicians, who, since they are standing closer to the amps, are theoretically experiencing even greater and more destructive pain.' A risk is taken by the guitar player and becomes part of the dramaturgy.

Artaud discusses another aspect of transgression and cruelty in performance in his 'Theatre of Cruelty' (1964 originally 1938, pp. 79-80). In the word cruelty, he indicates a *mental force* that drives the performance onwards. It is a sense of inevitability and determination to carry on:

In fact, cruelty is not synonymous with bloodshed, martyred flesh or crucified enemies. Associating cruelty and torture is only one minor aspect of the problem. Practising cruelty involves a higher determination of which the executor-tormentor is also subject, and which he must be *resolved* to endure when the time comes. Above all, cruelty is very lucid, a kind of strict control and submission to necessity.

'Cruelty' here suggests relentless and disciplined mental stamina which the performer needs to apply to the *body* to carry out the actions.

Artaud's idea of cruelty and violence influenced generations of theatre makers as well as performers in other disciplines. Douglas Kahn recounts David Tudor's initial struggle with Boulez's *Second Piano Sonata*, finally resolved by reading Artaud's *The Theatre and Its Double* (Kahn 1999, pp. 327-8). Tudor was influenced by the latter's discussion of hypnosis, overflowing of the senses, as well as 'affective athleticism'. These ideas gave Tudor the inspiration to experience *the moment*, approaching the piece through its physicality, and finding within himself a certain violent force to go through with the performance of an extremely demanding piece.

Composer Gilius van Bergeijk took the concept of cruelty in music performance to an extreme in his *Piano Installation* (1967), potentially turning it into a commentary on musical concert practices. In this piece, the pianist's wrists are attached to weights hanging on a pulley. The pianist must attempt to play an intricate piano piece while struggling with the pull of the weights. There is an 'inevitable' force, a given within the piece, acting against the body of the performer, and causing him/her to 'fail'. This is not merely a situation in which the performer shows endurance; the situation is dictated and devised (by the composer? Or is this a symbol of self-discipline?). Driving this 'cruelty' to the domain of the absurd lends the piece its ironic twist and causes the spectator to reflect on cruelty that is a part of the virtuosic performance tradition.

In Brian Ferneyhough's piece *Time and Motion Study II* (1976), a cellist is required to play a highly complex notated part that is amplified and processed electronically. The cellist's playing is amplified by four microphones: two contact microphones on the body of the cello, one air microphone in front of the cello, and one attached to the player's throat. The sound of the contact microphones goes into tape loops controlled by two technicians. The sounds of both the air and throat microphones are combined through ring modulation. The cellist needs to be initially 'plugged in' to the system by the two technicians, and after the piece is finished they switch the equipment off. Cruelty, as manifested through a system of control and physical constraints dictated by the score and the technology, is an integral part of the piece. Unsurprisingly, the piece was originally subtitled 'Electric Chair Music'. Even the very originator of the Theatre of Cruelty is present within the piece: as Martin Iddon demonstrates (2006, pp. 93-105), the vocalisations of the cellist in the piece are based on a text by Artaud!⁹

⁹ Details about this piece are all from Iddon (2006)

In these examples we have seen how the body is integrated in a very apparent way within the dramaturgy of electroacoustic performance, drawing on empathetic processes, and the meanings we associate with the social and personal experience of the body (in this case, cruelty). The body shapes the communication between performer and audience. But when technology enters, this communication is altered. Technology can emphasise the body's fragile fleshiness, as in the case of Ferneyhough's piece; it can simulate it, or sometimes completely erase it. In the following sections I will look at the effect technology has had on the way we perceive performing bodies, and how this has been addressed in the case of live electroacoustic performance.

2.2 THE TECHNOLOGISED BODY

The use of technology in performance is not necessarily recent or new – lights, sets and acoustic design have had a *supporting* role in performance for centuries, if not millennia. In current performance practice, with the use of digital technology in particular, sound and video media can produce simulations of human presence and performing bodies – in movement, gesture, and body-related sound. In live performance the presence of the human body together with its simulacra form a new relationship, a hybrid combination on stage. The simulacrum can act as a significant additional, independent presence with which the live performer interacts. In other cases there can be a relationship of extension in which technology takes on a secondary role, a tool at the disposal of the performer. In some extreme cases, there is a process of absorption in which the human body serves as a container, a host for the technology, the ‘machine’. Sometimes the machine is allowed to take over the performance altogether. One can work with these simulacra – either encouraging the impression of a relationship between the simulation and the real, or else working with ambiguity and the possibility of extending and transforming identities.

The experience of a ‘mediatised’ body is a part of everyday life. We call each other on mobile phones making our voices available any time anywhere; we can type our thoughts into computers and publish them for all to see as blogs; we can play interactive games on consoles that register our movements, and watch TV where the simulated presence of other bodies is seen performing in another time or space. As I mentioned in Chapter 1, Baudrillard views the contemporary world as pure simulation, stating that there is no ‘real’ as such and any exchange is via simulacra.

This view is pertinent to modes of performance that replace certain embodied aspects. This includes electroacoustic performance where ‘real’ bodies are juxtaposed with sounds that are not always connected to a physical agency.

Technology has been described as an **extension** of the human body by psychoanalyst Sigmund Freud and culture theorist Marshall McLuhan. Technology can potentially extend human motor and sensory abilities, if not redefine them completely. We view miniscule details through microscopes, converse with people far away through telephones thereby projecting our voice across a vast distance, and form a shared corpus of knowledge on the internet (the value and quality of which can vary, of course). However, this is not always an easy relationship. According to Freud (quoted in Pavis 1996, p. 46), 'man has become a god by means of artificial limbs' but 'they do not grow on him and they still give him trouble at times.' McLuhan (1964, p. 46) mentions a process of 'autoamputation' that occurs when there is an irritant, a stimulus that the body cannot locate or resolve, with the extensions of technology acting as a counter-irritant – for instance, the wheel replacing the legs in a society of accelerated exchange and increased burdens.

Technology also provides us with an ever-upgraded **projected 'self'**. In gaming environments or online environments such as Second Life, a user's on-screen representation (avatar) 'performs' the actions on screen. Whereas older generations of gaming systems demand arduous tasks from the animated avatar (playing football, running through mazes and castles) controlled by the passive human user sitting on a couch twiddling buttons and joysticks, newer gaming systems (such as Wii) incorporate the real body of the player into the game: the user needs to move and perform arduous physical tasks in order for the avatar to proceed accordingly. That said, the idea of projected bodies is not that new, especially within the area of performance and *play*: puppetry uses a simulated body and requires a leap of faith on the spectator's (or player's) part to synthesise movement, vocal sounds and character into one entity.

But other than *projected* selves, it seems that such simulated, networked realities are redefining the actual perception of our *own* body. As Shilling (2005, pp. 4-5) points out, technology has brought about the notion of the

‘uncertain body’. Disembodiment as well as man/machine hybrids are just one aspect of this ‘uncertainty’. Shilling indicates an opposing trend, represented by those who are ‘unhappy with attempts to erase the facticity of the embodied subject’ and claim that even though the body is more malleable, the main change is in the way we *feel* about the body rather than the actual physicality of the body.

Barbara Becker (2003) points to an even more extreme shift, in which the actual notion of *self* is undermined. Referring to the work of Derrick de Kerckhove, she states that ‘the new skin of the technologically transformed material body shows a universality without borders, which no longer binds the individual to a certain place and no longer makes his touch dependent on concrete contacts with other people.’ With the possibility of borderless interaction, Becker suggests that the physical self is established through a constant process of negotiation. In a potentially ‘borderless’ world, she explains, ‘the removal of borders should not be thought of as total, but is always accompanied by self-constituting acts which themselves set borders and which differentiate between themselves and the others.’ In a sense, the body, as it is discussed by Becker, becomes part of a larger, networked organism, in which the self is defined by *action* rather than physically.¹⁰

These perceptions of the body have implications for performance and the way it is experienced both socially and individually. Walter Benjamin, in *The Work of Art in the Age of Mechanical Reproduction* (see 1970, pp. 211-244, first published 1936) speaks of the way a film actor performs in front of a camera, thus making indirect contact with the audience. The actor’s presence is ‘viewed’ by the camera, which determines the angle of the close-up. Through a process of editing, the *time* aspect as well as the audience’s gaze is shifted and the actor ‘lacks the opportunity of the stage actor to adjust to the audience during his performance, since he does not present his performance to the audience in person.’ (ibid., p. 222). Benjamin indicates a distancing

¹⁰ This notion is highly relevant for network performance, as we shall see in Chapter 4.

effect of technology. This can apply to mediatised performance, be it via recorded media such as film, or the use of media such as film, recording, or cameras and microphones in a live context. Such distancing can limit performance flexibility and mutual response. The role of performance as a social, communal event is diminished. But does this necessarily imply a complete disappearance of the live human performer? After all, there is always a human presence in some form. There is an audience experiencing the performance even when there is no live performer around, such as installation or film. However, there are obstacles to the live experience. Through amplification of the performance, the audience's voice can be silenced. Through distance and lighting, the performer is blinded and cannot interact directly with a visible audience. And through the use of media such as TV where we do not speak back or respond we adopt a silent passive stance as a habit. Auslander (1999/2008, p. 25) talks about the mediatised modes of viewing as part of live events such as sports and rock performances. Even though there is co-presence, the audience often watches the performer on a huge video screen, while the performer does not see the last rows of the audience area. Indeed, technology is not always necessary for such unilateral performance. A player in a symphony orchestra does not necessarily respond to the passive audience at a classical concert. However, one can assume that the possibility of interaction is there, and that the mood in the hall is in some sense felt by those present.

But not only the nature of performance has changed: audience habits and expectations have gone through considerable transformation as well. As a result of increasing familiarity with the medium, it seems audiences are well equipped for synthesising the actions of a live performer with his/her various representations and simulations. Having been initiated into the world of zapping, fast edit cuts and multiple angles of vision, we are immune to some discrepancies in space and time. Auslander (ibid.) takes this a step further and states that we actually *expect* to see the language of media in live performance: 'The rhetoric of mediatisation embedded in such devices as the

instant replay, the “simulcast,” and the close-up, at one time understood to be secondary elaborations of what was originally a live event, are now constitutive of the live event itself.’ Non-linear time in which actions can be chopped up, re-edited and re-assembled has replaced linear time, and the representation of the body has become fragmented.

Where does this leave the body? Baudrillard (1994, p. 93-99) describes current reality as a world in which the body has disappeared, replaced by DNA and cloning. The technology has entered the flesh proper and could potentially subsume it. The body is perceived as a code, a product of chemistry, and might eventually be incorporated into machinery, making the body itself redundant. However, even with new media and transposed experiences of time and space, we still experience life via our body – the most basic tool for interpreting and understanding performance. In the very rooms where we sit, flying through virtual skies on the computer screen, gravity is still at work, a cup falls to the floor and smashes, and food is consumed with all its tastes and smells. We still experience pain and pleasure. And it is with our eyes that we can watch TV, and with our ears that we listen to music on our iPods. The body is our point of reference, and at the basis of the language we speak.

For the purpose of the following discussion I will be looking at ways that the body can be incorporated and presented in live electroacoustic performance. Different roles and scenarios are possible in technologised performance:

- The body might still be the main presence in performance, using the technology as a tool or an instrument.
- The body can be represented as a hybrid where the distinction between the real and the simulated is blurred.
- The body can be extended, playing host to the machine, with seamless continuity or containment between the original body and its ‘prosthetics’.

- A dialogue between human and machine could also be at the core of a performance.

Whatever form the human performer's role takes, bodily presence is essential, and remains a central part of the live experience.

2.3 THE BODY IN ELECTROACOUSTIC PERFORMANCE

Bringing electronic technology onto the musical stage has changed the role of the live performer. The body is no longer the direct cause of sound vibrations – a task relegated to the loudspeakers, and effort seems to almost disappear from the equation. Unless it is built into an interface or the performance scenario, the only aspect left from the instrumental music tradition is cognitive effort – the concentration on control. In this sense, the player of live electronics is at a remove from the sound, acting as an observer, a supervisor of a process or a technician operating the machinery. But does this always need to be the case?

2.3.1 DISLOCATIONS

A live audience negotiates the visible and audible.¹¹ In a musical context, the visible performed action is usually expected to correspond to a sounding result, but when this traditional relationship is severed, there is a gap that the audience needs to interpret and resolve. This is a specific issue for live electroacoustic performance, as the performer is usually visibly present, and some connection with what is heard, be it causality, expansion, similarity, dialogue or context is then sought by the spectator. This correlation is not always easily found. As previously mentioned Emmerson (1994, pp. 95-101) points to three acousmatic dislocations that are relevant: **location**, **causality** and **time**. To this we can add the category of **timbral transformation** which can have a further complicating effect.

Location

A separation of performance and sound in space brings about a sense of disengagement. The physical relationship between the player and the sound is altered and the performance action changes. Theberge (1997, p.168) notes:

¹¹ The sensations that involve more direct or close contact such as touch, smell or taste are only rarely part of a performance. However, some performances, especially within the 'performance art' discipline do make use of this, but are beyond the scope of this discussion

When drummers... approach digital drum machines for the first time, it is not primarily an unfamiliarity with the functioning of the device that is the source of a certain discomfort; it is, in part, the apparent loss of that entire “field” of physical/spatial/aural potential, so intimately tied to their sense of musical style and purpose, that is perhaps most disquieting.

It seems the spatial remove, even on an intimate, small scale level, has a huge impact on the player. However, Theberge is *comparing* the acoustic and the electroacoustic, rather than addressing the electronic instrument as it is. Nevertheless, an electronic instrument lacks the feel of mechanical causality and direct physical connection in the space, making playing a different, maybe less ‘intimate’, experience for the performer. Spatial discontinuity also makes the connection between the performer and the sound less easy for an audience to establish. It might be easier to grasp the connection when sound and image are familiar – as in the case of a rock concert featuring guitars, drums and vocals sounding from a PA. But it might be less easy to interpret connections between performed action and sound in the case of electroacoustic performance practice where a much more diverse and unfamiliar sound palette is encountered and new, sometimes hidden and elaborate, instruments are used.

When acoustic instruments are included in live electroacoustic performance, some non-amplified untransformed sound is projected from the performer’s location, but most of the sound is mediated, and comes out of loudspeakers placed at various locations throughout the space. In the case of an electronic, non-sounding control interface, the sound is completely separated from the source of human action. Some electronic instruments (such as an industry standard synthesizer keyboard) emulate an acoustic instrument spatially by using a localised loudspeaker. In other cases, a monitor speaker can be placed near the performer to provide an idea of the sound that he/she is playing, but this only enables the performer to guess what the playing really sounds like to the audience listening to the PA mix. Spatial dislocation does not facilitate the process of interpretation for the listener.

Simon Emmerson (2007, pp. 92-93) makes a distinction between 'local' and 'field'.¹² The local relates to controls and functions that 'seek to extend – but not to break – the perceived relation of human performer action to sounding result', whereas '[f]ield functions create a context, a landscape or an environment within which *local* activity may be found'. Emmerson proposes a diffusion model in which *field* and *local* are treated as separate elements. He advocates (ibid., p. 95) the use of loudspeakers in the vicinity of the performer in order to restore 'level intimacy' as well as better sound localisation. Emmerson further indicates a liminal function, between the two domains of *local* and *field*. He calls this the world of *play* in which the localised performer can influence the more diffuse, immersive *field*. I adopted such an approach in the performance of my piece *Flutter* for flute, fixed sound media and live processing. Whereas the initial flute sound emanates from the stage loudspeakers, the live processing (which is similar to the timbral world of the tape) is diffused on a pair of speakers further away from the stage, and the immersive fixed soundtrack is present on all loudspeakers throughout the performance space. A connection of direct and less direct causalities is part of the *play* world of the piece. As we can see in this case, diffusion can define relationships between the performer and electroacoustic sounds – immersion, extension and causality.

Causality

The instrument paradigm, a model most music audiences are accustomed to, is a transparent way of creating a correlation between performed action and sound. The clearer and more apparent the bodily gesture producing or influencing the sound, the easier the task of interpretation is. In the case of an instrument like a clarinet, familiarity with the timbre and playing gestures makes it easier for a listener to establish a connection between the playing and the sound, even if it is amplified and diffused through speakers that are

¹² Emmerson originally defines this in the article 'Local/field – toward a typology of live electronic music' (1996).

dislocated in space from the actual performer. We do not necessarily see the minute gestures, such as finger movement or breathing; it is almost enough just to see the clarinet player and hear a clarinet sound to perceive a connection. Cort Lippe's piece *Music for Clarinet and ISPW* (1991, CD1 Track 2) initially establishes a link between the live clarinet sound and its processed version via simultaneity, short delays or extension of a note by means of time stretching.¹³ As the piece progresses, the electronic part takes on a more independent nature, introducing different phrases and variations on the main theme. Precise timing, as indicated in the score, connects the live and the electronic even further through compositional elements such as pitch similarity and melodic contour.

In the case of an *electronic interface*, causality can be designed and shaped modularly. The possibility of mapping an interface to radically different sound processes and control parameters which are not necessarily familiar to the listener means that a clear connection between gesture and sound needs to be established through 'initiation'. This can occur within the time span of the piece, or beforehand. An evident connection between the body's action and the sound can be created through *simple* mapping procedures in which the change in sound parameters is audible and the body movement visible.¹⁴ Other than a 'one-to-one' connection in which one movement relates to one sound parameter, it is also possible to have more complex playing paradigms in which one gesture affects many parameters, or a whole sound process or stream. In such a case, causality will often be obscured and the use of gesture as part of performance less effective dramaturgically.

Time

Recording technology capturing sound events and introducing them at a latter point is frequently used in live electroacoustic performance, in 'mixed' pieces,

¹³ The techniques Lippe uses are: reverb, delay, harmonising, flanging, frequency shifting, spatialising and frequency/amplitude modulation, as well as real time audio analysis for continuous control signals (see Lippe 1993).

¹⁴ Hence mapping minute gestures with extreme changes in sound is not as effective.

where the fixed soundtrack part is based on the manipulation of previous recordings of the instrument, or in music based on live sampling. A dislocation in time complicates the audience's task of synthesising percepts. Even the slightest discrepancy between a performer's gesture and the resulting sound makes the impression of causality less obviously physical.

'Clues' or facilitating elements can help. One method is introducing an original sound, performed in the familiar causal modality, and subsequently moving into a less directly causal state of play such as live sampling and playback – as we have seen in the case of Cort Lippe's piece. In pieces for live instrument and *fixed soundtrack* connections can be created through compositional structuring principles based on similarity, continuity or ostensible causality of the materials in relation to the live action, usually through very precise timing or cues. Independent parts that are not similar to the live playing can also be connected as a backdrop/environment (a 'field' function) or a partner in dialogue.

Timbre Transformation

Timbre transformation of a live sound is another 'complication' blurring connections between a live performer and electroacoustic sound. For such a transformation to work effectively and be understood by the audience, it needs to show some connection to 'familiar' aspects: salient sound characteristics from the original live sound that are still evident in the transformed sound, a direct connection to the playing of the performer via direct, synchronous processing, or a gradual shift from familiar to unfamiliar sounds can all be useful connecting methods.

2.3.2 CONNECTION STRATEGIES

The ability to detect connections between the performing body and the sounds heard establishes the performer's presence and 'liveness'. Facilitating the process of integration, and manifesting that the event is taking place at that very location and time, is essential. The possible discontinuity between

the human body and machine-made/manipulated sound can obfuscate the dramaturgy of a performance. At this point, we need to question the duality, and the two elements that constitute it: Why does a technologised performance even need a human performer? Or, conversely, what is the motivation for the human performer to use the machine on stage?

Performers and composers have addressed these questions by defining a role for the human and the machine via connection, integration, narrative/drama, and context. Some attempt to make a direct, visibly responsive connection between action and sound, thereby continuing the instrumental tradition; they solve the problem of the 'gap' by connecting the two disparate elements – body and sound – via 'connective tissue' that re-establishes an impression of mechanical causality. Others reject this approach, which they regard as catering to the audience's hunger for the spectacle, and encourage us to look elsewhere for the essence of performance, by focusing on the sound. In these two approaches, the machine is exposed, and becomes either part of a performance tradition ('live electronics', 'mixed pieces') or a dramaturgic theme (man versus machine). An example of the latter can be seen in the work of the artist Stelarc for whom the body is a container, a host for technology; here, technology in the form of electronic devices, prostheses or genetic engineering creates substitutes for the human flesh. Another completely different approach hides the ostensible presence of the machine, using it as a performance tool serving the narrative. Michel van der Aa adopts this approach in his solo opera *One* (2002) in which the audio-visual part is a replica and extension of the live singer's actions on stage. With these different cases in mind, I will delineate five main approaches to the connection between the human performer and electroacoustic sound:

- The instrument model
- Anti-effort and audible sentience
- Human body welcoming the machine

- Connections created via sound
- Hidden integration within a performance's dramaturgy

In the context of the instrument model, I will also introduce the metaphorical concept of 'friction' as a possible guiding principle for designing interfaces and performance situations.

APPROACH NO. 1: CONNECTING TISSUE – THE INSTRUMENT MODEL

The instrument model connects body and sound by introducing causality into the interface design stages. This approach includes not only *instrument* design; it includes any environment that connects the performer with a sound – a completely electronic instrument, a system processing an acoustic instrument in real time, or an interactive sound environment or installation.¹⁵ This approach sometimes overlaps with some of the other approaches which I mention below, but the focus here is on *the design of the interaction chain*. Such a chain could schematically be described as follows (Figure 2.1):

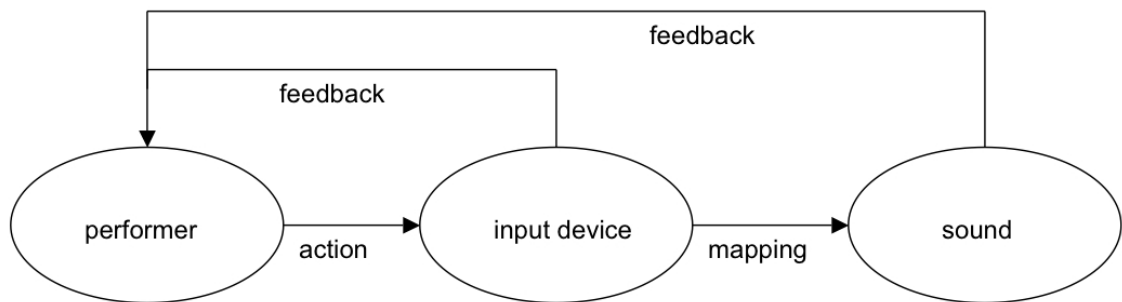


Figure 2.1 Electronic interface design chain

¹⁵ For an overview of interface types, see Miranda and Wanderley (2006)

Link in the chain	Category	Types
Performer/participants	Intention	- User is aware of the interface and thereby initiates action knowingly (e.g. performer) - User is initially unaware of the interface and isn't 'playing' it (e.g. hidden sensors in an interactive installation)
	Expertise	- Varying experience as musician – extending the playing of an existing instrument or creating a new electronic instrument and learning it. - Inexperienced users – such as gallery visitors interacting with an installation
Action	Physical gesture	- Instrumental-style playing - Movement of whole body (dance) - Minute gestures (hand movement, breath) - Technology-influenced gesture (mouse, switches, distance and motion detection interfaces)
Input device	Custom-made/industrial	- Specially designed according to performer's body, expertise, vision, specific performance project - Existing devices (music-specific or adapted for music playing): keyboards, MIDI controllers, game console devices, the laptop itself
	Body contact	- Surface contact (touching the body's surface – hands, arms, legs, mouth) - External (camera, external motion sensor) - Internal (swallowable devices, or detection of internal process via EEG, ultrasound). - Option of haptic feedback.
	Physical attributes	- Theatrical or functional - Exposing the technology or hiding it - Size, colour, shape, texture
Input data	Continuous/segmented	- Continuous - Segmented - Binary (on/off)
	Complexity	- Number of data streams - Fast changes or information-rich in time domain (e.g. sound input) vs. low resolution (e.g. MIDI) or content
	Quality of data conversion	- sampling rate - bit rate - other parameter resolution
Mapping	Type of input and output	- Sound - MIDI information - Visual (or other input parameters such as temperature, pressure, spatial position, motion) to audio or MIDI
	Relation between action and derived information	- One-to-one connection between action and change in sound - Control over parameters affecting a process or audio stream
Sound unit		- Processing of sound input - Sound generating (synthesis, playing back sampled/recorded material etc).

Table 2.1 Components of interface design

Table 2.1 is a summary relating to the possible typologies of each element in the chain depicted in Figure 2.1. All of these are usually considered while designing an interface. The user's intentionality and expertise, as well as the type of action or gesture we expect the interface to respond to will influence the type of input device created/chosen and the way it is tailored to the potential user. The input device has a strong dramaturgical significance due both to its presence as a theatrical object visible on stage and the type of actions it responds to. Instrument design also includes the type of input data captured, and how it is mapped to a sound result.

The player's abilities or the performance context can define the nature of the instrument that needs to be built. The experienced musician can draw on areas of specialisation and certain learned instrumental gestures such as breath and key playing. A less experienced user might need to learn a playing method, or interact in a more straightforward, simple way. In the case of an interactive installation there is no opportunity for a lengthy learning period, whereas in the case of a performance, there might be longer preparation and rehearsal time.



Figure 2.2 Michel Waisvisz and 'The Hands (Photo by Dominik Landwehr Migros-Kulturprozent).¹⁶

An interface can be theatrical, personal, and sometimes highly individual. Michel Waisvisz's MIDI instrument *The Hands* was his performance trademark, and determined his language of live musical gesture. Alternatively,

¹⁶ From <http://www.digitalbrainstorming.ch/weblog/2008/07/>

an instrument can be an industry standard or adapted device, such as gaming controllers or the laptop interface itself, or a hacked one, created by reconnection and adaptation of circuitry of an existing electronic device.¹⁷ Whatever the interface, its physical appearance and the degree to which it can provide control is of the essence in live performance.

Electronic interfacing is characterised by flexibility and modularity. The mapping process translates the input information into a myriad of sound control possibilities. Similarly, the input device can be replaced, while the sound generating process remains the same. In the acoustic situation there is *less modularity* and the sound possibilities are limited by physical constraints: the main option of flexibility is in the performer's actions, for instance – by using extended techniques, or in physical adjustments to the instrument – as in the case of John Cage's prepared piano pieces.

Even though a one-to-one relationship, in which a physical action appears to initiate a sound, tends to be clearer to an audience, there are other ways in which a performer can influence the sound. A performer can **influence a sound stream**¹⁸ or transform another 'live' sound such as that of a musical instrument.

Some musicians doubt the effectiveness of a modular approach in which the interface is separate from the sound generating mechanism. Bob Ostertag (2002, pp. 11-14) colourfully contends:

If I had some really wild controller that doesn't exist now but that I could dream up – such as a big ball of mudlike substance that I could stick my hands into, squeeze and stretch, jump up and down on, throw against the wall and wrap around my head, resulting in a variety of parameter streams that would be seamlessly digitized and fed to the computer – even if I had such a thing I don't know how I would use it...if we are "playing" by intervening in ongoing automated processes, then most of what is going

¹⁷ For a hands-on practical guide see Collins (2006)

¹⁸ For example, by influencing parameters of a continuous granular sound – grain size, density, pitch

on requires no input from the performer, and subtle interventions on the performer's part are more likely to add compositional coherence to the result than big, dramatic ones.

Ostertag points to a clear one-to-one connection, as well as a direct physical relationship between movement and sound generation, as the premise for a viable instrument. He names three such instruments: the electric guitar, Theremin and turntable, which he considers successful examples of instruments that require physical action in order for them to produce sounds: the plucking of a string, using precise nuanced hand gestures to control somewhat limited sound synthesis, or inducing motion in a recorded medium in order to produce the sound waves it 'carries' such as a vinyl LP. However, I maintain that this is possible in the design of a more modular interface. The simulation of those very models of physical causality can be the premise for interface design. After all, the Theremin is just such an instrument. Perhaps the simplicity and constant factors of an instrument such as a Theremin and a turntable offer more of an opportunity for the exploration of *playing* possibilities.

Indeed, another aspect that we need to think of, other than instrument design, is the *physical engagement of the performer*. Rather than redesigning and changing the instruments we build just because we *can*, it may be more useful to develop player/instrument intimacy via a more 'stable' environment that enables a performer to master an instrument and become virtuosic, while the actual changes to the instrument are more nuanced and based mainly on this learning process. Perry Cook (2009), taking as a case study his SqueezeVox instrument, suggests a series of principles in the design of computer music controllers that takes into account this very aspect. These include aspects that encourage focusing on the actual playing and music-making aspects as a crucial part of development. He recommends avoiding the endless adding of features, and instead advocates adapting an instrument/controller to the type of performer using it, thereby developing a new instrument inspired by existing expert instrumental virtuosity, and perhaps most importantly, making 'a piece,

not an instrument or controller’.

In considering the relationship between a performer and an instrument, it seems that the element of a certain ‘resistance’ is a key factor. Any instrument introduces resistance, and therefore a playing situation that can be explored and mastered. Such a situation offers the possibility for a performer to engage with the playing. I will discuss this type of resistance, using the term ‘friction’.

AN ESSENTIAL INTERLUDE: FRICTION

I use the word *friction* in a general, metaphorical sense, to describe the resistance that occurs in the performance situation. This could include a conceptual or physical aspect that functions as a counterforce to the actions of the performer. Such resistance can be built into the design of an interface, or apply to the performance situation in general.

In the discussion of electroacoustic interfaces and performance, the idea of *effort* as the manifestation of physicality is usually regarded as essential. Joel Ryan, a musician and composer working at the live electroacoustic studio STEIM in Amsterdam, states (1991, pp. 6-7) that even though the idea of ‘effortlessness’ is one of the myths associated with computers, it might not be useful in the design of a musical instrument using computer technology. He considers physical effort an important element of musical creation, as it serves both as an expressive tool, and the *foundation of the composition process*.

However, in many instances of electroacoustic performance presented as ‘live’, physical effort is not evident. Pressing the occasional playback button, or sitting behind a laptop without any apparent action does not easily lend itself to the impression of a connection between the body of the performer and the sounds heard. Unless this discrepancy is presented as the actual point of

the performance¹⁹ it is not quite clear what such a performer is doing on stage. In this vein, Andrew Schloss (2003, p. 242) stresses the importance of aspects such as: cause-and-effect, visual components, clarity of mapping, effort and the possibility of subtlety of gesture. He dismisses non-physical performance, stating that '[a] computer music concert is not an excuse/opportunity for a computer programmer to finally be on stage.' Schloss is himself a performer who developed the Radio Drum – an instrument consisting of two drum sticks or mallets, each of which transmits three dimensional position streams, as well as producing percussive effects (these can be created even without touching the surface of a drum). The three streams can be mapped to musical parameters for the sound-producing unit. In more recent works Schloss uses the streams to drive instruments such as a Disklavier or percussion robots. Drawing on the physicality of an existing instrument and its palette of gestures, as well as offering an expansion of the performance to new combinations and 'superhuman' playing techniques, Schloss creates an instrument that can be intuitively understood by a performer and an audience.

Aden Evens, in his discussion of *instrument resistance* (2005, pp. 162-3), defines the relationship between performer and instrument as 'a musical problem' which needs to be solved:

The problem is as much in the instrument, in its resistance, as it is in the musician and the music. The resistance of the instrument is the problem it poses to the musician but also the precariousness of the music embodied in the material forces that define that resistance.

In extending this to the realm of computer music, Evens states (ibid., pp. 162-5) that expression is the manifestation of a desire through the confrontation with the instrument's resistance. He suggests regarding the computer as a *machine for posing problems*, rather than providing pre-defined functions.

¹⁹ For instance, as I shall discuss further, the band Kraftwerk emphasises the fusion of human and machine through the imagery of the robotic or motionless performance.

This ‘problem solving’ situation can be a way of re-engaging a performer with the instrument during the rehearsal and performance stages.

We can identify several areas where these ‘problems’ or *frictions* manifest themselves, either in the physical objects used or in the conceptual resistances that affect physical action. These can be specific to the electroacoustic context in **the interface**, **mapping**, **self-resistance**, or more generally applicable to musical performance in general in the case of: **systems of reference** and **group playing**.

The Interface

The point of contact between the body and the sound, the physical surface that is touched and manipulated, is the most obvious place to look for friction. As Gillespie (1999, pp. 251-4) and Evens (2005, pp. 160-3) suggest, playing an instrument is of itself a situation that is ‘resistant’. In a conventional acoustic instrument, such as a clarinet or violin, there is physical resistance: the instrument will not produce the ‘right’ sound of itself. This resistance is overcome through a process of practice over a long period of time in which muscle movement, breath pressure, embouchure and positioning of the fingers are mastered. While playing an instrument, there is a constant stream of sensory feedback in the form of sound, as well as visual or tactile information which helps a musician correct physical actions in order to achieve the desired result. Even then, there is always the risk of making mistakes or under-performing.

With electronic instruments (such as a standard MIDI controller with keys and sliders, or a more personalised custom-made instrument such as Waisvisz’s ‘Hands’) any physical resistance present is not necessarily an inherent part of the design of an interface.²⁰ Sliders and buttons do not offer much in the way of a physical counterforce. Some instruments, such as the vBow, include a

²⁰ Though this can be part of interface design using haptic feedback. See Miranda & Wanderley (2006, pp. 74-83)

physical haptic counterforce in their design.²¹ However, as well as the physical resistance, which is typical of acoustic instruments and can be designed as part of electronic instruments as well, there are other kinds of ‘resistance’ elsewhere in the relationship between player and electronic instrument. Most noticeably one might examine the resistance present in the way the relationship between the player and the instrument is defined in the *desired result*.

A musician playing an acoustic instrument is confronted with resistance not only in the act of producing sound vibrations but also in the control of these vibrations, for instance, by finding the position to produce the right pitch or a pleasing timbre. Gillespie (1999, pp. 251-252) discusses a feedback model for the way an instrument is played. The brain sends control messages to the muscles, which in turn perform the physical action on an instrument. The brain receives sound and haptic information and then *corrects the error element* in order to adjust the physical actions. This implies that there is a *desired result* that the player wishes to achieve. The same applies to electronic instruments. It is this desired result that we need to define in order for friction to enter the process. In a new instrument, which is not designed to conform to an existing music tradition, we must decide *what this desired result actually is*. This can be found through experimentation. Once a desired goal is set, self-discipline and training of the body can apply in the case of a new electronic instrument. It is through this *limiting* aspect of the defined target that intentionality is evident and virtuosity can be achieved. Even if the desired intention is unknown to the audience, competence and gracefulness will be perceived in the performer’s actions.

²¹ See Nichols (2002). This instrument consists of a virtual violin bow as well as four cable and servomotor systems, maps bowing gestures to physical synthesis. The software, as well as mapping data from encoders attached to the servomotors, also sends control voltages to the servomotors, creating haptic feedback simulation of friction, vibration, detents and elasticity.

Mapping

Mapping is crucial to the way an instrument is played. It determines the type of physical action that can be carried out in order for an interaction to be controllable and intuitive. Mapping design will usually take into account the physical and cognitive limitations of a human performer. But it can also *dictate* the nature of the physical involvement of the player.

Hunt, Wanderley and Paradis (2003, p. 433) describe an experiment investigating the effects of effort introduced into the mapping of a simple interface. They assigned three sliders on a MIDI controller to an FM synthesis algorithm in different ways:

- The first type was a simple one-to-one mapping controlling the audio parameters of the synthesis.
- The second type was similar, but had the addition of requiring the user to input energy into the system in a bowing-like movement through another slider.
- The third type was a more complex many-to-many mapping in which parameters were cross-coupled.

The users were not informed as to the nature of the mapping procedure. After playing these configurations the users claimed the first situation was ‘dull’, the second created a feeling that they were connected with the instrument, and the third one did present an initial challenge, but eventually created musical rather than technical engagement. The users interacted with the instrument holistically while trying to produce a musical output, rather than trying to discover what each slider was affecting separately.

It emerges that a phenomenological approach to instrument design, in which the experience of the interface and its mapping, rather than a preconception of it, could lead to challenging yet satisfying interaction. Aden Evens (2005,

p.165-167) refers to what Hamman calls the *symbolic* and the *semiotic* in computer tools. The symbolic relies on preconceived musical objects such as tempo, pitch, dynamics, while the semiotic allows for the generation of new meaning and unfamiliar objects. This relates to the third category in the MIDI slider experiment described previously: the user is encouraged to explore the cause and effect of new mappings that cannot be analysed using previously known concepts. The performer must learn to play this instrument through physical engagement, both tactile and audible. In this process, another point of friction is revealed: working against the computer's resistance to being 'musical', learning to work with the unfamiliar instrument in order to make it expressive.

Self-resistance

Sometimes performing requires self-resistance rather than the initiation of an action. An experience we are familiar with is walking downhill. It is known that we use more leg muscle power to keep ourselves from going down too fast, rather than muscle power that drives us forward.²² Resisting motion (in this case induced by gravity) can cause more exertion than the initiation of motion. This category can be evident in many types of performance, and is common in electroacoustic playing when sound processes and streams which can proceed in an automated fashion are controlled live.

A familiar example of such 'friction' is turntablism. I once participated in a DJ workshop presented by colleague and fellow-ensemble member DJ DNA. I had never done any 'scratching' before, and assumed this act would involve a great deal of effort. To my surprise, the movement required was minute, and the physical effort – negligible. I found this surprising as the DJs I had seen performing live seemed to be exerting a great amount of effort while playing their solos. The effort is to be found in *self-resistance*. The DJ needs to resist

²² I was not completely sure that this wasn't an urban myth. A search on the internet shows this example is valid: downhill hiking has been connected to a larger reduction in blood glucose, see <http://www.scienceblog.com/community/older/2004/4/20043115.shtml>

the natural hand movement, and limit it to a certain range of movement. In addition, playing requires agility, precision and keeping in time with the beat that is established.

So how can this be applied to other electronic instruments? A possible example is the mapping of movement to a controller value that changes the sound very drastically as a result of even the minutest change, requiring one to avoid moving the interface too fast. Another known example is in the use of audio feedback that may overload unless we monitor the process continuously and adjust the value of the feedback factor. Designing a situation in which the performer needs to fight a certain force such as a natural physical tendency or a system that can go out of control will result in an effort that shows engagement with a sound process.

The next three categories of friction apply not only to electroacoustic performance but also to performance in general. In this context I will refer to the specific issues that need to be resolved in the context of live electroacoustic performance.

Systems of reference

A performer's effort on stage can be the result of a conceptual limitation such as a *system of reference* that is known to the performer, the audience, or both. Obvious examples in instrumental music are the score, or, in improvisation or oral/aural music traditions (Indian classical music using raga, Arab taqsim) – clear rules about what is or is not 'acceptable' musical material or playing style. Both the performer and the audience will probably have some knowledge of the system of reference. However, not all of those present at a live performance are equally 'initiated'. In some cases, the performer might act according to a set of rules which he/she or the composer has determined in advance – rules which are not necessarily known to the listeners. If this knowledge is not shared with the audience, it might not be able to appreciate the subtleties of playing or the virtuosity of the performance. Providing the

audience with this degree of familiarity with the system of reference makes performance more risky and 'frictional'. In the context of live electroacoustic music, aspects such as the technology of performance and sound production, the compositional strategies, the sound world and the social context are unfamiliar to many, and a diversity of approaches and aesthetics makes it impossible to speak of one style or performance tactic.

There are two main strategies with which the audience can be included in the understanding of the systems of reference:

(a) Initiation Processes

The initiation of the audience can take place in a learning process prior to the performance or it might occur within a performance itself. A pre-performance event can be in the form of a talk analysing the piece and explaining the concepts behind its creation, or a more 'hands-on' approach.²³ The initiation phase can also take part *within* a piece. A composition might include an exposition part that introduces rules, relationships, sound elements or themes which are then developed further.²⁴

(b) Familiar Systems of Reference

Another strategy of creating 'friction' is to rely on *familiar or shared* reference systems. In this case, the type of audience, its specialism and familiarity with certain systems or a repertoire should be taken into account. A specialised audience will know the piece and be able to compare it with the 'ideal' or 'best' performance. Other, more common systems of reference can be used. Clear time patterns, such as a steady beat that the performer needs to keep up with

²³ For example, in Tod Machover's *Brain Opera* there is a dedicated 'initiation' space in which the audience can play the electronic instruments used in the performance, leading to a better understanding of the technology and how it is integrated into the show. In a game-like live piece (such as in some live coding performances) the rules of the game are explained to the audience in advance in order to create engagement.

²⁴ In my piece *Nassama*, a timbre and pitch connection is established very early on between the live bassoon and the electroacoustic soundtrack that contains transformations between voice and processed bassoon sounds. This relationship becomes more complex as the piece proceeds, moving from a clear similarity to more independent parts where the distinction between the live bassoon and the soundtrack is more evident.

or a machine rhythm that must be adhered to are an example. Similar transparency can also be achieved in 'mixed' pieces consisting of live instrumental playing and a pre-recorded part or a scripted automated responsive system. In many pieces of this type the following of cues and indicated timing is crucial. Some relationships, such as simultaneous starting points, or repeated call and response patterns are simple enough for the audience to perceive, and require the extra effort of precise timing on the side of the performer. Extra-musical points of reference are also a rich source for creating connections. Correspondence of audio with non-audio media, for instance in the case of performing a live soundtrack for a film, is such a case.

Group Playing

There is an element of unpredictability in group playing. In formalised music such as a composed ensemble piece, or non-scored music with clearly defined structure or musical materials (for instance, in a gamelan orchestra), one relies not only on one's own playing, but also on the competence of fellow musicians and the precision and compatibility of playing within the ensemble. For the individual player there is friction in the constant adjustment of the playing to become integrated, through similarity, juxtaposition and responsiveness, with the group's pitch, timbre, timing and expressive decisions. Free improvisation also demands such a collaborative 'ear' using a language of sound and interaction negotiated throughout a performance

This kind of friction applies to live electronic music both in scored, pre-composed pieces as well as free improvisation. The latter enables musicians to explore the way an electronic instrument functions within different contexts other than solo playing. Quick reaction, expressive gestures or adaptation of the sound to correspond to other players (through contrast, similarity, timing, etc) are a 'frictional' challenge that the musicians face, making the performance engaging for all present.

Having now discussed various possible types of friction in the widest sense of the word, an important question remains: what is 'good' friction? Obviously, the possibility of having the computer 'crash', or getting the balance of sound elements wrong does not fall within this category. Performance is not about struggling with the possible failures of technology, unless we choose this concept as an integral part of the work. The technology is a *means to a cause*, and if it is not reliable, and preoccupies the performer in a non-musical way, this may take away from the concentration on essential performative aspects such as expression or precision. Rather, 'good' friction enables both the performer and audience to engage with the sounds and the context in which they are integrated within the dramaturgy of the stage.

APPROACH NO. 2: ANTI EFFORT – AUDIBLE SENTIENCE

Musicians adopting the 'anti-effort' approach believe that live electronic instruments should be accepted as a completely new performance resource, and that a different paradigm needs to be adopted rather than the traditional instrument model and the exertion of effort. Two approaches in this vein are **aural performativity**, and the recognition of **minute gesture as valid performance**. I will suggest that in performance adopting such an approach, a dramaturgy needs to be developed that places the minuteness or even absence of performative action in a context that is clear or engaging for an audience.

Caleb Stuart (2003, pp. 59-65) believes there is a 'distrust of the computer and performer's relationship' in performances where the musician is sitting behind the laptop; an audience tends to react negatively as it feels there is a *loss of the spectacle* that it is used to. He proposes a different approach in which the performer as well as the audience are *all* listeners in a state of 'aural performativity'. He suggests that in the case of laptop performance, the audience needs to shift its perception from a visual focus to an aural one; audiences should understand that there is something different at work here: a live aural creation that does not depend on visible action. However, how does

one 'educate' the audience to realise this? What motivation is there to make this shift when there is no proof that the performance is live? And finally, what validity is there to the presence of the musician on stage?

Another approach focuses on **miniature gestures**. With the advent of electronic instruments the performer can influence sound through the smallest of gestures: pressing a button, turning a knob, or even changing brain waves.²⁵ The emphasis is on cognitive action rather than a physical one. Julio d'Escriván (2006, p. 185-9) calls this a 'sentic' approach to music: 'In keeping with the sentic idea that any gesture, no matter how minimal, can be musically valid, it seems obvious to me that any input device can be a musical instrument.' Indeed, we need to accept the validity of an alternative, more inclusive approach to gesture that is suited to the medium. Such an approach calls for *suitable presentation* that is designed to accommodate the features of such a performance methodology.

An example of such presentation can be seen in the live work of Kaffe Matthews. Matthews has worked in diverse live electroacoustic settings. In her solo live work that is laptop based (described by Will Montgomery in *The Wire* 2003²⁶), Matthews prefers to perform at the centre of a space, with the audience sitting around her in close proximity, sharing the same listening space. She explains:

I want the people to be close because the hotspot of the sound is going to be where I am, in the middle, and they need to be there too. I need a little light so I can see what I'm doing but essentially it's dark and people are in the position of just dealing with the sound. That's what music is about for me, it's about listening, active listening.

In Kaffe Matthews' performance a situation is created in which *shared listening* is evident in the seating arrangement and lighting. In this way, the

²⁵ As in the work of David Rosenboom using 'biofeedback'.

See <http://leoalmanac.org/resources/emonograph/rosenboom/rosenboom.html>

²⁶ I consulted the article as it appears on Matthews' website <http://www.annetteworks.com>.

audience can intuitively grasp the logic of this particular ‘dramaturgy’.

Other performances emphasise the complete lack of performative action as the very premise of the dramaturgy. Performances of John Cage’s *4’33*, where a player is instructed *not* to play an instrument, can be highly effective, since the act of non-playing is in one respect clearly a reference to the potential of an expected action that is not realised. The inactivity of a performer can also be manifest in pieces that use sensors detecting invisible, involuntary body signals. Examples of such work are Alvin Lucier’s *Music for Solo Performer* (1965) in which electrodes attached to the performer’s head pick up alpha waves, which are then amplified to cause vibrations in percussion instruments in the performance space. In Adam Overton’s series of compositions *Medi[t]ations* (see Overton 2006, pp. 178-9) a performer is in a state of breath-based meditation, while sensors and software analyse internal bodily activity and map it into electronic sound. In both Lucier’s and Overton’s cases there is a clear dramaturgical context, one that aims to reveal that even the body of a motionless performer is alive and active. These performances clearly juxtapose the motionless body with its inner activity, and are presented in a manner that is clear to an audience, not least thanks to the imagery of the sensors and wires attached to the performer. The importance of the performer’s presence on stage is established as crucial functioning as the live and present source of the sounds heard.

To conclude, when an ‘anti-effort’ approach is adopted, it seems to be most effective when there is a dramaturgical context that contextualises the presence of the performer and his/her relationship with the sounds (or ‘silence’) and the audience.

APPROACH NO. 3: HUMAN BODY WELCOMES MACHINE

Some performers address the issue of the performing machine by welcoming it with open arms. Rather than regarding it as an obstacle or problem, machine-like aesthetics – or an artist’s impression thereof – are developed as

an essential part of the performance context. Here, the presence of the machine becomes the main agenda of a performance rather than a tool. Such a theme can be presented playfully, ironically, or as a manifesto welcoming a maybe-inevitable future. As we shall see, the iconic, symbolic representation of ‘the machine’ changes together with the new guises technology assumes.

One cannot mention machine aesthetics without tracing them back to the pioneering proponents, Futurists Pratella, Marinetti and Russolo.²⁷ Pratella, in his *Manifesto Of The Techniques Of Futurist Music* (1910) claims music ‘must add to the great central themes of the musical poem the domain of the machine and the victorious realm of electricity’ naming trains, ocean liners, battle fleets, automobiles and aeroplanes as the industrial modern sounds that should enter the musical realm. Marinetti, sound poet and founder of the Futurist movement, viciously embraced the sound of cannons and machine guns in his work (1911):

Attention! Courage! What joy to see hear smell everything taratatata of the machine guns to scream at the top of one’s voice under bites slaps traak-traak lashes pic-pac-pum-tumb... ZANG TUMB TUUMB toc-toc-toc... crooc-craaac....

Russolo expanded this idea in *The Art of Noises* and built noise machines, the *intonarumori*, which he integrated into his compositions. The Futurists embraced machine sound as a negation of what came before in art, music and society. Rather than merely accepting the machine as part of a changing world, they placed it at the centre of the stage. Machine aesthetics were also incorporated in the work of the Russian Constructivists (such as Meyerhold and Popova, El Lissitzky) and the Bauhaus movement (Gropius, Moholy-Nagy, Oskar Schlemmer).²⁸

²⁷ All factual information regarding the Futurist movement is from Mark Sinker’s article *Destroy All Music, The Futurists’ Art of Noises* (2002).

²⁸ For a historical overview of the early days of human/machine aesthetics in performance see Salter 2010, pp. 1-48.

William Burroughs, in his book *The Ticket That Exploded* (1968/2001, p. 14) as well as his tape experiments, relates sound on tape to flesh and uses the two realms interchangeably.²⁹ Proximity of tape voices via splicing is connected to an associative, metaphorical realm of the eroticised body:

The voices of Harrison and “Genial” alternated. They both recorded a short text then the two tapes were cut into short sections and spliced in together. This produces a strong erotic reaction. Curiously enough the content of the tape doesn’t seem to effect [sic] the result. In fact the same sexual effect can be produced by splicing in street recordings recorded by two subjects separately.

In Burroughs’ world, tape is more than a replica or representation of the body. It *is* flesh. It *is* the body. The confusion between the body proper and its copy, and the way the two can be confused, replaced and manipulated would have clear resonances in the work of following generations of artists such as Laurie Anderson, Genesis P-Orridge and William Gibson.

This inverse process of replication, in which, rather than machine becoming flesh, the flesh becomes machine, can be seen in the work of artists such as the German band Kraftwerk. This band cultivated a performance style based on robot-like imagery in the late 1970s, most notably in their album *Man Machine*. Automated playing via sequencers, processing of the voice via a vocoder, voice synthesis, as well as their trademark robot-like image, served to express the band’s notion of machine aesthetics. In this case, the machine is regarded as essential for performance, and can substitute human presence, as Ralf Hütter of the band explains (in Bussy 1993/2001/2005, p. 99): ‘We are playing the machines, the machines play us, it is really the exchange and the friendship we have with the musical machines which make us build a new music.’

²⁹ Some of these tape experiments can be heard on William S. Burroughs’ *Break Through In Grey Room* (Sub Rosa, 2002)

Performance artist Laurie Anderson has a more ambiguous relationship with the machine. While making abundant use of technology in her shows – using specially designed interfaces such as the body drum machine and the tape bow, voice-altering devices such as the harmoniser, and video images – the human dimension is still central. By referring to cultural clichés, acting various stereotypical roles and introducing an element of social critique into her work, Anderson’s work never fully embraces the machine, but rather, as Silvija Jestrovic suggests (2000) engages in ‘electronic storytelling’.

The artist Stelarc (1991, pp. 591-5) goes even further and welcomes the machine *into* the human body, radically claiming that ‘[t]he body is obsolete and not equipped to tackle the contemporary condition’. He proposes that evolution ends once technology enters the body, and therefore we must take steps in designing the body’s architecture ourselves. His performances include the use of prosthetics such as the *Third Hand*, the *Exoskeleton*, the involuntary contraction of muscles via electric impulses, remote-control of human bodies, the amplification of body signals to control elements such as light and sound, and many other inventions in which machine and body fuse into one.³⁰

Another type of ‘robot’ entering the electroacoustic stage is the automated responsive musical partner. George Lewis developed such a responsive environment in his ‘nonhierarchical, interactive musical environment’ *Voyager*. This system analyses the music played by a live performer and then generates multiple sound streams. Lewis maintains (2000, pp. 33-9) that though technology is used, such performance reflects a human, cultural and social source:

[M]usical computer programs, like any texts, are not “objective” or “universal” but instead represent the particular ideas of their creators...
[I]nteractions with these systems tend to reveal characteristics of the community of thought and culture that produced them.

³⁰ For more details on Stelarc’s work see <http://www.stelarc.va.com.au/>

Rather than regarding the automaton as a separate element, a musical robot, Lewis addresses it as an extension of a composition and the mind of its creator, as well as an artefact of a community and its culture.

The face of technology is changing. The machine looks different. The voice of the machine is also changing as a result of better simulation of the human via sampling and physical modelling in sound. The machine voices of the past – ring modulated, monotonous or vocoder-processed – are becoming a nostalgic relic. Most recently technology has started infiltrating the human flesh, the cells and the very essence of the body's building blocks via genetic modification. In 2007 Stelarc grafted a third ear onto his arm. This ear is a non-functioning one, yet this opens up some possible questions regarding live technologised performance. Might we at some point be able to hear differently or redesign our larynx or our hands to play a different sort of music?

APPROACH NO. 4: SOUND CONNECTIONS

Certain performance modes, such as 'mixed pieces' (for acoustic instrument and electroacoustic sound – fixed or 'real time') have become musical performance modes in their own right. Connections here are established via sound and form. John Croft (2007, pp. 62-3) suggests certain paradigms that apply to the relationship between performer, instrument and electronic sound:

- **Backdrop:** a remote non-causal relationship in which the sound evokes certain scenery such as 'playing the horn on a stormy coast'
- **Accompanimental**
- **Responsorial/proliferating:** an antiphonal relationship between the live and electroacoustic
- **Environmental:** recreating characteristics of acoustic environments and spaces, usually through live electronic processes such as reverberance and filtering.
- **Instrumental approach:** which I have discussed in *Approach no. 1*

In my piece *Nassama* for baroque bassoon and electroacoustic sound (including both a fixed soundtrack and live processing of the bassoon sound) connections between the live bassoon and the electronic sound are established using several of the paradigms listed.³¹ The piece explores the similarity of timbres between the bassoon and the voice of Muslim recitation, and the relationship between the two is in constant flux, moving between a merging of sounds and two independent voices. A clear *accompanimental* role in the fixed soundtrack can be heard when certain phrases on the soundtrack turn into a continuous drone which indicates a clear tonal centre for the melody played on the bassoon (e.g. 03:15-03:56). In other sections we can hear two separate yet related voices in a *responsorial* relationship (e.g. 06:20-07:09). While there is no direct reference to a 'realistic' environment, certain sounds, such as a texture of percussive tremolos on a glass instrument and time-stretched vocal sounds (07:54-09:55), provide an immersive '*backdrop*' in which the bassoon sound is placed. The live processing of the bassoon, though not intended to strictly emulate any realistic acoustic space, does evoke the general sensation of a large reverberant space. This could imply the acoustic environments of a mosque or of sounds echoing through a hilly landscape, both of which are relevant to the context of the composition. This example, therefore, would fall into the '*environmental*' category above.

But how does the performer feel in this mixed situation? In the 'mixed piece' performance type, the performer is in many cases bound to following a fixed soundtrack. Though there is usually a sound connection between the live and the 'fixed', the performer is forced to follow a rigid, strict timing. Flautist Elizabeth McNutt (2003, pp. 297-304) discusses this relationship, calling such fixed soundtracks 'temporal prisons': 'For the player, performing with fixed accompaniment is like working with the worst human accompanist imaginable: inconsiderate, inflexible, unresponsive and utterly deaf.' She points out

³¹ The composition *Nassama* is included in the portfolio section of this thesis, and the time indications here refer to the recording on the CD provided.

problematic aspects: inaudible cues on tape, or use of a click-track causing a diminished sense of musicality for the performer. She suggests a more successful approach of 'fluid coordination' in which there is some space for rubato and expression in between certain fixed points of coordination between the soundtrack and the live part. McNutt finds the non-fixed approach, which gives the performer control over the timing of the piece as well as dynamics and timbre, more satisfying.

APPROACH NO. 5: HIDDEN INTEGRATION

Live electroacoustic music need not be *about* the technology. The technology can be integrated, seamlessly forming part of the staged work. An example from the field of theatre is the use of lighting: even though the lights are there for all to see if we care to have a look, we tend to ignore them as a presence on stage. Similarly in the field of sound, we do not necessarily think about loudspeakers and diffusion while listening but rather experience the piece itself. In the same way, electroacoustic elements can unobtrusively be integrated into performance.

In his opera *One* for one singer, video and soundtrack, Michel van der Aa uses technology to extend the actions on stage. The composer explains (in Oskamp 2003, p. 55) that his use of electronic media serves to introduce that which is beyond the performative palette of the live performer. In the case of a composition for violin and electronics, he would for instance transpose the notes much higher than the range of the instrument. In the case of the solo opera *One* the video and sound extend the 'stage': other spaces such as corridors and other rooms are explored, other characters, alter-egos and doubles appear, and dialogues between the live singer and the 'video singer' are performed. Although one might at first be impressed by the virtuosic use of technology and the way it is combined with the live action, the opera is never *about* the technology. It is about the character, the singer and the narrative.



Figure 2.3 A scene from Michel van der Aa's *One*. Singer Barbara Hannigan and her video double.³²

In my chamber opera *Jasser* (2006) the audio-visual technology also serves the narrative context.³³ The sounds of the opera consist mainly of spoken and sung voice, as well as acoustic instruments. Electroacoustic sound plays specific roles:

- Amplification for the purpose of balance and comprehensibility
- The evocation of certain environments via 'real world' soundscapes
- Live processing to indicate a meditative unrealistic inner world
- The use of voice samples of the actor as quasi-instrumental parts suggesting that the world of this opera is actually a reflection of the actor's personal world
- The use of mechanical unrelenting synthesised rhythms to indicate the main character's struggle against an oppressive militarised authority

The video part is similarly a reflection of the actor's world of associations, memories and self-reflection, combining 'real life' footage, the simulation of 'personal photos', imagined scenes from other places (e.g. the actor in the desert), and live camera.

³² Photo available on <http://vanderaa.net/one>

³³ A video edit with fragments from this piece can be viewed on <http://vimeo.com/guyharries>

OTHER APPROACHES: DIFFUSED PERFORMERS

With the advent of high-speed online communication, live performance no longer relies on spatial co-presence. Online performances, technologically mediated but not necessarily electroacoustic, are becoming ever more widespread.³⁴ The live fusion of disparate places (bedrooms, living rooms, remote performance venues) on one cyber-podium can be listened to by a diffused audience. In a sense, this is an abstraction of live performance, and the performer essentially performs alone, using instruments that are virtual, via the standard computer interfaces (mouse, keyboard) or other interfaces or instruments³⁵, responding only to the mediated sound of fellow players rather than to an integrated communal space. The richness of expression, movement and sound from other performers as well as the response of a co-present audience are gone. That said, such performance can bring together performers who would otherwise never be able to meet. In Chapter 4 I will discuss such performance types on their own terms as well as methodologies of community and embodiment that are relevant to network performance.

³⁴ For a further discussion of this area, see Chapter 4.

³⁵ For an interesting discussion of 'cyberaction' – the way of interacting with virtual physical-model instruments, see Juraj 2009.

2.4 CONCLUDING NOTES: WORK WITH THE N-ENSEMBLE (2004/06)

In this chapter I have looked at the duality of the performing body and the sound it influences. In the context of electroacoustic performance both composers and performers have very differing approaches. Some refuse to part with the physical presence of the body and seek ways to involve it in the performing act by emulating traditional links, such as causality, or creating new ones. Others claim we must accept the new technology and use it on its own terms, either as a hidden tool of performance or as a performance aesthetic in its own right. Yet another approach embraces the machine on stage as a chosen aesthetic, a playing partner or an aspect of contemporary life that can be commented on. Whatever the approach, it seems the more successful cases address the duality in some way and establish a link of engagement between human and technology, manipulating and transforming the traditional connections of performance via the ambiguity of simulation, and designing a clear dramaturgy in which it is integrated.

CASE STUDY

In my work with the N-Ensemble I explored a possible performance situation in which sound is embodied. For this I used various tactics taking into account the nature of the sound, the interactive environment, group interaction and localisation. In this series of performances, developed in collaboration with the musicians and ensemble leader Koen Nutters, the ensemble consisted mostly of acoustic instruments: piano, recorder, percussion, viola, double bass, clarinet and flute.

The intention in this project was to use electroacoustic means to expand the sound of the instrumental ensemble. We initially recorded improvised gestures played by the instrumentalists. These were then edited into single separate gestures, as well as electronically processed versions of them. I programmed a playing environment in Max/MSP with which I was able to trigger these sounds and manipulate them using a MIDI keyboard and sliders

controlling processing and playback speed. This resulted in a performance situation in which the electronics were integrated with the instrumental sounds or served to extend them to a less familiar, processed electroacoustic realm. The main aspects we worked on while designing the electronic set-up were:

- **Quick response:** The form of the pieces demanded quick response from the players, and this included my electronic part. The intuitive and direct gestural approach to designing my interactive environment enabled this. Group playing, demanding fast response, provided the 'friction' in this case.
- **Localisation:** In some of the performances in this project I worked with a localised speaker placed near me on stage. This increased the impression that the electroacoustic instrument was part of the ensemble rather than a separate type of instrument with its own sound world or playing principles. In some performances we created spatial ambiguity by introducing recordings of previous performances into the live performance.
- **Flexibility:** As well as serving as an 'instrument' the electronic part also served other functions. It provided continuous textures, such as recorded flageolet sounds stretched through live granulation, controlled live as a backdrop for gestures from the other instruments. The electronic part also served as a confusion of causality by introducing recordings of previous performances. In all cases, the electronic part was visceral and indicated embodiment which we associate with the nature of acoustic instruments.

These considerations addressed both the need to have an 'instrument' that was responsive and intuitive as well as harnessing the potential of electronics beyond the instrument model.

CHAPTER 3

PHYSICAL SPACE / ELECTROACOUSTIC SPACE

In live electroacoustic performance we experience a duality of space: the electroacoustic space and the physical space meet and become a heterogeneous hybrid in which points of connections and confluence as well as disruptions and violations of spatial expectations are at play. This hybrid space brings with it a sense of ambiguity and blurring of boundaries, a connection of the real and unreal.

In the Western concert or theatre tradition the stage is usually the central focus point where the main performed actions take place; it is located where the main performer or the most captivating stimulus is. Conversely, in acousmatic diffusion without a live performer present, the *listener* is the central reference point.³⁶ In this case, sound diffusion is designed with the listener's location in mind. In live electroacoustic performance, the combination of a stage and electroacoustic diffusion creates a hybrid in which both the listener and the stage are possible focus locations. Performance here is extended beyond the physical stage, as the actual sound sources are spread throughout the space. The performer is extended beyond the association with one defined location, to a larger 'sound space'. The focused location of the stage (visually) and the diffuse nature of the sound sources (aurally) can create a dissonance which needs to be resolved by the listener.

In this chapter I will look into methods of connecting the electroacoustic and physical spaces and examine some possibilities of manipulation, extension, and disruption of expectation in the context of live electroacoustic performance.

³⁶ A similar situation can occur in the acoustic-only situation, in which musicians surround the audience or are spread throughout the space, such as Stockhausen's *Gruppen* (1955-57) and *Carré* (1959-60), and Henry Brant's *Voyager Four* (1963).

3.1 PERFORMANCE SPACE – A CONSTRUCT

Performance space is a place away from everyday reality. For a certain allocated time this space becomes a dedicated location with a specific social context. Alternative rules apply as well as modes of perception and interpretation that are different from those in the 'real' world. Separation from the outside world is marked by the *outer borders* of the performance 'territory', while the main significant actions conventionally take place at the *innermost centre*. Less conventional performance types, such as online performance or a live performance that is spread over several locations (for instance – a site-specific project spread throughout a park), are defined by a context that separates them from other events and some 'core' points where certain actions occur. In the most common scenario, theatres and performance spaces are similarly centripetal, designed to draw the spectators and participants into a centre of intense activity – a sacrificial altar, a football pitch or a stage. Performance space is a creation determined not only by the marking of a 'frame' indicating inclusion or exclusion but also by the central *actions* that take place within it. For instance, street performances draw their territory by their performative, unusual nature rather than a performance venue housing them.

Space can be reflected in different discourses according to the way it is perceived and used. Lefebvre (1991) sees space as politicised: it is conceptualised by different groups in society according to their agendas or interests. He distinguishes three approaches to the conceptualisation of space (ibid., pp. 38-9):

1. The spatial practice of a society secretes that society's space; it propounds and presupposes it... it produces it slowly and surely as it masters and appropriates it.
2. conceptualized space, the space of scientists, planners, urbanists, technocratic subdividers and social engineers, as of a certain type of artist with a scientific bent – all of whom identify what is lived and what is perceived with what is conceived.

3. space as directly *lived* through its associated images and symbols, and hence the space of 'inhabitants' and 'users', but also of some artists and perhaps of those, such as a few writers and philosophers, who *describe* and aspire to do no more than describe... It overlays physical space, making symbolic use of its objects.

We can detect here three types of *produced* space: **social**, **quasi-objective** and **personalised-poetic**. Lefebvre uses these three categories as part of his socio-political critique, indicating that there are certain methodologies, ideologies, strategies and messages embedded in these approaches. Though their socio-political implications are beyond the scope of the current discussion, the three approaches can be useful in distinguishing between different discourses that are relevant to this chapter's investigation. For this reason, I will use them as a framework for a general discussion of the use and perception of space, before moving on to the specific issues of the duality of electroacoustic and physical space.

3.1.1 SOCIAL ASPECTS

Most electroacoustic performance takes place within a building functioning as a dedicated or ad hoc music venue. Every building contains messages manifested in a subliminal or more blatantly obvious fashion. Markus (1993, p. 5) refers to the building as a text containing the narrative of the past and the present. Adopting a semiotic stance he states that the building's messages depend on a common language for the subject, the reader and the 'text'. In our case the 'text' consists of an array of meanings embedded within the building.

The design of musical venues exercises control over the audience. The venue is designed to accommodate the event, and in a sense forces its users to follow certain implicit rules. The functions of certain areas encourage certain behaviours at designated times (socialising, commerce, performance, listening) and the audience moves from one space-function to another at various points in the course of an event.

Other venues adapted and used for performance, such as warehouses, train stations or outdoor locations, are reshaped by the events that take place in them. Peter Brook (1968) coined the term 'The Empty Space' to describe a space that can be called a 'bare stage', avoiding the limitations of traditional theatre structures. However, the notion of an empty space can only be an ideal one: no building is anonymous or without a certain history of its own, as Wiles (2003, pp. 242-3) points out '[t]he shape and contour of the frame confers an identity on that which is framed.' Characteristics such as location, (former) function, shape, acoustics will all affect the way a space is used and perceived.

In many cases the performance itself takes place at the central core, embedded within the layers of the building and its environment. All of these layers have significance for the way the performance itself is experienced, and contain secondary performances of their own. Small (1998, pp. 19-29) examines the various aspects of the venue in the context of the symphony concert. He reads the socio-economic meanings in the details of the building, addressing the venue's location in the city, its relationship to the surroundings, the building and its scale and its functions past and present, the façade, the entrance, the lobby as transitional socialisation space, and finally – the concert hall with its stage and seating areas indicating social status and the dictated listening state. He points out that the concert is a contrived affair 'designed and built by social beings in accordance with certain assumptions about desirable human behaviour and relationships' (ibid., p. 29). Gay McAuley (1999, pp. 63-70) discusses the spaces of the *practitioner*: the stage with its hidden and revealed elements, the backstage areas and the rehearsal space. The 'hidden' nature of the practitioner's spaces is part of the performance ritual: the audience is only allowed to see the performers during the actual performance, and 'backstage passes' are granted only to a select few.

Objects in the space, including both interior and exterior design elements, can function as signifiers of ideas, conveying messages on a semiotic level and evoking narratives of the past and the present: banners list patrons and sponsors, pictures and sculptures remind us of notable artists who performed at the venue, and interior design can refer to revered cultures of the past such as ancient Rome or Greece. The stage and seating arrangement dictate the listening situation, and the hierarchies within the performance – between the different members of the audience or between audience and performer.

So how would these categories apply to the live electroacoustic concert?

Electroacoustic performance takes place in highly diverse environments. There is no *one* typical venue for electroacoustic music. Different types of electronic music have different venues with different codes of behaviour. In the more specialised, academic context the venue might imply a more exclusive, insular milieu. Such a venue could be a concert hall at a university, a research centre, a venue rented for a conference on computer music or a concert hall associated with this type of music. Some venues such as the Muziekgebouw in Amsterdam or IRCAM have unique sound systems and acoustically tailored spaces, manifesting the expertise, knowledge and resources behind them. In the more exclusive electroacoustic scene, most chances are that the audience members have been initiated in the workings of the medium, either as student, academic, a friend or a person with an avid interest. Live electroacoustic music also features in contemporary music festivals and concerts, either as an indicator of the 'new' or because it has been recognised as a significant stream of new music in the contemporary canon. Less specialised milieus allow for performance spaces that are open to other audiences. This is usually the case when live electroacoustic music is part of an interdisciplinary project, such as dance, opera and theatre. In this case, less specifically designed spaces, such as theatres, are often used. Other interesting cases include the presentation of electroacoustic works at galleries and museums, implying that sound art, including the live performance of it, might belong more properly with the contemporary fine arts,

possibly as a result of the rise of time-based arts, including video and installation. More recently, there have been initiatives trying to bring live electroacoustic performance to more informal places and to a wider public. With the availability of affordable music tools, a thriving electronic music scene is developing outside the confines of academia. Pubs, clubs and adapted spaces such as hangars, abandoned factories and the outdoors are providing new contexts and social 'scenes'.

Technology is a defining element in a venue, on a socio-economic level as well as artistically. Some productions enjoy state of the art equipment and acoustics designed specially for the electroacoustic medium. But then again, many spaces do not meet the technical requirements, and necessitate adaptation (through renting and installing equipment, or adjusting the acoustics of the hall) or compromised sound quality (e.g. concert organisers being obliged to use a pub's dubious sound system through lack of financial resources). Technology is a social sign whether we like it or not; it indicates power in the form of resources: expertise, manpower or funding. Calls for commissions to be composed specifically for a particular diffusion system, or for pieces to be performed in a space equipped with suitable facilities, are simply a contemporary take on the age-old system of patron and artist, and the existence of institutions that act as hosts to a work of art.

The ways venues define the relationship of audience and performance/performer are also highly diverse. In many cases, the venue is still regarded as a place for passive listening, and the division between the performance and the receptive audience is very clear. I will discuss the relationship between performance and audience in Chapter 4, in particular with regard to new modes of interaction, in which the spectator is encouraged to move around the space or even interact with it.

3.1.2 'OBJECTIVE' PHYSICAL APPROACHES

A performance venue can be conceived as an object with certain physical attributes, designed to accommodate the acts of performance and listening. Drawing partly on Xenakis (2001), we could consider physical attributes of performance spaces such as: **size, location, the receptacle, and borders.** To these I will add the **aural perception of space.**

Size

There is a wide range of possible size scales of performance. Xenakis encourages us to think of the extremes rather than limiting ourselves to the familiar scale of the typical music venue. An audience could be the entire population of the planet or consist of just one person. A spectacle might be huge and include fireworks and volcanic eruptions, or even play on a cosmic scale in the not-so-distant future. Xenakis's *Persepolis Polytope* (1971) comes to mind: a site-specific spectacle presented at the ruins of Persepolis in Iran. An 8-track audio piece was diffused in the palace ruins, while a spectacle was taking place on the surrounding hillsides with children carrying torches, as well as other light sources such as projectors and car-lamps. The performance space is extended from the centre outwards, to include the surrounding landscape.³⁷

A combination of technology-assisted mediation and direct experience can include a huge range of spaces that can be 'performed' and viewed. Stockhausen's *Helicopter Quartet* (1993) is another example of a performance on a large spatial scale, but in this case the large scale is experienced via real time transmission and diffusion. Each player of a string quartet performs in a separate helicopter while the sound, including the helicopter rotor blades, and live image feeds from cameras located inside the helicopters are transmitted to the concert hall. The piece starts with the players present at the concert hall. After the mediated performance in the helicopter is finished, the musicians return to the venue for a discussion of the

³⁷ The details of this performance are from Matossian 1986, pp 217-8.

experience with the audience.³⁸

The other extreme of a performance's scale is the possibility of observing the most miniscule detail through amplification or video projection. Bill Viola's installation *He Weeps for You* (1976) consists of a drop of water emerging from a valve and projected on a large screen via a video camera. The reflection of the spectator can be seen on the surface of the projected drop. When the drop finally falls, it lands on an amplified drum. The minuteness of image and sound detail is observed through a process of magnification.³⁹

Location

The location and distribution of the performative actions in relation to the audience can have different morphologies. Xenakis (2001) lists several of these (see Figure 3.1):

- **Frontal** – a typical stage situation with a 'line' tracing a quasi-lateral border between performance and audience space
- **Central** – such as a stadium in which the audience is situated around an event
- **Sources surrounding the audience** – a 'surround' setting; the most common diffusion method for multi-channel acousmatic works
- **Sources within the audience** – explored by Xenakis in his piece *Terretektorh* (1966) where 88 live musicians performed from scattered locations in the audience area
- **A narrow or lineal** performance space (as in a city marathon, the *Tour de France*, a procession or parade)
- **A hybrid of several** of these types

³⁸ The details regarding this piece are from Stockhausen's website http://www.stockhausen.org/helicopter_intro.html

³⁹ Details of this installation are from the Bill Viola catalogue 1998.

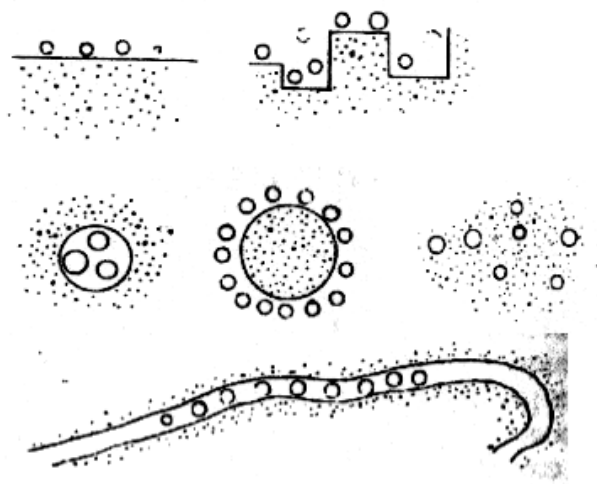


Figure 3.1 Xenakis's source location types (top to bottom, left to right): two frontal types, central, sources surrounding audience, sources within the audience, lineal processional (from Xenakis 2001)

Xenakis's categories address mainly the lateral plane. However, the elevation of source can also come into play, as well as the possibility of movement of sources.

Different distributions imply different uses and perceptions. With the central and frontal types, there is one main area of action – the more conventional stage type. With the sources spread throughout the space, the audience can only focus on one of them visually, while relying mainly on *auditory perception* to unify perception.

The Receptacle

The outer walls of the performance space need to accommodate the sources of the spectacle, the size of the audience, and the relationship between them. According to Xenakis, a space should allow for an ideal viewing and listening situation. He encourages the use of new technologies available for designing such perfect spaces, stating that creating a space for listening is like building the perfect musical instrument. Xenakis explored this idea in his *Diatope* in the Pompidou Centre in Paris (1978), constructing a curvaceous tent specially designed to serve a multimedia event consisting of a light show and a soundtrack (the piece *Légende d'Eer*). Spaces can also be *acoustically*

reshaped using audio engineering techniques, providing more optimal spaces for listening.

However, not all would agree with Xenakis that an ideal line of vision or listening situation is what a venue's structure needs to provide. Ian Mackintosh (1993, p. 170) advocates an approach to the design of performance spaces focusing on human interaction rather than ideal viewing:

The platitude that all must see and hear is just that, a platitude. Perfect sightlines result always in 'the tame, conventional, often cold hall' which Brook feared. Seats need not all face the playing area which may itself alter its position. Nor is it necessary for all the spectators to see equally and perfectly the full scenic picture. The architect or designer's prior duty is to arrange people into 'the most vivid relationship one with another' to quote Brook in 1968 or so as to 'appear to form part of the spectacle one to the other, ranged as books are in a library' to quote Algarotti in 1767.

In the context of electroacoustic performance, where precision of diffusion and spatialisation of sound is crucial, the situation might be a bit more fragile. In this situation we are relying mainly on the modality of hearing, which is very much affected by where one is situated. This approach would require a composer or performer to rethink the nature of a piece presented to an audience and provide a situation which is exciting, possibly on a social level, and tailored to a space and the place of an audience within it.

Borders and Porosities

The two main borders we encounter in the performance situation are between the performance space and the outer world (equivalent to a 'receptacle'), and between the performance area and the audience. The border from the outside world serves a purpose of perceptual seclusion. The image of the everyday world (the street, traffic, passers-by) as well as the sounds of it (cars, footsteps, voices) can be kept out. A venue can provide protection from the elements, keeping the audience and the expensive sound equipment shielded

from the rain or a sand storm. Sound and visual insulation may limit distractions or serve to create a controlled environment: visually or in sound.

But the creation of borders is also very much determined by social factors. Blesser and Salter (2007, p. 31) discuss ‘acoustic arenas’ – regions where listeners are part of a community that shares an ability to hear a sonic event. They contend that control over ‘acoustic arenas’ is a manifestation of power of stronger groups in society. Sometimes these groups silence or allow only certain types of sounds to occur in the ‘acoustic arenas’ they control. Some artists try to counter this approach of acoustic ownership. John Cage famously states (1961, p. 190) that no noise is external to the listening process.

If one feels protective about the word “music”, protect it and find another word for all the rest that enters through the ears. It’s a waste of time to trouble oneself with words, noises. What it is, is theatre, and we are in it and like it, making it.

However, this might depend on the outside world and what kind of experience it can offer: one might get tired of listening to passing cars when the venue is on a main street and very soft, nuanced textures are part of the composition. Usually, if one wishes to include the sounds of an external environment, this needs to be taken into account in the composition process.

Borders can have different degrees of ‘porosity’. Walls act as a border that can insulate sounds or let them through. A stage demarcates a border between performer and audience. However, image and sound emanate from the stage and reach through to the audience and in this sense the border is metaphorically ‘porous’. Sometimes, certain aspects of performance can be contained within a porous envelope while others are completely blocked. For instance, set design using a transparent cube might insulate the sound but not the image. Alternatively, a live instrument player might be heard but hidden from view. Varying degrees of porosity can be played with as an expressive

tool of the dramaturgy: semi transparent screens can induce an ephemeral, ghost-like presence or impression of the proceedings on stage, and musicians playing in less audible areas of the venue may encourage the feeling of remoteness or the otherworldly.

Aural Perception of Space

Every musical venue has its particular acoustic characteristics which will influence the way sounds are perceived in the space. However, the manifestation of such characteristics very much depends on the way the space is used. Different sounds produced at different locations in the venue will have various acoustic responses. In this sense, a combination of design of the physical space and the way it is used are what produce its 'aural architecture' (see Blesser & Salter 2007). In electroacoustic performance this architecture depends on different factors: the location of loudspeakers, the sounds played through them, the acoustic properties of the space such as volume, distances, absorption factors of surfaces. The use of space is crucial, and we cannot separate it from the social, as Blesser & Salter (2007, p. 24) state: 'Aural architecture is... a social system rather than a simple application of physical science to spatial design.' It depends on aspects such as control of spaces and the sounds produced in them, and the type of social interaction taking place in them.

3.1.3 PERSONAL-POETIC CONSTRUCT

Space is perceived subjectively, by an individual who brings to the interpretation his/her personal experience. Blesser & Salter (2007, p. 17) stress the importance of *auditory memory* for our spatial awareness: 'Because experiencing sound involves time and because spatial acoustics are difficult to record, auditory memory plays a large role in acquiring the ability to hear space.' We memorise the connections between sounds and the response they elicit from different spaces, and thanks to this accumulation of learned connections we are able to learn about a space according to sounds we hear.

Based on our experience of the world, we create what Blesser & Salter (2007, p. 46) call 'cognitive maps'. Such maps are not always a precise representation of the physical world:

A cognitive map of a space is a combination of the rules of geometry as well as knowledge about the physical world... This knowledge associates reverberation with enclosed space, echoes with remote surfaces, and high frequencies with hard objects. These associations are learned...The cognitive map of space in our consciousness is subjective, distorted, and personalized – an active and synthetic creation – rather than a passive reaction to stimuli.

Personal experience enables us to perceive space in a practical, functional way, and to navigate within physical surroundings. However, the experience of space also works in a symbolic, even poetic, fashion, evoking memories, emotions and personal connotations.

The physical aspects of the space can evoke subjective impressions. One such aspect is size. A larger building could create the impression of grandeur and awe. It could be associated with a system of power, as is the case in the fascist architecture of the Mussolini regime, or it could be designed to evoke the sublime, for instance – in the architectural design of a cathedral or large mosque. Tiny, confined spaces could induce a sense of intimacy or claustrophobia. A larger space would enable a larger audience to occupy it – leading to a feeling of belonging or the impersonal sensation of anonymity and being one of many. Different sizes of spaces have different acoustic attributes, which we recognise through experience.⁴⁰ These attributes can be replicated in electroacoustic performance and used expressively as a connotative strategy of composition.

⁴⁰ According to Blesser & Salter (2007, p. 21) the acoustics inside small spaces will have elevated low-frequency sounds and strong resonances, and a large space will typically have a long reverberation time.

Size is reflected in all three dimensions: height, lateral position and distance in relation to the spectator. Each one of these can lead to a different personal experience. Height, as we have seen, can be associated with power, hierarchy and awe – political, economic or divine. Distance will be associated with intimacy or the impersonal. Lateral position also carries certain connotations; central sources will attract more attention, with the traditional notion of ‘centre stage’ as the focus of the spectacle. Other ‘human’ aspects in the space concern movement, relative position⁴¹, orientation in the space and proxemics, all of which I will discuss in section 3.4.

Space is a text with multiple strata of meaning. Bachelard maintains that space is experienced through our personal imagination (1969, p. xxxiii). He demonstrates how physical space, such as a house, can contain our mental world, while our mental world can be structured as a metaphorical space. In a poetic sense this personal space is never a fixed one; it is dynamic, changeable, and expressive (ibid., p. 6):

[B]y approaching the house images with care not to break up the solidarity of memory and imagination, we may hope to make others feel all the psychological elasticity of an image that moves us at an unimaginable depth. Through poems, perhaps more than through recollections, we touch the ultimate poetic depth of the space of the house.

Using electroacoustic space, we can recreate and manipulate poetic sensations of spaces and expressively evoke this dynamic experience. For example, Kaffe Matthews uses the personal connotations of space in her installation *Sonic Bed* (2005).⁴² Visitors to the installation are invited to lie in a bed and experience the sounds played through the 12-channel system hidden under the mattress and the sides of the bed. This spatial design works on various levels; the small scale, the proximity of sound and its connection with the body, the prone position of the listener (Helpless? Passive? Relaxed?

⁴¹ This can be between different elements in the space – between audience and performers, between performers, between audience members, between each of these and the physical elements

⁴² <http://www.musicforbodies.net/wiki/SonicBedLondon>

Safe?) and the bed as a private space all work to evoke the poetics of intimacy.



Figure 3.2 Kaffe Matthews – *Sonic Bed*⁴³

As we can see, though there is clearly a difference between the three spatial discourses – social, ‘objective’-physical and personal-poetic – there is often an overlap between them: borders have both physical and social meaning, the physical size of a space affects the poetic aspect, and the personal-poetic perception can inform a social or political experience. Space is created not only by its physical features, but also by those who inhabit and use it – the sounds they make, their movements, the exchange of messages and perceptions and the social interactions taking place. In the next sections I will examine the doubled space of the physical and the electroacoustic, and the way a hybrid space is formed with its own characteristics.

⁴³ Photo from <http://www.musicforbodies.net/wiki/File:BedVisitors.jpg>

3.2 PHYSICAL SPACE / ELECTROACOUSTIC SPACE

In live electroacoustic performance, physical and electroacoustic spaces are articulated via different media, yet both are perceived simultaneously.

The **physical space** includes the tangible entities of a performance:

- The 'receptacle' of the event: walls, ceiling, floor
 - The people involved: performers, stage hands, audience
 - Objects: props, set, chairs
 - Sound producing elements, such as acoustic instruments or voices.
- Loudspeakers, in their physical presence, also belong to this category; they introduce the electroacoustic space into the physical one.

The **electroacoustic space** of performance is the space *represented* in sound produced by electric or electronic means. It is confined to one sensory modality (sound) while implying spaces that could be experienced physically through *all* sensory modalities.

While physical space is perceived as 'real', the electroacoustic one can sometimes be perceived as a simulation. The fact that it is presented within a spatial model indicating movement, distance, magnitude and location enables us to relate it to the real physical space. However, unless it creates the illusion of a tangible physical reality (for instance, by introducing credible sound simulacra of real objects such as passing cars), the electroacoustic space will be perceived by the listener as 'mediated', a copy of the real.⁴⁴ In live electroacoustic performance the listener assumes the role of an observer of another, represented space, while confronted with phenomena within the physical space as a 'true' reality of space that is co-present.⁴⁵

⁴⁴ The focus here is on electroacoustic sound in a live performance situation. In some scenarios, electroacoustic sound can be a part of a 'realistic' space – for instance, electronically transmitted audio cues and messages in a public space.

⁴⁵ An important distinction needs to be made here. Sound itself is a physical reality as well. Sound coming from the loudspeaker is real: it could pose a threat to your hearing or to other parts of the body. This is the real, but the *space represented in it* is not.

For the purpose of our current discussion, I have split both the electroacoustic and the physical space into two categories: **environmental space** and **energised space**. This relates to two approaches to space that Pavis (1996, pp. 150-1) refers to in the context of performance⁴⁶:

1. [Objective, external space]

Space is conceived as an empty space to be filled as one fills a container or an environment that has to be controlled, filled, and made expressive...

2. [Gestural space]

Space is conceived as invisible, unlimited, and linked to its users, determined by their coordinates, movements, and trajectory: space as a substance not to be filled, but expanded and extended.

These categories draw our attention to two perceptions of space. The first one sees space as an environment, a backdrop, an empty vessel where action may occur. The other one is the gestural or ‘energised’ space (McAuley 1999, pp. 90-96) – the space of agents such as the actor, performer, musician, and their actions.

In his article ‘Space-form and the acousmatic image’, Denis Smalley (2007, pp. 35-58) proposes a framework for the analysis of acousmatic works through spatial concepts. He offers an examination of the aspects of acousmatic space, and an extensive terminology which I will use in the current discussion and extend to the case of live electroacoustic performance.

Energised space includes Smalley’s *source-bonded* spaces such as nature sounds or *enacted spaces* created through human activity: utterance (vocalised), agential (produced through human movement and its interaction with objects), or mechanised (produced by machines) and mediatic (sounds associated with media – radio, TV, etc). The energised space also includes any gesture of sound *associated with, but not necessarily created by*, a direct

⁴⁶ The titles of the two categories (in brackets) are mentioned later on in Pavis’s text, after this quotation.

physical enactment. For example, a rise and fall of pitch or movement of a sound in the spectrum can be associated with motion in space or the instrumental/vocal music tradition. What is typical of these sounds is a focus point in space, an association with human activity or an event-like behaviour with a clear start and end in time. These sounds are focused in space or time rather than occupying a large slice of either one manifest in panorama or constant texture.

In the electroacoustic space, enacted space is manifested in *sound*. The listener tries to attribute these sounds to actions of the body or an event that is not necessarily human, such as rock fall, avalanche or water dripping. In the physical space, the source will be a *physical object* which can be perceived in other sensory modalities as well.

The **environmental space** is also perceived differently in the electroacoustic and the physical domain. While in the physical domain visual perception may allow us to experience the space instantly via vision, in the electroacoustic medium the image of the space will be perceived in time through an *accumulation* of sound stimuli. Indications of the panorama of a space via sound localisation will define the outer spatial borders.⁴⁷ Reverberation effects can emulate reflective surfaces of an implied enclosure, indicating dimensions and absorption/reflection attributes.

When discussing live electroacoustic performance, we need to take into account two aspects that distinguish it from the acousmatic-only listening situation.⁴⁸

⁴⁷ There are exceptions to this principle: it is possible to force the physical space into cumulative perception modes (for instance, through making the space dark and illuminating only part of it), as it is also possible to present the electroacoustic image quite quickly, if not immediately, through providing indications of the entire environment in sound over a very short expanse of time.

⁴⁸ I use the term 'acousmatic' here to indicate an electroacoustic piece that is diffused over loudspeakers without a live performer other than the person diffusing the piece.

The first is *the clear presence of two spaces in the perception of the spectator*: the electroacoustic and the physical. A live performer, whether playing an instrument or just being present on stage, is a constant indicator of the physical space. In an acousmatic fixed media composition, the listener may choose to focus less on the real space and follow the indication of space in sound. In live electroacoustic performance, the performer makes such a negation of physical space more difficult. As the 'liveness' of the situation is determined by a human presence influencing the proceedings, the audience is encouraged to acknowledge the physical space as well as the electroacoustic space. Some creators of a live electroacoustic performance choose to establish a spatial correlation between the physical and electroacoustic, for instance – by placing the speakers near the performers, or creating a 'frontal' listening situation, relying on the familiar scenario in which all stimuli, both visual and audible are emitted from a 'stage' area.

A second major difference between the acousmatic and live electroacoustic performance, which I touched on previously, is the *centre point of performance*. In acousmatic diffusion the listener is ideally at the centre and assumes the role of an observer in the space: the acousmatic space relates to him/her and listening is key. However, in live electroacoustic performance there are clearly two central points: that of the listener and that of the performer. The performer at the centre of action is the source of important *visual* stimuli, and in many cases – the acting agent of causality. The performer may also act as a projection point for the listener, through a process of empathetic interpretation.⁴⁹

The electroacoustic and the physical can intersect in various ways, providing points of connection and the possibility of negotiating the perceptions of them both. The main points of intersection are: **diffusion, the performer,**

⁴⁹ We also need to remember that the performer is another listener in the space. The performer does not always have the vantage point of the listener in the audience. This may result in the performer's only reference being a representation of the sound space presented through monitor speakers. This creates a multiplicity of listening conditions (which can also occur when there is a large audience that occupies a larger space with different listening positions).

localisation, formal principles, context / extra-musical aspects and the ‘perfect copy’.

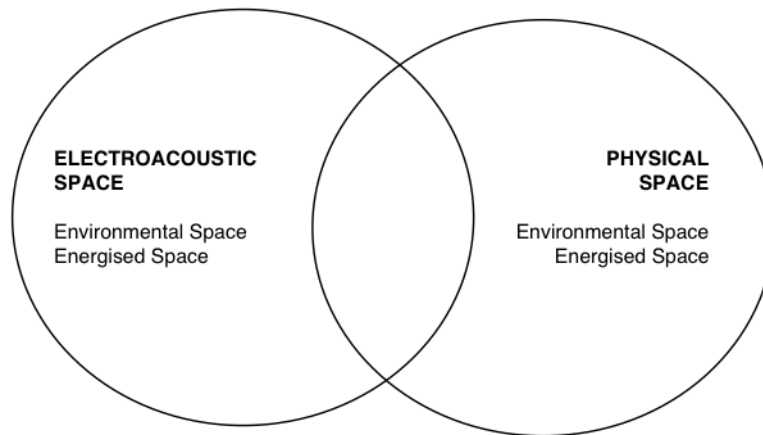


Figure 3.3 Types of space in electroacoustic performance

The **diffusion** process connects the electroacoustic space with the physical space. It includes the loudspeakers and their location, the amplifier, the mixing desk, as well as the acoustics of the physical space. This is the point at which the sound generated by the electronic or electric source is projected into the physical space. The loudspeaker is a physical object in its own right, but the sound information it introduces is that of a *represented* space. Electroacoustic space is *translated* into a physical presentation, relying to some extent on the attributes of the physical space. Reflections influenced by the surfaces, absorption of objects and size will fuse with the space represented in the electroacoustic sounds. Sometimes these can interfere with each other. A composition relying on highly localised spatialisation or intricate changes in spatial indications in the sound would not fare well in a highly reverberant space. The composition contains an ideal spatial image created by the composer, but it may be represented differently in different spaces. In some cases, a composition might *depend* on the acoustics of the physical performance space and incorporate its attributes in the technology used. An example of such a piece is Alvin Lucier's *I am sitting in a room* (1970) which features the recording of a text read in a room, subsequently played and recorded in the same space with the recorded result replayed and

re-recorded. The resonance features of the room become increasingly prominent in subsequent recordings. The sound is influenced by attributes of both the physical and electroacoustic spaces.

Another point of intersection is the **performer**, whose actions in the energised physical space can relate to the energised electroacoustic space. In performance, causality will probably be evident to the performer through the connection of tactile action and perceived sound result. For the audience this might not be immediately the case; the more visual cues there are or the more familiar the connection between action and sound result is, the easier it will be to negotiate the two spaces. For instance, a musician plays the flute whose sound is then amplified and located in the electroacoustic space (via diffusion on loudspeakers). Our familiarity with the sound of the instrument, the relation of the player's action to the sound, as well as our knowledge of the process of amplification will enable us to relate the sound of the mediated, electroacoustic flute sound to the 'real' location of the performer even if it is transformed and diffused in the space.⁵⁰ As we have seen in the previous chapter, there are various approaches of connection, each carrying different interpretation strategies.

The **localisation** of a sound in the electroacoustic space in relation to elements in the performed physical space can create a strong connection both visually and acoustically. The most common relationship is that of the proximity of electroacoustic sound diffusion to the performer, the most extreme case being the emulation of the traditional instrumental situation (for instance – using a keyboard with an in-built speaker).⁵¹

⁵⁰ In live performance, the distinction between the live instrumental sound and electroacoustic sound can be enhanced or made ambiguous via the actions and movements of the performer and the way sounds are diffused in the space. In the case of a recording, sound is the sole medium on which we rely to perceive such a distinction – through a difference of timbre as well as the way sounds are placed in the sonic space (for instance – a constant position for the live player, and a more dynamic, shifting position for electroacoustic sound).

⁵¹ See section 2.3.1 for further discussion of localisation and Emmerson's 'local/field' functions.

In 2008/09 the POW Ensemble, of which I am a member, performed the project *Strange Attractors*. A number of composers wrote pieces for two computers and electric guitar. The amplification traditionally used with an electric guitar is an example of localised diffusion, with an amp placed near the live performer functioning as an extension of the instrumental idea. In this project, the same approach was extended to the two computers, each one of them connected to a stereo speaker system located next to each player. The composers writing for this setting were asked to take this set-up into account. This resulted in pieces employing different performance strategies: pieces making use of the performers' gestures and their relation to the sound, pieces creating a 'character' both theatrically and musically for each computer part thus emulating opera or theatre, or pieces using the separation in space to provide a hocket impression in which similar sounds distributed between two computers produce a 'ping-pong' effect. Interestingly, all these approaches draw on models from the instrumental chamber tradition.

Another way of connecting the electroacoustic sound space to the physical space is through **formal principles of grouping**. For instance, principles derived from Gestalt psychology can help identify some grouping mechanisms (see Shepard 1999, pp. 32-35):

- **Similarity** in pitch, timbre, spectral behaviour, or motion within an acoustic parameter (such as intensity, spectral centre, spatial localisation)
- **Good continuation** of a sound contour (e.g. a downwards glissando played on the violin continued by a descending sine wave sound located elsewhere)
- **Proximity** of sound elements occurring in:
 - **Spatial position**: sounds localised near the performer will be related to his/her presence

- **Time:** for instance, a rapid sequence of sounds indicating a call and response pattern between electronics and instrumental sound
- **Spectral centre:** sounds in a certain frequency range will be grouped together, as indicated in the popular idea of ‘treble’, ‘mid’ and ‘bass’.
- **Symmetry** can be indicated in sound when there is a clear structural connection. For instance, a row of descending pitches played on a piano could be reproduced in reversed order in the electroacoustic space.

With grouping principles, the sounds that are perceived as part of the physical space or the visible physical actions can be perceived as relating to the sounds in the electroacoustic space. Several of these principles are prominent in my work *Flutter* for flute and electroacoustic sound.⁵² Connections between the live flute sound and the fixed soundtrack are established through *similarities* of pitch (e.g. 02:54-03:30), dynamics (e.g. 00:19-00:33) and spectromorphological forms and activity (e.g. 01:27-01:42). In several cases, the flute continues a melodic line that appears in the soundtrack (e.g. 02:34-02:47). Another grouping via ‘*good continuity*’ in space is created via the diffusion in which the live sound is localised nearer the stage, the live processed sound is localised somewhat further away, and the soundtrack sound is diffused throughout the performance space. Some of the phrases in this piece tend to focus on a certain spectral range, and this is evident in both the flute and soundtrack sounds (compare 01:04-01:23 with 03:47-03:59). This spectral proximity serves to connect the two sound elements. There is also *proximity* grouping evident in the synchronicity of changes in the electroacoustic and live acoustic sound, even when the sounds themselves are very different (e.g. 5:56-6:19).

⁵² Refer to the recording of the piece included in the portfolio.

Bregman's notion of audio stream segregation traces certain grouping principles, and specifies how they can relate to **spatial cues**. As Harley points out in her summary of Bregman's principles (1999, pp. 148-9), spatial difference increases stream segregation more than other acoustic parameters. However, visual cues seem to be stronger than spatial ones, and we tend to group sounds with the visual cues that seem to relate to them in what is known as the 'ventriloquism effect'.⁵³

Indeed connections can be established transmodally. We make connections between behaviours in different sensory perceptions (most commonly sound and vision) through common factors that relate to both, such as changes in time and types of motion. Such changes are continuity/discontinuity, direction of movement, speed of change. For instance, it is possible to relate trajectories of motion or change in the visual domain to sound; one instance of this is the change of hand position of a musician playing the Theremin, controlling the audible pitch. Other than a relationship of similarity, the other principles discussed (continuation, proximity, symmetry) are valid here as well. However, due to the use of different modalities, the simpler connections, such as similarity, are usually easier to detect.

Another connecting element between electroacoustic and physical spaces can be a **common context**. The most straightforward example is the narrative of a music theatre piece, in which all sounding elements support the representation of a particular scene. In the chamber opera *Jasser*, for which I composed the music, soundscapes indicate the town in which the main character grew up, and evoke a sense of an imported 'real' place. Though the characteristics of this soundscape have nothing to do with the other sounds of instruments or voices playing, it is a backdrop that we can interpret as an integral part of the scene. Semantic, symbolic and other extra-musical references can provide contextual connections between physical and represented space.

⁵³ This is based on a summary of spatial cues and stream segregation by M. A. Harley 1999.

Another overlap of electroacoustic and physical space is that of the **perfect copy**. It is one in which the electroacoustic space is a representation of a source-bonded sound, creating a strong, credible impression that the source is present in the physical space. Some airports, such as Schiphol in the Netherlands, introduce realistic bird sounds into the passenger terminal space. Chris Watson's installation *Whispering in the Leaves* (2010) brought the Palm House conservatory at Kew Gardens to life by introducing field recordings from Central and South American rainforests into it.⁵⁴ Though visitors were aware that the sounds were recorded, the combination of smells, sights, humidity and temperature evoked a sense of reality and eased the flight of the imagination.

Transformations

Once a connection between the electroacoustic and physical space is established, shifts between spatial domains can occur. For instance, a flautist's playing in the energised physical space could be connected to the processed live sound on the speakers. When this connection is established through similarity or apparent causality, this sound can be modified, split into several sound gestures throughout the space or even changed into a static texture that could be perceived as part of the electroacoustic 'field' function (Emmerson 1996). As I will discuss in more depth in the conclusion of this chapter, I have used this process of shifting spatial categories in my piece *Flutter* (2004). Through live processing of the flute playing, the flautist's actions are connected to the environmental space in the diffusion of the soundtrack. Trevor Wishart creates such a connection in his pieces *Vox 1-4* for live voices and tape: the live vocalists' utterances gradually transform into, or emerge from, electroacoustic source-bonded sounds that are mostly environmental or non-human (such as a swarm of bees or thunder). The piece constantly shifts between the space of the live performance expressed in live vocalisation and implied spaces of the fixed electroacoustic sound.

⁵⁴ <http://www.whisperingintheleaves.org/>

3.3 SPATIAL DYNAMICS

There are two kinds of spatial shifts that we encounter in electroacoustic performance:

- **Movement:** a more common shift relating to everyday experience
- **‘Elasticity’:** the transformation of the *spatial identity* of objects

We will see that though some of these dynamics can occur in the physical space, the electroacoustic space offers much more flexibility of transformation. Relying on the spatial-auditory memory of the listener, space can turn into a malleable, expressive parameter.

3.3.1 MOVEMENT

We are accustomed to the idea of movement of objects in the ‘real world’, and in the live electroacoustic context we encounter both motion of objects in physical space and *indications* of motion in the electroacoustic space. After looking at movement in each of these spatial domains, I will examine the relationships that can emerge between them.

Motion of Physical Entities

In the physical space we encounter three main elements that have the potential of moving: **the performer, the loudspeakers and the audience**. To these we can add the less explored motion of the **physical environment space**.

The Performer

The electroacoustic medium has introduced its typical obstacles on stage; cables, computers, microphones and monitor loudspeakers create a veritable cage for the performer. However, even though the use of technology enables the impression of motion through the electroacoustic space, one does not need to discard the idea of the performer’s movement in the physical space as well.

In general, the mobility of the sound/music performer is being made increasingly possible by the development of wireless technologies. Wireless microphones are used to amplify instrumental and vocal sounds when movement is necessary (e.g. in opera). Electronic controller interfaces are also moving in this direction. Or one can simply use longer cables! Having the performer energise the physical space is more a matter of approach: laptop music does not require sitting at a laptop. The laptop is a means for sound performance, but need not be the focus of stage presence. Some technical issues (changing between 'patches' and software, making sure the computer doesn't crash) might cause one to want to remain somewhere near the laptop, but this can be resolved quite easily, by dividing the 'technical' and 'performative' function.

A live performance's *starting point* can be movement. However, movement needs to have a dramaturgical rationale. Various motivations apply:

- A functional reason, as freer motion is then available for a more physical performance
- A theatrical motivation depending on the narrative context
- Movement can be regarded as an integral part of a performance, and the focus of the main medium may be shifted from the dominance of sound to the *integration* of sound and vision, with movement as part of it. Further connections can be forged when a dancer's movement is translated into sound, for instance when motion is captured by a camera and then mapped to musical parameters.
- Drawing on the instrumental tradition, we can change the centre of focus to the *interface*, the instrument that the performer is using, rather than the processing unit – the computer. Having the performer focus on the interface makes him/her engage with the playing as well as the larger expanse of performance space, including the stage, the venue and the audience.

The Loudspeakers

Loudspeakers do not readily lend themselves to the possibility of motion. The ideal positioning, height and angle are normally a concern at a concert in which diffusion is supposed to reproduce the ideal listening. In a way the performance space here is a replica of the studio in which it was created, and reflects the compositional intention.

We can however choose to regard the loudspeaker as an object that *can* be moved in space, just like an acoustic instrument. Loudspeakers swivelling on a platform, swinging in space, placed on a moving performer or even installed on a robot – all of these options have been explored but are not used very often. Composer Huba de Graaff has explored the idea of the mobile loudspeaker in many of her works, such as the opera *Hephaistos* (1997), in which loudspeakers are mounted on the live performers as well as robots in a colourful, theatrical way.⁵⁵ The loudspeaker in these situations is clearly part of the *physical* space, and treated like an object that is moved and engaged with rather than a medium representing a different, electroacoustic, space.

Audience

Some situations, such as sound installations or performances distributed through a large space, encourage movement of the audience. The listener can explore various vantage points resulting in an active involvement and an individual time experience of the piece. The integration of such an approach into a work needs to be considered in the composition process. A composer needs to take into account that the audience might be distracted while moving, and might decide to provide the possibility of exploring different points of view through repetition or slow progression in the music. Maja Trochimczyk (2001, p. 50) suggests the idea of a 'net' where the live event is spread over a variegated space:

⁵⁵ More information can be found on <http://hubiware.nl/Hhephaistos.html>

The net, consisting of a potentially unlimited number of interconnected nodes, stands for chaos and complexity, but also for equality and the lack of hierarchy and centralized focus. Without a center, the net does not have a super-structure; it is essentially egalitarian in its nature and capable of infinite expansion.

Trochimczyk mentions Cage's Happening pieces in which a multitude of parallel events create a performance environment overflowed with events to be explored and discovered, such as: *HPSCHD* (1969) – where seven harpsichords, 51 tape recorders and 5000 slides create an immersive, asynchronous environment, and *Musicircus* (1967) – which included a simultaneity of 'centres' including elements such as jazz bands, pianists, dancers, mimes, vocalists, films, slides, black lights, balloons, cider and popcorn.

The Environment Space

Motion of the physical environment space of a performance is not as unusual as we might think. In theatre, sets are moved and replaced, changing the physical space on stage as well as the indicated dramatic space of the play. This also occurs in the musical world, where moving screens and walls can be effective both *dramatically* and *acoustically*. In Peter Eötvös's opera *Three Sisters* (1996-97) a screen is raised for the second act to reveal an entire second off-stage orchestra. A performer can also move within the whole performance space, thereby defining an ever-shifting 'stage' and forcing the audience to move in the space, or change its focus of attention.

Motion in the Electroacoustic

In discussing motion in the electroacoustic space, we can distinguish between two main elements: the 'environmental' sound space and the motion of 'sound objects'.

I use the term 'sound objects' here to describe sounds that have a constant salient acoustic attribute, such as a typical timbre or recognisable source that enables the listener to perceive it as one consistent entity. This constancy is crucial if the impression of movement is to be created. The range of movement depends on the diffusion system, which can enable sound objects to move around the audience or for motion to be 'observed' as coming from the stage area only.

But how can motion in the electroacoustic 'environment' be created? In the electroacoustic space, a shifting of the point of view in the environment could be produced, creating the impression that the listener is moving in space. This type of motion is common in gaming environments in which a static system creates the sensation for the spectator that he/she is moving in virtual space, or in film sound design when we follow a character's point of view. In the electroacoustic situation, the listener can experience various vantage points embedded in the sound composition rather than in the listener's actual movement through physical space. A recording of motion through an environment, as in Luc Ferrari's nocturnal soundscape of *Presque Rien no. 2* (1977), changes the spatial perspective for the static listener.

Another possibility of movement in the environment is a *shift of focus point* in the diffusion. The centre of activity can change at different times during the piece. This can create an impression similar to that of a parade in which the main proceedings move on while the spectator is static (or alternatively joining the parade and moving along with it). The 'realism' of movement will depend to some extent on the diffusion system and the localisation of the loudspeakers. While systems surrounding the audience might suggest a realistic diffusion on the lateral plane, the vertical position can be implied through source-bonding (e.g. aeroplanes, birds, thunder) or spectral transformation (see Smalley 2007).

In addition to the ‘environment’ and ‘sound object’ aspect, Smalley (2007) also refers to *implied* spaces in the spectral aspect of the sound: ‘[S]pectral space is concerned with space and spaciousness in the vertical dimension – up, down, height, depth, along with infill and clearing’. Rather than referring to the location of movement, this is an association of motion of spectral attributes with the idea of physical space.

Connecting the Two Types of Motion

Physical space and electroacoustic space – each has its ‘environment’ and ‘energising’ elements. These can be connected in different ways. Taking the performer as a central reference point, we can point to different relationships between his/her movement and indications of movement in electroacoustic space.

- **Causality:** The performed physical movement affects movement in the electroacoustic space – either the ‘environment’ or the sound objects in it. The performer is in a sense ‘extended’ in space.
- **Polyphony or dialogue:** A performer can relate to ‘sound objects’ in the electroacoustic space that are independent of his/her part. The ‘sound objects’ are considered as different voices in the composition.
- **Containment:** the performer is ‘placed’ inside an electroacoustic environment that defines the backdrop to the gesture-based actions of the performer.
- **A performer can also act as a sort of observer** guiding us through the environment of the piece. A live electroacoustic performance by John Drever at Goldsmiths College’s Great Hall in 2007 comes to mind: with the composer sitting at a central position and diffusing an ‘environmental’ soundscape, I remember feeling that rather than being part of that space, it seemed Drever was guiding us through it, like the ‘driver’ of the piece’s ‘car’, controlling the way this communal observation was taking place. In this case, the performer becomes an external observer rather than *part* of the electroacoustic soundscape.

3.3.2 ELASTICITIES

Qualities of sound-spaces: bouncing, pushing, swinging, lifting, dropping, guiding, opening, closing in, stretching, passing through, twisting, narrowing, pulling, rebounding, relieving, confining, stimulating, rocking, crushing, soothing, rising, rousing, contracting, liberating, embracing, surrounding, relaxing, expanding.

(B. Leitner 1978, p. 15)

Transformation can also occur in what I call the *spatial identity* of the performance elements, rather than their location. Identity is a stable attribute of an object. Some identities are usually taken for granted: human performers do not tend to change their physique significantly during the span of one performance (though imaginative use of costumes can achieve this impression); an acoustic instrument has a limited set of sound characteristics; the walls of a venue are usually fixed and have a constant reflection/absorption factor, and an enclosed space does not normally turn into an outdoor space in an instant.⁵⁶ In the electroacoustic space, manipulations of spatial identity are easier to implement, and can be used expressively. I use the term ‘elasticity’ for this sort of transformation. Elasticity implies malleability of material, and in this case the ‘material’ of an object is its perceived spatial identity that is changed and manipulated.

I will look into some of these elasticities and discuss possible modes of transformation in time: fixed, dynamic (rupture or continuous) and combined states.

The Performer

The performer’s spatial identity can be manipulated electroacoustically, producing impressions of varying size, nature of source, spatial category or symbolic connotation.

⁵⁶ Kinetic architecture was conceived and explored in the works of R. Buckminster Fuller, Frei Otto, Kas Oosterhuis, Santiago Calatrava, Wes Jones, Metter Ramsgard Thomsen, Check Hoberman and Michael Fox, Mark Gouldthorpe: see Salter (2010, pp. 99-104).

The implication of **size** can be transformed through **amplification**, a **spread of the diffusion**, or by **sound symbolism**.

- **Amplification:** Louder sounds, other than having a more noticeable physical effect, evoke the association of a larger source. However, in many cases we recognise amplification as such and translate the representation back to the original object and its size. An impression of closeness rather than enlargement is created.
- **Spatial diffusion:** The presence of the sound throughout the space, as well as the use of amplification techniques and spatialising effects (such as reverberation) lend the performer a certain 'grandeur'. As previously mentioned, Marshall McLuhan (1964) regards technology as an extension of the human body. We can regard a microphone as an extension of the sound-producing capacity of the source, and the spread of a sound through space via electroacoustic localisation can create a similar impression of extension.
- **Sound symbolism** uses our association of certain sounds with bodies of certain sizes: for instance, a higher pitch or a softer sound is associated in our mind with smaller objects or beings. Blesser & Salter (2007, p. 21) mention reverberation and frequency resonances as indications of a space's volume, as well as making the observation that '[s]trong sonic reflections arriving shortly after the direct sound increase the apparent aural size of the sound source' (ibid., p. 53). Making associative links with our auditory memory, these perceptions can be used to indicate transformations of spatial identity.

I have mentioned some types of *motion and location* in connection with movement. However, motion can also indirectly imply a transformation in the

actual *nature of the source*. Sounds ‘flying’ through the space, perched high up, springing from the floor to the ceiling, having a mechanical-cyclical trajectory – all of these are made possible via electroacoustic means, and, if associated with the performer, can transform the perception of him/her into that of a ‘superhuman’ entity. Another example of localisation actually indicating an altered spatial identity is the splitting of the performer’s sound into various spatial locations, creating ‘clones’ or ‘variations’ that are separated in space.

A performer’s sound can be transformed electroacoustically to cross over from one spatial category to another. For instance, a performer’s instrumental *gesture* can be sampled and processed to become an *environmental* sound that is textural and diffused through the space. Through continuous transformation, a sound such as the performer’s voice can turn into another source-bonded sound of a completely different category: machine or nature sounds.

As I have mentioned, sound transformations can indicate altered spatial identity through semiotic **connotation**. For instance, vocal timbre can be transformed to have acoustic characteristics typical of radio, television or phone, evoking the connotation of mediatised sound. In my piece *Shadowgraphs* the recorded voice is transformed in various ways: at times it sounds as if spoken sounds are voicemail messages on a mobile phone, at other moments – it is fragmented and associated with typing sounds. Towards the end of the piece the voice is direct and ‘close’ to the microphone, indicating a degree of intimacy. In my piece *Safari TV* I use other manipulations of the recorded voice, such as delay, filtering and harmonizing, to indicate varying degrees of proximity and human/machine hybrids.

Environmental space

In the electroacoustic medium, environmental space can be malleable rather than fixed, serving as a highly versatile means of expression in itself.

The **dimensions and type of space (for instance - enclosed or outdoors)** of an electroacoustic environment can be 'elasticised' by altering the sound characteristics that indicate it, such as reverberation and spectral envelopes, or the sounds indicating the outermost edges of its panorama which can, over time, be more spread or confined.

Source-bonded sounds can indicate **different environments** and their implied contexts. William Burroughs in his book *Nova Express* (1964, p. 129) suggests that re-allocating sounds to environments they don't belong to initially can be a powerful tool creating anarchy:

"The Subliminal Kid" moved in and took over bars cafes and juke boxes of the world cities and installed radio transmitters and microphones in each bar so that the music and talk of any bar could be heard in all his bars and he had tape recorders in each bar that played and recorded at arbitrary intervals and his agents moved back and forth with portable tape recorders and brought back street sound and talk and music and poured it into his recorder array so he set waves and eddies and tornadoes of sound down all your streets and by the river of all language.

The electroacoustic medium can transform the context of a certain locale. Bill Fontana uses this technique in many of his works.⁵⁷ For the centenary of Brooklyn Bridge in 1983, he chose to transmit the sounds of cars passing on this bridge (which produce a hum-like tone) to the completely different location of the plaza of the WTC towers (at the time still standing) via hidden loudspeakers. He juxtaposed the old and new, and transmitted the changes in traffic and weather as well as sounds of the centenary celebrations to the more isolated, modern environment of the Twin Towers. Bill Fontana describes the effects of this displacement:

In this architectural context, the familiar humming of the Brooklyn Bridge became an acoustic paradox... The physical and spatial relationships of the humming sound to the architectural scale of the World Trade Center

⁵⁷ <http://www.resoundings.org/Pages/Urban%20Sound%20Sculpture.html>

towers altered the acoustic scale of the humming. This alteration of scale gave the humming sound of the Brooklyn Bridge a new spectrum of possible acoustic meanings.

We can also choose to import other performance contexts. In my collaboration with the N-Ensemble, ambiguity is created by playing back recordings of one live performance as part of subsequent performances. As well as creating confusion and ambiguity by introducing gestural played sounds from another context, another space and other acoustics are also transferred and reintroduced.

Modes of Transformation

The range of possibilities that the electroacoustic medium offers for elasticity of audible space enables different ways of composing the spatial parameter in time.

The virtual space indicated in electroacoustic sound is not bound to the constraints of the physical space and needn't attempt to replicate such characteristics. Space can now be performed like an instrument in itself, as Blesser & Salter state (2007, p. 213):

Once a spatial parameter is connected to a knob, button, or key, a reverberator becomes effectively indistinguishable from a musical instrument, played in real time by a musician... As part of a musical composition, space can then be made to grow in size, walls can move in and out, surfaces can morph from hard to soft, and the sound source can approach and recede from the listeners. If we accept that a virtual space is subservient to artistic meaning, it need not remain static.

The most simple and straightforward transformation is the **fixed type**. An indication of a virtual space, such as a static reverb effect, can emulate an unchanging spatial entity. Things get more interesting when the transformations are **dynamic**. Settings can change in a *continuous* or *abrupt* fashion, transforming our perception of the space. The virtuality of the medium

enables us to create changes that are not physically possible. A **combination of transformations**, either static or dynamic, can work with spatial incongruity and hybrids. Combinations of spaces that could not exist at the same location are now possible through technology, bringing together vastness and intimacy, the near and the far, the present and absent.

Creating Ambiguity

The overlapping of the physical and electroacoustic spaces can create ambiguity. Virtual and real objects connect, collide, coincide and change. Electroacoustic space is a powerful resource, which not only has a rich vocabulary of its own, but also affects the way the physical space is perceived.

Marcos Novak creates structures and spaces in sound, projected image and solid structures. His works are often based on spatial dynamics and elasticities both in video and in sound. He coined the term 'liquid architecture' to indicate the possibility of an ever-changing space form and the possibility of integrating the virtual and the actual. His installation *ZeichenBau : Virtualités réelles* combines these ideas in different modalities creating a space in flux.⁵⁸ The installation consists of a large video projection of liquid forms derived from mathematical models, a physical model captured from the projected form, an invisible interactive sensor-created sculpture, and a generative interactive soundscape. These various streams are connected and influence each other. The visitor's motion is captured by sensors, and this influences the musical algorithms of the soundtrack. Through listening to the sound, the visitor can 'feel the shape of the invisible form'. The result is a combination of physical and virtual elements, as well as a transmodality of interconnected streams. A combination of tactile, visual, and sound interactivity as well as the physical and the virtual creates a fluid space evident to various senses.

⁵⁸ <http://www.archilab.org/public/2000/catalog/novak/novaken.htm>

3.4 RELATIVE SPATIAL POSITION AS EXPRESSION

In every type of human interaction relative spatial position is crucial and affects communication. How close or far away we are from each other, whether we stand higher or lower from another person, and the direction in which we move away or towards one another can all convey important messages. In performance, there is spatial interaction between the performer and the audience, between the performers on stage, and sometimes between members of the audience. In live *electroacoustic* performance, there is an additional element – the loudspeaker and the technology driving it. This additional element transforms and ‘warps’ the way relative position is perceived.

Edward Hall in his seminal work *The Hidden Dimension* (1966) examined spatial behaviour, calling the use of space the ‘silent language’ of culture. Argyle draws on this in the book *Bodily Communication* (1975), and indicates **proximity**, **orientation**, **territorial behaviour** and **movement** as forms of spatial behaviour.

Proximity can be divided into different types of interaction relating to ranges of distance between subjects: the intimate, personal, social-consultative or public.⁵⁹ Various degrees of intimacy are associated with these distances.

Performance normally takes place within the category of public space. However, the electroacoustic space can change the impression of proximity. An indication of intimacy can be created by amplification of sounding gestures that would normally be perceived from a closer, intimate distance. Even though the listener is aware that the gesture is mediated, there is still an impression of intimacy-from-afar which can seem almost voyeuristic.⁶⁰ Argyle points out that distance does not need to be fixed, and can change during

⁵⁹ This coincides with Hall’s categories of proxemics.

⁶⁰ Examples of sounds that when amplified can be too close for comfort: the wet sound of saliva while chewing, heavy breathing, erotic groaning. Interesting in this context is Elisabeth Weis’s discussion of ‘écouterism’ (1998). Using this term as the sound equivalent for voyeurism, she investigates its possible psychoanalytic meanings in film.

interaction, thereby altering the way this relationship is perceived – from intimate to public and back.

Orientation, another category of spatial relationship, indicates the angle at which one person faces another. A performer normally faces the audience. However, this angle may change during a performance, indicating the degree of contact or engagement. In live electroacoustic performance, an equivalent notion of engagement in the *diffused sound* could be audibility or legibility. Taking the simple example of microphone amplification, we could think of the distance of the performer from the microphone (or whether he/she is directing the sound to it or not) as indicative of the degree of communication intimacy.

Height is also a parameter of spatial interaction. A raised podium may give the performer an aura of authority and power. An audience member sitting down or lying on the floor will be more passive and possibly vulnerable. In Xenakis's *Cluny Polytope* (1972) the audience is required to lie on the floor and watch a light show taking place above and around it. Maybe the association with lying on the ground watching stars is implied? Association, memory and cultural background will influence our experience of space. The electroacoustic equivalent could be used in amplification – the louder the sound, the more powerful the impression might be, as is the case in rock performance. Loudspeakers located high up in a venue will indicate a removal from the audience's level and maybe even some evocation of the sublime.

Territorial behaviour is crucial to the way the performer is perceived. A clear division between the audience and the stage area defines territories and a separation of functions. The more obscured the separation, the more intimate the connection might be. I recall a performance I attended in 2008 of the disco punk band Spektrum in which there was no stage area as such, and the members of the band were located on the same level as the audience and dancing *with* them. Without any clear separation, some spectators went up to the performers, standing very near and even touching them (well, maybe the

girl was the bass player's girlfriend). This gave the event the feeling of a communal party in which all of those present were actively involved. This suited the genre – rhythmic dance music inviting physical engagement and socialising.

Loudspeakers and the diffusion of sound alter the notion of territoriality. In some cases a PA is placed near the stage, thus strengthening the sensation of separate functions of the transmitting and receiving areas. In other, more immersive listening situations, the loudspeakers are placed *around* the audience. The performer can be either inside this immersive situation, experiencing the piece *with* the audience, or else removed from it, evoking the impression that the performer is creating this situation *for* the audience without really being part of it.

3.5 OTHER SPACES: HEADPHONES, IN-HEAD LOCALISATION, CYBERSPACE

Though most live performance occurs in a situation of co-presence in space and time, there are other locations that we have not discussed.

IN-HEAD LOCALISATION

The location of a sound can be *our own body* as is the case of 'in-head localisation'. This is the case in Simon Emmerson's *Spirit of '76* which we will look at in Chapter 5: sum and difference tones occur through the interplay of live flute sound and the sampled and transformed version.⁶¹

Leitner, who consistently explores the element of space in sound art, created a series of headphone pieces that work with in-head localisation. He describes the works as follows⁶²:

Headsapes are works specifically created for the interior of the head. They can only be experienced with earphones. The head is here conceived as hollow volume, as a globe-like receptacle for time-based acoustic-geometric spaces. Sensing, hearing space in motion within the resonant inner space of the head. Hearing, contemplating the interior, the inside however unfathomable it may be.

This could also work in the context of live electroacoustic performance: give each person a pair of headphones, locate yourself inside the head of the listener, create an intimacy, transfer yourself *into* the listener.

Nowadays sounds enter the ears of so many listeners through the headphones of portable audio players and mobile phones. In a sense, we are used to dissonances of physical and simulated headphone spaces. We 'create' our private spaces in public, as Michael Bull points out (2004a):

⁶¹ This can also occur in a purely instrumental acoustic situation, for instance in the work of musicians such as sax player John Butcher who uses extended techniques to create such sum and difference tones.

⁶² <http://www.bernhardleitner.at/en/03kopfraeume.html>

The use of these technologies demonstrates a clear auditory re-conceptualisation of the spaces of habitation embodied in users' strategies of placing themselves 'elsewhere' in urban environments. Users tend to negate public spaces through their prioritisation of their own technologically mediated private realm.

According to Bull (2004a), this process also means a negation of the spaces of daily life, turning them into 'non spaces' while we inhabit new private 'mobile media sound bubbles of communication'.⁶³

CYBERSPACE

Cyberspace is another (non) location increasingly explored in electroacoustic practices, in works by Atau Tanaka, Pedro Rebelo, William Duckworth and many others – either completely online or as a hybrid of live and online performance, manifested everywhere and nowhere. Such performance is manifested differently at every node of a world-wide network. The individual user determines how it will be made physical – what medium, what headphones, what speakers the sound will come out of. It also challenges the idea of a musical venue – are we co-present with the performance? Are we *really* there with the performers?

But are these spaces disembodied ones? It might be sufficient for us to believe in the existence of bodies somewhere on the other side of the line, playing, listening. Is a videophone conversation on Skype less 'live' than one conducted face to face? In any case, a physical space and an online space need to meet, either in a centralised situation in a concert hall or at home, in front of the screen. Zones of ambiguity offer fascinating altered modes of sharing and participation as we shall see in the next chapter.

⁶³ Bull further researches 'iPod culture' and its influence on our relationship with the urban space in his book *Sound Moves* (2007).

3.6 CONCLUDING NOTES: *FLUTTER* (2004)

In this chapter I examined various aspects of space in live electroacoustic performance. I discussed its social, 'objective' and personal-poetic perspectives and their different constructed discourses. I then analysed the duality of space – the physical and the electroacoustic – and the way the two types of space overlap or relate to each other. I concluded by looking at ways the electroacoustic medium can broaden the spatial vocabulary of live performance, through introducing particular types of transformations and relationships. Two main types of manipulation were introduced: motion through space and the manipulation of sound identities ('elasticity'). The palette of possibilities is even richer in live performance where the original 'real', is juxtaposed with its altered simulated versions in the performance space. Spatial ambiguity is created where the categories overlap and the borders are blurred.

CASE STUDY

In my piece *Flutter* for flute, soundtrack and live processing I explore transformations between spatial categories: electroacoustic and acoustic, gestural and environmental.

The soundtrack was derived from several studio sessions in which I improvised on the flute, producing a variety of textures and gestural events, using techniques such as flutter tonguing, breath sounds, harmonics, vocalisation and trills. I then processed these sounds by manipulating spectral content and adding ring modulation and delay. The fixed soundtrack is a multilayering of this material, including both gestural and 'environment' type materials.

The live part has a fixed meso-structure within which I improvise the micro-structure of gestures, using sounds that relate to the soundtrack – complementing, continuing, answering, or playing 'solos' on top of a more static textural accompaniment. The live processing is similar to that which I

used to create the soundtrack and serves to connect the worlds of live playing and the soundtrack sounds.

The result is a world of spatial ambiguity. A live sound can be processed, delayed and then 'sent' into the domain of the electroacoustic space. Sounds that start out as gestures (trills, breath crescendos, etc) can be enlarged in space, or become part of a more static textural sound that provides a backdrop to further gestural playing. In this way localised gestures from the stage are amplified, duplicated, transformed and extended across the space.

The diffusion of the piece also serves to create a spatial continuum between the stage and the whole performance space. The live, unprocessed flute sound is diffused mainly on stereo speakers on stage, while the soundtrack is diffused through the whole space on four additional loudspeakers around the audience, and the live processing is heard on two of these loudspeakers at a slight remove from the stage. Higher frequencies of the soundtrack are diffused on tweeter speakers on the ceiling. As a result, a range of 'spaces' is evoked, ranging from the (relatively) localised 'live' stage sound to an immersive electroacoustic space.

In this way I attempt to create a state in which the boundaries between the physical 'live' and electroacoustic spaces are blurred, and there is a seeming connection in which both worlds can respond to each other, and bounce from one to the other via transformations and precise timing. The distinction between 'real' and 'simulated' is crucial here, as it defines the two poles of a continuum. It is through playing with this continuum – between the 'live' flute playing and the prepared electroacoustic sound – that an ambiguous state of flux is created. The dramaturgy in this piece is evident in the spatialisation and diffusion of sound: it encourages the sense that the performer on stage is extended into the whole space.

CHAPTER 4

PERFORMANCE / AUDIENCE

The relationship between **performer/performance** and the **audience** is at the centre of this chapter. With the audience as the initial focus, I will look at the different guises it may take on, what mechanisms members of an audience use to interpret and engage with a performance, and the way new technologies have influenced and redefined relationships within performative situations. After looking at technologies of dissemination and interactivity, I will discuss the way they have influenced not only the emergence of new types of audience, but also various modes of interaction and their social repercussions in the context of performance in general, and sound works in particular.

This chapter continues my discussion of duality between the present-embodied-‘real’ and the absent-disembodied-simulated. We will see how roles and modes of audience interaction are changed, and how certain elements of performance become disembodied. This will be manifest in several aspects of performance that employ new technologies:

- **Transferred/delegated performance** implies that in interactive environments such as installations or games a performer does not need to be present and the performative action is delegated to the audience.
- **Co-presence in physical space is no longer a given** in networked performance, where performers and audiences across the globe can participate in the same event, experiencing it in different ways, in different venues and listening environments, and possibly perceiving completely different aspects of the performance. The ‘stage’ as such becomes a diffuse, disembodied concept. However, there is still a sense of a shared ‘event’ experienced at the same time, combined with real-time reciprocity.

- **Roles of authorship, performance and spectatorship are blurred** and they can be shared, transferred, and superimposed. Creation, performance and reception are not clear-cut as in the conventional performance model, and in some cases the performance is emergent, occurring as a result of a more open framework or platform rather than directed. In this situation there are diffused performers and audiences rather than clearly defined, and ostensibly embodied ones.

In all three respects, the performance context is reshaped. 'Liveness' here relies more on interaction, the agency of the self, reciprocity and a *shared belief* in the existence of a 'performance' rather than its manifestation via fully embodied presences.

These ambiguities redefine the more traditional performance situation, and challenge some aspects we tend to take for granted in a more conventional music or theatre context:

- **Co-presence** in space and time of the performers and all members of the audience
- **A separation between audience and performers** both in the spaces they occupy and the roles they play
- **The assumption that there is an author** who creates the piece and determines the framework for the performative acts.

In this chapter we will see how these givens are challenged within the context of musical performance, examining performative situations that include technologies of **interactivity** and **dissemination**. Such challenging of the performance situation was undertaken initially in performance contexts that do not make use of such technologies, such as Happenings, experimental theatre and installation art. These predecessors will be discussed in context as a possible influence on current practices.

I will start by looking at three main fields in which uses of technology have had a major impact:

- **Dissemination** of sound, performance, and its replicas both in the traditional co-present context as well as via broadcast, recordings and the internet
- **The materials of performance**, including electronic and electric sound sources, and the means of live interaction such as interfaces, instruments and live processing
- **Interactivity** in a wide perspective, enabling increased engagement of an audience with a work

I will then discuss two main aspects of the audience's interaction with a performative, time-based work:

- **Interpretation to participation:** degrees of audience engagement with a work, from the personal reading of work to the actual possibility of actively influencing the work through interactive technologies and participatory frameworks. I will try to show that the audience and performance / performer never exist as two entirely distinct entities with individually defined roles. In fact, the relationship between audience and performance can fall anywhere on a continuum between a clear division of roles and a blurring of such roles. New technologies possibly provide the means for exploring this fluidity.
- **Community and networked performance:** I will look at the ideas of co-presence and the feeling of communality in the context of networked performance – a field that is expanding and developing rapidly in the internet era. What kind of feeling of sharing can replace the co-presence in space and interaction with fellow audience members? And where are the stage, performer and audience in this context?

I will focus mainly on the live performance situation, but will also discuss other forms which are potentially performative: interactive installation, online performance, CD-ROMs and computer games – all of which could be integrated in the live performance situation, could influence it, or could indeed redefine the notion of 'live'.

4.1 AUDIENCE AND TECHNOLOGY

Three main areas of technology can affect the relationship between the audience and performance: **dissemination**, **interactivity** and **performance materials**.

4.1.1 DISSEMINATION

The use of content-distribution technologies – be it print, recording, broadcast or the internet – affects communication, stretching or compressing it in time and space. McLuhan (1964, p. 3) regards electronic technology as a stretching of the senses, turning the world into a ‘global village’ in which space and time are abolished. The use of such technology also opens up the possibility of transformation and manipulation in the process. Dissemination technologies have resulted in the emergence of certain types of audiences – reflected in numbers of ‘auditors’, the diffusion of performance over time and space, as well as changes in modes of reception and interaction. Audiences are becoming increasingly diversified, communication now including more multi-directional and participatory forms influencing the *social situation* in which a work is perceived.

Abercrombie and Longhurst (1998, pp. 41-76) distinguish between three audience types that have different ‘rules’ of interaction: **simple**, **mass** and **diffuse**, to which I will add a fourth type, the **mediated-reciprocal** audience.

- The **simple audience**, such as the ‘live’ co-present type of theatre performance or a concert, is characterised by a sense of immediacy and directness between sender and receiver. There is high attention and involvement, and the event is usually ceremonious in some sense.
- **Mass audiences** of TV, radio and recorded media are not localised in the same place. The communication is less direct and usually more casual though there are exceptions (e.g. a person taking the time to listen to a CD).

- The term '**diffused audience**' indicates the idea that in contemporary society everyone is an audience all the time. People constantly consume mass media to a degree that it has become constitutive of present everyday life. Another aspect of diffused audience is the idea that human interaction in society is essentially performative and 'life is a constant performance: we are audience and performer at the same time.' (ibid., p. 73)
- **The mediated-reciprocal audience:** With internet-based communication, though the situation is very often casual, the possibility of interaction means increased engagement, and in some cases co-presence in time and cyberspace between users. This type could also imply a multi-directional network-shaped relationship rather than distinct roles of production and reception.

In live electroacoustic performance we see a combination of these types. The most common is the *simple audience* – the traditional model of live performance based on co-presence. The notion of a *mass audience* can influence live performance as the language of media such as film, TV and radio has been brought onto the stage, as well as its technologies and aesthetics. In our discussion of participatory forms, especially in the case of online performance, there is a *mediated-reciprocal* audience. The idea of a *diffused audience* (in which everyone is a performer and audience at any point) is incorporated in more interactive performance forms.

Inevitably, ubiquitous dissemination technologies become part of performance *narratives*. The newer the technology, the greater the fascination with it and the more of a chance it will be used in art and performance as topical reflection on current trends. The increasing popularity of online social networks has inspired no less than three productions at the Edinburgh Fringe Festival 2009⁶⁴: *Facebook: The Musical* , *Chat! The Internet Musical* and *Facebook Fables*.

⁶⁴ <http://www.edinburgh-festivals.com/viewreview.aspx?id=563>

Online platforms, a current form of human communication, are at the core of the narrative of my impro-opera *Imaginary Friends* (2008). There is an attempt to engage the audience by offering a glimpse into a rather familiar situation: an individual attempting to communicate with another from the confines of his own room. The stage consists of a table with a sketchbook, a sofa and a large screen at the back of the stage. The improvising musicians sit 'outside' the large lit area of the stage indicating the 'room' and are lit with separate spotlights. The main character moves around inside this designated 'room' territory, until a moment comes in which he steps outside of this space, and addresses the audience directly. This is the moment in which the communication is no longer mediated (in the narrative scenario).



Figure 4.1 *Imaginary Friends* – stage view⁶⁵

As well as performing the part, the main character/performer also plays the laptop using a USB keyboard or the laptop itself. The laptop functions not only as a musical instrument, but is a natural part of the set. The 'acted' part and the musical performance both converge here. For the visual projection, rather than using what we associate with computer-generated visual aesthetics characteristic of online environments, I 'go back to the basics' using a paper sketchpad and various crafts objects: felt tip pens, stickers, fluff balls, feathers

⁶⁵ From video footage courtesy of Fabrice Schomberg

and coloured paper. The sketchbook is placed on the table and projected on a large screen, so all the actions performed on it, using the basic 'crafts' DIY aesthetics, are projected and exposed to the audience. This serves to convey a sense of subjectivity of the character – a physically direct way of visualising the story as a sort of 'humanised' observation of the stereotypically digital. This has a narrative function, as well as being part of a dynamic stage design. The sound of the piece is a combination of very minimal electronics produced by the laptop, and more complex sound worlds emerging from the turntables and guitar (via pedals), as well as the typically expressive 'human' sound of the violin. In the music, I attempt to reflect the human aspect by not using predominantly computer-produced sound, in a way similar to the visuals.

4.1.2 PERFORMANCE MATERIALS

Advances in technology have led to the creation and modification of **performance tools**: set design, video projection, lighting, and in the case of live electroacoustic music – spatialisation, diffusion, amplification, sound synthesis, sound manipulation as well as the creation of instruments, interfaces and interactive environments. This has changed the vocabulary of performance. I have discussed this aspect of performance extensively in the previous chapters, addressing some strategies of creation and interpretation. We have seen how the audience could interpret the relationship between the body of the performer and the sound or how it could perceive connections between physical and electroacoustically implied spaces.

4.1.3 INTERACTIVITY

Increasingly, we see works in which the performance is extended beyond the territory of the stage and reaches out to the audience, offering the possibility of interaction. Audience engagement can span a whole spectrum from passivity or inattention to increased participation and the inclusion of the audience within an artwork's 'frame'. We can distinguish between two areas of interactive technology:

1. Interfaces and responsive environments designed specially to enable audience participation as part of a work.
2. Existing ubiquitous platforms and interfaces (social networks and virtual environments such as Second Life, gadgets such as smartphones) which are adapted and used in the context of an artwork.

In the first category we find installation works in which the audience can ‘play’ a responsive environment using interfaces that trigger and influence sound or produce sounds that are then integrated in the work. This category also includes performances that offer ‘open’ situations that allow the audience to make decisions or influence the proceedings *on stage*. Internet based works can extend this type of engagement to completely virtual environments and instruments or to situations in which an online user can influence a ‘real life’ situation. However, audience engagement is not always equally participatory – it can be merely a multiple choice situation in which the interaction is limited, or alternatively offer a much more exploratory and creative scenario, demanding authorship or actual performance from the spectator.

The second category includes both online platforms and interfaces that are in widespread use and which can be used or manipulated as a means for artistic engagement. Internet social networks (Facebook, Twitter) as well as content sharing sites (YouTube, Vimeo, Soundcloud) have possibly intensified a desire to not only watch but ‘perform’ via the creation of content. We upload videos and photos of ourselves, share experiences via blogs, and potentially live our lives as an ongoing TV series.⁶⁶ Sometimes the performative ‘frame’ might include creations that are less mundane, including music created independently, or curatorial platforms such as iPod DJ-ing and shared playlists, or whole fantastical worlds created in online environments such as Second Life. Some productions use the appeal of social networking technologies and mobilise them as a possible tool of participatory creation. In

⁶⁶ This relates to Abercrombie and Longhurst’s category of ‘diffused audience’ according to which we are all continuously an audience and performers in our social interactions.

2009, the Royal Opera House initiated a project set to encourage engagement with the dramatic musical genre, and the public was invited to write a libretto for a new opera via Twitter. The result was surreal and somewhat patchy: by the end of the first scene ‘William is languishing in a tower, having been kidnapped by a group of birds who are anxious for revenge after he has killed one of their number. Hans has promised to rescue him. The Woman With No Name is off to her biochemistry laboratory to make a potion to let people speak to the birds.’⁶⁷

In section 4.3 I will look at some environments that use a similar ‘social network’ model in a musical context, such as online communities sharing their musical creations, and chatrooms used for jamming online.

As well as social networks, ubiquitous interactive devices – the most representative proponent of which being the smartphone – also have potential for enabling an audience to become ‘performative’. Another widespread technology, gaming systems and the controllers used for playing them (such as the Wii), makes performative situations in which similar devices are used intuitively understood. In summer 2009, while teaching a workshop on live electronics in Indonesia, I discovered that no explanation was needed when a colleague demonstrated the Wii controller as an interface for manipulating sound synthesis in Max/MSP. ‘Digital initiation’ is happening at home, in front of the computer screen. These very systems are also absorbed into performance on stage and game controllers⁶⁸ and mobile phones⁶⁹ become instruments of performance.

Ubiquitous interfaces and networks have led to fascinating new performative modes in which the mediatised and the ‘real’ world complement each other. Howard Rheingold coined the term ‘smart mobs’ to refer to modes of co-

⁶⁷ http://adage.com/globalnews/article?article_id=138417

⁶⁸ STEIM developed the software *junXion* that maps the sensor stream from various game and camera interfaces into MIDI or OSC data (http://www.steim.org/steim/junxion_v4.html)

⁶⁹ For such an application see Essl and Roh’s (2007) mobile phone based musical instrument application ShaMus.

operation enabled by mobile devices with communication and computing abilities. Such co-operation can also lead to the eruption of political protest, group actions and games in public spaces in the phenomenon called ‘flash mobs’ (Salter 2010, pp. 344-8). This phenomenon is also used in fascinating works of groups such as London-based Blast Theory that combine the participation and communication of online and off-line players as well as physical and virtual perceptions of the urban environment. In their work *Uncle Roy All Around You* (2003), ‘real world’ participants or ‘Street Players’, equipped with a handheld device, are given 60 minutes to find ‘Uncle Roy’. Online users can see the Street Players on a virtual map of the city and communicate with them. Street Players also get messages and instructions for actions they need to follow. Once Street Players find Uncle Roy’s office, they are asked to make a commitment to a stranger – one of the online players. However technological and multi-platformed this work appears, it is a powerful experience that is essentially about human interaction and communication.



Figure 4.2 Blast Theory’s *Can You See Me Now?* – a game taking place simultaneously on the streets and online.⁷⁰

New technologies have been used to design the possibilities of human interaction with a work. However, as Lev Manovich (2001, p. 57) suggests, the physical objects and interfaces are not what we need to focus on:

⁷⁰ Image from http://www.blasttheory.co.uk/bt/work_cysmn.html

When we use the concept of “interactive media” exclusively in relation to computer-based media, there is the danger that we will interpret “interaction” literally, equating it with physical interaction between a user and a media object (pressing a button, choosing a link, moving the body), at the expense of psychological interaction. The psychological processes of filling-in, hypothesis formation, recall, and identification, which are required for us to comprehend any text or image at all, are mistakenly identified with an objectively existing structure of interactive links.

Indeed, rather than focusing on the actual objects and interfaces, we need to look at the *types* of interaction and the mental and social processes associated with them. In the next sections I will focus on various types of interactions in the context of electroacoustic works. We will see a whole range of performance relationships in which an audience actively interprets a work, influences and participates in its creation, or engages in a more multi-directional mode where participants can all create, send and perceive in a network-shaped performance.

4.2 FROM INTERPRETATION TO PARTICIPATION

In this section I will look at participatory modes of an audience/user in the context of sound works, starting with ‘active interpretation’ and moving towards more participatory modes in which the creator of a work focuses on designing the interaction.

4.2.1 ACTIVE INTERPRETATION

The interaction between the performer and an audience, even in performance types such the symphony concert, is a bilateral, or even multi-lateral one – a constant exchange where all of those present are in a way performing. As well as the main performance taking place on stage, the audience has a ‘performative’ role towards the performers.⁷¹ Eskelinen & Tronstad (2003, p. 200) indicate two feedback loops in performance: ‘a transactional one between the audience and the actors and an interactive one between the actors.’ Bearing in mind that performance is essentially a *social* event, we could add the interaction *between the spectators* as another ‘feedback loop’.

Nattiez (1990, pp. 10-28) proposes a model for the process of communication. According to this model, a *Trace* – such as a poem, symphony or painting – does not serve merely as a medium conveying a message from a *Producer* to the *Receiver*, but is an intersection for a *poietic process* of creation, as well as an *esthetic process* of reception, both of which create a ‘message’. *Both* of these processes influence the way a *Trace* plays out its part in communication.



Figure 4.3 Nattiez's model of communication (1990, p. 17)

⁷¹ In the case of the classical concert this can be reflected in conventions such as dressing less informally than the performers, applauding at the right moment or sitting in silence. See Davidson 1997, p. 2.

This model will apply to our discussion of both more traditional performance models where there is a clear division of performance and audience, as well as more participatory forms in which this distinction is blurred. In performance models there is an initial Trace – be it a script, a production that the audience is coming to see, a game with devised conceptual principles such as rules or roles, an interactive environment created and presented to the Receiver, or a network performance for which a structure and framework has been determined in advance.

A live performance does not exist as a finished work presented to a passive spectator. Not only is there a multi-directional process of exchange between the audience and the stage, but the individual audience members are also actively creating their own experience of the piece as it unfolds. Listening strategies have been addressed extensively in the world of electroacoustic music.⁷² Delalande (1998) has researched listening strategies by analysing the reports of listening subjects, and detects three main strategies of interpretation:

1. **Taxonomic:** focused on structure: detecting units and their configurations
2. **Empathic:** the listener experiencing the piece empathically as though experiencing it through his/her own body
3. **Figurative:** perceiving certain sounds as 'living' set against other sounds that are 'contextual'

Such analysis draws our attention to the tendency of listeners to rely on a transmodal experience. This transmodal experience includes not only the way we perceive the work at the moment it is performed, but also the world of the listener as a human individual, including memories and associations. Katharine Norman (2010) advocates a compositional approach that focuses on 'a convergence of autoethnographies' going *beyond the sound*, and

⁷² See Smalley (1992), Bridger (2002, in Landy 2007, p. 39) and Landy (2007)

encouraging listeners to draw on their own personal experiences and narratives to engage with a work. This approach is essential in live performance, where the transmodal, extra-musical context is an integral part of the listening situation. There is more to experience here than sound: the stage, the space and the human presence all influence an audience's experience.

Pavis (1996, pp. 227-302) points to three kinds of 'vision' we need to consider in the reception process: **psychological**, **sociological** and **anthropological**.⁷³

In electroacoustic performance, the **psychological** aspects will be manifest in:

- The **physical nature of the sound and its affective impact**. This can work through a huge range within musical parameters: very loud to very soft, the whole frequency spectrum, diffusion throughout the space, fast changes in every sound parameter – such extremes are evident in the electroacoustic case.
- **Connotative strategies** such as sampled sound worlds, mimesis and symbols could be a subtext evoking the listener's personal world of reference, including everyday experiences, memories and dreams. As we have already seen, empathic processes will affect identification with the performer's body on stage.
- The **time structure** of a Trace will also influence the way a performance is perceived, affecting modes of engagement of the Receiver with it (to name just one example, 'minimalist' pieces based on repetition and gradual transformation evoke varying modes of attention and inattention).

⁷³ Though Pavis is referring to theatre performance, these three aspects are highly relevant in the case of analysing the experience of musical performance.

The **sociological vision** refers to the collective behaviour codes of the performance event itself, and the appropriate ways of interpreting and engaging with it. Ola Stockfelt talks of ‘adequate listening’ – the acquired skill of listening to music of a certain genre according to its ‘rules’ – as an essential requirement in order for communication to ensure reciprocal communication between performers and listeners.⁷⁴ This applies to electroacoustic performance as well. Various electroacoustic modes tend to be interpreted differently: laptop performance might not always include very visible performance of the body, acousmatic concerts do not have a performer on stage, electronic control interfaces might not always have an obvious chain of cause and effect with the sounds they control, and to those unfamiliar with electroacoustic sound composition there is not always a reference model to ‘access’ it. Each of these modes needs to be perceived within the context of their musical and performative tradition.

Music performance can also include a narrative and refer to extra-musical, possibly social or political, themes. There is also a hidden, underlying social ‘narrative’ reflected in the tools of performance and resources used, such as sound equipment, expertise and manpower. Certain messages are reflected in the event: innovation, connoisseurship, knowledge of the performance ‘rules’ and reception processes, exclusiveness of scene etc. All of these indicate a socio-economic reality which is experienced and affirmed or negated.

The **anthropological** vision extends the scope even further. Electroacoustic music is embedded within (sub)cultures which use different technologies and are sometimes even *defined* by them. We sometimes come across an almost fetishist obsession with analogue synths, digital sound software, soundscape recording methods, novel gadgetry, DIY/hacked circuitry or meticulous production and diffusion standards. Other (sub)cultures adhere, almost as an ideology, to certain aesthetics both in the studio and on stage: the acousmatic

⁷⁴ In Cox & Warner 2004, pp. 91-2

tradition, free improvisation, 'complexity', beat-based musics. Each (sub)culture represents a certain approach and has its own heritage with heroes, icons, works that are considered groundbreaking, as well as places of gathering – concert halls, clubs, academic institutions – where the music is shared.

4.2.2 PARTICIPATION

Some performative situations are designed to encourage more participation on the part of the audience members, ranging from minimal influence through to delegated performance or co-authorship. Dixon (2007, pp. 563-598) distinguishes between four categories of interaction, in ascending levels of interactivity:

1. **Navigation** – simple multiple-choice
2. **Participation** – more engaged interaction that also encourages social interaction between audience members
3. **Conversation** – reciprocal connection with the work
4. **Collaboration** – altering the performance or artwork significantly, co-authorship

In participatory modes, Nattiez's 'Trace' is open ended, and allows the Receiver to engage both in esthetic processes of interpretation, and in poietic ones – by creating new situations or new Traces.

Authorship can be manifest in an interactive environment in which, as Manovich suggests (2001, p. 61), '[w]e are asked to mistake the structure of somebody's else mind for our own.' The possibility of composing the interaction rather than a structured, 'closed' work is not a recent concept, but with the ubiquity of affordable technologies such as computers, smartphones and the internet, the possibilities for exploring it are becoming increasingly widespread.

Audience participation is not a recent development in the world of musical performance. It was a crucial part of music's original social context of ritual such as celebration, sacrifice and prayer, and music was played at home on instruments for pleasure in the days preceding recorded sound. It might seem that mass media such as TV and radio, or certain music performance modes such as the symphony concert, encourage a model in which the listener is a consumer whose participation is only manifested in a highly limited and prescribed way (via votes on talent programmes, comments on websites or the choice of what product to buy or performance to go to).

However, the field of performing art since the mid twentieth century has seen experimentation with more participatory forms. Experimental performance works, such as the Happenings of the 1950s, explored audience involvement by allowing for direct interaction between actors and audience members or encouraging audience members to be involved in the performative actions. Allan Kaprow defined the idea of the Happening in 1957.⁷⁵ According to his definition, variegated space and non-prescribed time structures leave a lot of decisions which are traditionally in the hands of a script-writer or composer to the audience, ultimately doing away with professional performers or with the concept of 'audience' altogether. But how uncontrolled is such a situation? After all, there is a creative/controlling mind behind the proceedings: the creator (or Producer) in this case actually has an even stronger hold on what happens, by shaping the environment, resources and rules. Schechner, who also worked as a theatre maker and was involved in the exploration of experimental performance forms with The Performance Group, is aware of the possible problems of participatory performance (1971, pp. 74-5). In such performance the audience is not 'trained' to deal with a participatory situation; it doesn't know what to do or what to expect, which might lead to confusion and hostility. Also, the structure and rhythm of the performance could be destroyed. As a possible solution, he suggests using a structure that combines scripted and controlled moments as well as open-ended ones which

⁷⁵ From Eskelinen, M. & Tronstad, R. 2003. pp. 201-202

are shared by all, audience and performers alike. Indeed, an audience's trust needs to be earned for it to accept and engage with the *unfamiliar rules of interaction*.

The design of participation can be part of the work's creation, or even the main method of composition. A participatory work is like an 'open form' piece in which the composer can choose to leave parts of the realisation of a piece to the performer.⁷⁶ In some of the cases I will discuss here, the creator/composer or the performer *is* the audience. With a focus on electroacoustic sound works, I will discuss three main models of participation: **interactive environments**, **games** and **communal events**.

INTERACTIVE ENVIRONMENTS

Any live performance is, in a sense, an interactive environment. The audience can engage with a performance via what Gay McAuley (1999, p. 255) calls 'multiple focus' and 'independence of vision'. Different seating or location in the space will lead to a different way of perceiving the performance, but even from one fixed position the spectator can choose which what to observe at any given moment.

Active engagement can be enhanced even more when more freedom is given to the audience in **space** – by legitimising or encouraging the audience to move, and in **time** – by giving the audience the choice of switching between attention and inattention to certain aspects of performance or allowing the audience to construct the work by choosing from a variety of elements and materials.

Janet Cardiff's work *The Forty Part Motet* (2001) is an installation which, though presented within a fixed medium rather than live context, allows the audience to interact with it in a performative way. Thomas Tallis's composition *Spem in Alium* (1573) is played through forty individual speakers placed in the

⁷⁶ For further discussion of the concept of 'the open work' see Eco (1959).

space with one voice assigned to each speaker. Cardiff designed the installation to provide the viewer/listener with the chance to experience the music via different vantage points, leading to a dynamic mix in which one can hear the individual voices as well as a varying combination of them all.⁷⁷ The audience here is invited onto a virtual stage and can experience the piece from the viewpoint of the singers.



Figure 4.4 Christina Kubisch's *Electrical Walks*⁷⁸

In other works, the audience is actually invited to individually compose the time structure of a piece by determining the sound materials experienced at any moment. Since the end of the 1970s Christina Kubisch has created a series of sound installations in which the viewer/listener can wear wireless headphones that respond to electric induction. By walking through the space, one can 'compose' the piece⁷⁹:

The musical sequences are experiencable [*sic*] in ever-new variations through the listener's motion. The visitor becomes a "mixer" who can put his piece together individually and determine the time frame for himself.

The viewer/listener here is both performing and co-composing a piece by Kubisch. The listener's body 'plays' an instrument which is the responsive environment, while perceiving the piece at the same time. The experience is an individual one, in which the performer/co-composer is also the sole

⁷⁷ <http://www.cardiffmiller.com/artworks/inst/motet.html>

⁷⁸ Images from http://www.christinakubisch.de/english/klangundlicht_frs.htm

⁷⁹ http://www.christinakubisch.de/english/install_induktion.htm

listener. Similarly, in Max Neuhaus's *Drive In Music* (1967), a driver in a car can 'compose' a piece by tuning in to certain radio frequencies, and by driving through the space thus determining what sounds are heard from seven different radio transmitters.⁸⁰

The degree of participation in the pieces mentioned is confined to *choices*. Certain materials are offered and then structured and experienced by the listener. Other works offer more direct performative possibilities. In David Rokeby's installation series *Very Nervous System* (1986-90) computer vision techniques were used to detect movement of visitors/participants, and this data was then converted into musical compositions (see Salter 2010, pp. 328-9). Achim Wollscheid's pieces are also based on a system's response to movement. In his outdoor installation *Possible Polyson* (2006), six circular light projections are connected to six respective speakers with a typical sound.⁸¹ Once a person enters one of the circles, the respective loudspeaker's sound changes and responds to the movement. This responsive environment also allows for the interaction of several users simultaneously in a shared 'performance'.

Wollscheid took this idea a step further in a situation, described by Labelle (2006, p. 246), in which an audience was handed Sound Boxes – loudspeakers with a microphone and an embedded computer chip transforming incoming sound into tonal blips. This resulted in a lively response, as LaBelle reports:

The audience began to organise themselves, responding not only to the speaker-instrument but also to others in the room, as partners in the pursuit of sonic events... [D]ialogue was instigated based on exploring the range of noises one could make, and ultimately share.

⁸⁰ <http://www.max-neuhaus.info/soundworks/vectors/passage/>

⁸¹ <http://www.selektion.com/members/wollscheid/default.htm#>

In this case, not only was the interactive object more versatile, but the context in which the experiment took place allowed for an interesting shared social interaction. Co-presence of audience members in time and space, seems to add to the excitement lacking in the more incidental installation scenario. In the performance-installation work *TGarden*, the result of a collaboration between the art research groups Sponge and FoAM, small groups of participants from the general public were invited to wear highly theatrical-looking, sensor-embedded costumes and move in a dedicated space. Their movement was tracked and analysed in real time, resulting in musical and visual equivalents based on physical models (Salter 2010, p. 331-2). This work attempts to create a connection of material and immaterial media, as well as a 'conjunction of media and social behavior'. In both Wollscheid's work and the piece *TGarden*, the 'Producer' of the event composes the situation, including the interactive tools and the social context.

Responsive environments can also be virtual. Laurie Anderson's CD-ROM *Puppet Motel* (1995) is an example of interactive literature, combining text, music and interactive narrative, experienced through instruments and sound compositions embedded in a virtual space. The audience is invited to explore thirty different virtual rooms – each with its own situation or environment, as well as some virtual representation of the artist (for instance – her likeness in the form of a puppet asking the user to release her jaw that got stuck). *Flying Puppet*, a series of online works by Nicolas Clauss (usually in collaboration with other artists), is an example of how interactive objects offering a rich range of responses from the limited 'gesture' input of the standard mouse and keyboard can be designed in the artist's personal visual language, drawing on reference to art history and images from the physical world and evoking memories and connotations.⁸² The online environment *Second Life* provides a platform for similar creations such as the *Whisper Box* by a certain Robbie Dingo (the name of the avatar in *Second Life* rather than that of the real-life

⁸² <http://www.flyingpuppet.com>

composer)⁸³ and voice-based pieces *A Cappella* and a spoken work piece by Daruma Picnic.⁸⁴

Some interactive works are a hybrid of the online and the physical world. *Absolut Quartet* (2008) created by Jeff Lieberman and Dan Paluska⁸⁵ is an installation in which a physical automated instrument, consisting of a marimba played by bouncing ping pong balls, tuned glass bowls playing long notes, and robotic percussion instruments, is influenced by musical input played by online users. The instrument is presented at a gallery and can be viewed by 'real life' visitors, as well as remotely via a live webcam feed. In this case there are multiple performers (the user at home, the visitors to the gallery viewed by online users, and the robotic instrument) and multiple audiences (in the gallery space and online).

GAMING

An interactive environment allows the audience to 'play' with the work and explore it. When more structuring principles are introduced, defining possible behaviours within a responsive environment, we can speak of a *game*. Gaming as a model for interaction not only redefines the role of the Receiver, if one can speak of the participant as such, but also redefines the act of composition and performance. The use of game principles for music making is not a new phenomenon. Mozart famously created a game in which dice were used to determine bars that would form a minuet. John Zorn created a series of game pieces in the years 1976-90, the most famous of which is *Cobra* (1984). His intention was to structure the idiosyncratic musical language of the improvisers he worked with and deal with *relationships* rather than specific sounds⁸⁶: The focus in these pieces is on the communication between the musicians – the relationship that unfolds on stage according to certain principles, and sometimes in unexpected ways.

⁸³ <http://digitaldouble.blogspot.com/2006/07/whisperbox-complete.html>

⁸⁴ Second Life co-ordinates: A Cappella (58 102 807), spoken word work (65, 96, 601) (Accessed February 2010)

⁸⁵ <http://bea.st/sight/absolutQuartet/>

⁸⁶ See Cox & Warner 2004, p. 199

The game as a structuring principle can take on different forms. The more intricate and varied the rules of the game are, the more versatile and interesting the results can be from a structural point of view. Some games prescribe a certain clear goal – winning points or defeating a rival. Other games do not have clear rules, but rather create an environment in which one can interact with objects or other users, engaging in ‘play’ for the sake of it.

The same applies in the domain of computer games. Eskelinen and Tronstad (2003. pp 202-5) point to a connection between Happenings and computer games. Both are performative as the user is essentially experiencing them through participation, following the guidelines of a particular framework. But can computer games really be considered as a mode of live performance? Dixon (2007, p. 620) points to a heightened sense of ‘liveness’ in games as they ‘operate responsively in real time and certainly appear live from the perspective of the player-character, arguably far more so than plays or films, since they demand rapt attention and lightning responses.’ As an art form, even though the computer game form is considered ‘plebeian’ by academics when compared to other theatrical modes, Dixon believes that we should not overlook the main point, which is that computer games ‘embody the most expansive and successful display of involvement in theater-based concerns that the world has ever witnessed.’

Whereas most computer games are based on a narrative theme or setting, they could also be modified and used for music-making. The popular computer game *Guitar Hero*⁸⁷ is based on a well-known musical format – the rock band. Based on quite basic actions performed on interfaces made to look like rock instruments, the players can play along with a well-known song according to a stream of timed graphical instructions on the screen, and also go online and play with other users. The environment of the game is quite limited: one *plays along* with a track, and the main goal is winning rather than

⁸⁷ <http://www.guitarhero.com>

a more open-ended motivation. However limited and commercially driven *Guitar Hero* is, it does demonstrate the potential of a virtual environment for musical performance and online sharing of this experience. Nicolas Collins (1998, p. 31) suggests using the computer game model as a form of engaging electroacoustic performance – embracing both an element of developing music skills and social interaction:

Imagine a form of home music evolving like a weekly bridge game: a cable scanner, an interactive CD or a computer program could provide elements of chance, topicality, score and sound material. Performances could take place at many different levels of skill and could be played back later for analysis or passive listening. The game-like competitiveness could provide the initial hook for pulling a listener off the couch and activating him or her as a performer, while the social factor would encourage the reintegration of musical performance into everyday life.

There are certain advantages to such virtual 'Happenings'. They are not dependent on actual spaces, and can be experienced anywhere. This makes them more modular, financially viable and accessible. Furthermore, the player can become a self-taught musician, improving his/her skills in the process.

As well as providing an interactive environment for the user, games can also be the structuring principle for a live performance in front of an audience, John Zorn's game pieces providing a clear example. The listener, who is usually familiar with the rules, watches expert musicians play the game, just like a fan watches a football match played by professionals. Cristyn Magnus (2006) created such a 'witnessed game' scenario in a piece for computer and percussion titled *vs. computer*. With the help of a visual interface, the percussionist, by playing his/her instruments, is required to move a green square on screen and pick up black squares before they fade out. If successful – the percussionist wins a point. If the black squares fade out, the computer wins a point. Rather than being represented visually to the audience, the game is perceived in sound: certain cues indicate whether the

computer or the player won a point, while increasing computer interference and processing swallowing the percussionist's sounds indicate that the live performer has lost the game.

In my piece *Safari TV* (2009) for two laptops and electric guitar, I *simulate* a computer game environment on stage in a theatrical way. Rather than a screen with avatars and an automated game system, the live performers execute the 'game' actions: the guitar player uses his guitar as an 'interface' to play against the laptop performers who are 'representatives' of the computer system, aptly using game controllers to trigger and modify sounds on Max/MSP. Another 'representative' of the system is a disembodied recorded voice giving the guitarist instructions and continuously teasing or menacing him. A series of tasks is set: imitating 'bird song', roaring louder than the 'lions' and dancing with 'monkeys'. Gradually, more cracks in the system are exposed and the trappings of manipulation and coercion are revealed. The audience experiences the piece through familiarity with the framework of the computer game. I chose this as a concept that the audience could relate to, and which I could subvert and critique. This enabled me to place the exploration of sound within a theatrical setting.

COMMUNAL EVENTS

The social context of a work also defines the degree of participation and the communal behaviour that emerges. Parties, demonstrations, religious rituals – all have a framework of interaction with a structure and code of behaviour that encourages active participation as well as the possibility of connection between the participants. Another participatory form is the dance club. Though not performed live, the audience experiences sound in the 'here and now' by engaging with it physically. The music is usually designed according to a common world of reference (beat, genre) for all of those attending.

Ulyate and Bianciardi (2002) used the model of the dance club as the premise for their *Interactive Dance Club* at the 25th annual ACM SIGGRAPH

Conference on Computer Graphics and Interactive Techniques. Audience interaction was a key goal as they state (ibid., p. 41):

The Interactive Dance Club was designed with three goals in mind. First, we wanted to allow group and individual participation in the modulation of multiple musical and computer graphics elements while maintaining a musically coherent and visually satisfying whole. Second, we tried to create a compelling social environment that amplifies the uniqueness of the individual and reveals the synergy of the group. Finally, we wanted to deliver the euphoria of the artistic experience to “unskilled” participants.

The interactive environment was designed according to the social situation it set out to enhance. Clear, intuitive interfaces and sensors influencing video and audio were designed to add an element of play and interactivity rather than a complicated, over-cerebral learning process. The interfaces that were spread throughout the space included the Beam Breaker – which allowed the triggering of a musical phrase by ‘breaking’ a light beam, Stomp – consisting of floor-mounted pads triggering musical phrases and computer-generated projections when stepped on, Meld Orbs – which are spheres with proximity sensors via which the audience influenced computer graphics and notes of musical chords, and many more. Interaction was kept simple and rewarding, with ‘no instructions’ and ‘no thinking’ as some of the basic rules, thus keeping the ecstatic state of mind of partying.

This served to *enhance* participation and communality within a situation which is already familiar, and essentially social. The dance club format, which is in itself based on physical engagement on the participant’s part, was extended via increased playfulness of a shared experience.

Social interaction, and a degree of freedom for the audience to engage with a performance was also used in the *Decamerone* project (2006) devised by artists/performers Marije Nie and Karl Gillick, in which I took part. This project was an attempt to create an open performance situation with the possibility of

audience engagement. OT310, a space in Amsterdam normally used for alternative live performances, was transformed for three nights to serve as the backdrop to an imaginary scenario in which a bird flu pandemic had taken over the world. In this scenario, the space was a 'safe' sheltered zone for a group of artists. Just as in Boccaccio's original *Decameron*, members of a group entertain themselves every night with 'storytelling'. In the contemporary case, storytelling took on the guise of short acts and performances. On the three nights of the project, the space was 'opened' to the public. The spectators were 'initiated' before entering the space and were required to undergo a (rather comical) 'sanitation' process. The rules of the game were explained: going in and out of the space was not encouraged, and re-entry entailed a repeat of the sanitation process; one was allowed to move through the space as long as the performances were not disturbed. A 'host' was appointed for each night, making the atmosphere intimate and informal.

I performed as a singer and laptop player during this event. Even though the suspension of disbelief was quite minimal, the event was successful due in part to the distribution of the acts in the space and the freedom the audience had to move between the various corners, socialising with other audience members or with the performers, or watching the performance taking place. The sense of isolation from the outer world was enhanced, creating a sense of intimacy. The audience members were part of the performance setting: they were the community within the prescribed scenario. A sense of community *among* the performers was created via preparatory emails and newsletters, 'pooling' of performers (one could ask any participating artist to join their act), pre-event gatherings on the night, as well as the fact that some performers already knew each other previously. There was quite a clear division of roles between performers and audience, yet the mix of performance and socialisation modes (in which the acts were sometimes discussed and responded to), and the shared imaginary scenario made this an event with a strong sense of communality for all involved. The technology of amplification and video projection served to enhance participation, by

indicating where any performative focus was at any given moment, and helping switch between modes of attention and inattention.

Both Ulyate and Bianciardi's dance club, and the Decamerone project attempt to bring the performative into situations in which the audience is invited to socialise within a heterogeneous environment, and explore various spaces and performance modes.

4.3 COMMUNITIES, NETWORKS AND DIFFUSED PERFORMANCE

When we talk about community, we broaden our scope to regard music-making as a network with a many-to-many distribution form, where all participants are potentially both audience and performer, and where interaction is emergent rather than authored. This could be manifested either in a situation where all are physically co-present (e.g. a live event which encourages non-hierarchical participation and co-creation of the Trace, such as the piece *TGarden* mentioned previously) or in a network using a platform such as the internet. The latter will be the main focus of this section.

In a sense, every communal event contains a network of relationships in which there is a *binding context* that defines its existence: belonging to an organisation or common interest group, playing the same online game, or being an audience of the same performance. The internet provides a platform for 'online communities'. But could the term 'community' actually be applied here? Shaun Moores, in his discussion of media (2005, pp. 164-5), suggests that *any* community, even the most localised, is *imagined* as a common identity – a created conceptual construct. This is most evident in the case of national identity, where mass media play a significant role in spreading this concept and creating a sense of commonality for a mass of people. I would propose that 'community' is determined by *its ability to define the members' actions and interactions*. This can occur on various levels: **localised** (neighbours living on the same street, an amateur choir gathering for rehearsals) relying on co-present, face-to-face interaction; or **diffused** (a nation, a diaspora, an online group) relying on a conceptual framework and a way of conveying it to all its members. The latter is typical of internet-based communities. Sometimes the internet complements real world contact, but it can also replace it. Hampton (2004) suggests that computer-mediated communication has affected communities in a way that is not disconnected from the physical world and locality. Manuel Castells (see Moores 2005, pp. 168-9) adopts a slightly different approach, suggesting that 'rather than

conceiving of social groupings primarily as communities, it is better to begin by thinking of them as being formed within networks.' He calls this emergent social model 'networked individualism' – a social pattern in which the individual chooses the time, place and partners of the interaction.

In the context of musical performance we face a different situation. Though musical performance was initially part of a community's life and an extension or confirmation of its existence, the more recent Western performance tradition only forms temporary communality within a limited time and space. Online musical networks might enhance and expand this to a more durable sense of community, with a continuous sharing of common interest. I will examine two categories of networks: online music communities with a shared interest, and network performance.

4.3.1 ONLINE MUSIC COMMUNITIES

Online shared interest communities can form around the appreciation of certain music types or, more interestingly, around musical creation. Lysloff (2003) provides an 'internet ethnography' of a musical online community: the mod scene.⁸⁸ The members of this community create their own compositions via a specific online module, and share the results with other users via a personalised user page. Certain interactions here are typical of performance-based communities (hit charts, fans) and of 'off-line' ('real life') communities with a hierarchy of experts/elders, email contact, exchange of information and self-regulation in case of ownership infringement. Lysloff (ibid., pp. 55-6) insists that even though the members of the mod scene are physically scattered all over the globe and might never have met in real life, they can still be described as a community.

I would argue that all communities are based less on material and embodied proximity (humans sharing physical space) than on a collective sense of identity, of feeling that one belongs and is committed to a particular group. And the group coheres through the common interests, ideals, and goals of

⁸⁸ This is different from the Mod scene of the 1960s

its membership... [I]ts collective identity is stronger than the centrifugal pull of its individual members – all of them real, embodied people... [R]ather than question whether this or that online collective is or is not a community, we should perhaps ask what these social networks do and mean for their members.

One could describe the ‘mod scene’ as a musical community based entirely on the internet. The potential for multi-vocal authorship and sharing of the creative process is vast, and similar networks could also work well in the field of electroacoustic music. Long-distance music relationships via file sharing and online live playing, as well as a common platform which might be more electroacoustically oriented than the ‘mod’ one have the potential of becoming a strong tool for the creation of a common interest community. *Visitors Studio* is such a platform, and is defined by its makers as ‘a real-time, multi-user, online arena for creative ‘many to many’ dialogue, interviews, networked performance and collaborative polemic.’⁸⁹ This online environment sets out to provide a platform for collaboration between artists from various backgrounds and locations. Participants can upload sounds or still images, and respond to each other’s input by mixing and remixing in real time. Participants can also ‘book’ the online mixer for a collaborative ‘live’ online performance.

4.3.2 NETWORK PERFORMANCE

New forms of online, networked collaborations are currently emerging: live performance on cyberspace means musicians in various locations can play together without being spatially co-present to an audience which is also scattered at a multitude of locations. The venue is nowhere and potentially everywhere – everywhere with an internet connection, that is.

In the past decade there has been a surge of interest in network music performance using the internet. This is evident in the work of various artists such as Atau Tanaka (for example, *Global String*), Pedro Rebelo (*Netrooms*) as well as *The Telematic Circle* formed by Pauline Oliveros, Chris Chafe and

⁸⁹ http://www.visitorsstudio.org/about_vs.html

Jonas Braasch in 2007 to develop telematic systems in research and *in practice* through composition and performance (Braasch 2009). Network performance was the theme of the 2008 International Computer Music Conference.⁹⁰ There is also increasing interest in the forerunners of telematic and network performance evident in the project Networked Music and Soundart Timeline (NMSAT).

Network performance is not new. Max Neuhaus's series *Networks*⁹¹ is an early example of network-based sound projects. In *Public Supply* (1966), Neuhaus combined a radio station with the telephone network and created a two-way public aural space twenty miles in diameter encompassing New York City, where anyone could join a live dialogue with sound by making a phone call. He continued to explore network works in a series of pieces, including the more recent internet-based work *Auracle* – an online environment in which virtual ensembles can be formed with up to five participants activating and influencing electronic instruments using their voice.

The first networked music groups using computers appeared in the late 1970s, with the League of Automatic Music Composers at Mills College (1978-83, reforming in 1986 as the well-known HUB). The group used data exchange in a computer network environment, and each computer could 'listen' and change the behaviour of other computers in the network. As internet networks became faster, real-time audio streaming enabled the creation of several music platforms.⁹²

Network performance entails a certain social interaction in the act of music-making. As in the case of participatory sound works discussed previously, the

⁹⁰ Leading to the issue of the Contemporary Music Review 28:4/5 (2009), edited by Pedro Rebelo, to which I refer extensively in this section.

⁹¹ <http://www.max-neuhaus.info/soundworks/>

⁹² The SoundWire project developed by Chris Chafe, the Vortex Jamming Software (1994) and LiveJam (1998) which enabled users to jam online with remote fellow musicians, Georg Hajdu's Quintet.net environment using Max/MSP (2004), and most recently - the JackTrip and Soundjack applications. Other prominent artists working with such platforms are Sensorband (with the multi-user instrument NetOsc (1991) and Guy van Belle. See Schroeder (2009, pp. 377-9) and Salter (2010, p. 216)

interfaces, modes of distribution, definition of roles such as creator, performer and listener, all influence the way in which a work is produced and experienced. As Kim-Boyle states (2009, pp. 372-3), the relationships of composer and performer are transformed into that of designer and player, with the composer being to some extent responsible for the relationships emerging.

Rebelo (2009) and Schroeder (2009) offer a useful framework for discussing the relationships of design and performance using the concept of dramaturgy. Rebelo (ibid., pp. 389-92) makes a useful distinction based mainly on the way a work is conceived and performed. He distinguishes between three types of dramaturgy:

1. **Projected dramaturgy** in which one node of a network functions as author and other nodes as contributors, with one public node in which the contributions are 'projected'
2. **Directed dramaturgy** in which there is one artist or group taking on the role of 'director' who determines the role and contribution of each node to the work and designs the presentation at each public node
3. **Distributed dramaturgy** - each node contributes to a shared production, as well as co-authoring it. 'This type of dramaturgy does not imply a coherent whole, but rather a rich set of connections that are reconfigured and reinterpreted depending on the nature of each node.'

Within network platforms there is a potential for varying degrees of (de)centralised creation and performance. Rebelo's *Netrooms: The Long Feedback* is a series of network-based performances in which anyone can potentially participate.⁹³ According to Rebelo (2009), it is an example of the 'distributed dramaturgy' type. It consists of 'an extended feedback loop and delay line across the internet'. Anyone who is interested in participating can

⁹³ <http://netrooms.wordpress.com/about/> and <http://www.sarc.qub.ac.uk/~prebelo/netrooms>

receive a PD⁹⁴ patch in advance, via which one can listen to the loop, add sound to it via a microphone, or communicate with other players. The performance is a live mix of the feedback loop and signals from each stream. Though the environment for the piece is pre-determined, it is open enough to encourage co-authorship from all participants. Though authorship is shared, there is a centralising instance, as a mix of the different sound streams is mixed and presented to a live audience in one venue. A similar process occurs in Atau Tanaka's *Prométhée Numerique* in which sounds are submitted by internet and mobile phone users, creating a 'living data-organism that constitutes the continuing evolving component of the project.'⁹⁵ During the live performance and broadcast, the composer takes over by 'activating and wiretapping the sleeping entity' – in which the machine is also introduced into the creative process.

As we move from works that are centralised, to more distributed configurations, we see a more diffuse manifestation of the elements of performance such as author, performer, stage and audience. Re-embodiment is occurring through the actions of the user him/herself who is now simultaneously 'Producer' and Receiver. The impression of embodiment is created through constant reciprocity (indicating one's own presence in the realtime performance scenario as well as that of others), and through the *belief* in a 'performance' event *rather than a direct experience* of it as a centralised entity. However, as Kim-Boyle (2009, p. 373) points out, when presenting such works there is a risk of insulating members of the public who are not directly involved in playing and exploring.

⁹⁴ PD (Pure Data) is a free audio programming/playing environment, making it available to all interested.

⁹⁵ <http://www.ataut.net/site/Promethee-Numerique>

4.4 CONCLUDING NOTES: PARTICIPATORY ASPECTS OF *SHADOWGRAPHS* (2009)

In this chapter I have looked at the duality of performance and audience. I focused on the way uses of technology have affected modes of dissemination, performance materials and interactivity. In exploring the interaction between the audience and a performance, it emerges that rather than a duality, there is a possible continuum of performance modes in which the duality of performance and audience is blurred. This continuum ranges from works that focus on performance as a fully structured artefact to be perceived and interpreted by an audience, to increased modes of participation, in which performance action is delegated, and an audience is invited to co-author the work. Network performance can have virtual stages and remote presences, manifesting hybrid forms or heterogeneous experiences of one 'performance'.

CASE STUDY

In the context of my project *Shadowgraphs* I decided to explore multiple ways of creating audience engagement:

- An **installation** at a gallery in which the visitors were invited to take part in the creative process by 'continuing' the work
- A **live performance** of a piece exploring similar themes
- A **blog** exploring themes and influences of the installation and live piece, and providing opportunities for response and co-authorship

The first version of the installation was created for a group exhibition *The Eagle Document: The New Collection of Enumerated Things*, curated by Monika Oeschler at the Stephen Lawrence Gallery in Greenwich. This exhibition set out to create 'a performative and dialogic situation between viewer and art works, which does away with passive spectatorship.'⁹⁶

In my installation the visitors were invited to sit in a tiny room, look at

⁹⁶ <http://www.stephenlawrencegallery.net/OS-Eagle-PR.html>

snapshots of details from a wood on the walls, listen to a soundtrack (composed from processed vocal sounds, rural soundscapes and sounds 'recycled' from my piece *Flutter*), and draw in a sketchbook. This seemed to work well, and resulted in intricate, personal, varied drawings. The drawings accumulated and became part of the experience for following visitors. In this sense the work was indeed participatory and multi-vocal.

The next stage was the blog. This platform seemed to work but only to a point. The internet seems to be a casual medium that one doesn't 'prepare' for or commit oneself to as much as when visiting a gallery or attending a performance. It seemed that there was a reluctance of users to invest more than a couple of minutes in responding to the blogs unless pestered by me. Of course this was not always the case, and those who actually did contribute came up with fascinating responses. Possible improvements could be the provision of easier tasks demanding less time, or a clear rewarding experience as a result of participation.

The live performance stage was influenced by the blog. Unexpectedly, I felt that by sharing the thoughts and influences for this piece I was 'living' the material more intensely and the narrative had an increased emotional resonance. The live piece itself, presenting fragments of text, soundscapes and acts, encourages active interpretation on the audience's part to decipher the meaning of the nonlinear narrative: What is the piece about? What really happened? The listener is invited to experience the piece via his/her own experience.

The project *Shadowgraphs* enabled me to explore various degrees of audience participation, from engaged participation to co-authorship. It was fascinating to see how various platforms could be combined and influence the content of each other, as well as involve the audience in the creative process. The theme of the piece – an attempt at reaching a lost person, with the woods as a metaphor of this search – evolved differently in the various platforms, and in this case the medium was indeed the message. Communication and

storytelling were expressed in the actual act of writing, drawing and responding that the three platforms were used to initiate.

CHAPTER 5

PRESENCE AND ABSENCE

In this chapter I depart from the discussion of specific dualities in performance and look at a theme that is common to them all – the juxtaposition of the embodied and disembodied, the present and absent. This theme can have powerful poetic affect within the context of live electroacoustic performance. This chapter demonstrates how the relationships discussed in the previous chapters can evoke certain meanings and perceptions that can become an integral part of the narrative and dramaturgy of a performance.

This duality of *absence* and *presence* is central to the dramaturgy of live electroacoustic performance. How do we perceive the ‘absent’ quality of electroacoustic sounds that do not directly relate to what is clearly ‘present’? What place can this ‘absence’ have in a live performance? I will suggest two poetic themes that can be associated with the duality of ‘absence’ and ‘presence’ and place them within a meaningful dramaturgy: these themes are **the uncanny** and **the sublime**. I will discuss these themes in the context of ritual and performance traditions, and demonstrate how they can be used in the electroacoustic case. Ritual is essential to this investigation, as the interplay of ‘absence’ and ‘presence’ and its connection to the sublime, mainly in a religious context, is an evident part of it. The concept of ritual has also influenced the performance tradition and contemporary performance theory.

5.1 PRESENCE, ABSENCE AND THEIR POETIC MEANING

Before discussing the live electroacoustic case, I will define what I mean precisely by the terms ‘absence’ and ‘presence’ in this context. I will also provide a background and definition of the dramaturgical themes associated with the interplay of absence and presence, namely – the sublime and the uncanny.

5.1.1 ABSENCE AND PRESENCE IN PERFORMANCE

Presence

‘Presence’ refers to physical elements of a performance: the bodies of the performers and audience, the performance space, the instruments, the props. Not all tactile objects and bodies are equally manifested as ‘present’. Presence can be emphasised through amplification and exaggeration (screaming or crying at a funeral, enormity of a monument or a building or sound amplification), or visible exertion such as the effort evident while playing a difficult piece of music, or during ecstatic ritual dancing.

In performance, ‘presence’ is represented via a living body: that of the performer and, in more participatory forms such as art installations or a dance club, that of the spectator. The performer plays out a drama through the body that struggles, moves, is acted upon and transformed. The spectators experience ‘presence’ through their own bodies in an empathetic process of identification with the performer.

Absence

I use the term ‘absence’ to describe an element of ritual or performance which is not experienced as a physical entity, but rather serves as a *concept* influencing a performance. This could be:

- **The notion of an *absentee*:** an entity or person that those present are conscious of but is not actually physically present – a deity, a deceased loved one or a famous figure such as a composer.
- **An idea that is regarded as sacred or important** (e.g. the purpose of the event, such as commemoration of a historical event), a tradition (rites that are known to all present such as annual festivities), a structure (the score of a composition) or a set of rules (such as the behaviour codes of a rock show or very different ones at a classical concert). The ‘absence’ here is the notion that there is something intangible, a communal force bringing the participants together.

‘Absences’ are manifested indirectly, through an intermediary (a priest, a prophet, a musician performing a composition by a well-known composer), symbolic structures (statues, sacred objects, consecrated sites), symbolic acts (prayer, sacrifice, use of names in memorial services). In some ritual contexts physical elements *hide* an object, thus indicating a crucial *lack or pointing to an entity that we cannot grasp in full* (the confessional at a Catholic church, the curtain hiding the holy bible in the Jewish synagogue, the backstage area of a performance venue or the curtain at the theatre).

A performance’s context leads us to perceive certain ‘absences’ and ‘presences’ as *significant*. Peter Brook refers to the creation of such a context in performance in his discussion of ‘Holy Theatre’ (1968, p. 63):

All religions assert that the invisible is visible all the time. But here’s the crunch. Religious teaching... asserts that this visible-invisible cannot be seen automatically – it can only be seen given certain conditions... A holy theatre not only presents the invisible but also offers conditions that make its perception possible...

The structures are different – the opera is constructed and repeated according to traditional principles, the light-show unfolds for the first and last time according to accident and environment; but both are deliberately constructed social gatherings that seek for an invisibility to interpenetrate

and animate the ordinary. Those of us who work in theatres are implicitly challenged to go ahead to meet this hunger.

In order for the play of 'presences' and 'absences' to occur, the right contextual setting needs to be created. Significant elements are highlighted through previous knowledge, convention, drama, narrative, staging or the design of the space. The creation of context is highly dependent on *engagement* or *belief* on the audience's part and an implicit contract between all those present. Music performance similarly depends on a belief in the importance of music and of certain ritualised behaviours and spaces. One example is the pilgrimage of Wagner fans to Bayreuth to attend performances of his operas.

5.1.2 POETIC MEANINGS

An individual member of an audience will experience a performance in a personal way, perceiving not only sound, but drawing on both personal experience and messages inherent in the work to construct meaning. When discussing aspects of absence and presence, which are so evident in the case of electroacoustic performance, I will focus on two possible 'meanings' or sensations: the sublime and the uncanny.

The Sublime

[W]hen experience slips out of conventional understanding, whenever the power of an object or event is such that words fail and points of comparison disappear, *then* we resort to the feeling of the sublime. As such, the sublime marks the limits of reason and expression together with a sense of what might lie beyond these limits.

(Philip Shaw 2006, p. 2)

The sublime marks the limits of our understanding and a way of imagining or sensing what lies beyond those limits. It marks a movement starting from the familiar, and leading to possible unfamiliar domains. The notion of the sublime has changed significantly throughout the history of the term's use. Shaw

points to the different areas in which the sublime has been manifested: rhetoric, religion, philosophy, poetry and art. For Longinus (Ancient Greece, first century CE), the sublime is manifested in a striking mode of rhetoric, for St Augustine (354-430 CE) it relates to the God manifest in the word. In the 18th century John Milton and Joseph Addison related it to the idea of worship via the experience of nature, while for Kant the sublime lies in the cognitive realm and is manifest in the extraordinary power of the mind and imagination to transcend sensual experience. Romanticists (such as Schelling, Wordsworth and Coleridge) regard the sublime as the possibility of sensing the unimaginable by bridging the distinction between words and natural material objects. For postmodernists such as Lyotard and Derrida the sublime is a presence that is unrepresentable to the mind, not offering itself to dialogue and dialectic, whereas for psychoanalytical theorists such as Lacan and more recently Zizek, the sublime is the *embodiment of a lack*, manifested in a 'surplus object' which cannot fully represent the sublime but actually indicates a failure of grasping it.⁹⁷ As we can see from the different approaches, the sublime is usually manifested in a tension between an object or familiar concept (language, natural object, cognitive capacity) with that which cannot be represented or grasped.

The Uncanny

Another connection of familiar and unfamiliar realms can be found in the 'uncanny' often associated with Freudian psychoanalysis. Freud (1919) defines the uncanny as 'that class of the frightening which leads back to what is known of old and long familiar'.⁹⁸ It seems the uncanny is a scary unknown that is a result of de-familiarising what is originally known. Similarly, for Royle (2003, p. 1) the uncanny is the strangeness arising as a result of 'a peculiar commingling of the familiar and unfamiliar' and 'an experience of liminality.' He lists some possible instances of the uncanny: curious coincidences, loss of body parts, mechanical/automated behaviours in the living, life-like objects,

⁹⁷ This brief overview is based on Philip Shaw's *The Sublime* (2006)

⁹⁸ *The Uncanny* (1918) – <http://people.emich.edu/acoykenda/uncanny1.htm>. Freud refers to an earlier discussion of the term by Ernst Jentsch in *On the Psychology of the Uncanny* (1906).

beautiful yet frightening phenomena such as doubles, the uncertainty of silence, solitude or darkness and something hidden or secret coming to light. We will come across some of these themes while discussing electroacoustic performance and its 'absences' and 'presences'.

The various experiences of the uncanny and sublime, however diverse, have a common theme – a duality between the familiar and evident to the senses, and the invisible or inexplicable. These are the two sides of the duality of *absence* and *presence*. In performance or ritual these two entities and the different domains they inhabit – the physical, fleshy vs. the ethereal, austere, unattainable – can be *emphasised* and the two elements interact in a meaningful way.

5.2 ABSENCE AND PRESENCE IN ELECTROACOUSTIC PERFORMANCE

A key scene in David Lynch's film *Mulholland Drive* (2001) exploits the eerie sensation that can arise from the disembodiment of recorded sound. The two young protagonists, Rita and Betty, arrive at the nightclub Silencio. On stage, a musician is playing a jazz tune on the trumpet. After finishing a few phrases, the player slickly removes the trumpet from his mouth, but surprisingly the music continues. The charismatic showmaster draws our attention to the fact that *this is a tape*: this is all an *illusion*. A singer then enters the stage and sings a heart-rending song. Rita and Betty burst into tears when suddenly the singer collapses, seemingly dead, and is carried away on a stretcher while her voice continues to resound within the space. An ambiguity of absence and presence creates an uncanny atmosphere here. Rather than feeling that we are fooled, and that this is a 'fake' performance, we are mesmerised by the ambiguity. This ambiguity creates an altered mode of showmanship, and the awareness of illusion serves to increase the sublime sensation rather than destroy it. The showmaster and the venue, with its play of screens, lights and shadows, create a suitable *context* for perceiving the sublime aspect of the experience.



Figure 5.1 The Club Silencio scene from David Lynch's *Mulholland Drive*. The trumpet player removes the trumpet from his mouth, yet the sound of a trumpet playing continues.⁹⁹

The use of electroacoustic sound in a live context and its relationship with the performers on stage – its ambiguity of bodily and spatial entities, invisibility of source, unfamiliar causality chains and other unknowns – works on the boundary between absence and presence and can be associated with poetic

⁹⁹ Images from *Mulholland Drive* (2001) Directed by Lynch, D. [DVD]. STUDIOCANAL / The Picture Factory.

meanings evoking the sublime and uncanny. I will look at several different types of 'absences': **evoked absentees, partial absences, doubles, the familiar made unfamiliar, and the tremendum in sound.** Though this list is not exhaustive, it demonstrates a range of contexts giving rise to different performance dramaturgies. As well as live electroacoustic works, I will place the discussion within a broader context to include examples from other types of performance, art and ritual.

5.2.1 EVOKED ABSENTEES

Some rituals refer to *specific* absentees. Small (1998, p. 197) notes that performances have a particular set of relationships 'between those present and those significantly absent or perhaps those supernatural beings that are being summoned by the musicking'. The musical performance tradition never fails to evoke the memory of its mythological figures. Concert halls are often fitted with statues of famous composers, or named after them. Issues such as performance 'authenticity', summoning the 'ghosts' of the musical past, can become part of the aesthetic experience, or even overshadow it. In the world of electroacoustic performance there is no established tradition of evoking the memory of a composer. Maybe the genre is too new to 'commemorate' the composer, or this might have to do with a different form of music-making or a different role for the composer in a society where the celebrity rather than the artist is adulated.

A composition with a history of previous performances carries an array of 'absences': historical contexts, venues and interpretations. For an informed listener, the piece becomes a sort of re-enactment. Performances are compared to famous past performances available as recordings, or, in a more specialised context, to a score. In the case of new compositions, the layer of past performance and previous knowledge is less dominant, and the performance can be more easily judged on its own sounding merit.

The *sound traces* that electroacoustic composers leave behind are a possible

evocation of the past when re-played. In composed 'mixed' pieces, the 'tape' part carries with it the imprint of the point in history at which it was created. Stockhausen's *Kontakte*, with all its nuanced complexity, also carries a trace of an electronic studio in the 1950s. A performance of the piece becomes a mixture of the here-and-now with a time gone by. A sense of nostalgia can also explain the appeal of 'retro' sounds and the equipment that produces them such as analogue synthesizers.

Citation is also a means of evoking the past. Music that has been kept in the form of a score allows for renewed performance, as well as citation. In his piece *Sinfonia* from 1968/9, Berio quotes profusely from pieces such as Mahler's second symphony, Debussy's *La Mer*, Stravinsky's *Rite of Spring* and many others, with appropriation as an important layer in the composition. Part of our musical past has also been kept in the form of sound recording: the whole history of recorded music is potentially at a musician's disposal (the issue of copyright providing the only limitation). Recordings are fragments of a time and a place. A new piece can either clearly refer to the past, or alternatively try to reassemble it. Referring to the past can be a tribute; it can evoke nostalgia or work with particular cultural connotations and narratives.¹⁰⁰

Charles Dodge utilises nostalgia for the absent in his *Any Resemblance is Purely Coincidental* (1980, CD1 Track 3) for live piano and tape, based on a recording from 1907 of legendary singer Enrico Caruso. The recording was restored and resynthesised into a hybrid of man and machine. This piece is usually performed in a live context, with the live presence being the piano accompanist. The soloist in this case is the invisible, ghost-like 'appearance' of the legendary singer electroacoustically brought back to life. As the composer testifies¹⁰¹:

¹⁰⁰ Such appropriation of recordings is widely used in various genres of pop music in the form of 'sampling'. Tricia Rose (1994, p. 89) refers to the cultural resonance of sampling in rap music, stating that samples function as a challenge to know certain sounds, to make connections between the lyrical and musical texts, thus affirming black musical history by placing 'past' sound in the 'present'.

¹⁰¹ <http://artofthestates.org/cgi-bin/piece.pl?pid=37>

In the course of the work the voice searches for an accompaniment and is heard at different times with the original band, with electronic sounds, with copies of itself, with the live piano, and with combinations of them all. There is a surrealistic, dreamlike aspect to these apparent dislocations. The initial efforts are humorous; as the work progresses other emotions come into play.

Other than actual human entities, *a different time and place* can also be evoked and commented on. Bob Ostertag's piece *All The Rage* (1993) for tape and string quartet refers to a real life event – a riot in San Francisco in 1991 which followed California Governor Pete Wilson's veto of a bill designed to protect gays and lesbians from discrimination (CD1 Track 4).¹⁰² The piece starts with a recorded recitation of a text while the string quartet simultaneously plays a tightly synchronised part which is based on the speech rhythms. The read text sets the scene and helps the listener understand the context, as well as introducing a lucid, moving connection between this context and a more personal guise of the anger. This section is followed by increasingly manipulated/edited recordings of the demonstration. The string part is at this point derived from sonically notable moments: whistles, screams, voices shouting demo slogans and glass smashing. The string part moves from clear emulation of the recorded events to other material which develops into independent parts. The piece evokes a certain space and time. Placing this material within a context of musical performance expressively amplifies the nature of the issue at hand and creates focus and a space for observation and reflection.

In the project *Infantry* (2001) created by Meira Asher and myself, text material based on testimonies by child soldiers and victims of war was the starting point for a multimedia piece using electronics and voice. In the case of the piece *Girl* from this project (CD1 Track 5), we used a transcription of a recording of a woman who had gone through a violent rape. Rather than using the recording, Meira 'channelled' the presence of the woman by reading the

¹⁰² See <http://www.bobostertag.com/music-recordings-alltherage.htm>

text on top of a harsh electronic texture. To emphasise the traumatising, dehumanising violence, all pronouns indicating the victim and perpetrator were omitted, leaving a gap in the text as though 'hiding' identities and acts. During the silences, and most noticeably during the 'pronoun' gaps, a noisy texture appeared, further emphasising the omission. The decision not to use the original recording of the testimony was also part of the 'hiding' process. The horrific reality is beyond comprehension, and we felt that it needed to be revealed via a process of mediation. In this way the focus was also transferred from a documentary-style of recording to a 'framed' scenario that focuses the attention of the listener on the actual words and the horror of what they are telling us. This process of 'channelling' was used in a similar way throughout this project. The presence of the children whose testimonies inspired the performance was felt through understated yet highly intense vocal performance, rather than a documentary style to which a listener might be all too accustomed and de-sensitised.

5.2.2 PARTIAL ABSENCES: PHANTOMS, SILENCE AND THE HIDDEN

Some absences can be marked by gaps or lacks in the manifestations of the 'presence'. I will look at three cases:

- **Phantoms** in which there is presence in one sensory modality, but absence in another
- **Silence** which is juxtaposed with sound, for instance, through long pauses between sound phrases
- **The hidden.** Here part of a presence is revealed but another part of it is not.

Phantoms are created through absence in one modality and presence in another, or as Merleau-Ponty (quoted in Chion 1994, p. 125) points out 'a ghost is the kind of perception made by only one sense'. A visual presence may be missing when we hear a sound that we associate with a physical source; alternatively, a sound could be missing while there is a visible sound-

producing action. This dissonance can be very powerful. One only needs to think of Edvard Munch's painting *The Scream* (1893), and its awful silent screaming image to understand how effective this can be. Phantoms can appear in a live situation: an organist playing a huge church organ is rarely seen while performing the music. While the image of the huge organ and its sound reverberating through the huge space produce a sense of grandeur, it is the lack of a visible human presence and the sense of an object 'coming to life' that enhances the experience of the sublime.

Volkmar Klien's installation *Relative Realities* (2007) works with such phantoms of partial absence.¹⁰³ It consists of a large pendulum swaying through space and 'colliding' with objects which are not physically present in the space, and are only represented in sound. A video projection provides the backdrop with images of the phantom scenes. The phantom presence is created through computer modelling of the space:

A computer traces the pendulum's position and – in a computer model – embeds it into a mathematical world where it collides and interacts with objects. This interaction between the pendulum and its mathematical surroundings provides the source for a three-dimensional soundscape.

In electroacoustic performance presences are manifested in sound and vision. By omitting presence in one of these sensory modalities while retaining it in another we create phantoms. As well as the initial surprising 'magical' effect, phantoms force the spectator to 'fill in the gaps', and imagine the invisible presences behind the sounds heard or the implied sounds behind the visible action.

In his discussion of film, Chion uses the term *acousmêtre* to describe a voice without a visible body – a voice that is neither inside nor outside the image (1994, p. 129). The *acousmêtre* is not inside the image, as the source is not

¹⁰³ In cooperation with Thomas Grill. See http://www.volkmarklien.com/installations/rel_rea.html

seen, but not completely outside it, as it is part of the narrative and might at any point enter it. There is a constant flux in the relationship, and this delicate balance is what makes the acousmètre 'magical'. In my piece *Safari TV* (2009) for electric guitar, two laptops and CD, there is a central role for a 'hidden' disembodied voice representing the machine or system of the game. There is something menacing about this voice: it explains the rules of the game, encourages or admonishes the guitar player, teases and intimidates ('I can see you. You can't see me. But I'm here. I am watching you. We are *all* watching you.') and finally it invites the guitar player to join 'the team'. A manipulation of the recording (delays, various reverbs, filtering, harmonisers) indicates an ever-changing space and highlights certain characteristics, making the voice both present but never quite located 'here' in the live situation of the stage. Its invisibility adds to its authority as well as ambivalence: who is this voice? Is it machine or human? Who is behind it? What system of power does it represent? How come it commands and influences so blatantly? This ambivalence might not have worked with such a 'voice' physically visible on stage.

'Phantom' sound is not always a voice; it can be any sound that is source-bonded and placed in a context that causes us to anticipate the sound from a visible cause such as a musical instrument – an expectation that remains unfulfilled.

A *location* and its context can also evoke phantoms. For his work *Entferntezüge* (Distant Trains) from 1984 Bill Fontana chose the location of the ruins of a former train station, the Anhalter Bahnhof in Berlin.¹⁰⁴ Feeling the empty field near the station was 'acoustically haunted' by sounds of trains and people he decided to amplify this sensation by introducing the sounds of the busiest train station in Europe, the Köln Hauptbahnhof, to the site via live broadcast. These plans for live broadcast were eventually abandoned due to technical limitations, and were replaced by an eight-channel version emulating

¹⁰⁴ See <http://www.resoundings.org/Pages/Urban%20Sound%20Sculpture.html>

the real-time feel of the bustling station. The absence of activity in space was represented and replaced by sound. Fontana created a phantom by reintroducing sound to the site *without* its accompanying source.

Whereas phantom sensations can occur through incongruities of simultaneity, other absences can occur through juxtaposing absence and presence in the *time domain*, as gaps of **silence**. In several of Morton Feldman's pieces the composer introduces lengths of silence between instrumental gestures. His piece *Rothko Chapel* (1971) for viola, solo soprano, chorus, percussion and celesta evokes absentees on many different levels. The piece was written in memory of Feldman's friend Rothko who had committed suicide. As Alex Ross (2008, pp. 530-31) points out, the piece also refers to the 'voice of God' in Schoenberg's *Moses und Aron*, to Stravinsky's *Requiem Canticles* and a melody reminiscent of the synagogue.¹⁰⁵ The instrumental passages provide a 'frame' for the silences: the presence of sound prepares the scene for the 'absence' – the silence that is juxtaposed with it. In a sense, a phantom of sound 'spills over' into the silent passages. The audience has the active role of imagining sounds, or the possibility of their occurrence.

An extreme example of silence made evident by context and human presence is John Cage's piece *4'33*. The score of the piece is playable by any musician on any instrument. It consists of three movements, with precise durations indicated per movement, with the sole instruction 'Tacet' for each one of them. The setting is 'musical': there is a performance, a score, an instrument. Once the *expectation* of sound is created through the physical presence of a performer and an instrument, silence becomes meaningful. Silence here is not total; one can still hear sounds of the surrounding environment. However, the moment can be perceived as silent due to a lack of the sound that we *expect* to hear. Stan Link (1995, pp. 219-20) considers silence as conceptual. Even though there is no such thing as complete silence, we have a notion of what it

¹⁰⁵ Several sublime 'absences' are hinted at in a referential way: the two major icons of modernist composition, the deceased friend and artist Rothko ('evoked absentees') as well as the religious context of the synagogue and the cathedral in the title of the piece.

should be, and that notion is *absolute*, as Link maintains:

Rather than the relative silence of the real world, it is primarily a paradigmatic silence which informs our understanding of a work. Our impression of the impact and meaning of silence in a musical context is therefore heightened by a sense of transcendence: the ideal silence banishing the real.

Silence is an absence, a transcendence that we can only conceptualise by imagining it through its imperfect copy in the real world. It is this dissonance of the conceptualised ideal and the reality of it that imbues silence with meaning, as Link states (*ibid.*, p. 229):

As an absence with a strongly felt presence, part of the effect of silence, like being "soaked through with meaning," is in the illusion of experiencing what can't be experienced. As with the so-called "phantom pains" of the amputee, we sense something which isn't there, a feeling heightened by its impossibility.

A juxtaposition of absence and presence also occurs in the act of **hiding** and **revealing**. In this case too, the audience is invited to fill in certain gaps. In the case of live performance, a performer is often hidden and separated from the audience until it is time to start the show. Degrees of veiling and unveiling can also be used as expressive means *during* the actual performance. The last part of George Crumb's piece *Night of the Four Moons* (1969) for alto, alto-flute, banjo, electric cello and percussion ends with a sustained cello harmonic at which point¹⁰⁶:

[t]he performers (excepting the cellist) slowly walk off stage while singing or playing their "farewell" phrases. As they exit, they strike an antique cymbal, which reverberates in unison with the cello harmonic.

The now-hidden instrumentalists continue playing their last parts off-stage

¹⁰⁶ See <http://www.georgecrumb.net/comp/night4-p.html>

("Berceuse, in stile Mahleriano") and the music is 'to emerge and fade like a distant radio signal'. Crumb states that this epilogue indicates a simultaneity of two musics: the cellist's "Musica Mundana" ("Music of the Spheres") and the offstage "Musica Humana" ("Music of Mankind"). The performance at this point splits into two domains – an embodied one and a disembodied, eerie, quasi-mediatised, nostalgic one. Composed around the time of the Apollo 11 space mission and inspired by it, this point of the piece conveys a sense of duality and separation of two worlds, and maybe a sense of yearning for home in the nostalgic, familiar ring of the melody and the radio-like appearance of it.



Figure 5.2 A scene from the opera *Jasser* (Photograph: Anne Reinke)

Using amplification, diffusion or recording, the electroacoustic can create powerful phantoms on stage. In the chamber opera *Jasser* (2006), for which I composed the music, the mezzo-soprano singer performs vocal parts of characters from the protagonist Jasser's past. One of these characters is Jasser's mother, who is never visibly present: this part is performed behind a video screen with the projection of the family's home. This serves two functions: to indicate that the mother is behind the walls of the house, but mainly – to hint that this is playing out in Jasser's head rather than physically in the present moment. Later on, when the singer performs the role of the father, though he is represented visibly on stage by the mezzo-soprano singer, there is a reverb effect on the voice, indicating that this is a dream.

The reverb effect ‘places’ the father in another space and thus renders him partially hidden from the ‘now’ of the character Jasser who is present on stage (see Figure 5.2).

‘Hiding’ can also occur in the sound domain itself and can work well in situations where a sound gradually reveals itself to be a source-bonded type. This can also be very effective when using speech sounds. A more muffled, filtered speech sound can create the impression of a hiding of presence or of a message. I use this technique throughout my piece *Shadowgraphs* in which the recorded voice is often filtered or fragmented and only occasionally comprehensible. This entices the listener to construct meaning and try to discover what the text is about.

5.2.3 DOUBLES AND PARALLEL WORLDS

A performer occupies two different realities. One of them is the physical present world; the other is a represented reality, of another space, another time, other entities. Pavis (1996, p. 59) demonstrates this in the case of the theatre actor:

[T]heater actors have a dual status: they are both real, present people *and* at the same time imaginary, absent characters, or at least located on “another stage.” Describing this ambiguous presence is one of the most difficult tasks, for the indices of presence resist any objective pinning down, and the “mystical body” of the actor both makes itself available and takes itself back.

The performing musician is also a ‘doubled performer’: as an audience we are aware of the human reality of the performer, but on stage, this person becomes a sort of ‘channeller’ of a specific musical work and of music in general. Through certain behaviours and rites this person is transformed into the *persona* of *musician*. The performer occupies the world of the musical in sound, structure, expression, virtuosity. However, the balance is a fragile one: if there is a failure on the part of the performer to attain perfection in the purely

musical, this immediately throws him/her into the realm of the cruelly human with its limitations of the body and the 'real world'.

Electronic technologies create a doubling of the physical by adding simulacra of bodies and space to the performance situation. Dixon (2007, pp. 241-70) points to the phenomenon of doubling in performance that incorporates digital technology. Focusing primarily on visual aspects of performance, he detects several types of doubles: reflection, alter-ego, spiritual emanation and manipulable mannequins, and relates them to Freudian psychoanalysis and themes of the uncanny. In a similar way, electroacoustic means offer us the possibility of evoking these contexts in sound:

- **'Reflection'** via delay is a way of looking into a sonic mirror of sorts. The performer gets a chance to listen to him/herself, and the audience perceives doubled instances of the performer represented in sound.
- **'Alter-egos'** can be created through sampled versions of performed sound that 'come back to haunt us', for instance, via live sampling and transformation.
- Dramaturgy can evoke the illusion of **'spiritual emanation'** (e.g. the voice 'leaves' the body of the collapsing singer in Lynch's *Club Silencio*) or **'manipulable mannequins'** – through sonic cues that force a performer to follow certain dictated cues, rules or scenarios (for instance, the cellist in Ferneyhough's *Time and Motion Study II*).¹⁰⁷

Different types of doubling occur in electroacoustic performance. I will examine three types and discuss them in the context of specific works and scenarios:

1. **'Strange' doubling of the live performers** – in Marko Ciciliani's piece *J&J*
2. **The creation of a sonic mask** that creates an ambiguity or doubling of

¹⁰⁷ See Chapter 2, section 2.1

a performer's identity – with the example of familiar *Star Wars* character Darth Vader

3. **Symbolic doubling** in which sounds can represent another layer of parallel narrative to a performance – in my piece “LOVE”

1. ‘Strange’ Doubling of Presences

Marko Ciciliani's piece *J&J* (1996/7) for mezzo-soprano, piano and electronics is a fascinating exploration of the song tradition.¹⁰⁸ As the composer points out, a sense of *duality* pervades the piece. This is evident in the *juxtaposition of two different texts* – a Grimm fairy tale, and a contemporary text about people trying to reach each other by phone. A duality is also evident in the *relationship of the two musicians*, as well as *the way the electronics relate to the live part*. The electronic part consists of recordings of the singer, as well as an electronic piano sound controlled by MIDI. These electroacoustic sounds are played from loudspeakers attached to the resonating body of the piano. The recorded voice adds an extra layer of meaning as well as the presence of invisible speaking characters. The electronic piano part doubles the live piano sound, and at times moves from the familiar to the unfamiliar when it is detuned by a quarter tone from the tuning of the live piano. There are two layers at work in this performance – one that is easily associated with the Lied genre complete with a singer and piano, and a second layer that is an eerie doubling manifest in the invisible world of recorded voices and piano sound made uncanny by the addition of mediated piano sound and detuning.

2. Sonic Masks

Another type of doubling, both metaphorically and physically, is the use of a mask. Schechner (1977/2003, pp. 43-44), describing the Hevehe ritual of the Elema people in Papua New Guinea, points out how the masks worn as part of the ritual help create a doubled perception of two co-existing parallel worlds: one being the world of the Hevehe masks and the entities which those wearing them are supposed to represent, and the other – the reality of the

¹⁰⁸ http://markociciliani.de/archive/j_j.html

villagers' everyday lives:

In theatrical terms neither the performed (masks) nor the performers (villagers) is absorbed into each other; one does not "play the role" of the other. They stand whole and yet autonomous... Both move freely through the same time/space. The realities confront, overlap, interpenetrate each other in a relationship that is extraordinarily dynamic and fluid.

The participants *negotiate* the two worlds and fuse them, while still being aware of the two separate realities. But what is the electroacoustic equivalent? We can consider real-time processing of a sound played live, instrumental or vocal, as a sonic 'mask'. This impression is most strongly evoked if electroacoustic processing is simultaneous with the original sound: the connection between performer and sound is evident, yet de-familiarised and rendered uncanny. An example of the mask reflected both in a visible, physical object and in sound transformation can be seen in the *Star Wars* character Darth Vader. The mask in this case both hides the face and transforms the voice. Both of these erase the impression of the character's humanness. It is only after his death that the character is unmasked and revealed to be the protagonist's father, both fragile and human. In this example the mask causes a partial acousmatisation of the voice, as the source is partly hidden: we cannot see the mouth or any facial expression.

Indeed, in a way similar to the visual effect of a mask altering an aspect of one's appearance and perceived identity, in the domain of sound the timbral quality of a voice (or an instrument) can be altered, thereby influencing the possible connotations of gender, age, machine/human hybrids, or size. An example of this is Laurie Anderson's use of voice-altering devices in creating the different characters and alter-egos in her performances.

3. Symbolic Doubling

A *symbolic* doubling is another 'text' running in parallel with what we see on stage. A well-known example is Wagner's use of Leitmotifs in his operas,

most notably in *Der Ring* cycle. These short themes are used to indicate a character or a place. In performance, the audience is encouraged to make semiotic associations. The motifs can sound simultaneously with the appearance of a character, but they may also indicate connections or premonitions that are *not immediately apparent*. In this way, the drama is indicated on several levels with the Leitmotifs hinting at an additional narrative layer that is not visible on stage.



Figure 5.3 A scene from the piece “LOVE” (Photograph: Arnold Schalks)

In my piece “LOVE” (2004) for five vocalists and electroacoustic sound I use a similar principle. The piece is performed theatrically and consists of five characters: a teenage boy, a ‘naughty’ girl, a brothel madame, an ageing actress and a ‘manipulator’. Rather than melodic Leitmotifs I use typical ‘sonic gestures’ for each character (CD1 Track 6). For each vocalist/character I created a group of sound icons based on recordings of their voices and a characteristic electronic processing emphasising certain stereotypical vocal expressions: groaning, giggling, playful humming, sighing, and mechanical commanding. At first the sound icons appear in conjunction with the live voice of a character. Later on, these sound icons go their own way, and are combined in a ‘parallel world’ that extends the one on stage. Rather than a sense of premonition (à la Wagner) there is an extension and doubling of the singers’ presence, in sound scenarios that could indicate the subconscious

level of the characters' psyche, in which transgressive desires come true, and dreams and nostalgic memories are played out.

5.2.4 FAMILIAR TURNS UNFAMILIAR

As we have seen, the sublime and the uncanny are often associated with the unfamiliar. In electroacoustic music, though there is an increasing familiarity with new technologies, there is the potential of creating new sounds and causalities that seem strange and uncanny. However, a suitable context needs to be created, so that we can actually perceive this 'strangeness'. Stockhausen (1988, p. 109, quoted in Lalitte 2006) suggests that the combination of the familiar and unfamiliar creates such a context:

[T]he meeting of the familiar, the named, in the areas of the unknown and the unnamed, confers the earlier growing mystery and fascination. And conversely, the well-known, even the banal, the old, to which we hardly pay any attention, gets fresh and alive again in the new environment of the unknown.

Applying such a tactic to the cultural perception technology, we can trace strangeness to the areas where a technology is still new, unexplored, and potentially dangerous. The combination of the familiar human body and the unfamiliar machine extension can be uncanny. This relates strongly to one of the 'uncanny' themes suggested by Freud – namely, 'life-like' objects (see section 5.1). According to Mori (1970), while human likeness of a certain object such as a robot or a prosthetic body part increases it can arouse a positive feeling, but only until a critical point, at which there is a strong sense of repulsion which he calls the 'uncanny valley' (see Figure 5.4). There seems to be a dissonance between the seeming familiarity of the object having human-like traits and the realisation that this is not truly the case. Similarly, this sense of ambiguity and discomfort can be created in the juxtaposition between the human performer on stage and the 'other' presences which are his/her extensions.

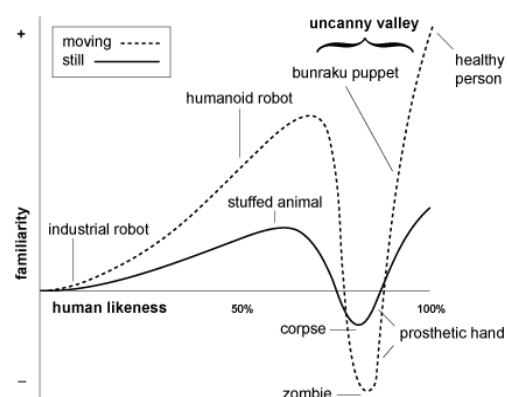


Figure 5.4 The 'Uncanny Valley' (Mori 1970)

As we have seen in Chapter 2, electroacoustic methods can alter the perceived causalities relating the performer to the sound. In the case of clear causality a sound is related to an initial physical act. When a connection to a performer is established, but the causality is not a familiar one, the uncanny is evoked. In Simon Emmerson's piece *Spirit of '76* (1976, CD1 Track 7) a solo flautist plays an instrumental part which is recorded in real time and played back using a tape machine¹⁰⁹ creating a highly uncanny effect, as the composer also suggests (2006, pp. 212-15):

Most notably, sum and difference tones are created 'live' in the room; they seem to be present but 'strangely' located somewhere around your head and ears. Many of these are lower than the lowest performable note on the flute.

The structure of the piece introduces an ever-increasing intensity in dynamics, texture, and movement from high to low pitches, as well as rising psychological tension. Towards the end, a massive block of sound is created and then cut off abruptly just before the tape reaches its physical breaking point. In this piece the sound realism of the flute performance is broken by the addition of tones (some of which cannot be produced by the flute) and their localisation within the head of the listener. This contributes to an unnerving, uncanny effect.

¹⁰⁹ In later versions a Max/MSP patch is used.

5.2.5 TREMENDUM IN SOUND

The sublime can be manifested in the actual nature of the sounds we hear. Sound can act as a 'present' perceptible element that indicates a departure to the unimaginable. I suggest that this can work in a number of ways:

- as **symbolic icons** working in a semiotic way by signifying 'sublime' phenomena or religious context
- as **extreme sounds** that test our boundaries in a very physical way yet do not reach the ultimate extreme (for instance, very loud sounds that have the potential of deafening us)
- **very quiet sounds** that force us into the other extreme in which the boundary between imagined and real sound is blurred

Certain sounds can function like **symbolic icons**; they are used in particular contexts, and if we are familiar with such contexts, we will associate these sounds with the sublime. An example of such sound is the music used in certain religious rituals: the church organ, bells¹¹⁰, the choir, the call of the muezzin, the cantor. This works in a similar way to the Leitmotif that conveys meaning via association, but in this case it has a *cultural* resonance and relates to a shared social phenomenon rather than motifs that are only part of one composition.

Some sounds can indicate certain 'real world' phenomena, which, just like the objects of nature for the Romantic poet, can imply a tremendous force and serve as a first stepping-stone on the way to indicating something larger than the phenomenon itself. These forces can evoke awe by indicating an indescribable, uncontrollable force.¹¹¹

Such tremendous forces can also be manifested via the sound itself. Extreme sounds act physically on the body of the listener, and rather than *representing*

¹¹⁰ the sound of which is used effectively in Jonathan Harvey's *Mortuos Plango, Vivos Voco* (1980)

¹¹¹ Trevor Wishart used such nature sounds in pieces such as the Vox series, which I will discuss in section 5.2.6.

the awe-inspiring objects of Romanticism such as thunder or high mountain ranges, the sound in this case *is* such an object. Extremely loud music, typical of the Noise music scene (a well-known example of which is the work of the artist Merzbow), forces one into a unique state of listening, into utter submission. Here sound is a force that can affect one physically and even cause real harm to the listener. The listener enters a liminal state involving pain and danger. Paul Hegarty, in his discussion of Noise music (2007, p. 147) describes the listening experience as a sort of ecstasy that relies on full embodiment and a loss of the subjective sensation:

The experience of noise has been thought of as ecstatic, and this is far from wrong. The listener at a loud noise event is taken out of the subject body to be dumped back into embodiment, lowered into something like ecstatic noise consumption. The mistake would be to imagine any lasting freedom emerging from that ecstasy. It is certainly more ecstatic than pleasant, and closer to the sublime than the beautiful, with which it cannot share anything. Like Kant's sublime, though, it is also in the framing of the moment the self is lost as the rational reflection on the moment the self was lost.

Such a state is similar to the liminality of ritual, in which transgressive states are explored. This liminal state defies but also enables the functioning of everyday community by enabling an outlet and controlled zone for exploring transgression.

Extremely soft sounds push the physical and mental boundaries in another way, by requiring increased attention and concentration on the details of barely perceptible sounds. Hiromi Ishii's *Summer Grasses* (2004) consists of extremely soft sounds, based on recordings of metallic sounds filtered through formant filters emulating insect sounds. The listener's ears are challenged not with painful loudness, but with extremely soft sounds that demand full attention and concentration. Ishii points to the use of silence in the piece as

influenced by the concept of 'ma' – “moments of emptiness”, but high-tensioned silence, in traditional Japanese music.¹¹²

5.2.6 TRANSFORMATIONS

We have seen how the interplay between 'absence' and 'presence' can occur in a parallel, synchronous fashion through the process of *doubling*, or in the case of evoked presences or phantoms – through a *lack* that is created by a presence that implies it. Another means of manifesting the play of 'absence' and 'presence' is through *transformation in time* occurring either as a sudden rupture, or gradually.

A process of disembodiment or re-embodiment is a powerful method of transformation with a strong dramaturgical resonance. Chion (1994, p. 131) alludes to such a transformation in the *de-acousmatisation* of the voice in cinema. In film, the acousmètre, a disembodied voice, might at some point in the narrative 'find' a body. A villain whose voice we have heard but whose face we have never seen, or a narrator whose voice has led us through the film, is finally revealed. Chion (1994, p. 131) suggests that 'the de-acousmatisation of a character generally goes hand in hand with his descent into a human, ordinary, and vulnerable state'. Žižek (1999, p. 16) demonstrates how such a moment of dramatic rupture can serve in the context of ideological critique in Terry Gilliam's film *Brazil*. The light-hearted song from the 1950s, also titled 'Brazil', is heard throughout the film, leading us to believe it serves a function of enjoyment in the plot's atmosphere of a totalitarian regime. However, when the protagonist's resistance seems to be broken by the regime's torturers, a shift of meaning occurs: he whistles the very same disembodied tune we have heard throughout the movie – 'Brazil'. This tune and its function is a type of object termed by Lacan as '*sinthome*': It is not a coded message to be interpreted, but 'meaning-in-enjoyment'. In *Brazil* it indicates the protagonist's departure to a state of mind that is beyond semantic interpretation. This is a state where the protagonist cannot be

¹¹² http://www.ohrenhoch.org/Texte/Summer_Grasses_E.html

reached by his torturers. Again we are faced with an element that is beyond function and familiar rationality – a ‘sublime’.

The reverse process of *acousmatisation* is another method in which the sound ‘leaves’ its body source, which we have seen in the example of David Lynch's *Mulholland Drive*. The full presence of sound and its apparent cause turn into a phantom – a sound which continues once the human agency is no longer ‘cooperating’. This results in an eerie dissonance.

A series of acousmatisations and de-acousmatisations occurs in Trevor Wishart's *Vox 1-4*. In these pieces, for vocal ensemble and tape, the live vocalisations start out merging in an almost indistinguishable fashion with the tape. Gradually, the tape sound is transformed into other source-bonded types, such as thunder or a swarm of bees, only to eventually reconnect with the timbres of the live vocalisation. Sounds seem to float in and out of embodiment, as though they are an ephemeral presence, travelling from the visible to the invisible and back. Though familiar source-bonded sounds are used, there is hardly a sense of realism or representation, but continuous flux that has nothing to do with the real world, evoking an eerie, surreal impression.

The shift from embodiment to disembodiment occurs over a large time scale in Xenakis's 46 minute long acousmatic piece *Legende d'Eer*.¹¹³ The piece can be perceived as an epic cycle with a departure, journey and return – a theme which guides Richard Barrett's analysis of the piece (2002). Moving from sounds that we would more readily associate with an embodied agency, such as African and Chinese instruments, as well as the scraping of cardboard and stones¹¹⁴, to a cyclical, almost compulsive, clearly synthesised sound, we feel as though we have left a physical, familiar world, and arrived at an unfamiliar ‘other’. This change, and the subsequent return to sounds of a

¹¹³ Also used as part of the Paris *Diatope* (1978)

¹¹⁴ Information from Barrett (2002)

type similar to those heard at the beginning of the piece, evokes a sense of arrival and attainment and a subsequent return 'home'. It is the way the sequence of sounds is structured that evokes a sense of a journey towards the sublime.

Katharine Norman (2004, pp. 29-49) explores the way electroacoustic sound can convey 'immeasurable space'. One of the examples she discusses is the ninth movement of Jonathan Harvey's *Bhakti* (1982, CD1 Track 8). Norman demonstrates how the piece breaks some well-established rules we use when interpreting space. The piece is for 15 instrumentalists and quadraphonic tape, and in this case the mass of sound consists of, in Harvey's words, 'massive G's, mostly electronic', which are played by the instruments and continued in the electronics. Norman explains the breaking of the rules:

- The rule 'sounds begin and end' does not apply: the Gs appear from the textures in the previous movement, so they do not have a clear starting point, and they continue for three minutes.
- Rule number two – that 'timbre indicates proximity and effort' – is broken, as the timbral transformation of the long Gs does not relate to these parameters.
- Finally, rule no. 3 – 'the sound indicates the nature of the space' – is broken via short bursts from the tape part which clearly do not relate to the gestures of the ensemble (the members of which at this point are instructed to sit perfectly still).

Norman then discusses the motion from familiar to the unfamiliar (ibid., p. 41):

It sounds as if 'one thing' is making the dynamically evolving sound. That thing has human connotations because the timbre has vocal qualities... and yet it cannot possibly be perceived as human, because the timbral evolution and the duration precludes this likelihood. And an inhuman, endlessly evolving breath that nevertheless has some human associations is difficult to envisage, because it is unknowable. And we don't know *where* it is either

because in terms of auditory perspective, it indicates a space that is all around us, in quadraphonic space, and yet one that cannot exist in the real, external world.

The result is an ambiguity. Sound starts from what is perceived as human and physical – reflected in the instrumental timbre and the actions of the live players, and continues into the unfamiliar, superhuman ‘endless’ sound, and imaginary, unreal spaces.

5.3 CONCLUDING NOTES: *NASSAMA* (2005)

In this chapter I have looked at the duality of absence and presence in performance – a notion which can be closely linked to the sublime and the uncanny. I proposed the idea of a continuum between physical 'presences', and certain 'absences' – a category including the *significant* elements that are not physically there.

However, not every absent aspect is perceived as meaningful or significant. Creating the right *context* is key. A 'contract' between all present, both audience and performers, tacitly indicates that the 'absences' experienced are conceptually important. This happens at religious rites through initiation and familiarity, and the very same 'contract' is part of live performance. In David Lynch's *Club Silencio* it is not only the ambiguity of the real and the fake, with voices entering and leaving bodies, which creates the sublime; the lighting, the overacting, the showmaster presenting this all as an illusion – all of these indicate that something different, otherworldly and meaningful is going on here.

CASE STUDY

In my piece *Nassama*, for bassoon and electroacoustic sound, I create a dialogue between the 'presence' of the bassoon player and an 'absence' which is reflected in the processed recording of a reciter of surahs from the Koran. Through the merging and diverging of sound characteristics I create a continuum between two worlds. I explore ways of evoking the sublime through the creation of electroacoustic phantoms, sonic indications of hiding and revealing, and iconic sublime soundscapes. To achieve this, I use spectral and spatial processing as well as certain structuring concepts.

The electroacoustic material is based mainly on samples of Muslim chant and recordings of bassoon inspired by them. The two types of material are processed, and combined through spectral manipulation. The result consists of continuous slow moving textures that inhabit a sound world between the

two sound-source identities, sometimes gravitating towards and revealing one or the other.

A key to the duality of absences and presences occurring in the piece is at the very beginning, when the live player vocalises on the same note she is playing on the bassoon. Both the vocal and instrumental play a part here: the same note is also heard in a vocal timbre. The live player is a 'presence', but also refers to an Other – the 'absent' voice.

The impression of a phantom is evoked as we gradually sense that the electroacoustic material is not merely similar to the bassoon sound but is derived from another, invisible source – a chanting voice. This play of hiding and revealing is repeated throughout the piece, yet the voice is never completely exposed – it is never quite intelligible or recognisable for what it is.

The material itself evokes the sublime and refers to a sound world relating to religious contexts. Based on the modes, inflections as well as the static structure of Muslim chant that avoids motivic development or climax, even the listener who is not familiar with this type of chant tends to interpret the piece as relating to a sacred context. As well as the musical material, I try to imply a space in which these sounds originally would occur: resounding through a village, reverberating in a mosque.

The structure of the piece, though it avoids development, does suggest a sense of 'arrival', through the introduction of a glass-based sound in a higher spectrum. This exposure and emphasis of a higher spectral field can evoke notions of a conceptual 'higher plane'.

CHAPTER 6

CONCLUSION: *SHADOWGRAPHS* (2009) - A CASE STUDY

Throughout this thesis the lens of duality has served as a framework for examining the central relationships that the electroacoustic medium has brought about in live performance. It has helped me explore some gaps, incongruities and relationships between the 'real' and 'simulated'. I chose to discuss four main dualities that I consider fundamental to the live electroacoustic experience and central to a framework that focuses on the dramaturgy of the *live* aspect, and the actual moment of performance:

- physical space / electroacoustic space
- the performer's body / electroacoustic sound
- performance / audience
- presence / absence

The focus on dualities has been useful in questioning certain connections that are typical of live electroacoustic performance. These dualities can indicate a gap between the embodied and disembodied (such as the performer and the performed sound, virtual and real space), but they also present the possibility of redesigning these connections: new interfaces, extended elasticised spaces, and a new definition and distribution of audience and performer roles, as well as new narratives and meanings in which the disembodied and embodied are both part of the dramaturgy.

To conclude, I will discuss the way in which I apply these themes in practice in my most recent project, *Shadowgraphs*. This project, discussed in brief previously, consists of three different 'platforms': a participatory sound and image installation, a blog and a live performance. Here I will focus on the live performance platform and discuss each of the four 'dualities' in turn.

The piece consists of four main parts, each with its own characteristic sound and live actions. On stage, the performer (myself) is acting the 'present' protagonist who is also producing the live sounds. Throughout the whole piece we also hear a recorded 'absent' woman's voice, who is the second protagonist, as well as a soundtrack that provides additional layers of narrative and space.

00:00-03:04 PART 1	03:04-06:20 PART 2	06:20-09:15 PART 3	09:15-15:30 PART 4
A woman's voice heard in messages from mobile phone Mediatic-type electronic noises, buzzes, interferences Live non-verbal vocalisations	Wind and rain sounds Typing on computer keyboard – both live and pre-recorded sound Live typing triggers recordings of the woman's voice suggesting a traumatic experience	Sounds produced by tearing, flicking through and slamming shut a book both in live action and pre-recorded sound. The woman's voice filtered to the extreme. Inflection and content suggest a private diary.	Both voices – of the live performer and recorded woman – are heard clearly and enter a dialogue of repetition, completion, and synchronicity Sounds from previous sections reappear and serve to enhance the narrative

Figure 6.1 Structure of the live piece *Shadowgraphs*

In part 1 (00:00-03:04) we hear a series of messages, the sound quality of which implies that they are spoken on a mobile phone. The messages might suggest that the woman is desperately trying to reach someone. We also hear sounds which could be associated with communication technology – interferences, beeps, buzzes, and a continuous hum-like drone. There is also the sound of pronounced breathing. The live performer utters non-verbal sounds – breath, hissing, singing – which are spectrally processed. The live sound indicates a connection between the live performer and the recorded material through timing, gestures and possible narrative connotation suggesting some sort of distress.

Part 2 (03:04-06:20) starts with an abrupt change in the sound world of the piece, with the sound of wind and rain falling on various hard surfaces. The

typing on a computer keyboard, both recorded and live, in combination with the sound of wind and rain creates a superimposition of indoors and outdoors, and a connection between narrator and narrative. The live typing triggers sounds of recordings of testimony-like accounts told by the 'absent' woman's voice, exposing them gradually in a fragmented way and hinting at a possible traumatic event.

The most salient sound features of part 3 (06:20-09:15) are sounds of pages of a book being flicked through, written on, torn, crumpled and closed shut. This occurs both live with a real, physical book and on the prepared soundtrack. To these sounds are added different types of reverb effects, 'moving' the book between different virtual spaces. The woman's voice is filtered to the extreme, and only occasionally can one understand fragments that might be part of a personal diary.

Part 4 (09:15-15:30), the final movement of this piece, indicates a complete turning point. The woman's voice is direct, mostly unprocessed, and her words are clearly understandable. The live performer's voice, which is transformed electronically, relates to the woman's voice, repeating, coinciding, complementing and responding to her words. The soundtrack alternates rapidly between sound types: rougher 'electronic' sounds, timestretched sung sounds, and recordings of footsteps, wind, country soundscapes and breath. The piece ends with only the sounds of the two voices coinciding, uttering the words: 'I was looking, you are here'.

PERFORMER'S BODY – ELECTROACOUSTIC SOUND

In Chapter 2 I discussed the relationship between the body of the live performer and electroacoustic sound, looking at some approaches to the connection between them: instrument design integrating bodily action, machine-human hybrid aesthetics, sound connections relying on acoustic characteristics that are manifested both in the evidently 'live' and the electroacoustic sound, and hidden integration of sound technology as part of

a narrative. I also discussed the idea of *friction* that can enhance the physical engagement of a performer with a sound, including interface design, clear systems of reference, and the presence of an audience.

In *Shadowgraphs* one live performer is in constant dialogue with an electroacoustic soundtrack, relating to it via sound similarity, textual connections and narrative concepts. The electroacoustic medium is prominent throughout the piece and integrated within the narrative of a search and a desire to communicate. The physical actions strengthen this idea, and are, at times, theatrical. Physical acts such as typing, breathing, creating sounds with pages of a book and vocalising all serve not only a musical, but also a narrative, theatrical purpose, in which the human presence on stage is trying to trace and recreate what actually happened.

The concept of *friction* is manifest in several ways. In part 2, the performer must type and speak whatever he hears. As the act of typing triggers sounds of the woman's testimony, more words are introduced for the performer to repeat and type. This creates a constant 'chase' after the text, which is apparent to the audience. In part 4, the soundtrack introduces very precisely timed texts read by the female protagonist, to which the live performer's response must be strictly timed – responding, completing a sentence, or speaking synchronously with the recorded voice. This friction, as well as indicating an engagement of the present performer with the electroacoustic sounds, enhances the dramatic aspect of the continuous search.

Throughout this piece, there is a sense of ambiguity. Not all is as straightforward as it seems, and the audience might be right in asking whether the live performer really is typing, producing the sounds and vocalizing, or whether this occurs on the fixed soundtrack. What is live, what is recorded? And who is the main character or world – the recorded or the live? In this uncanny situation, time as well as causality are manipulated. There is a nonlinearity to the story, but also to the actions. The sounding bodies in this

piece are both present and disembodied. This ambiguity emphasises the narrative of a search: disembodied characters and spaces expose only part of the reality of the piece, while a nonlinear narrative demands an active process of subjective interpretation on the listener's part.

PHYSICAL SPACE – ELECTROACOUSTIC SPACE

In my discussion of the relationship between physical and electroacoustic space, I looked at points of intersection between the two. These intersections occur in the sound diffusion stage, the causality of the performer's actions, the localisation of sound in the space and connections via formal principles, and a common contextual framework in which both the physical and electroacoustic spaces play a role. I also discussed spatial dynamics, including movement, both in the electroacoustic and physical (i.e. not only manifest as sound) domains, as well as the transformation of spatial identities (such as size or nature of the sound source), which I alluded to as 'elasticity'.

In *Shadowgraphs*, there is a juxtaposition of various spaces: the represented spaces of the soundtrack and the 'here' of the stage, the various spaces *within* the soundtrack, and also in the electroacoustic transformation of the sounds performed live on stage. The spaces evoked in the soundtrack are in constant change, functioning as a fast moving 'theatre set' providing a backdrop to the two protagonists: the man on stage and the woman on the soundtrack. However, this 'set' is really a non-space. Though it does refer to what we might perceive as spatial, the soundtrack does not really evoke a *realistic* space. This space shifts too quickly and is amplified to a non-realistic scale (in the case of the book or typing sounds). It is also juxtaposed with another space from a completely different context (e.g. the sound of rain on a tin roof coinciding with the somewhat similar typing sounds). Some of the sounds are non-spatial by their very nature – in particular the 'electronic' sounds reminiscent of communication technologies in parts 1 and 4.

The woman's voice is also presented in many different ways: as a voice

leaving a message on a mobile phone, as a fragmented testimonial voice, as a (highly filtered) inner voice writing a diary, as a conversing voice. Fast transformations in the spatialisation of this voice (reverb, panning) have an almost psychological, connotational function, indicating proximity, intimacy, or, conversely, distance and unintelligibility.

Connections are established between the live performer's actions, and the electroacoustic world of the soundtrack through similarity, verbal/textual connections with the woman's voice such as repetition and dialogue, and narrative context (e.g. walking sounds coinciding with text about walking). Other sounds on the soundtrack, such as drones, soundscapes, rain and wind, provide a backdrop that places the live performer within an imagined 'environment'.

These spatial aspects of *Shadowgraphs* work on a semantic level. As listeners, we know what the spaces here *mean*: indoors and outdoors, distance and proximity, means of communication. The concept of space, as it is evoked here, is a narrative element. The 'elastic' nature of the electroacoustic allows for fast shifts, and the space of the piece becomes a text to be read and deciphered.

PERFORMANCE – AUDIENCE

In Chapter 4 I discussed the relationship between the audience and live electroacoustic performance, and how modes of interpretation, interaction and participation can be designed and 'composed'.

In each of the three manifestations of *Shadowgraphs* – the installation, blog and live performance – the members of the audience are invited to assemble pieces of information and create an individual or shared narrative.

In the installation, the visitor is provided with 'clues' (snapshots and a soundtrack) and is then invited to draw in a sketchbook. The drawing added

then becomes part of the work for subsequent visitors. The installation was also presented as an 'initiation' phase in a foyer space in conjunction with the live piece.

The blog was started in the months preceding the first live performance.¹¹⁵ For those interested, it provided another platform of participation. It also provided some background information about sources and inspirations that guided me during the creation of the performance.

The live performance, though prepared and more or less 'fixed' as a work, was also an invitation for the audience to construct their subjective 'take' on things. Though there is a possible narrative to be construed, it is presented as a series of 'exhibits': diary entries, mobile phone messages, testimonies, a poetic text inspired by *Erwartung* (Marie Pappenheim's libretto set to music by Schoenberg), and a fragment by Harold Pinter. Questions may arise in the listener's mind: How do the live performer's voice and the woman's voice relate to each other? What environments are indicated in the soundtrack? What does it all mean? What really happened?

Via the different platforms, a network of details emerges: images and sounds of woods and countryside, the voice of a woman singing and speaking but never seen, a search, a traumatic event. In the blog as well as in the text of the performed piece, there are allusions to other works referring to similar themes. The audience is invited to assemble and interpret this network of materials. The choice is there: to participate by writing and drawing, to construct a narrative, to discover this network of connections and what it might mean.

ABSENCE – PRESENCE

In Chapter 5 I looked at aspects of absence and presence in electroacoustic performance, as well as possible meanings that this duality can evoke, such

¹¹⁵ See <http://shadowgraphic.wordpress.com/>

as the sublime and the uncanny. I looked at some types of absence – evoked absentees, partial absences such as ‘phantoms’, strange doubles, unfamiliar elements and their relation to the familiar, and the evocation of the sublime via certain ‘iconic’ sounds.

In *Shadowgraphs* there are three main dualities of ‘absence’ and ‘presence’. The most central one is between the live performer on stage and an invisible female character manifested only in sound. The live performer performs a series of actions that attempt to decipher and reconstruct traces of the female persona: messages, diary entries and testimonies. In part 4, the situation changes, both voices (the live and recorded) are heard clearly and relate directly to each other: a wall of distance is broken.

Another dialogue of ‘absence’ and ‘presence’ occurs in the relationship between the physical space of the live performance and the invisible space which is evoked electroacoustically via the soundtrack. The ‘here and now’ of the performance space is established by the presence of the live performer and the actions he performs, while the soundtrack suggests a multitude of environments which are never quite ‘realistic’ – the outdoors, the mediatic space of communication technologies, and the ever-changing space of the female protagonist, indicated via filtering, mobile phone acoustic characteristics, reverberation.

Finally, on a more semantic level, there is tension between the known and unknown, the told and untold. This occurs throughout this project and is one of its main narrative themes. Though provided with certain clues, the listener/visitor is also faced with a clear *lack* – the ‘absence’ of what the actual story line is, and what really happened. This piece is about the limits of reconstruction and the impossibility of discovery of a ‘truth’; it is also about broken communication – between the two protagonists as well as between author and reader.

CONCLUDING NOTES

Though I have discussed some of the central elements common to all live electroacoustic performance, this is not an attempt at providing a general methodology. Rather, it is an exploration of certain angles that are of particular interest to me and have influenced my musical practice. Most of my recent work is theatrical and sometimes based on a narrative. It is therefore only natural that the focus in this work is on the live *event*, and the relationships within performance itself – including not only sound composition, but the totality of performance: the use of space, the performing body, the relationship between the performance and the audience, and the possible meanings of electroacoustic sound in a live context. The central theme of this thesis – duality – is the foundation helping me explore the relationship between the 'here and now' of the stage, and its connection to other bodies and spaces. This duality of the 'real' and the 'simulated' introduces ambiguity into live performance. Through the interplay of physical elements and their simulation, perceptions of the live are changed, manipulated, extended and 'elasticised'.

This thesis was informed by my own work in practice, and focused on approaches inspiring me in the creative process. However, the scope of this present work stretches beyond my own compositions and performances. I have tried throughout to incorporate a broader approach to live electroacoustic performance, with a certain agenda that I am trying to bring forward in which performance, and in this case *electroacoustic* performance, can be created, composed on all levels – including the moment of performance itself. I am calling for a dramaturgy of live electroacoustic performance, in which the creator/composer, composes a *situation*. This does not necessarily need to be spectacular or to require grand theatrical gestures. Still, elements such as movement, use of space, the presence of the performer, and his/her relation to other elements of performance are of the essence. In a sense, any performance is 'total' theatre, and through the relationship and dualities I have discussed, I have endeavoured to point out

some ways in which this can occur within live electroacoustic performance practice.

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COMPOSITION PORTFOLIO

GUY HARRIES

**PhD Thesis, Electroacoustic Music
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PART 1

Piece Abstracts

INTRODUCTION TO THE PORTFOLIO PIECES

The pieces included in this portfolio mark a process of exploration of themes that are at the centre of my thesis: (dis)embodiment, presence, dramaturgy, audience interaction and performance space. These pieces have been used as case studies and examples in my thesis, with the final piece, *Shadowgraphs*, used as the focus of the concluding chapter. Before discussing each piece individually, I will trace some trajectories in my work that demonstrate my research in practice.

DRAMATURGY

All of the pieces have a dramaturgy that is crucial to their performance. In the pieces *Imaginary Friends*, *Safari TV* and *Shadowgraphs*, which have a strong narrative component, the staging is an important element, and there is emphasis on the total performance experience, including video, lighting, acting, movement and sound. In *Nassama* there is a reference to an absent voice in a devotional context, as well as in the relationship between the live performer and the electroacoustic sound. In the pieces *Flutter* and the structured improvisations with the N-Ensemble, the ambiguities between the electroacoustic sound and the live performer are a main part of the dramaturgical concept. All the pieces are theatrical and can be seen as short 'plays' with different contexts: a computer game, a search in the woods, online communication or religious recitation. The pieces evoke a sense of characters in dialogue – with each other or with absent worlds, persons and sound-sources.

AUDIENCE

Throughout my research I have explored different modes of interaction between the performance and the audience. The potential audience experience in the performance context influenced the composition and rehearsal process. I attempt to introduce 'points of access' for an audience, by creating evident connections between the electroacoustic sound and live

action, referring to a narrative framework (*Imaginary Friends*, *Safari TV*) or by providing platforms for audience interaction (such as the *Shadowgraphs* blog and installation).

PERFORMER INVOLVEMENT

All of the pieces in this portfolio rely on performer involvement during the creation process. In the piece *Flutter*, though there are clear indications of playing techniques in the score, the performer is required to rehearse with the soundtrack, and create his/her own interpretation. *Nassama* and *Safari TV* were created in close collaboration with the performers, who brought into the composition process their ideas and playing techniques, unique to them and their instruments. *Imaginary Friends*, though relying on some fixed composed parts, also comprises extensive group improvisation. The pieces with the N-Ensemble were also created through improvisation, and involved preparation of materials for the live electroacoustic part through the recording of sound material played by the musicians.

PRACTICAL NOTES

In the first part of this volume I have included an abstract for each of one of the pieces, including the general concept and a discussion of materials and work methods in the composition, rehearsal and performance stages. In the second part of this volume I have included scores and texts. In some cases I omit materials used in rehearsals as I feel they do not add to the understanding of the piece.

Flutter (2004)

For flute, fixed soundtrack and live processing

Performed by Guy Harries

Premiered at Theater Paradiso, Amsterdam, June 2004

Duration: 8'22

CD2 Track 1

This piece is an exploration of the transitional areas between sound categories: noise and pitch, recorded and live, original and processed sound.

The fixed soundtrack was created first. It is based on recorded breath and vocalised sounds played on flute and recorder. The processing that I used (MSP spectral gating) enabled me to create transitions between pitch and noise. The structure of the live part was based on the timeline of the soundtrack.

The live flute part was constructed through repeated improvisation with the soundtrack, using the same playing and processing techniques. The improvisation takes were recorded, and a choice of possibilities for the live material was made, which led to the creation of script-like instructions indicating pitches, playing techniques and textures to be performed at specified moments throughout the piece. Though the instructions in the score were initially used to help me memorise the parts for my own performances of the piece, they could potentially be used by other flautists developing their own live part. As the instructions leave quite a large degree of freedom to the performer on the micro scale, each flautist could develop a very different interpretation of the piece. Indeed, any performance by the same flautist could sound very different as well.

The live processing methods (consisting of a chain of spectral manipulation, ring modulation, variable delay and feedback – all of which can be controlled by the live performer) are similar to those used in the creation of the

soundtrack, and serve to connect the tape and the flute sound. As a result, an ambiguity of sound worlds is created.

This piece, which is the first composed during my PhD research, is one of the least theatrical in the portfolio, and falls more easily within the type of 'mixed' pieces. However, thought was given to the dramaturgical aspect, with an emphasis on the ambiguity between the live playing and the gestures on the soundtrack that extend it.

The diffusion of this piece in the performance space creates an extended presence of the live/prepared sound world of the piece. Due to the evident connection between the sounds and the introduction of various degrees of processing, a connection between the 'original' sounds emanating from the stage (acoustically as well as located near the stage loudspeakers), the transformation thereof (live processing coming from speakers slightly further away from the stage) and the ultimate similar yet independent, fully processed soundtrack sounds (diffused throughout the whole performance space) extend the performance from the 'local' to the 'field' notion.¹ Gesture turns into texture and becomes an immersive environment for the piece.

The title of the piece, 'Flutter', refers both to the use of flutter-tongue technique throughout the piece, as well as the possible reference to similarity of certain sounds in the piece to bird-song and the fluttering of wings.

¹ Emerson (1996 and 2007, pp. 92-93) introduces these terms to indicate two different spatial functions: 'local' which extends the relationship of the performer to a sound and 'field' which creates a context or environment in which the 'local' occurs. I discuss this in Chapter 2 of the thesis.

Collaborations with the N Ensemble (2004/06)

1. Text Piece

Performed by Morten J Olsen (percussion), Koen Nutters (double bass), Carlos Galvez (bass clarinet), Gudrun Hardadottir (viola), Magda Mayas (piano), Susi Froehlich (recorder), Guy Harries (electronics)

At De Unie Rotterdam January 2004

Duration: 4'14

CD2 Track 2

2. 2x2

Performed by Koen Nutters (double bass), Jelte van Andel (double bass), Bjornar Habbestad (electronics), Guy Harries (electronics)

At Q-02 Gallery, Brussels January 2006

Duration: 16'04

CD2 Track 3

These two fragments are from recordings of live performances in which I collaborated with the N Ensemble. In creating the electronic parts, two main aims were taken into account:

1. Creating connections between the electronic and the acoustic instruments' sounds via live sampling, processing, or the use of prepared samples based on recordings of the acoustic performers (or their voices).
2. The capability of playing the electronics with precision, control and fast response being the top priorities

The music throughout this series of collaborations is structured using categories of material, interaction and shifts to different composed pitch groups or sections with specified sound and pitch material. In this way, we attempted to create a constructive environment for the occurrence of coherent musical events and for the inclusion of electronic manipulations and voice sounds.

My first collaboration with the N Ensemble was based mainly on pre-recorded material of all the individual ensemble members. The musicians were asked to play short phrases, mainly 'licks' that they use during improvisation. I then selected some of these phrases and created samples which I could play back and manipulate, using a Max/MSP patch. The interface which I used for playing this part was a MIDI controller with a keyboard and sliders. The keyboard was used for triggering the various samples, while the sliders enabled me to change aspects such as playback speed, reverberation and pitch. I found that this set-up worked well, as it enabled me to play a vast range of materials, yet maintain a clear degree of control over gesture through quite simple, straightforward processing.

In the live performance of *Text Piece*, the members of the ensemble were asked to utter text fragments from the phrase 'Flesh that fades at the first silent touch of junk' (an excerpt by W. S. Burroughs) as well as play certain instrumental phrases. I also played pre-recorded fragments from the same text, as read by the ensemble members during the recording sessions. This created a confusion in live performance, between electroacoustically diffused and acoustic sound, manipulated and 'real' voices, and instrumental and vocal utterance.

In the second piece, *2X2*, the ensemble consists of two pairs of instruments: two double basses and two live electronics players. The live instrumental sound of the double basses is transformed either directly via live processing, or via live sampling and looping. Pre-recorded material is also triggered. In this context the electronic part, as well as being 'instrumental' by nature through the triggering of independent gestures, also takes on other functions – transforming and extending the double bass sound, or creating a repetitive loop-structure for the double basses to play on.

The dramaturgy of these performances is based mainly on the extension of the acoustic ensemble via electroacoustic means (based on both pre-

recorded samples and live processing). This not only extends the ensemble's sound, but also de-familiarises it, as gestures that are played by the acoustic instruments are processed, continued and protracted in an unfamiliar way. Further de-familiarisation and surprise occur by occasionally playing recordings of previous performances of the ensemble during a live performance, thereby transforming the performance from a situation in which instrumental causality is clear to one in which there is a 'doubling' of the instruments, and it is hard to tell what is live and what is not.

Nassama (2005)

For baroque bassoon and electronics

Performed by Stefanie Liedtke (baroque bassoon) and Guy Harries (electronics)

Premiered: Stedelijk Museum, Amsterdam, December 2005

Duration: 8'52

CD2 Track 3

Muslim chant provides the inspiration and source material for *Nassama*. Waking up one morning to the sound of the call to prayer from a mosque on the West Bank, and thinking that I was hearing a bassoon on the radio until I realised my mistake, I knew that I would one day write a piece based on the similarity of these two sonic worlds. A close exploration of muezzin chant and a collaboration with bassoon player Stefanie Liedtke brought this piece into existence.

After some initial experimentation with the classical bassoon sound, Stefanie and I decided that it would be a better idea to work with baroque bassoon. The unique voice-like timbre and the possibility of changing intonation and sliding between notes provided a better connection with the original vocal sound.

I selected recordings of a few suras (sections from the Kuran) recited by Shaykh Abd El Basit Abd El Samad as initial inspiration for recordings of the bassoon. After several recording sessions with Stefanie, in which I asked her to play phrases inspired by the timbre and pitch of the recitation, I edited the recordings and selected the most powerful material that also resembled the sound of the reciter's voice. I then processed the bassoon sound in various ways (spectral correlation, filtering, ring modulation, granular synthesis) and edited the various sounds together. The live bassoon part in the score and the soundtrack part were composed in parallel, and created as separate sections. I then connected the various sections together into a coherent whole. Rather than any development or climax, I attempt to create an immersive world rather like the resonant space of a mosque and the phrase-based nature of Muslim

recitation.

The relationship between the timbre of the voice and the bassoon shifts throughout the piece, drawing on the similarities and dissimilarities between the two. The live bassoon part aspires to a lyrical vocal quality, while the fixed soundtrack connects it to its source of inspiration: a highly expressive and devotional human voice.

The score of this piece includes a notation of the phrases to be played on the bassoon, with time cues referring to the timing of the soundtrack part. The piece does not have a fixed time signature, and the barlines are included only for ease of reference to specific parts of the piece while rehearsing. Also, the part should be played *rubato*, and note lengths provide only an approximation of relative length within a phrase. The player needs to develop an interpretation through rehearsal with the soundtrack, timing the phrases to fit within the cues indicated. The timbre of the live bassoon part is also developed during rehearsal, and the intention is that it refers to and merges with the sounds on the soundtrack. The score also includes the waveform of the soundtrack, including a verbal description of the prominent sound elements, to assist the bassoon player in timing her part and phrasing.

Nassama, the title of the piece, indicates 'soul' as well as 'breath'. Both meanings are derived from the same root; both seemed appropriate in the context of this piece.

Imaginary Friends (2007/08)

An impropere

Performed by Guy Harries (voice, live electronics, live drawing, video), Alfredo Genovesi (guitar, electronics), DJ DNA (turntablism), David Marks (violin)

Duration: 55'

DVD Film 1 (excerpts) and Film 2 (entire live performance), filmed by Fabrice Schomberg.

Imaginary Friends is a performance combining songs, improvisation and visual elements into a narrative structure, which is why I call it an 'impropere'. It was originally commissioned as part of the POW Ensemble festival 2007 in a tryout form, and later developed into a theatre production at Zeebelt Theater in the Hague 2008.

This piece was an opportunity for me to explore performative modes that I am particularly interested in: free improvisation, use of multimedia, songwriting, vocal performance and live electronics. It was a chance to combine these categories, which I previously tended to keep separate, and see how they could serve each other: narrative providing a macro-framework for improvisation and song, live drawing extending the act of music-making, etc.

In the synopsis/programme notes for this performance I describe the main theme as follows:

Something weird has happened to communication these days. With e-mail, instant messaging and virtual world environments we are losing our bodies. We live in parallel realities. We choose who we want to be. Our identities change. Our friends are imaginary. And so are we.

I chose to deal with a theme that fascinated me: the connection between real and virtual communication. Can you really know a person through online contact? Is it the same type of connection as it would be in the real world? Or is *this* the real world – an extension of reality through different means of expression? And can the two worlds coincide with each other? Can there be a

deeper connection online than in real life, as people dare to expose more? Do online platforms provide a chance of creating a new identity, a new self?

I chose to work with three other live musicians, who come from different musical backgrounds: Alfredo Genovesi – an electric guitar player who works in the field of free improvisation, theatre and dance; David Marks – a violin player who plays contemporary and classical music but also writes his own folk-style operas, and DJ DNA – who feels equally comfortable in the world of pop (hip hop, rock, dance) and experimental music. This choice would provide a wide palette of sounds and musical styles.

As a starting point, I wrote the libretto, some of which I then composed in song form. For the songs I created melodies, chords, and the electronic accompaniment which I would play live. In other cases, the text was used as material for the group to improvise with. During the process of rehearsal, the group worked together, developing instrumental solos and choosing sounds to play (LPs, guitar sounds, extended techniques). A major part of the music was completely improvised, serving to convey certain moments in the narrative (which would also be manifested in the live drawing or video part). During the rehearsals we decided on the pace, sound world and pitch centres which would work best. In this context I worked as a musical director, guiding the process and making the final choices.

The staging of the piece was based mainly around the idea of a main character (played by myself) in his living room, going online and engaging with different aspects of the internet, exploring various modes of communication with other online users. A sofa was placed in the centre of the stage and the laptop, which I used for playing my live electronics part, was placed on it. Next to the sofa there was a table with a sketchbook and various pens and objects which were projected on a screen via a camera. The screen was placed at the back of the stage. The other three musicians were situated around the 'living room' area, but at a distance separating them from the main

theatrical action, and thus enhancing the feeling of solitude and isolation. This was sometimes further emphasised by the lighting with a separate spot for each of the musicians.

The video part was a combination of live drawing and other actions performed on the table and prepared video material. The prepared material was based mostly on similar actions but slightly manipulated (slowed down, sped up, fast cuts and edits). The intention was to create a seamless connection between live and prepared materials, as well as to cause confusion between them (as to what was really being drawn live at any given moment). I chose a DIY aesthetic of live drawing and 'simple' means rather than the more obvious choice of computer manipulated graphics in order to create the impression of a more personalised, subjective view of the story. It reflects the impression of the protagonist here and now, fully embodied, using physical materials rather than digitised ones.

Safari TV (2009)

For electric guitar, soundtrack and live electronics

Performed by Wiek Hijmans (electric guitar), Luc Houtkamp (electronics) and Guy Harries (electronics)

Duration: 11'03

CD2 Track 5

As part of the POW Ensemble project *Strange Attractors*, I was asked to write a piece for electric guitar and two laptops. I decided to create a theatrical piece, using the idea of a computer game as a framework for the structure and performance actions. The machine/human duality of the setting, of laptop performance usually associated with the 'machine' rather than the human body, and the presence of an electric guitar player very often associated with the physicality of the rock guitarist, proved to fit perfectly within this context.

During the performance, the guitar player is addressed by a recorded voice, representing the 'game', explaining (to the guitar player, but indirectly also to the audience) the various tasks that must be accomplished. The voice encourages, teases and admonishes. The 'interface' used by the protagonist to accomplish these tasks is, naturally, the guitar. The live electronic parts are played by the laptop performers, who are the voice's 'assistants', via game controllers. As well as the 'game' scenario, other parts of the piece gradually expose the darker reality of the game: manipulation in the system, the admission that this is all a 'simulation' and finally – an offer to the guitar player to join 'the team'.

The electroacoustic sounds used in the soundtrack and in the live electronics were created in close collaboration with the guitar player Wiek Hijmans. Initially, once I had decided the computer game would have a 'safari' theme, I tried to create simulations of animal sounds using FM synthesis. I then played back these sounds to the guitar player on headphones and asked him to simulate them as closely as possible – in some cases an almost impossible task. Using various extended techniques (Ebow-ing, extreme scordatura,

bottle neck playing, tapping), as well as various guitar pedals and effects, Wiek created close approximations of the sounds. I then used the recordings of the electronic and guitar sounds in various combinations and interpolations in the soundtrack and the live part.

The soundtrack includes recordings of vocalist Han Buhrs. As well as the intricate work done during the recording sessions (inflection, proximity to the microphone, varying vocal timbre) the voice recordings were manipulated further in the studio. Virtual spatialisation was created using reverb, EQ and panning. This was employed expressively to indicate certain moods, distance, a threatening stance, candidness, as well as the ephemeral quality of disembodiment. Other techniques such as harmonisation added an element of kitsch to some parts, and ring modulation evoked the banal impression of a robotic, machine-like presence.

Finally, other sounds reminiscent of old-fashioned computer games were added to provide cues for the start and end of the game.

The live electronic parts were played by the two laptop players wielding wireless game controllers controlling sound parameters in Max/MSP patches. The source material in these patches was based on similar sounds based on the 'animal' sound recordings of the guitar combined with synthesised sounds. In this case, more 'utterance' based sounds were chosen. Parameters manipulated by the live players were panning, pitch shift and playback speed.

The live guitar part was constructed from semi-improvised sections, for which I provide instructions and notated materials in the score. The playing techniques were based on those used by the guitar player during the recording sessions. As well as playing techniques, the score also specifies principles of interaction between the guitar and laptop players. Other live guitar parts are fully composed and notated in the score, and are designed to be tightly synchronised with the recorded voice.

This piece deals with simulations on various levels: the simulation of landscapes and animals, the illusory presence of the controlling vocal entity, as well as the simulation of a game situation. It is also about the element of manipulation hiding behind the game, gradually exposed as a system mobilising the player to join its ranks. This double-ness of the game is most obviously manifest in the double 'Game over' ending – occurring first when the game is finished, and then a second time when the player is exposed to the real world *behind* the game and asked to join the team, which is when the game is truly over.

Shadowgraphs² (2009)

Created and performed by Guy Harries

Recorded voices: Anna Levenstein, Airlie Scott

Shadowgraphs was a project consisting of several manifestations – a participatory installation, a blog and a live performance – exploring themes of audience participation and interpretation. An overarching theme was the generalised notion of a search (for a lost person, for meaning and narrative) as represented in the metaphor of the woods, and evident in images, texts and soundscapes.

INSTALLATION

Summer 2009 at The Stephen Lawrence Gallery, Greenwich

DVD Film 3

The first manifestation of the project was a participatory installation which was part of the exhibition *The Eagle Document: The New Collection of Enumerate Things* curated by Monika Oeschler. The exhibition addresses the relationship between the artist and the spectator³:

[It] considers the spectator as a social agent, embedded in the wider cultural network, and as an active participant in the creation of new ideas, thoughts and associations. Thus, 'The New Collection' exhibition creates a performative and dialogic situation between the viewer and art works, which does away with passive spectatorship.

In my installation I emphasise the role of the 'spectator' as an active participant in a process of collective authorship. The gallery visitor is invited to enter a small cell at the side of the gallery with a CD player on a small table and somewhat sombre looking snapshots on the walls. The visitor is

² For a discussion of this piece in relation to the main themes in the thesis, please refer to Chapter 6 – Conclusion.

³ See <http://www.stephenlawrencegallery.net/OS-Eagle-PR.html>

instructed to sit down, listen to the soundtrack, and draw in a black sketchbook, using white crayons, pens and pencils. The soundtrack for the installation is a combination of processed soprano vocalisations, soundscapes recorded in the woods in Sussex, and segments from the electroacoustic part of my piece *Flutter*.

The installation was successful in that it resulted in a considerable number of drawings, which in turn served as part of the work to subsequent visitors. Some visitors copied images from the snapshots on the wall, others referred to the 'woods' theme, while others let their imagination run free drawing ghost-like figures, abstract formations or 'aliens' and spaceships.

BLOG

shadowgraphic.wordpress.com

October - December 2009

During the period preceding the live performance part of the project, I decided to extend the involvement of the audience by creating a participatory weblog. The aim of this blog was to provide information about the influences and sources of the live piece's composition (such as Schoenberg's *Erwartung*, Kierkegaard's *Shadowgraphs* from *Either/Or*). This was also a further experiment in collective authorship. The site's visitors were asked to participate via comments, responding to certain challenges such as 'solving' the *Erwartung* 'murder mystery', imagining the sounds used in the installation by relating to the drawings from the installation (which were presented as a slideshow video) or responding to the installation soundtrack in words rather than drawing.

The blog resulted in very interesting responses and inspired me during the composition of the live piece. However, it was not quite as successful as the installation. It demanded quite a lot of pestering and promotion on my part,

and did not result in quite as much participation. A possible reason is the text/online environment which made the tasks look too much like 'work'. Also, the fact that there was no dedicated time and space (such as a gallery) could also mean that there was no initial commitment to the participatory situation.

LIVE PERFORMANCE

17/11/2009 at City University, London

Duration: 15'54

CD2 Track 6 (studio version)

The live piece *Shadowgraphs* extends the idea of a non-passive spectator into the concert hall. Here, too, the audience members have the opportunity to go through participatory initiation phases (through the blog, or the installation, which was presented again at the entrance to the concert space).

On stage – there is a desk with a book, a computer keyboard, and a lamp. This is where the live performer is seated – and the desk might imply that there is a process of authorship at hand.

The performance itself consists of four 'scenes'.

1. On the prepared soundtrack we hear a female voice speaking voicemail messages accompanied by electronic sound. The live performer responds through non-verbal sounds: (strained) breathing, non-textual vocalisation, whispering – all of which are processed electronically.
2. The live performer types on a keyboard, thus triggering recordings of the woman reading a testimony of a possibly traumatic experience in the woods. Occasionally the performer repeats fragments of the text he

hears. In the background we hear processed typing sounds and the similar sounds of rain falling on a tin roof.

3. Highly filtered sentences read by the woman's voice (possibly diary fragments) are heard on the soundtrack. The same sentences are written in a book on the table on stage. The live performer silently reads the sentences, and leafs through the book, tears and crumples the pages to produce sounds that are then processed electronically.
4. A series of texts (a mixture of sources by Harold Pinter, Schoenberg and the composer) are read both by the live performer and the woman's voice on tape – responding, complementing, coinciding. This is a fast changing scene. It is a key moment in the piece, at which the voices relate directly to each other, and finally speak in unison during the last sentence 'I was looking, you are here.'

In the live performance the theme of the search is explored further. The live performer attempts to recover the texts and narratives of the recorded voice and relate to them. The audience is presented with a fragmented narrative, and can choose to reconstruct a story of what this piece might be about.

PART 2

Scores, Texts and Other Documentation

FLUTTER

for flute and electronics

Guy Harries
2004

FLUTTER

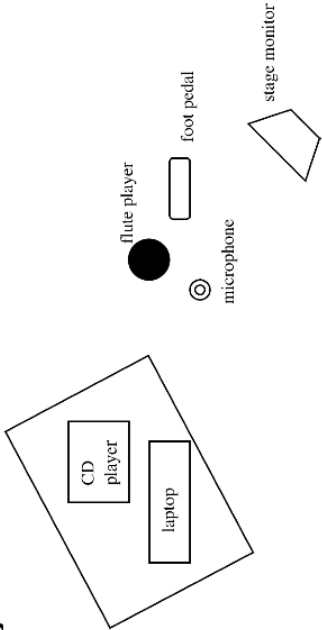
for flute and electronics

General Instructions

This score is a starting point, suggesting material and playing techniques for the performer to create the improvised live flute part. Even though precise time cues are listed, they are only a rough indication. The recommended method of work is to memorise the techniques suggested, and practise with the soundtrack to have a more intuitive feel of the time structure.

The live flute sound is processed via Max/MSP, using a patch with prepared presets. The cues for changing presets are indicated in the score. For further information, please contact the composer.

Stage Plan

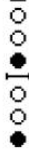


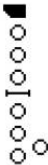
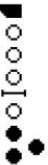
Channel Listing

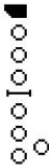
channel	input	comment
1+2	CD soundtrack	
3	flute	condenser microphone, send to laptop sound card
4+5	laptop processing	processing send from channel 3

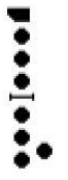
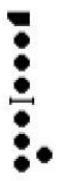
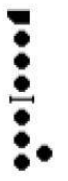
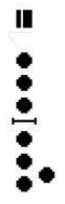
FLUTTER

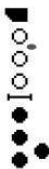
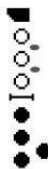
SOUNDTRACK TIME	00:03	00:24-00:30	00:32	00:34
ELECTRONIC PRESET	P1			
FLUTE ACTIONS	 interchanging harmonics: Ab3 and occasionally Ab2, Eb3 shift between pitch and breath-based	change to 'sss' and 'shhh' change mouth 'filtering' by changing lip 'vowel' position. as audible as possible	breathe in audibly	 interchanging harmonics on G2, D3, G3 Trill on lever between F & E keys.
FLUTE DYNAMICS	<i>pp-p</i>	<i>cresc. ending with sf burst</i>		<i>p</i>

00:48	00:50-00:56	01:00	01:11-01:27	01:30-01:42
		P2		P3
 sounding: same + G1 continue trill	 sounding: C#2 gradually transform into 'p'hhh' sound	 interchanging harmonics Bb2, F3 transform to 'sss' sound	Continue same with occasional pitched overtone sounds and mixture of 'sss' + 'p'hh' + pitched sounds	Interchange of the following textures: • Double tonguing (t-k) sound played into flute. • Almost closed mouthpiece. Low flutter tongue (emphasis resonances at back of mouth) • Long breath sounds
<i>dim.</i>	<i>mf</i> -> <i>dim</i> -> 'p'hhhh' breathy sound	<i>mp</i>	<i>p-mp</i>	Fingering – ad lib <i>f</i>

01:44-01:57	02:01-02:06	02:08	02:13	02:30-02:34
	P4			
 'shhh' + <i>cresc.</i> TO: fast 't-k-t-k' (double tonguing) + fingering ad lib + <i>ff</i> TO:  'shhh' <i>cresc -> ff -> mp -> cresc</i>	 trill on grey key – varying speeds sounding: E3 – A3 shifts between breathy/‘noise’ and pitched sounds	 breathy double tonguing ('tk tk')	 trill on grey key – fast sounding: E3 – A3 intermittent bursts only switch between regular and <i>flz.</i> playing	Transform 'shhh' to 'sss' and end on burst
	<i>mp</i>	<i>mp</i>	<i>p – cresc.</i>	<i>cresc</i> and end on burst

02:39	02:45	02:47-02:53	02:54-03:02	03:08
P5				
 sounding: C#3 very breathy molto vibrato	 sounding: A#2 very breathy molto vibrato	alternate 'sss' <-> 'shhh' undulating	Fast interchange Ab3 E3 Eb3 (fingering: C# 3 2- A1 – Ab1) with intermittent long Eb3 (sounding)	 sounding: A#2 -> G2 ->  B2 ->  G#2 -> 'shhh' texture
<i>p</i>	<i>mf</i>			

03:19-03:30	03:33-03:36	03:37-03:39	03:41	04:02
	P6			P7
 sounding: A# -> G# -> play flz.	 flz – very pronounced, mouth almost completely closing on mouthpiece change dynamics and speed of flutter ad lib	'shhh' sound – mouth not closing mouthpiece	 flz – very pronounced, mouth almost completely closing on mouthpiece change dynamics and speed of flutter ad lib interspersed with occasional loud inhaling sound	 sounding: Eb1 short swells in dynamics <> <> <> inflect pitch ad lib
				<i>p-mf</i>
<i>dim.</i>				
04:11	04:14-04:21	04:25-04:33	04:34-04:37	04:42
 sounding: Ab1	Same fingering. Sounding: interchanging overtones Ab2 Eb3 Add trill using lever between E and D keys Add flz <i>mf</i>	Same fingering. Sounding – play the following harmonics consecutively: Ab1 -> Ab2 -> Eb3 -> Ab3 -> Eb3 <i>flz</i>	Inhale, exhale, play 'shhh' and 'sss' sounds.	Same process as 04:25-04:37
			<i>mp</i>	
04:55	04:59	05:12	05:19	05:38
	P8		P9	P10
Loud bursts of the textures 'phhh' -> 'shhh' -> 'sss'	 sounding: interchange on harmonics on Eb3 and Ab3 fast trill on lever between E and D key	 pitched sound, slightly rough	 +lever between E & D keys play on various registers/harmonics flz. Vary degrees of closure on mouthpiece	 descending notes on consecutive grey keys. Fast repetition. Various speeds. Vocalisation.
<i>f</i>	<i>mp</i> and end on dim.		<i>f</i>	<i>mf</i>

05:55	06:05	06:12	06:15	06:19
 + trill lever between E and D keys <i>flz.</i> Vocalisation into flute	 descending scale using consecutive fingering on grey keys vocalisation into flute	 trill on lever between E and D keys vocalisation + <i>flz.</i> -> transform to 'shhh'	 trill on levers between F & E and E & D keys simultaneously rhythmic vocalisation with tape pattern: 3 3 2 4	Sharp 'shhh' and 'sss' sounds
06:22-06:28	06:32 P11	06:52-07:17 P12	07:20 P13	07:34
 trill on levers between F & E and E & D keys simultaneously rhythmic 'shhh' sound with tape pattern: 3 3 2 4	 play harmonics on Eb2 Eb3 Bb2 vocalise (scream-like) on Eb2 <i>flz.</i> Long intermittent notes <i>ff</i>	 fast random changes in fingering of grey keys play in 2nd and 3rd register <i>flz</i>	 play harmonics on Eb1 Eb2 Bb2 Eb3 creating a melody line	Breathing sounds alternating with 'shhh' and 'sss' textures.
07:48 P14	07:58	08:10-08:25		
 sounding: C#3 occasional note	 fingering: fast descending 'filtering' pitch using consecutive grey keys. Repeated. 'shhh' sound + 't-k-t-k'	 'shhh'-'sss' texture		
<i>mp</i>	as loud as possible	<i>mp – cresc. to burst – dim.</i>		

Nassama

for baroque bassoon and electroacoustic sound

Guy Harries

2005

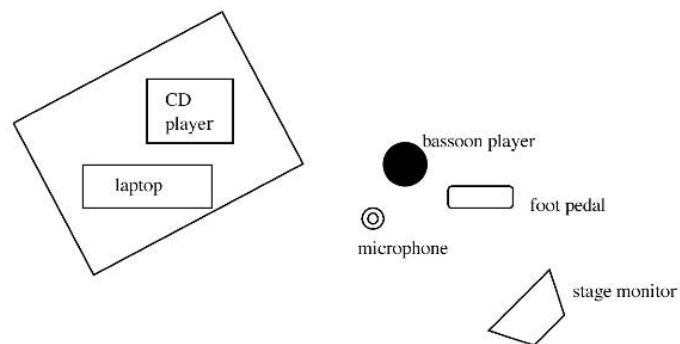
Nassama

for baroque bassoon and electroacoustic sound

General instructions

- This piece is for baroque bassoon and the notation follows this tuning (415Hz).
- The cues indicated follow the timing of the soundtrack on CD.
- The bassoon playing should be quite free and recitativ in style, yet remain roughly within the time frames indicated by the cues in the score.
- Optional live processing of the bassoon sound, with the purpose of creating a timbral continuum with the soundtrack, is possible. Entry cues for preset changes are indicated in the score. The Max/MSP software and further instructions are available from the composer on request.
- The electronic part in the score consists of two elements:
 1. a graphical representation and verbal description of the soundtrack to facilitate the bassoon player's following of the time cues.
 2. an indication of preset changes for the optional live-processing.
- Sound levels of the bassoon and the soundtrack should give the impression of continuity between the two parts. If live processing is used, it should be mixed to enhance this impression.
- The intonation of the bassoon changes slightly per phrase. It should follow the tuning of the main pitches of the soundtrack.
- The piece deals with the similarity and dissimilarity between vocal and instrumental sound. The bassoon should play in an evocative, chant-like manner.

Stage Plan



Channel Listing

channel	input	comment
1+2	CD soundtrack	
3	bassoon	condenser microphone, send to laptop sound card
4+5	laptop processing	processing send from channel 3

This piece was created with Stefanie Liedtke, and was premiered by her at Stedelijk Museum in December 2005

NASSAMA

FREE, RECITATIF TIMING BUT COINCIDING WITH TIME CUE POINTS

PRESET 1

drone on Eb (slightly sharp).

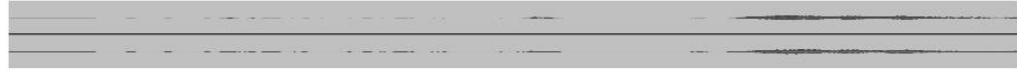
fluctuating noise ("sss" sound) texture

granular texture enters

gradual rise in pitched sound (D -> Eb -> E)

Elec. sound

C



Bassoon

hum only (through nose bassoon in mouth)

0'29 bassoon only (vary intonation subtly)

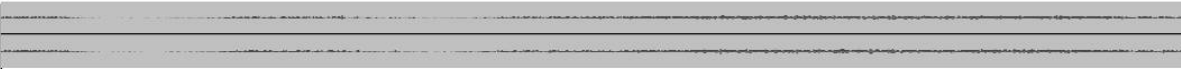


p

mp

7

Elec.



7

Bsn

molto vib.



mp

13

gradual rise in pitched sound from D to E

Elec.



13

Bsn

flz

1'00

vocalised (unison bassoon+voice)



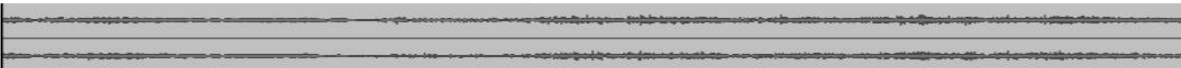
mf

mf

PRESET 2

granulated and vocal textures

Elec.



19

Bsn

audible long breath

1'30

vocalised (unison bassoon+voice)



mp

25 *filtered vocal sound on E (slightly flat)*

Elec.

Bsn

25

mf

mf

2'00

31 *crescendo in main texture (until 2'54)*

Elec.

Bsn

31

mp

2'15

37 *short 'whispery' sound*

Elec.

Bsn

37

mf

f

molto vib.

2'30

43 **PRESET 3**
undulating vocal sounds (pitch Bb)

Elec.

Bsn

43

f

mp

3'05

vocal sounds fade. lower frequencies appear.
main pitched sound - on F# (occasionally E)

49

Elec.

Bsn

49

3'25

p

3

p

55

Elec.

Bsn

55

3

61

PRESET 4

Elec.

Bsn

61

4'00

mp

66

variations in pitch - melodic line

Elec.

Bsn

66

4'30

mf

mf

*melodic lines (on Gb, Ab, E).
undulating vocal sound.
drone sound with bassoon timbre*

71

Elec.

Bsn

3

PRESET 5

*high filtered noise texture.
lower frequencies recede.
varying bassoon sounds (pitches Gb, Ab, E)*

76

Elec.

Bsn

5'00

vocalise (bassoon+voice)

81

Elec.

Bsn

5'30

f

87

Elec.

Bsn

3

3

low frequency drone reappears (Gb and occasionally E)

91

PRESET 6

Elec.

Bsn

*glass sound appears.*96 *various pitched sounds, no main pitch.*

Elec.

Bsn

99

Elec.

Bsn

PRESET 7

103

gradual crescendo in main texture

Elec.

Bsn

107

Elec.

Bsn

107

3

mf

112

Elec.

Bsn

112

7'20

short 'whispery' sound

118

Elec.

Bsn

118

7'55

f

increase in lower frequency sound.
main pitch - Gb

124

Elec.

Bsn

124

8'18

gradual fade.
thinner texture. mostly glass sound.

dim. poco a poco

130

Elec.

Bsn

The musical score for measure 130 features a Bsn (Bassoon) part and an Elec. (Electric) part. The Bsn part is written in bass clef and begins with a measure rest. In the second measure, it plays a half note G2 (one ledger line below), followed by a half note F2 (two ledger lines below), and then a half note E2 (three ledger lines below). These three notes are beamed together and marked with a piano (*p*) dynamic. The Elec. part is represented by a grey rectangular block, indicating a sustained or continuous sound.

SAFARI TV

For electric guitar and two laptops

Guy Harries
2009

*A safari for the ear. Animals turned electronic or electronics turned animal by way of guitar, wires, amps. Is this a computer game, or something a bit more sinister?
Sit back, you are protected, inside the jeep with the windows closed.
No need to engage. We won't bite. Or will we?*



(photos: Adri v.d Berg)

Safari TV was premiered by the POW Ensemble (Wiek Hijmans – electric guitar, Luc Houtkamp and Guy Harries – laptops) at De Link / Cenakel, Tilburg on 6 October 2009

Many thanks to Wiek Hijmans for helping research the guitar sounds, Luc Houtkamp for assistance in developing the interactive environment and Han Buhrs whose voice features on the soundtrack.

This piece was composed with the generous support of Nederlands Fonds voor Podiumkunsten (NFPK)

Technical Requirements

For each laptop player:

- 2 loudspeakers (all identical, each pair located near the player)
- 1 mixer (with EQ controls)
- 1 laptop with Max/MSP and the patches for the piece
- Interfaces for controlling the sound (ideally – a gaming interface for triggering sounds and manipulating them via movement + midi interface with 4 sliders)

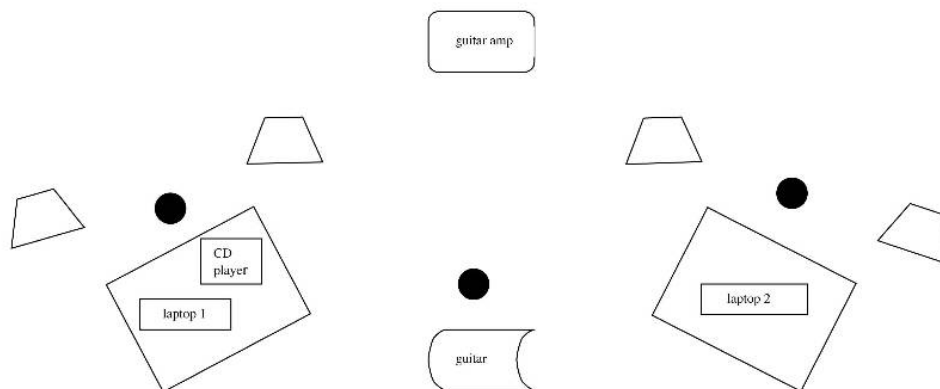
+

1 CD player with a connection to both loudspeaker pairs (with a division left/right according to the players' location on stage)¹

For the guitar player:

- electric guitar
- guitar amp (sufficiently loud to be balanced with the laptop sounds, or else amplified further via a microphone and diffused on the loudspeakers)
- volume pedal
- effects unit, controlled by foot pedal

Stage Plan



¹ Alternatively, the soundtrack could be played via Max/MSP, with a way of synchronising the two laptops. This enables the separation of the recorded voice part from the 'background' parts.

General Instructions

Structure of the score

For the sake of clarity, this score is constructed more like a theatre script than a music score. There is an indication of time cues based on the timeline of the prepared soundtrack. The score is split into sections (split with horizontal lines). For each section, the guitar part, recorded voice part, and, where relevant, the electronic part and guitar/electronics interaction principle are specified separately.

The main guiding elements on which time cues are based are the *recorded voice*, and the *'video game' ending sounds* at the end of the 'game' sections C, D, E and G.

Staging

Theatricality is an important part of the piece. The way it is staged is left to the performers' discretion, but it is necessary to emphasise the following:

1. That this is a computer game with one player (the guitarist), two 'representatives' of the game system (the laptop players) and a disembodied (recorded) voice which is manipulating the situation. The guitar player should visibly relate to the voice, and act as though he is facing gaming challenges (but not overact!).
2. It is recommended that the laptop players use an interface that is an adapted gaming device (Wii, joystick, etc) to control the sound parameters.
3. In sections B, F and I the situation is slightly different and 'cracks' in the game are revealed. This could be staged by the guitar player sitting down, or assuming a different, less prominent, position than the 'game' one.

Live Electronic part

For the live electronics players there are two roles:

1. Representing the 'game system' by challenging the guitar player. For each of the 'game' scenes (C, D, E and G) a different Max/MSP patch is used with which the players can trigger a sound (by pushing a button/key) and manipulate it (by moving a sensor or a slider/knob). See the patches for more details. The way the electronic part is played and the way it relates to the guitar playing is specified in the parts

titled 'interaction principle'.

2. Manipulating the background sound (in sections B and I) - this can be done by using the EQ controls of the individual mixing desks and by changing the volume. This should be done in response to the recorded voice and the guitar playing, while retaining a good balance in which no element (voice, guitar, background sound) is obscured.

For software and further information please contact the composer (guyharries@gmail.com)

Guitar part

There are two types of guitar parts in this piece:

1. Sections B, F, I - the guitar player should follow the notated part, playing in free timing (rather than at a fixed tempo) and following the recorded spoken text as indicated in the score. Sections A and H are also fully notated, but in this case the guitar part relates to the beeping sounds on the tape.
2. In sections C, D, E and G the guitar player is given instructions for improvisation in which there is more choice regarding the material used and timing. These are 'game' sections and the guitar player must relate the playing to the live electronics part.

For each section, the desired guitar effects are specified.

Abbreviations

BPU - body pick up
MPU - middle pick up
NPU - neck pick up

BN - bottleneck
RH - right hand
LH - left hand

SAFARI TV

A

00:00

GUITAR (medium reverb, BPU):
play along with beeping sounds on CD

moderato, freely

The musical notation for guitar part A consists of three staves. The first staff contains measures 1, 2, and 3. Measure 1 is in 4/4 time with a treble clef, key signature of one sharp (F#), and a common time signature (C). It contains a half note F#4, a quarter note G#4, and a dotted half note A4. Measure 2 is identical to measure 1. Measure 3 is in 2/4 time with a treble clef, key signature of one sharp (F#), and a common time signature (C). It contains a half note F#4, a quarter note G#4, a quarter note A4, and a quarter rest. The second staff contains measures 4, 5, and 6. Measure 4 is in 4/4 time with a treble clef, key signature of one sharp (F#), and a common time signature (C). It contains a half note F#4, a quarter note G#4, a quarter note A4, and a quarter rest. Measure 5 is identical to measure 4. Measure 6 is in 2/4 time with a treble clef, key signature of one sharp (F#), and a common time signature (C). It contains a half note F#4, a quarter note G#4, a quarter note A4, and a quarter rest. The third staff contains measure 7, which is in 2/4 time with a treble clef, key signature of one sharp (F#), and a common time signature (C). It contains a half note F#4, a quarter note G#4, a quarter note A4, and a quarter rest. The dynamics are marked as *pp* for measures 1-2, *p* for measure 3, *mp* for measures 4-6, and *mf* for measure 7. The tempo/mood is marked as 'moderato, freely'. A repeat sign is placed at the end of measure 7.

repeat this bar ad lib until CD voice enters - then stop abruptly

00:15

VOICE:

'Hello there guitar adventurer, guitar hero Wiek Hijmans!
I welcome you to Safari TV.
You will be travelling OUT THERE. To the outback. Into the wilderness.
It's a fascinating world. It's a DANGEROUS world. So be prepared.
Meet my two ever loyal assistants, computer wizzos Luc Houtkamp and Guy Harries.
They will be guiding you through the sights and sounds of Safari TV.
This isn't a holiday. You have some tasks and challenges ahead of you. Get your
guitar ready. It is your survival toolkit.'

B

01:07

GUITAR (same effects):

play the following rubato relating to the voice cues indicated

<like morse>

mp

<gentle, lyrical>

5 'We head into the wilderness' 'It's so still.' 'So empty.' 'It hasn't started yet.'

p *mp*

10 'All we hear is the faint sound of crickets, or mosquitoes, or something insect-like.'

mf *mp*

13

C01:42 *Guitar stops when voice enters***VOICE:**

'AHA! There they are, the monkeys (apes, chimpanzees, some sort of monkey, never mind which).

LEVEL ONE

And here is your first challenge! The first level. Let's see what you're made of.

The monkeys are suspicious. They don't think you belong in their group. They are dancing their monkey dance. Can you show them that you belong? Can you do the monkey dance?'

02:10 [immediately after voice]

Interaction principle

The guitar player attempts to play a series of rhythmic patterns to match the pulse on the soundtrack, while the computer players provide an utterance-like 'commentary'.

COMPUTER:

Controlled sound parameters: sample triggering, sample playback speed, transposition, volume

Automated sound parameters: panning

Expression should be controlled by fast changes of the sound parameters. The sound should appear sporadically, and change in intensity.

GUITAR (other medium reverb, MPU):

Play the following rhythmic patterns.

Use BN on LH string 2+6. RH taps string 6.

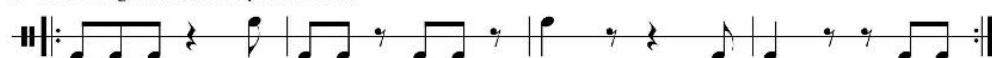
Play a relative 'high' or 'low' register sound as indicated, pitch can be chosen ad lib and changed or repeated freely per note. Vary dynamics in response to the live electronics.

Repeat each phrase until you hear the next vocal 'encouragement'

<lively, bouncy,
roughly in sync with the rhythm on the CD>



5 That's no good! Put some pizzaz into it!



C'mon now, dance. More energy. More rhythm. More drive. More silliness. You can do it!



Pizzaz into it!



17 Put some pizzaz into it!



21 Pizzaaaaa into it!



25 That's no good!



03:23 All stop immediately after 'computer game' sound ends

VOICE:

‘The monkeys are not impressed. Off you go! We will give you another chance. The next challenge is coming up.’

D

03:34

VOICE:

‘LEVEL TWO

The birds... Such lovely songs. Such different songs. So exotic! So different! They're all around you. They don't care who you are or what you can do. But I do. I want you to imitate that bird song. I want it to be precise. Can you imitate them? Are you that good?'

04:04

Interaction principle

The guitar player tries to imitate sounds played by the computer players (one at a time) as precisely as possible, by referring to the list of motifs provided.

Controlled sound parameters: panning, continuous transposition (resulting in a glissando), volume

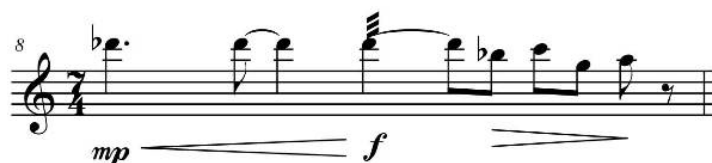
Automated sound parameters: transposition per triggering

COMPUTER:

Play a melody-like sound (by repeatedly triggering a sound - which transposes automatically every time and/or changing the other parameters quickly). Try to refer to reproduce a contour that appears in the list below. The computer players should play one at a time, and only proceed once the guitar player has finished playing the motif.

GUJAR (short reverb, doubling at octave+2 octaves above):

Choose from the following phrases in any order ad lib, and intersperse with improvised phrases imitating the live computer part. Play in a very fast tempo. Leave short pauses between the phrases. Insert more improvisation as you proceed.



9 
mf

10 
mp

11 
mp

12 
mf *mf* *p*

06:43 – all stop after ‘computer game’ sound

VOICE:

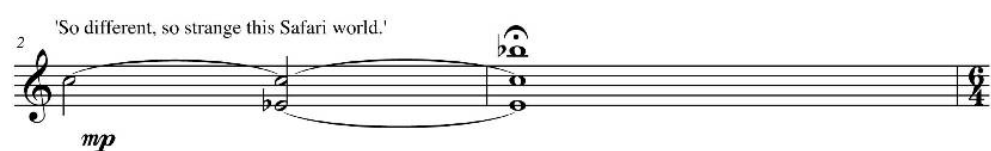
‘I’m amazed! You sing better than all the birds out there! Such a lovely guitar song!
On to the next challenge!’

E

05:24

GUITAR (sul tasto, BPU, medium reverb):


pp *f* *p*

2 
mp

‘So different, so strange this Safari world.’

4 'Driving through it in our jeep, it all passes so fast.' 'We see a lot. Protected. A wonderful experience. It's new.'

8 'Something to add to our memory image bank.' 'In a few years from now, we will feel nostalgic.'

12 'We have been here. We have seen this.'

F

06:09

VOICE:

LEVEL THREE.

This is a tricky one. The lions are unpredictable these days. Sometimes they're hungry and they don't show it. But they don't know you. Are you a threat? Are you dinner?

The only thing you can do is ROAR!"

06:30

Interaction principle:

The guitar player attempts to supersede the ever-increasing roar-like textures played by the computer players. Each of the performers should play in turn, with less overlap occurring at the beginning of the scene. The intensity gradually increases.

COMPUTER:

Controlled sound parameters: sample playback speed, distortion, volume
Each of the performers (including the guitar player) plays a roar texture in turn. First, interchanging, and gradually overlapping each other's sound. The intensity increases, as does the amount of distortion.

GUITAR:

Try to compete with the sounds played by the two laptops. Create roar-like

sounds using Ebow at NPU position. Low register. Glissando or static notes. Use feedback effect. Lowered string scordatura. Possible distortion by increasing Ebow pressure. Every time there is a vocal 'encouragement' increase intensity and chaos.

[VOICE comments during this scene:

'You'll need to roar much harder than that if you want to scare them off.'
'Roaaaaar!']

07:56 – stop playing when 'computer game' sound ends

VOICE:

'That guitar can rock! You scared the poor things away!'

G

08:04

GUITAR (medium reverb, double at octave above, BPU):
play along with voice + beeping on the CD. Staccatissimo.



VOICE:

*'Did you win? Did you lose?
Who cares!
You won. Congratulations!
You lost. You're out of the game!'*

Guitar stops playing

'Game Over'

H

08:24

VOICE: [no other instrument playing]

To be honest, I haven't ever been there
I've never seen a lion, or a monkey, or exotic birds
We are never going there
You are never going there
It's a simulation. But don't tell anyone.'

08:40

GUITAR (compressor, medium reverb, MPU, tune low string back to normal):

start playing after this text

'Where is 'Safari'?'
mp *mf* *mp*

mf *f* *mf*

'I can see you. You can't see me. But I am watching you. We are all watching you.'
mp *f* *ff*

mp *p* *mf*

'It's so dark in here. Where are you? Are you scared YET?'
f *mf*

The musical score for guitar consists of five staves of music. The first staff is in 4/4 time and contains the lyrics 'Where is 'Safari'?'. It starts with a mezzo-piano (*mp*) dynamic, followed by a mezzo-forte (*mf*) dynamic, and ends with a mezzo-piano (*mp*) dynamic. The second staff is in 4/4 time and contains the lyrics 'I can see you. You can't see me. But I am watching you. We are all watching you.'. It starts with a mezzo-forte (*mf*) dynamic, followed by a forte (*f*) dynamic, and ends with a mezzo-forte (*mf*) dynamic. The third staff is in 4/4 time and contains the lyrics 'It's so dark in here. Where are you? Are you scared YET?'. It starts with a forte (*f*) dynamic, followed by a mezzo-forte (*mf*) dynamic, and ends with a mezzo-forte (*mf*) dynamic. The fourth staff is in 4/4 time and contains the lyrics 'It's so dark in here. Where are you? Are you scared YET?'. It starts with a forte (*f*) dynamic, followed by a mezzo-forte (*mf*) dynamic, and ends with a mezzo-forte (*mf*) dynamic. The fifth staff is in 4/4 time and contains the lyrics 'It's so dark in here. Where are you? Are you scared YET?'. It starts with a forte (*f*) dynamic, followed by a mezzo-forte (*mf*) dynamic, and ends with a mezzo-forte (*mf*) dynamic.

23 'Don't worry, you can't be killed!'
f

27 'Do you want to go back out there? To the machine?'
mp

31
mf *f* *ff*

37 'We won't meet, but I will know where to find you.'
f *ff* *mp*

39 slower
mf *rit.*

42 'You're very good! Do you want to join this team?' 'We're working on version 2.0!'
mf *p* *ff*

After a few seconds, the guitar player says in a somewhat melancholy voice: 'Game over'.

Shadowgraphs - Libretto

Text: *Guy Harries (with excerpts by Harold Pinter and Marie Pappenheim)*

PART 1

SHE (Mobile phone sound):

I've been trying to reach you for ages. Give me a call back. Please?

It's me again. I just wanted to ask. Are you sure?

I'm sorry. It's not that easy to let go. Give me some time.

Hi. Yes, it's me. Call me back when you hear this. I need to talk.

I hope I didn't wake you up. I can't sleep.

I think you tried to call me. Why aren't you picking up the phone?

I'm going away for a while. You can leave me a message, though. I'll be checking my voicemail.

It's beautiful here. I think it's going to be ok. I've calmed down. It's safe to talk.

I'm reading this book. It reminded me of you. I want you to read it too. Maybe you'll understand. Maybe you'll remember.

Don't ignore me. Please. You can do anything, but don't ignore me?

I waited for three days, but maybe it's been long enough? Trust me.

PART 2

SHE (revealed fragmentarily through typing):

Don't remember the exact time it was, but it was getting dark.

I went down to the horse stables to get away. That was my safe place

I decided to go for a run.

We went to some ruins.

We asked some people how to get there.

I didn't feel like going home yet so I decided to go for a walk.

I figured it would be this lake.

I had my headphones on so I couldn't hear anything around me.

I had to be home soon.

We ended up walking in the woods to this creek.

I had to walk under this overpass.

As I rounded a turn, I started to walk faster.

It was like looking at a movie or something, and I couldn't wake myself up.

I wasn't there.

...return to the city quiet.

...that we were going to do everything we planned in life.

It's been quite a long time.

Didn't remember for like three months.

It was the only way I knew how to deal with things.

I am better now.

PART 3

SHE (on soundtrack, extremely processed/filtered):

When you went, when you died, something broke, something changed, AND THERE'S NO going back. I feel sorry for you. No. I am actually sorry for myself.

The night is too cold for a search like this. You were in such a state. I was counting the seconds, the minutes, the days, but you never came.

There was just enough light for me to see the way. I thought I heard your voice, but you weren't really there. I thought I saw you.

I know I am not welcome in there. They are not my friends any more. They don't know me any more. Now they are strangers.

The night is almost over, and you were going to be here with me. The sun rises, but I am not sure I will welcome it.

What happened the last time? Wasn't there something that time, the way you looked at me?

In a sense, you are there. Your body is still the same. It breathes. But you are gone. The days are too long.

PART 4

Walk. the repetition of movement, these steps I take.
To the centre of the cold. The deep grass I hide in.

The centre of the night and the morning.

I walk very fast but I do not run, so I can pass those trees.
out of breath, I take only short breaths of air.
I can escape.

Not a breath in the fields, they seem dead
There is the city.
There is the moon
That face... if only it would disappear...

There is no wind.
There is no moon.
There is no wood.
This is a room.
The centre of the night and the morning.

There's a light, the sun or a 40 watt light bulb.
It is neither night nor morning.
In the city.
I have my cell. I have my compartment.
All is ordered, in its place, no error has been made.
There is no hiding.

I lived far from everything. A stranger.
I knew nothing but you all this year.
That face... if only it would disappear...

The room.
I am perfectly still.
I watch the paths on my walls,
dead at their destination.
The room is moving
The room is moving
The room is moving
The room is still.

It is not night. It isn't morning.
No room.
Only this space between two strangers.
I was looking.
You are here.

Imaginary Friends - Libretto

Text: Guy Harries

OVERTURE

BEAUTIFUL DAY

Today is a beautiful day
The sun is shining through my window
I close the blinds
And go online
Where it always shines.

In the mornings
There is coffee.
In the mornings
I cannot find myself.
Out of this void
Words arise.

GLITTERGLOW SCREEN

My room is lit by the computer screen
It glows and glows and glows
Through the night
it glows

*GLITTER GLOW SCREEN
GLITTER GLOW SCREEN
Shimmer shimmer shimmer*

Last night I went outside
I looked up at the sky
It was so three dimensional
(Not two dimensional).
All the sky was full of stars
So huge
It was endless
it was surrounding me

*GLITTER GLOW SCREEN
GLITTER GLOW SCREEN
Shimmer shimmer shimmer*

FLUID IDENTITY

I put a mask on every day
It is flesh
It is a part of me
Fluid identity

I am a man
I am a woman
I am black
I am white

I am green

I synthesise myself again
A new mask for me
A new life for me
Fluid identity

FUNNY AVATARS

Funny avatars,
Meet each other
Funny humans
Digitised cuddly toys

A giant panda bear
A fluffy kitten
A horse
A car
That's who we really are

I'm so pretty
I really love myself!
You're so cuddly
I wanna touch you!

Is that a hat or do you really have rabbit ears?
There's a Ferrari car
Where your head is supposed to be

THE DARK

Find me again,
I was there in the dark

Shall I tell you
Where I came from?
Or shall we fly
A million skies?

My head is your head
Our brains are swimming in them.
They want to leap like dolphins
Into each other's skull
But they can't.

CYBERPONY

I take my laptop to bed
And chat to you
We type we type we type we type

It keeps me warm

The laptop overheats
It gets so hot
It melts
It turns into a pony
And I ride that pony

We change positions
We change personalities
We change positions
We change personalities
We change positions
We change personalities
We lose ourselves

The pony is sweating
like a horse
It comes out of the stable
Ride the pony.

ONLINE PARANOIA

We'll sell you what we know you want
We know your mind
We've measured it for you
We've tailored this thing for you

DIGITAL GUERILLA

Hack hack hack
Digital guerilla
Delete delete
Digital guerilla
We spy we spy
Digital guerilla
Destroy your life
Digital guerilla

GHOST TOWN

Every time I go on the internet
It seems like everyone is gone
Leaving all their shit behind
Their pics, their blogs, their ads, their
memories
Left there to be shown
And I am here alone
In this Ghost Town

They say it's a mode of communication
Say it's global, say it's a community
But where do I find that?
Where, where are you now?
Why won't you stick around in this Ghost

Town

Last time that I went online
I thought that you were there.
When I looked a second time
You'd vanished into thin air.
Where have you gone now?
I want to reach you, but how?
In this Ghost Town.

TOUCH

Why can't we occupy the same space
Why can't we breathe the same air
Smell doesn't travel down electric cables

Get closer
The eye can see
Get closer
The eye touches

Touch flesh,
Touch flesh,
Touch flesh

AEROPLANE

Enlarge your carbon footprint
Take an aeroplane
I can meet you there
We can have some coffee or tea
Get on flying back to me

Out of your room
onto an airconditioned train
a smooth slick air lounge
Through security
Get on flying back to me

High in the air,
See the map of the earth
The sun might shine for real
Get on flying back to me

And when the plane lands
There's a violent hit
Maybe you're scared
You come out and then we meet
Get on flying back to me

DIFFERENT

I see you standing there
As you are
You really are

But you're different
Yeah, you're different.

With a flower in your hair
It's a sign
A meeting sign
But you're different
Oh, you're different.

It looked so funny when you wore it
online
Now it just makes you look silly

But when we go home
We might discover
That there's a depth below
To uncover

I see you standing there
As you are
You really are
But you're different
Yeah, you're different.

I see you standing there
All alone
My very own

And you're different
But I'm coming over anyway.

THE ARK

When all the rain came down and
covered the land
Flooding our houses making them
disappear
That's when Noah called all the animals
And told them to enter the Ark

Surfing all alone
Disappearing
Floating away
And all we have is each other
I'll be your cuddly animal
You'll be my cuddly animal
I'll save you from extinction
You'll save me from extinction

I'll be your cuddly animal,
Will you be my cuddly animal?
Now hold tight...

Imaginary Friends – Melodic Lines and Chords

Please note: this is not a score for the piece. This material was only used as a reference for parts of the improvisation by the musicians during the rehearsal process.

Beautiful Day

The musical score for "Beautiful Day" is presented in three systems. Each system consists of a voice staff and a piano accompaniment staff. The key signature is one flat (B-flat), and the time signature is common time (C). The score includes measure numbers 6, 13, and 20.

System 1 (Measures 1-5): The voice part begins with a melodic line in common time. The piano accompaniment features a series of chords in the right hand and a bass line in the left hand. The key signature changes to one sharp (F#) at the end of the system.

System 2 (Measures 6-12): The voice part continues with a melodic line. The piano accompaniment features a series of chords in the right hand and a bass line in the left hand. The key signature remains one sharp (F#).

System 3 (Measures 13-19): The voice part continues with a melodic line. The piano accompaniment features a series of chords in the right hand and a bass line in the left hand. The key signature remains one sharp (F#).

2

27

34

Fluid Identity

A G# G F#

8 B B $\flat$ A A $\flat$ G

16 F# B A

25 G# G F# B

Ghost Town

Voice

7

13

19

Touch Flesh

A^b

5

G^b

9

A^b

G^b

13

Aeroplane

The musical score for 'Aeroplane' is presented in three systems, each with a vocal line and a piano accompaniment. The key signature is one sharp (F#), and the time signature is common time (C). The piano accompaniment features a steady bass line of half notes and chords in the right hand, some of which are beamed together. The vocal line consists of a melody of eighth and quarter notes.

System 1: The vocal line begins with a quarter rest, followed by a series of eighth notes: G4, A4, B4, C5, B4, A4, G4, F#4, E4, D4, C4. The piano accompaniment starts with a half rest in the right hand and a half note C3 in the left hand, followed by chords in the right hand and half notes in the left hand.

System 2: The vocal line continues with a quarter rest, followed by eighth notes: D4, E4, F#4, G4, A4, B4, C5, B4, A4, G4, F#4, E4, D4, C4. The piano accompaniment continues with similar patterns, including beamed chords in the right hand.

System 3: The vocal line concludes with a half note G4, a quarter rest, and a final half note C4. The piano accompaniment ends with a final chord in the right hand and a half note C3 in the left hand.

The Ark

The musical score for "The Ark" is presented in four systems, each featuring a vocal line and a piano accompaniment. The key signature is B-flat major (two flats), and the time signature is common time (C). The piano accompaniment is characterized by sustained, block-like chords in the right hand and a simple bass line in the left hand.

System 1: The vocal line begins with a half rest, followed by a quarter note G4, a quarter note A4, a quarter note Bb4, and a quarter note C5. The piano accompaniment consists of a sustained chord of G4-Bb4-C5 in the right hand and a single note G3 in the left hand.

System 2: The vocal line continues with a quarter note D5, a quarter note E5, a quarter note F5, and a quarter note G5. The piano accompaniment remains the same as in System 1.

System 3: The vocal line starts with a half rest, followed by a quarter note G4, a quarter note A4, a quarter note Bb4, and a quarter note C5. The piano accompaniment remains the same as in System 1.

System 4: The vocal line begins with a half rest, followed by a quarter note G4, a quarter note A4, a quarter note Bb4, and a quarter note C5. The piano accompaniment remains the same as in System 1.

28

28

35

42

Imaginary Friends – Max/MSP patches

