Sonic Arts Portfolio and Commentary

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Abstract

This research investigates the process of "opening out" spaces with sound as an approach to sonic arts practice, investigating the spaces that sounds articulate, reveal and imply in our encounter with them. It positions spatial aesthetics as a key consideration at each stage of the creative process and connects approaches to spatiality in sonic arts practices with contextual considerations drawn from, for example, phenomenological accounts of spatial and sonic experience, human geography, architecture and acoustic ecology. The portfolio consists of seven sonic artworks and two collaborative projects that each engage with these ideas from a different perspective, exploring a number of applications, contexts and outcomes in the investigation. This accompanying commentary discusses these works, providing an introduction to the portfolio followed by a discussion, in the subsequent chapters, of the practices explored and developed in the research process.

Portfolio Contents

Theme	Title of Work	Duration	Type/Playback Conditions (For full playback conditions please refer to Appendix 2)
Hollowing Out the Darkness	Room	10:31	Horizontal-only ambisonic composition to be presented in its own completely dark space.
	Interlude	10:07	Horizontal-only ambisonic composition to be presented in its own completely dark space.
	Adrift	41:20	Horizontal-only ambisonic composition to be presented in its own completely dark space.
Intertwining Spaces	CloudLines	09:09	Horizontal-only ambisonic composition for playback in a venue suitable for around 30 listeners, dimly lit by security lighting - presented as its own sonic "happening" rather than as part of a concert programme.
	Hagar and the Angel	10:06	Four-channel sonic component of collaborative multimedia installation
	The Rinsing	03:56	Short Film Soundtrack – collaborative (Mixing/Additional Sound Design)
Transmission/ Transduction	Isolation/Oscillation	06:10	Horizontal-only ambisonic Installation – commissioned as part of multi-sited exhibition exploring research at the Institute of Gravitational Research, University of Glasgow
	Tangent Lines	09:58	Stereo headphone work for listening post installed in public space
	Krafla Geothermal Power Station/Hverir, Iceland, June 2014	27:28	Looped horizontal-only ambisonic artwork for white gallery space (in its own room)

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Contents

Introduction

The world of sound in which we live envelopes, connects and permeates us, creating distances – both near and far – and articulating and producing physical, social and aesthetic spaces. Our ears grant us access to these spatialities, and as these sound worlds reach us, laced with meaningfulness, we expand out into them, inhabit them, and become part of them as we listen (and, importantly, as we hear). Sonically articulated spaces open up our field of experience independently from and beyond visual space, offering spatialities that are, as Edmund Carpenter and Marshall MacLuhan write, "dynamic, always in flux, creating [their] own dimensions moment by moment"[1].

The notion that sounds articulate their own spaces, as expressed by MacLuhan and others[2], was central in the development of this portfolio of works. In Jean-Luc Nancy's account of listening, he writes of a *sonorous present,* which "is a product of space time: it spreads through space, or rather it opens a space that is its own, the very spreading out of its resonance, its expansion and its reverberation"[3]. The "opening" of sonic spaces to which Nancy refers is a fundamental part of my creative approach – I understand the basis of this practice as producing or opening out spaces with sound. It is a sculpting of sonic environments that are realised, and evolve, over the duration of the compositions. Each sound that emerges is designed to shape the spatial image produced, by delineating positions, movements and fields of sound that articulate such spatial characteristics as proximity/distance, opening/closing, enclosure/exposure, focus/diffusion, spaciousness/crowding, masking/revealing, approaching/receding, and bounded-ness/permeability. Thus, engaging with Nancy's idea as an artist, the aim is to *shape* the listener's sonorous present, to create spatial configurations in sound that become the *lived space* of the listener.

Developed out of this premise, the principle aims that guided the research process were as follows:

- To investigate the process of "opening out" spaces with sound as an approach to sonic arts practice, focussing on spatial aesthetics in both the processes of creation and in the intended outcomes.

[1] Carpenter and MacLuhan, "Acoustic Space", 67.
[2] This idea is addressed in writings by, for example, Gernot Böhme, Eugène Minkowski, Erik Davis, John Hull, and Jean-Luc Nancy; many of which are specifically cited in this commentary.
[3] Nancy, *Listening*, 13.

- To explore the aesthetic, affective and communicative potential generated by considering spatiality at every stage in the creative process, from recording sonic materials to presenting the completed works.
- To consider auditory and multisensory spatial aesthetics in the life-world as a means of informing the development of artistic practices in spatial audio. This is explored in two ways:
    - By experimenting with practices influenced by phenomenological thinking about everyday sonic and spatial experience (from, for example, Gernot Böhme, Yi-Fu Tuan, Gaston Bachelard, Jean-François Augoyard and Henry Torgue, Salomé Voegelin and Jean-Luc Nancy);
    - By incorporating, in the compositional process, reflections on the personal experiences, as recordist, with the spaces encountered in the specific recording locations/situations engaged with for these works.
- To consequently contextualise and position sonic spatiality within a broader aesthetic framework, through engaging with practices that question the relationships between space and place, between spatial and temporal forms, between the material source(s) of sound and its spread in acoustic space, and between spaces articulated by sounds and the visual and physical spaces they coincide with.
- To question, within this broader aesthetic framework, how knowledge may be communicated through sonically articulated environments, exploring the role of spatiality in this process.

The development and exploration of these aims was motivated and informed by knowledge communicated by a number of artists and researchers working with and writing about spatial audio, listening, and spatial experience. Spatiality is an important concept in a number of fields of study, and therefore, combined with the practices and work of sound artists and theorists, my engagement with texts from philosophy, architecture and geography also fed into the creative ideas behind the works, resulting in practices that often constituted an investigation, through the medium of sound, into ideas contained within these texts. Indeed, the practice-based investigations were instigated by a variety of situations and encounters during the research period: through reading of academic and poetic writing on spatiality; by the spatial qualities of particular locations; through experimentations with technology; as a response to collaborative opportunities; and through insights from other artists working with sound.

As such, the research was carried out in a manner that reflects Hazel Smith and Roger T. Dean's model of the *iterative cyclic web*[4]. This model encompasses and interweaves both research-led practice and practice-led research. It outlines a number of pathways through research processes that incorporate cyclical and reciprocal relationships between the interpretation of relevant theories, the application of theories and techniques to creative work, the subsequent extrapolation and investigation of creative ideas, and the development of these ideas into artistic output. Therefore, in the discussions of the works and practices developed in this commentary, the focus shifts fluidly between practical and theoretical contributions, illuminating, with reference to the practice outcomes, traces of the "web" of knowledge that underpins this practice-based research.

The purpose of drawing upon these different influences ties in with the trajectory of this research project toward a contextualisation of spatial sound practices within a broader aesthetic framework. Indeed, while the primary aesthetic consideration in the development of this portfolio was the *spatial* design of the works, this was formed in reference to related concerns encompassing temporality, constructions of place, materialities, mediation spaces, listening practices, and cross-media interactions – exploring too the role of the artist and field recordist in these constructions. The practice of opening out spaces with sound was therefore rooted in spatial aesthetics but extended in its potential contextual understandings.

This approach reflects Gernot Böhme's observations about the nature of acoustic space. He writes: "acoustic spaces are something autonomous, independent of things and not identical with real space. But of course, acoustic space is also experienced in real space."[5] This acknowledges the fact that while sound may "open out its own spaces" (Nancy and Carpenter/McLuhan), these spaces are intimately and inevitably connected to everyday and multisensory spatial experience. In exploring an artistic practice which has at its basis the idea of opening out spaces with sound, these connections and contexts provide dynamic opportunities for investigation. The practices involved in the creation of this portfolio therefore deliberately and actively negotiate the lines between the creation of autonomous acoustic spaces-in-themselves and approaches rooted more firmly in a practice that Barry Truax terms *context-based composition*, in which "knowledge of specific contexts shapes the composer/designer's work and invokes the listener's knowledge of those contexts"[6].

Indeed, one of the principle considerations in the creation of the works in this portfolio was the volatility of the tensions between working with and presenting the sonic materials – particularly field recordings – as abstract, "pure sound", and treating them as a signifier or

[4] Smith and Dean (Eds), *Practice-led Research, Research-led Practice in the Creative Arts*, 19-25.
[5] Böhme, "The Great Concert of the World", 17.
[6] Truax, "From Epistemology to Creativity: A personal View".

carrier of meaning or context. This meaning or context could be, for example, a place, a material, or an action. Each of these have spatial implications, and therefore enrich the scope of the aesthetic focus on spatiality. As such, the creative practices draw upon methods that cut across both acousmatic and soundscape approaches to composition, exploiting the spatio-aesthetic possibilities revealed by each approach. In both its concepts and practices the research project also looks outward from compositional frameworks toward practices in sound installation art and investigations in acoustic ecology that engage with spatial sound. Consequently the practice approaches variously and precariously inhabit different areas of the spectrum that ranges from a) considering sonic spatiality in itself, as abstract manifestations of directionality, motion, scale, distance etc., to b) considering the potential implications, meaningfulness, and associations inherent both in acoustic spatial configurations and in the materials that articulate them. In investigating these potentialities I was interested in particular in the ways in which the mediation and artistic processes can either contribute to a strengthening and development of the contextual spatial information, or, conversely, can contribute to the de-contextualisation and transformation of the sonic spaces inherent in the materials used to create the works.

The following commentary is divided into two sections, beginning with an outline of the portfolio. This outline discusses the three thematic divisions of the portfolio, and provides a short introduction to each audio work. This is followed by a *Discussion of Practices,* which highlights some of the methods utilised in exploring the aims outlined in this introduction. The discussion is subdivided into four chapters that address the practices involved in the four main constituents of the creative process: *Recording/Creating Materials*, *Spatialisation*, *Form/Structure*, and *Presentation Practices*.

The Portfolio

The practice-based outcomes of this research consist of a portfolio of seven sonic artworks (six ambisonic compositions and one stereo headphone work) and two collaborative projects (an audio/visual installation and the mixing of a short film soundtrack). These works are organised under three thematic divisions: *Hollowing out the Darkness*, *Intertwining Spaces* and *Transmission/Transduction.* Each theme engages with the research aims from a different perspective, exploring a number of applications, contexts and outcomes in the investigation. *Hollowing out the Darkness* investigates the spatio-acoustic potentiality of dark space; *Intertwining Spaces* explores layered, complex and multimedia spatialities through collaborative projects and juxtapositions in auditory and multi-sensory spaces; and *Transmission/Transduction* considers the spaces revealed by the sonic artworks as potential sites for communication of knowledge. Attentiveness to the spatial conditions in which these works are presented is an important part of this practice and therefore **Appendix 2** outlines the technical, spatial, and installation/presentation requirements for each work. The following sections illuminate the conceptual frameworks that underpin the thematic divisions of the portfolio, with each being concluded with notes that introduce the works relevant to that theme.

Part 1. Hollowing out the Darkness

The works in this section (*Room*, *Interlude* and *Adrift*) are designed to be presented in a dark space. The title given to this section, *Hollowing out the Darkness*, refers to the process behind the development of these works, and is borrowed from a description of an approach to designing buildings outlined by architect Peter Zumthor. He states:

> "the first of my favourite ideas is this - to plan the building as a pure mass of shadow then, afterwards, … put in light as if … hollowing out the darkness, as if the light were a new mass seeping in..."[7]

Analogous to this approach, these works employ *sound* (rather than light) to "hollow out the darkness". The dark presentation environment is utilised to create a visually formless spatial experience, allowing a *sonic* sculpting and revealing of spaces to take place.

While the practice of presenting works in darkness is often adopted in the performance of acousmatic music, the approach taken here differs conceptually from this context. The acousmatic situation is defined as hearing a sound without seeing its source, and acousmatic compositions utilise the dislocation of sound (via mediation) to conceal sound sources, with this process "intentionally eliminating the possibility of seeing the sounds' initial causes"[8]. This is intended, as is elucidated in Pierre Schaeffer's theorisation[9], to bring the sound itself into focus, encouraging a *reduced listening* which concentrates on the characteristics of the sound without reference to its cause or any derivative meaning. In this context, the darkening of the listening space enhances the acousmatic experience by serving to also conceal the loudspeakers, which can be understood as a secondary layer of sound sources that may revert the listening experience to a *visualized*[10] one. Thus, both the mediation process and the darkening of the listening space adopted in acousmatic music practices are utilised to deprive the visual sense, focusing attention on listening, rather than seeing.

The process of *hollowing out the darkness* with sound, however, requires an original *mass of shadow* - to borrow Zumthor's words - out of which the sound may sculpt its *own* spaces. The darkening of the listening space is thus not simply used to focus attention on sound by means of visual deprivation – it is *not* an attempt to essentially isolate the auditory sense. By focussing on the environmentality of sound, it becomes, rather, a means of creating a sense of formlessness, a space of unknown depth or a disorientating environment. The consequent

[7] Zumthor, *Atmospheres*, 59.
[8] Chion, *Audio-vision: Sound on Screen*, 72.
[9] As developed in Schaeffer, *Traité des objets musicaux.*
[10] Chion coins the term "visualized" to refer to the opposite of acousmatic sound – i.e. accompanied by the sight of its source or cause. See Chion, 1994, p.72.

spatial ambiguity of the visual allows for a *sonic* articulation of space – when the listener enters the darkness, sound becomes the medium by which spaces are revealed.

Here I am making an important distinction between darkness as a condition set for performance, and "dark space" as a *site* within which the sonic artwork is exhibited – a distinction which I argue plays an important role in its aesthetic reception. While this may appear to be a conceptual difference, the particular reasoning for taking this approach had practical implications in the development of the works, influencing decision-making in the processes of creation. In particular it influenced and relied upon specific choices concerning the modes of presentation, and led to experimentation and questioning regarding my engagement with established presentation formats such as electroacoustic concerts, listening rooms and sound installation practice.

To offer an example in support of this argument, in switching off the lighting for a performance of an acousmatic work the listening environment is visually dimmed for the duration of the composition. It remains, however, in the consciousness as a "container" for audience and work, and thus the listener's spatial experience can be described as follows - "I am here in this room listening to this acousmatic composition". This may, of course, involve a sense of transportation or suggestion of spaces or places through the sonic materials of the work, but from the initial aesthetic position of being situated in a particular listening space. The experience that I wish to create instead *begins* with a process of disorientation. This is achieved through creating no established visual boundaries to the listening space, by presenting the work in its own space that is always in darkness. The use of dark space is thus designed to create such a visually formless *site* for the work – revealing a spatio-acoustic potentiality or possibility, which the work embraces and operates within for its duration.

The visual environment, in its formlessness, thus becomes an important part of the work. It is not therefore a practice designed to *remove* visual significance; rather the significance of the visual becomes its spatial ambiguity. In this way the works engage with Salomé Voegelin's notion of a sonic sensibility that "illuminate[s] the unseen aspects of visuality, augmenting rather than opposing a visual philosophy"[11].

The experimentation around the spatio-acoustic impact of darkness/invisibility is not limited to the presentation contexts for these works, however. Each of the works is based upon recordings made at the threshold of visibility – *Room* engages with a process of utilising technology to *listen-in* to an other, inaccessible space; *Interlude* is based on recordings made in a dark tunnel in Glasgow; and *Adrift* explores the aesthetic qualities of three recordings

[11] Voegelin, *Listening to Noise and Silence*, xiii.

made at night. In each of these situations the spatial experience was affected by the invisibilities encountered. These experiences as recordist filtered through to my approaches to the compositions created from these materials, manifesting in a variety of ways in the spatial designs of the works. This process is revealed in more detail in the following introductory notes to the works.

To conclude the introduction to this section of the portfolio, I would like to refer the reader to a description, articulated by John Hull in his lecture on *Sound: Enrichment or State,* of the way in which sound may open out spaces from within a context of visual formlessness. Hull lost his sight twenty years prior to giving this lecture, and it reflects upon his process of discovering life in sound. As he describes this process, he explains the way in which the sound of rain slowly revealed his surroundings to him, opening out spaces to him sonically, from what he refers to as a "disorientated and vacant interior"[12]. An extended quote from this description appears in **Appendix 1** as it serves, in many ways, to encapsulate the understanding of sound that underpins the creative approaches adopted here.

[12] Hull, "Sound: Enrichment or State", 11.

Notes on the Works: *Hollowing Out the Darkness*

Room (February 2012; 10:31)

Room is an ambisonic work that was first presented at *Sound Thought 2012*, in a dark basement room in *The Arches* in Glasgow. Emerging out of the darkness, the materials and forms of this work reflect upon the spatialities encountered whilst recording an empty grain silo in the North East of Scotland. The silo is situated amidst a number of disused farm buildings and the interior of the silo is itself inaccessible. The only reachable opening is a small hatch large enough to allow a microphone to be manoeuvred in on a boom pole, but small and high enough to prevent any direct listening experience in the space. As recordist, this immediately opened up a series of spatial inconsistencies between the embodied experience of the environment and the sound being recorded, setting up a *listening-in* on an other space.

These inconsistencies are a function of the mediation process - as I recorded the silo I could feel the breeze on my skin whilst listening to an interior space; I watched the sunlight reflect from the corrugated surface of the structure while the depths of the dark interior sounded, reverberating inside metal walls. This - along with the physical actions of holding the microphone, pressing the record button, wearing headphones and occasionally sonically activating the structure with physical contact - constructed both an aural access to the space that granted a *sonic* immersion in the silo, and, simultaneously, a heightened awareness of the mediation process through the displacements and spatial contradictions experienced.

Furthermore, what was revealed in recording the grain silo was a sonic expanse – a reverberant spatiality that presented a sense of an *opening out* of space, despite, from the outside, it being viewed as an enclosure. These concurrent senses of spaciousness and confinement, of opening out and folding in, served to extend the inconsistencies experienced.

These constructions of immersion/exclusion, expansion/confinement, and the thresholds of interior/exterior space are explored in the spaces articulated by *Room*. For example, the spaciousness of the silo is revealed through various uses and manipulations of the reverberant recordings made there; the de-stabilising of these spaces over time disrupts the immersion in this spaciousness; and the shifts from interior to exterior spatialities are constructed through intrusions and interferences in the sound world.

Consequently, the approach taken to composing this work weaves traces of the recording location into the composition beyond simply the inclusion of the materials gathered there, bringing into play the relations and tensions between space and place as part of the creative process. The spaces hollowed out of the darkness draw upon complex life-world spatialities –

including spaces of mediation, listening-in practices, interior/exterior boundaries, inaccessibility, and immersion – experienced at a specific location. They are, however, ultimately abstracted from the specificities of this location via mediation and artistic processes, being re-established in the world of the work as non-contextualised, pre-placial spatio-acoustic experience. This tension became a principal aesthetic focus in the design of the work, and is teased out further through the contrasting moments of stability/ emplacement (place) and freedom/ openness (space) that underpin the work's structure.

Room was presented at *Sound Thought 2012* in Glasgow in March 2012, and as a concert work at Spazio Bocciofila in Venice in May 2014.

Interlude (March 2014; 10:07)

Interlude is an ambisonic work created from recordings made in a tunnel underneath a busy road in Glasgow. The tunnel runs parallel to a river, and perpendicular to the road above, both of which present bounded, directional fields of flow. The space itself invites a passage through – as one enters the darkness, the light from the other end offers an irresistible draw, and the path enclosed by the stone structure has its own sense of directionality. However, the acoustic qualities of the tunnel belie these linear spatialities: the acoustic reflections are everywhere – a broad, multi-directional field of sonic feedback, rounding out the traffic sounds from above; exploding the linear passage of footsteps and voices; distancing and smoothing the flow of the river into a rush of dampened white noise that hovers in the darkness. Sonically, there is something of a momentary pause experienced in the depths of the tunnel, in which the flow of the surroundings is absorbed into a resounding, omnipresent mass, aided by the darkness that envelopes and expands the field of experience.

Yi-Fu Tuan, in his book on *Space and Place*, suggests that a sense of place can be formed in such a pause-space – he notes that while time suggests motion or flow, place exists as a "pause in the temporal current"[13] and "each pause in movement makes it possible for location to be transformed into place"[14]. The potential of the *acoustic* qualities of an environment to draw such a pause-space in the flows and directionalities of urban space is an important aspect of our auditory life in the places we build and inhabit. In the multi-layered world of sound these spaces can, acoustically, appear in unexpected places beyond, for example, the visually constructed open "green spaces" in urban environments. In exploring the pause-space that this particular built structure reveals, *Interlude* engages with the life-world of aural architecture, drawing upon an auditory spatial awareness fuelled by this environment in order to develop the aesthetic focus of the work.

The creation of *Interlude* was based upon taking up the invitation, offered by this pause-space, to wait a moment – suspending progressive motion, absorbing the potentiality of the darkness beneath the curved ceiling – allowing an unfolding, over time, of the many sonic layers that may be encountered there. During the development of the work, this pause was extended into a focussed exploration of the environment as I worked within the tunnel to gather materials, engendering a sense of emplacement through the explorations and extended occupation of the space.

[13] Tuan, *Space and Place*, 179.
[14] Ibid, 6.

In the same sense that Gaston Bachelard writes of "hearing in the roar of Paris the rote of the sea… Hearing what is, and what is not"[15], there is, in the darkness of the tunnel, a sense of the volatile potentiality that fuels an imagined space – it opens up a space of daydream that is situated within the physical environment, yet simultaneously exceeds it. Regarding this daydreaming state, Bachelard writes;

> "Immensity is within ourselves. It is attached to a sort of expansion of being that life curbs and caution arrests, but which starts again when we are alone. As soon as we become motionless we are elsewhere; we are dreaming in a world that is immense. Indeed, immensity is the movement of motionless man. It is one of the dynamic characteristics of quiet daydreaming."[16]

For me, the reverberating pause-space created by the acoustic properties of the tunnel offers a sense of *motionlessness* and a correspondent *expansion of being* within this space, thus offering, or opening up, a potential dream-space within the darkness. Working with the notion of such a rooted but simultaneously transcending spatiality, *Interlude* explores both the physical and dream-spaces of this location in sound, engaging with the dynamic between these spaces in the understanding and formation of place. This dynamic is reflected in the presentation environment for this work, as the dark space reveals spatial possibilities that are "imagined" through both identifiable and intangible sonic forms that originate from the tunnel environment.

Interlude formed part of the programme for the listening room at *Invisible Places/Sounding Cities* in Viseu, Portugal in July 2014, and a stereo version was included in the *A Quiet Position | Road* installation at the *End of the Road Festival*, Salisbury, UK in August 2014.

[15] Stilgoe, "Foreword to the 1994 edition" in Bachelard, *The Poetics of Space*, ix.
[16] Bachelard, *The Poetics of Space*, 184.

Adrift (August 2014; 41:20)

Adrift is a three-movement ambisonic work based on field recordings made under cover of darkness in the north east of Scotland during winter 2013/14. In making these recordings in such a manner I was interested in extending the exploration of *invisibility* beyond the processes of mediation and the dark presentation context, embedding it deeper in the compositional process. The act of *hollowing out the darkness* thus originates with the ways in which the constituent sounds of these field recordings served to occupy and articulate spaces in the night – filling the visual uncertainty with sounding spaces whose ephemerality and instability left open spaces of imagination within the fabric of experience. As well as drawing upon the intrinsic, audible spatialities and aesthetic features of the recordings themselves, the approaches to composing the work also derive direction from these particular experiences in the environments as listener/recordist. Each movement begins with an unprocessed presentation of one of these night-time recordings, establishing the context out of which the ensuing composition is formed.

Movement One: Wind **(00:00-13:05)** is based upon a recording of strong winds tearing through the environment, interacting with trees, hedges, walls, gates, and buildings. Layers of space are exposed as the wind whips up nearby leaves over a distant roar. This distal sonic image advances into proximate space as the wind rushes and resonates through physical structures, revealing their presence in the darkness. The perceptual depth of the sound field is enhanced at night (and in the dark listening space) as the visual space extends to infinity, expanding the scale of the spatialities experienced.

The subsequent exploration of this recording engages with three specific aesthetic elements encountered in the sonic material and the recording process:

1. The physical force of the wind – understood both through its tangible impact in embodied space and through the witnessing of its activation of other objects and spaces within the environment;
2. The ways in which spaces are articulated by the interactions between the wind and trees, leaves, walls, and other components of the environment;
3. The fluctuating, unpredictable shifting between motion and stillness, reflecting on the sound-shapes made by the undulations between violent movements and periods of rest.

Movement 2: Rain **(13:06-27:59)** is based on a recording of rainfall made from the inside of a porch. The porch is constructed from wood, brick, acrylic (glass) and slate, and looks onto a paved and gravel path, a hedge, and a number of deciduous trees that obscure from

sight the fields beyond. Drawing upon Hull's description (see **Appendix 1**) of the way in which the sound of the rain opens the various immediate, surrounding and distant spaces to the ear, this recording was, like the previous, made at midnight in winter, using the natural darkness to allow a listening outwards into the environment as articulated in sound.

Recorded from inside the porch, the rain becomes simultaneously part of a "here" and an "elsewhere". The sounds of the rain enacting upon the boundary between inside and outside – the walls, windows and roof of the porch – create a margin space, or an initial distance, from which the sonic environment, as articulated by the rainfall, spreads outwards. While the spatio-acoustic potentiality revealed by the darkness visibly deconstructs this boundary, both in the process of recording and in the presentation of the composition, the perspectival position evident in the recording brings back into play the spatial tensions of here and elsewhere, inside and outside – a tension that, in Hull's description, is both revealed and addressed through the action of pressing his nose against the glass, creating physical contact with the boundary space, quite literally connecting with the sonic agent of the windowpane.

The composition that follows this recording imagines, in its spatial forms, the nose pressed on the glass, connecting the body with the space into which its presence expands. It directly engages with the primary concept of this research – the opening out of spaces with sound – and, in keeping with this thematic division of the portfolio, draws these spaces out of an original site of visual boundlessness utilising techniques (discussed later) that reflect upon Hull's description of this.

Movement 3 – Waves **(28:00-38:20)** is based on a recording of the sea, made at a shoreline on the east coast of Scotland. Out of the dark the white tips of the waves, the bubbling backwash, and the sand at my feet were illuminated by streetlights a distance away. This articulated the near field of my visual perception, as the horizon was absorbed into the darkness, merging with the night sky in a view of infinite depth. The exploration of this recording draws upon the tangible aesthetic details of the sound of this environment - the constant motions, varying temporalities and textural detail of the wave-shapes; and the spatialities of submersion and surfacing. It also reflects on the spaces of alienation formed and enhanced by the darkness – the unknown depths and *mythical space*[17] of the ocean.

Adrift ends with a ***Coda*** **(39:20-41:20)** that consists of a recording made from inside a small boat house. The elements featured in the first three recordings are all present here – it was a stormy evening, with waves crashing onto the shore and the rain and wind lashing the sides of the building. This recording thus serves to offer a period of reflection on the three

[17] Tuan, *Space and Place*, 86.

sound-worlds explored in the composition, with their aesthetic investigations being referred to briefly by means of the reiteration of textural materials from those prior explorations. These materials ultimately interrupt the flow of the recording and end the work.

Part 2: Intertwining Spaces

The works in this section (*CloudLines*, *Hagar and the Angel*, and *The Rinsing*) investigate the coinciding of ephemeral sonic spaces and their interaction with physical, material, visual and socially constructed spaces. Moving beyond the ambiguities of darkness as a presentation environment, spatial complexities were created through the interactions of these works with the spatial specificities of the contexts in which they are exhibited. The process of "intertwining spaces" was two-fold: firstly it involved exploring the potential for "simultaneity, superimposition and non-linearity"[18] in *sonic* space by creating spatio-acoustic juxtapositions, intrusions and layers; and secondly it focussed on the ways in which these sonically articulated spaces could engage with, enhance, or disrupt the visual and physical contexts within which they were presented.

With regard to the latter, each work is therefore designed for a particular presentation context: *CloudLines* is a composition that is intended to be played in a dimly lit environment that allows a shared, collective listening experience, bringing the social space of concert listening into play; *Hagar and the Angel* is the audio component of a collaborative audio and visual installation that was designed as an intervention into an exhibition at The Hunterian Art Gallery in Glasgow; and for *The Rinsing* this research is applied to the mixing process of an experimental short film soundtrack.

In engaging in a creative practice of "intertwining spaces" I am acknowledging, exploring and questioning the duality/multiplicity of the spatial experience that occurs when electronically mediated sounds are presented within a particular space, but also contain their own intrinsic spatial qualities (which may in themselves be complex). As explained previously, the organisation of sounds in *dark* space privileges the spatial qualities communicated through the *sounds* by means of the open, ambiguous sense of visual/physical spatiality created by darkness. However, the intertwining of sonic spaces with socially, visually and physically apparent spaces instead creates spatial layers, juxtapositions and frictions, thus creating a focus, in terms of spatial aesthetics, on the ways in which these spaces may interact.

For example, when Salomé Voegelin writes that sound is "down below, underneath the visual surface, mobilizing what we see, invisibly and without light, unfolding the complex and fluid fragmentedness of what seems unified and scaped above"[19], she highlights some of the ways in which sound can be understood to behave, relating it to and contrasting it with

[18] Erik Davis notes these characteristics of acoustic space, positioning these as ways in which acoustic space differs from visual space. See Davis, *Acoustic Cyberspace*.
[19] Voegelin, *Sonic Possible Worlds*, 11.

visual experience. For Voegelin the *mobility* of sound is key: she describes listening as "illuminat[ing] the undulating pool of sound that moves and shapes the landscape"[20], and, in reference to the acousmatic music of Francis Dhomont, writes that "rhythms and vibrations produce things that do not exist as counterfactual elements of a visual, actual world, but open a view onto an unfamiliar existence that lives unseen as the mobility of sound."[21] Jean-Luc Nancy also identifies the mobility of sound as a quality that differentiates it from visual/tactile experience. He writes:

> "Whereas visible or tactile presence occurs in a motionless "at the same time," sonorous presence is an essentially mobile "at the same time," vibrating from the come-and-go between the source and the ear, through open space…One might say: there is the *simultaneity* of the visible and the *contemporaneity* of the audible"[22].

This characteristic of the sonic is particularly exploited in *Hagar and the Angel*, a multi-media installation in which the static materiality of the gallery presentation context is deliberately disrupted by a sonic intervention that introduces *motion* to the space - through undulating metaphorical "sound dunes" that create their own mobile, fluid, invisible shapes.

Carpenter and McLuhan's assertion (previously referenced in the introduction to this research) that auditory space is "a sphere without fixed boundaries, space made by the thing itself, not space containing the thing… not pictorial space, boxed-in, but dynamic, always in flux, creating its own dimensions moment by moment"[23] also notes a distinction between auditory and visual space. In situating these three works deliberately within visible environmental contexts, I aimed to set the flexibility of auditory space against the boundaries created by the visual environments. This point of interaction interested me, in particular the possibilities it revealed for engagement with, disruption of, or transcendence of these boundaries.

The collaborative nature of *Hagar and the Angel* and *The Rinsing* enriched this experimentation into intertwining spaces, offering opportunities to explore the practice in a multidisciplinary context, and in reference to the artistic practices of others. These two collaborative projects involved the interweaving of practices and disciplines – working within film and alongside a visual artist, poet and writer/translator. The mixing process of *The Rinsing* was conducted in response to the work of the director/co-sound designer Simone Smith, and the audio component of *Hagar and the Angel* was developed alongside the contribution of visual artist Birthe Jørgensen, in response to a fragment of poetry translated by our collaborator Dr Madeleine Campbell. In both cases the aim was to create a sonic

[20] Ibid. 12.
[21] Voegelin, *Sonic Possible Worlds*, 71.
[22] Nancy, *Listening*, 16.
[23] Carpenter and McLuhan, "Acoustic Space", 67.

experience that engaged the audiences in a sonically and visually constructed aesthetic world, with that world being equally the product of both artistic practices/outlooks. In doing so I explored their interconnections with my own practice, resulting in my research being extended in scope and increased in complexity through the interdisciplinary contexts.

Notes on the Works: *Intertwining Spaces*

CloudLines (September 2013; 09:10)

> *''In a listening which does not leap over tones, voices, sounds to the sources where they might stem from, listeners will sense tones, voices, sounds as modifications of their own space of being. Human beings who listen in this way are dangerously open; they release themselves into the world and can therefore be struck by acoustic events. Lovely tunes can lead them astray, thunderclaps can shatter them, scratching noises can threaten them, a cutting tone can damage them."*[24]
>
> Gernot Böhme, *Acoustic Atmospheres*, 2000

CloudLines is an ambisonic composition that explores sound as agent of disturbance. In this work, sonic spaces are intertwined as intrusions, interruptions, and interferences. The potential for contradictory, superimposed and simultaneous spaces to be articulated in sound is exploited here to disrupt established or expected spatio-acoustic forms; to "strike" the listener with acoustic events (Böhme); and to create a sonic environment that is unpredictable and unsettled in its structuring of acoustic space. The playback environment described in **Appendix 2** - a dimly lit collective listening space - is intended to support this idea, utilising the social space of the performance environment, along with security lighting (which disrupts the darkness) to contribute to the aesthetic exploration of disturbance.

As Böhme's writing suggests, in certain circumstances the nature of the sonic shaping of our bodily presence may be violent, intrusive – "dangerous". Böhme, however, continues to write that "listening is a being-beside-yourself (*Außer-sich-sein*); it can therefore be the joyful experience of discovering oneself to be alive"[25], highlighting the invigorating, thrilling potential of this potentially invasive force as a means of affirming one's existence in the world. However, the negative impact of noise is a primary concern of acoustic ecologists investigating agents of disturbance such as aircraft, traffic, air conditioning, amplification systems and marine vessels. Here it is not simply about decibel levels – what might damage our hearing – but the qualities and contingent affective potentials of the constituents of our sonic environment. Indeed as Schlüter writes, "noise is principally an ambiguous concept"[26]. However, taken and utilised to extremes (as evidenced in Steve Goodman's *Sonic Warfare*), sound can undoubtedly become a weapon, "contribut[ing] to an immersive atmosphere or

[24] Böhme, "Acoustic Atmospheres," 18.
[25] Ibid.
[26] Schlüter, "Mapping the Drone".

ambience of fear and dread… threaten[ing] not just the traumatized emotional disposition and physiology of the population, but also the very structure of the environment"[27].

Engaging with this multi-faceted consideration of the power of sound, the work explores the contingent nature of the ways in which noise can attract and repel, produce and remove boundaries, confine us, release us, intrude upon us, articulate dwelling spaces, alienate us or draw us in to security and familiarity. It explores the borderlines between the exhilarating energies of noise and its potential power as agent of disturbance or destruction, engaging with issues broached within the field of acoustic ecology surrounding the contingent nature of noise as disruptive, destabilising energy.

CloudLines was included in the programme of the *Symposium on Acoustic Ecology*, held at the University of Kent in November 2013.

[27] Goodman, Steve. "Sonic Warfare", xiv.

Hagar and the Angel (May 2013; 10:06)

The four-channel composition *Hagar and the Angel* constitutes the sound component of a multi-media installation that was the result of a collaboration with writer Dr Madeleine Campbell and visual artist Birthe Jørgensen. The project was based on Campbell's work *Jetties,* which is an assemblage of translated fragments of Algerian poet Mohammed Dib's oeuvre, created for interpretation by performers and artists working across various media.

This collaborative interpretation was created in response to a fragment of Dib's poem, *Dawn Ismaël*, which is featured in *Jetties*. Due to copyright reasons this excerpt cannot be published here, however, the poem retells the Biblical story of Hagar and the Angel, in which Abraham's slave Hagar is banished to the desert with her child Ismael. Dib offers a fluid, nomadic rendering of the story, articulating a sense of movement through his words and engaging contemporary themes of exile, migration and identity.

This story was also depicted in a painting by 18th century Scottish artist John Runciman, which was on display in an exhibition of Runciman's work at The Hunterian Art Gallery in Glasgow from September 2012 to August 2013. Having arranged to exhibit our work within the gallery space as part of *The Hunterian Associates Programme*, the installation was intended to bring the nomadic qualities of Dib's poem into this contrastingly ordered, "framed" world. The work was therefore designed to introduce a space of motion and sonic vitality into the gallery, engaging with the contemporary contexts of the Old Testament story as revealed in Dib's poetry.

As such, the installation was created to disrupt the spatialities of the site in which it was presented. The uniform confines of the gallery's visual space presented an opportunity to explore an approach based upon creating coinciding but conflicting visual and acoustic spaces. This juxtaposition was central to the exploration of the themes raised by Dib's poetry, engaging a disruption of established boundaries - in collaborator Jørgensen's words "breaking the rules of the room". The strong sense of emplacement in the gallery, created by the rich red walls and static spatiality organised with lines and right-angles, was brought in to tension with the disorientating, dis-(or re-)locating sonic environment. Through providing an encounter with shifting sonic forms whose spatialities extended beyond the enclosed room, the work was designed to incite an exiling from the familiar geometry of the space, de-stabilising the rootedness that this established context engendered.

The visual component of the installation – a sculpture created by Jørgensen – was similarly designed to engage the friction between the static, ordered structures of the room, and a sense of moving, nomadic, embodied space. Four walnut posts were positioned in a

square in the centre of the room, with thin, semi-transparent plastic dustsheets suspended between them. These dustsheets formed three "walls" that moved and created subtle sounds in the drafts as visitors walked by. The sculpture surrounded the space of the sound installation; however its semi-transparency and movements offered an ambiguity in its role as boundary space, allowing the spatialities created by the sounds to articulate spaces beyond, within and through it.

The sound element of the installation was therefore designed not to disrupt this additional element of the visual environment, but to engage with it, extending its forms into the acoustic space of the work. Together, then, the sculpture and audio work formed an experiment in disrupting a comparatively static environment, offering a fluid counterpoint to its linear spatialities. The contemporary themes of exile, migration and cultural identity raised by Dib's retelling of the story of *Hagar and the Angel*, were thus explored in the spaces of displacement, movement and nomadic spatiality created through the intertwinement of the installation both with Runciman's painting and the gallery space itself.

Hagar and the Angel was installed at The Hunterian, Glasgow between 21st and 26th May 2013.

The Rinsing (October 2013, 03:20)

The Rinsing is an experimental short film directed by Simone Smith, commissioned by Channel 4's *Random Acts* programme. The film is a journey through the nightmare of a woman, exploring her insecurity in the face of objectification and oppression. This work is included in the portfolio as an example of an application of this research outwith an academic context.

In September 2013 Smith approached me to provide additional sound design and to mix the soundtrack of the film. The unmixed audio that I received set the aesthetic tone for the soundtrack, and, cut to the picture, presented the basic temporal structuring of the audio. In keeping with Smith's assaulting and confrontational artistic approach[28], the sound design was shaped into a distorted, glitching, rhythmically driven structure whose sharp edges accentuated the abrupt cuts of the picture editing. The development of this material involved spatialising it within the stereo field (including depth of field); introducing further processing beyond the distortion and compression originally applied; and creating additional sound design elements to support the sonic environment created.

My approach to mixing the soundtrack involved an extension of the uneasy nightmare-like qualities of the image into the shaping of the sonic environment of the film, approaching its spatiality in such a way as to draw the viewer into the mind of the central female character, engaging the audience sonically in the psychological drama that unfolds. The soundtrack to this film can largely be described as non-diegetic, with what little potentially diegetic sound there is largely being de-synchronised from its visual counterpart in order to effect a sense of unreality. For example, from 00:14 to 00:20 a group of females is shown laughing onscreen, with a temporally disconnected, and reversed on occasion, recording of female laughter.

There are, however, a few key synch points throughout the film (for example the signing of the document at 00:40) that sustain the idea that at least elements of what the audience are hearing are heard by the central character in the film, placing her "within" this sonic world, as experiencing its affective tone. In my reading of the soundtrack as it was presented to me, these became signifiers of the nightmarish/unreal qualities of the drama. In the spatial mix of the soundtrack, therefore, it was intended that even the jarring, de-synchronised and non-diegetic sounds became "contained" within a sonic environment that encompassed both the central character and the audioviewer, despite the potential independence of these sounds from the image. This involved creating a spatial "setting" for the existing components of the soundtrack that equally placed the invested audio-viewer *within* this environment, but

[28] Smith, "Artist Statement".

simultaneously produced an unsettling, disorientating juxtaposition of inner and outer space from the point of audition of the central character.

The film was broadcast on Channel 4 on 6th December 2013, won an award for Best Film at Shorts on Tap "Women at Crossroads" in January 2014, and made the official selection for the Aesthetica Short Film Festival 2014.

Part 3. Transmission/Transduction

The works in this section investigate how the environments created by spatial sonic artworks may be viewed as sites for communicating knowledge, exploring the role spatiality can play in this communication. Each work forms a collaboration with the people and places whose stories I aim to communicate something of - through an art/science collaboration project with the Institute of Gravitational Research at the University of Glasgow (*Isolation/Oscillation*); engaging with stories of the environmental concerns about the waters and wildlife of Loch Alsh (*Tangent Lines*); and exploring the natural and man-made sonic treasure chest of the Krafla Geothermal area (*Krafla Geothermal Power Station/Hverir, Iceland June 2014*).

This practice contrasts with the intentions behind the two previous themes, in that while *Hollowing out the Darkness* and *Intertwining Spaces* were concerned with the creation of aesthetic "worlds" through the interaction of the audio works with the visual/physical presentation context, this theme extends to bring into the works some knowledge of "absent" places and contexts. The fact that, while specified, the presentation environments are not visually shaped for or responded to directly by the installation of these three works accentuates the experience of the sound as carrier of information from elsewhere – displaced, dislocated, mediated. In this way they occupy the lines between presence and absence, situating the mediation and artistic processes as potential transmitters, transformers, transducers, displacers and renderers of meaningfulness.

The process raises questions as to the nature of the knowledge transferred, transmitted, or transduced to the listener through such a practice. This line of inquiry was informed originally by an article from Stefan Helmreich, entitled *An Anthropologist Underwater*, in which the author writes of his own experience diving to the seafloor in a three-person submersible. In this article Helmreich draws the reader's attention to the way in which, in using the "potentially immersive" ethnographic present tense, he is transducing ethnographic experience into ethnographic text[29]. Helmreich attributes his choice of the word *transducing* to Michael Silverstein's suggestion that we "imagine the work of rendering meaning from one milieu into another as akin to transduction"[30]. In elucidating this, Silverstein uses the metaphor of the energy transducer through which one type of energy is *asymmetrically* converted into another type of energy.[31] Helmreich highlights the usefulness of this metaphor

[29] Helmreich, "An Anthropologist Underwater", 627.
[30] Ibid.
[31] Silverstein, "Translation, Transduction, Transformation", 83-84, cited in Ibid.

for his purposes, noting that "meaning is nearly always transduced—and sometimes radically transformed—in such transfers"[32].

In these three works, both the mediation and artistic processes involved in their creation take the place of the metaphorical energy transducer, transferring and transforming knowledge – knowledge of the places encountered, the visual and sonic environments; knowledge of scientific developments and explanations; of eye-witness accounts and translated personal histories, and of personal experiences and discovery. The resultant works are not, therefore, designed to communicate knowledge as a fixed, static understanding, but rather offer something of a story or place through the encounter with the environments the works articulate. Salomé Voegelin, in her discussion of Cathy Lane's work *On the Machair*, offers a useful insight that reflects the approach taken to the communication of knowledge and meaningfulness here. Writing of the way in which a sense of place is produced by Lane's work, she notes:

> "The objectivity of the place follows rather than precedes the sensorial encounter. It is informed and produced by it rather than informing it…the piece does not produce the location or time as fact. Instead it invites a sense making which produces a *practice* rather than an *apprehension* of knowledge, confirming that listening is a practice, a practice of hearing, inventing, imagining and knowing"[33].

Similarly, I suggest that the knowledge embedded in *Isolation/Oscillation*, *Tangent Lines* and *Krafla* is not (re)produced as fact, but is instead an invitation to hear, imagine, invent and know through the practice of listening. In these works this invitation is offered by the opening out of sonic spaces. The contexts in which they are presented challenge the listener to enter these spaces, to inhabit the visually absent worlds in order to practice a knowledge-making created by listening.

[32] Helmreich, "An Anthropologist Underwater", 627.
[33] Voegelin, *Listening to Noise and Silence*, 23.

Notes on the Works: *Transmission/Transduction*

Isolation/Oscillation (June 2013; 06:10)

Isolation/Oscillation was commissioned in June 2013 by Philip J. Nicholson, a PhD researcher in Human Geography at the University of Glasgow. Nicholson's research into art/science collaboration involved curating an exhibition, entitled "Touching Space-Time", which engaged with the work of University of Glasgow experimental physicists based in the Institute for Gravitational Research (IGR). The exhibition was created as an exploration into "the notion of art as a laboratory… specifically…the manner in which theoretical and experimental physicists investigate cosmic events that are 'intangible,' but that can be translated into sensible forms via various technologies"[34].

"Touching Space-Time" was set up as a multi-sited exhibition, consisting of three artworks in different locations at the University of Glasgow. I was commissioned to create a sound installation that formed a response to the work of the scientists at the IGR, specifically the development of technologies and analysis methods for gravitational wave detection. Nicholson also created a short documentary film about this work, and commissioned a short story from writer Tristam Adams, which was performed, recorded, and played back asynchronously over several speakers in a stairwell. Forming a collection of works exploring the IGR research, the overall setting for the sound installation was thus extended beyond the room it was presented in, to include the contexts inhabited and created by the other artworks. This extended contextualisation provided a set of knowledge – gained through experience of the other two interpretations of the scientific research – which could potentially be brought in to the encounter with the sound installation. In particular, Nicholson's documentary highlighted specific elements of the research that are directly explored in the shaping of the sonic environment of Isolation/Oscillation.

To provide some of this background here, gravitational waves are understood as distortions or ripples in the fabric of space-time that propagate as waves, with a potential source of these disturbances being binary star systems that rotate around a central point. The system for detection which the IGR is involved in researching is called LIGO - Large Interferometer Ground-based Observatory. This system utilises the positions of two perpendicular mirrors measured by a laser in order to detect motion caused by gravitational waves. This system is completely isolated so as to eliminate the interference of, for example, movements of the earth's crust, as the motion the system is designed to detect will be around one millionth of the wavelength of light (10^{-12}m).

[34] Nicholson, *Touching Space-Time.*

As a part of the process of engaging with the research conducted at the IGR I attended interviews that Nicholson conducted with the scientists featured in his film. During these sessions the scientists' references to waves, distortions of space-time, rotations, extreme scale, isolation and motion delineated a potent site for aesthetic exploration utilising spatialised sound. The analysts' stories furthered this, with sonifications of the data being used to literally listen for gravitational waves, as well as identify formations such as Pulsars that are thought to trigger them. Furthermore, the physical spacing of the detectors allows the scientists to hear the directionality of passing waves. Indeed, an analogy made in one of the interviews suggested that where previous research using the electromagnetic spectrum is akin to *seeing* the universe, using gravity as a probe is like *hearing* it – it is a different medium by which we can explore the universe.

Isolation/Oscillation was created entirely with materials recorded in the laboratories at the IGR. The equipment recorded included a laser controller, a prototype interferometer, a vacuum tank, a centrifuge, and strings of silica, thinner than human hair, that are used in the isolating device. This equipment, however, is not *represented* in the installation by these recordings. While the traces of their technological sources are evident through the manipulations of the sounds, this exists as a general referential environment. It was not my intention, in this work, to transmit information about the technologies involved in the search for gravitational waves. The recordings are instead manipulated into various forms that articulate, variously, forms of rotation, pulsation, micro and macro scale perspectives, and disturbances, ripples and distortions. It is in this way that the work engages with the gravitational waves research, exploring the various spatialities inherent in the ideas, concepts and technologies encountered at the IGR. It was my intention to bring these conceptual, technological or intangible spatialities into the lived sonic space of the work, creating an immersive realisation of the spatial forms that the various elements of the research into gravitational waves invoked.

Isolation/Oscillation was installed in the University of Glasgow Geographical and Earth Sciences Department, from 12th -14th June 2013.

Tangent Lines (October 2013; 09:58)

Tangent Lines was created from recordings made on a field recording trip to the Kyle of Lochalsh in north west Scotland, led by Jana Winderen and Mike Harding. It is, in a sense, a work about this place, but it focuses on the idea of temporary coincidence – the encounter with it as a visitor – engaging with the permanence/impermanence of place and the coincidence of human and environmental durations. The title comes from the geometrical term given to a line that just touches the edge of a circle, without crossing over, thus meeting it once. In *Tangent Lines*, transitory sounds gathered from passing boats, aeroplanes and bridge crossings, form sonic trajectories that fleetingly interact with continuous textural, environmental sounds.

During the field trip, an evening expedition out onto the waters of Loch Alsh – a sea inlet between the Isle of Skye and the Scottish mainland – presented an opportunity to make a number of recordings with hydrophones. Listening-in on the space beneath the calm surface of the water revealed a rich, vibrant sound-world of crackling and snapping, vocalising cod, and the motors of passing boats. Immediately above the surface, the night was still, calm, quiet – an entirely different sonic environment. The particular spatial quality of this experience – in that this vibrant underwater sound world stopped in its spatial extension at the surface – contributed to the decision to create a headphone work in which the spatial extension of the work is confined within the headspace of the listener, reflecting the abrupt edging and contained quality of the sound-world encountered through the hydrophones.

The five hour recording session explored different areas of the loch – underneath the Skye bridge, in the depths of Loch na Bieste, and out to the comparatively open waters of the Inner Sound. In almost all of the locations, a pitched electronic audio signal occurring at irregular intervals pervaded the waters. Inaudible above the surface, this continuous disturbance of the habitat beneath the waves was caused by an acoustic seal deterrent situated at a fish farm over a mile from our recording locations.

This prompted a discussion between Winderen and the boat's captain, Nigel Smith, who, having worked in the area for around 17 years, had observed the impact of fish farming and dredging on the environment, and the lasting effects of these industries' temporary presence. Smith's knowledge of the environment formed a tale of emplacement, rootedness and change, reflecting the impermanence of place, but serving also as a reminder of the coinciding of varying human and environmental durations. Indeed, Smith's immersion in the environment through an accumulated familiarity contrasted with my own encounter as a temporary visitor, but also served to extend it through my overhearing of his account of the place. Furthermore his account highlighted how the industries that had been there, and would continue come and

go, were having a lingering effect on the environment as generations-old seal colonies were disrupted and various species of fish disappeared from areas around the fish farms.

This composition, made from the materials gathered here, reflects upon hearing these stories of the impact of passing industry on the waters around this area; on my encounter with this place both through my presence there and through overhearing accounts of its past and present; and with my temporary sonic submersion via the hydrophones.

Tangent Lines was installed at a headphone listening post at *Sound Thought 2014* at the Centre for Contemporary Art in Glasgow.

Krafla Geothermal Power Station/Hverir, Iceland June 2014 (July 2014; 27:28)

In June 2014 I attended the *Wildeye Sound Recording in Iceland* course led by Chris Watson and Jez Riley French. The recording excursions included a visit to the Krafla Geothermal Power Station in North East Iceland, as well as the nearby geothermally active area of Hverir, which featured a number of steam vents and bubbling mud/sulphur pools. These sites are part of a large area of geothermal activity, and offered a dynamic sonic experience as the energy bubbled up through viscous mud, was channelled through the pipes and chambers of the power station, and, quite literally, exploded from the ground in bursts of steam.

The composition is created from unprocessed recordings taken from this environment. However, utilising this method was not intended here to engage a "documentary" approach to soundscape composition – the aesthetic focus of the work is not simply to represent this environment through playback of recordings gathered there. In presenting something of this place through the work, my approach relates to Voegelin's suggestion that "sound gives geography…a new dimension. This is an ephemeral and transient dimension…it suggests a geography that considers the process of place, from within its depth, rather than projecting an aerial view"[35].

Indeed, what was striking about this sonic environment was its liveliness across all perspectives, all distances, all scales – from the tiny bubbles on the fizzing surfaces of sulphur pools to the bird calls echoing across the lava field. These qualities are inherent in the recordings and, despite their locatedness, their sonic structures contribute to what Francisco López terms the "transcendental dimension"[36] of sound – not achieved through ambiguity of source, or abstraction from location, but through fostering an attentiveness to its "inner world". For López,

> "sound recording does not document or represent a richer or more significant "real" world. Rather, it focusses on the inner world of the sounds. When the representational/relational level is emphasized, sounds acquire a restricted meaning or goal, and this inner world is dissipated…[T]he richness of … sound matter in nature is astonishing, but to appreciate it in depth we have to shift the focus of our attention and understanding from representation to being"[37]

My approach to recording and working with the materials in *Krafla* involved bringing a sense of the dynamic, energy-emitting environment into the world of the work, focussing on the vibrations, textures, motion and dimensionalities of the materials as articulators of a sonorous present that may, reflecting Voegelin and López's thought, engage the listener in an

[35] Voegelin, *Listening to Noise and Silence*, 144.
[36] López, "Profound Listening and Environmental Sound Matter", 85.
[37] Ibid.

understanding created through being, rather than representation. The rich diversity of materialities and spatialities experienced in this sonic environment provided a strong basis from which to develop this approach, with, for example, the intricate sonic textures of bubbling mud, the distant rumble of the boreholes, intrusive hisses of steam, and resonant pitches of the multitude of metal pipes all forming different layers of potential in the compositional process.

Discussion of Practices

Recording/Creating Materials

Sonic materials were created both in the studio and during a series of field recording sessions. I used a variety of microphones that offered different spatial potential at the recording stage, including the following: the SoundField SPS200 microphone that captures a full ambisonic sound field; DPA 4060 lavalier microphones that can be positioned in inaccessible, small places; a coil pickup that records electromagnetic interferences; JrF hydrophones that capture underwater sound; and JrF contact microphones that can reveal the inner sounds and vibrations of objects.

The practices involved in field recording constituted a significant part of the creative process, providing - along with the gathered sonic materials themselves - unique spatio-acoustic experiences that often became interwoven into the creation of the works. The spatial characteristics of the recording environments, including the relationships between the auditory and visual spaces, became influential in the development of the works, and therefore the practice of field recording contributed more than simply the sound materials with which I worked. Citing the field recording events as a significant part of her compositional process, Jana Winderen remarks "for me the composition process starts out in the field", continuing "I am already thinking in terms of layers, even when I am out at sea, layers that might be incorporated into a compositional structure."[38] As I made recordings for *Tangent Lines* on the boat in Loch na Beiste, I observed Winderen recording, intently monitoring and making notes during the process. In an interview with Angus Carlyle, she states:

> "I am attracted to recordings that have something distinctive about them – they might, for example, include a new species of fish…I am more interested in the fish within its full sound environment and I will select passages of recording that best represent that. At other times, what attracts me to a recording are its abstract qualities and sometimes even while I am placing my hydrophone and listening I will get a sense of how successful something might be in those terms"[39].

With my own focus on sonic spatiality preceding the recording session on Loch na Beiste, I heard - in the sounds I was recording and monitoring – interesting sonic articulations of space that attracted me to specific recordings (and moments within the recordings). For example, the all-pervading seal deterrent offered a spatial quality that was revealed over the course of the various recordings made that evening. Being both stationary and continuous this sound-source offered a rare fixed underwater marker, with its intensity relative to that of the ubiquitous, proximate crackling sounds rendering a sense of distance across this set of recordings. For example, a distant recording can be heard from 00:56 a closer one at 03:57 and an occupation of proximate space by this sonority is evident at 03:44.

[38] Carlyle and Lane, *In the Field: The Art of Field Recording,* 154.
[39] Ibid. 153-154.

This spatial characteristic informs and supports the structuring of *Tangent Lines* – the proximity and distance articulated by these recordings created a sense of coincidence and divergence respectively, and this was utilised in forming the trajectories toward and away from the moments of coincidence (at 03:44 and 05:33) that underpin the structure of the work. Furthermore, as mentioned previously, the decision to make this piece a headphone work was made in response to the witnessing (sonically) of the two discrete spaces in this environment, above and below the surface of the water.

Across the portfolio such environmental/spatial encounters are reflected upon and explored in the creation of the works. This process is directly and intentionally rehearsed in *Adrift*, in which each movement begins with the unprocessed field recording that provided the basis for the ensuing composition. These recordings were deliberately made at night in order to give an acousmatic experience of the materials from the beginning of the creative process. The visual formlessness became a canvas not for my own sonic constructions to open out spaces, but for the natural processes of the wind, rain and waves to articulate sonic spaces around me, hollowing out the darkness with their sound. The development of the composition was consequently based upon experiencing this sonic *illuminat[ion of] the unseen aspects of visuality*[40] in the life-world.

However, in some cases it was not solely the process of listening to the sounds in a particular location or environment that influenced the creative choices made in the development of works, but the particularities of listening *as recordist*. Certainly, as exemplified in the underwater recording for *Tangent Lines* (listened to from above water), the technologically enabled listening and mediation processes involved in recording often formed a key component of the spatial encounter with the recording environments. This was particularly evident during processes of "listening-in" – the act of listening to/recording sound as an active overhearing, or as a deliberate attempt to discover concealed sonic worlds. This was practiced in a number of the recording sessions (notably for *Room*, *Tangent Lines* and *Isolation/Oscillation*), and is a process engaged in by a variety of field recordists and sound artists – in particular those working with technologies such as contact microphones, small lavalier microphones, accelerometers or hydrophones.

For example Jana Winderen's approach to field recording is based upon the idea of "blind listening", a practice she describes as

> "concerned with finding unknown sources of sound, sound we do not know is there, or cannot reach with our senses ... It is a very concentrated listening process, something which is unknown, unseen, not obvious what it is, like a search through sound, and not through

[40] Voegelin, *Listening to Noise and Silence*, xiii.

> looking at and then listening to. Close your eyes while recording, then follow the sound, and investigate the audible and not the first seen or heard."[41]

For Winderen this involves the use of various technologies, including hydrophones and ultrasound detectors, to explore environments and sound emitting sources ranging from fish to bats to glaciers and deep-sea environments, ultimately bringing these hidden and inaccessible sounds into the presence of the listeners encountering her work. Chris Watson's varied recording practices also include the revealing of unknown, unheard or otherwise inaccessible sounds – for example his recordings made inside an ants' nest, utilising a Particle Velocity Microphone, explore and magnify the tiny sound world of creatures whose lives exist on a different spatial scale from humans. This magnification of sound produces a potential "shrinking" of the listener in their encounter with it, situating the audience sonically inside an environment they could never physically enter.

Danish artist Jacob Kirkegaard, whose practice is also based upon revealing unheard sonic phenomena, utilises "unorthodox recording methods" to "deal with acoustic spaces or phenomena that usually remain imperceptible"[42]. For example the installation *Ark* draws sounds from spaces in the Arken Museum of Modern Art in Denmark. Kirkegaard uses accelerometers to reveal the vibrations of the building, and the resonances of the spaces are explored by layering and playing back recordings within the same space, drawing upon the technique used by Alvin Lucier in his work *I am Sitting in a Room.* This produces a work that listens-in to the spaces and structures of the museum, exposing these acoustic phenomena to the ears of Kirkegaard's audiences.

Again utilising technological interventions to reveal sounds of architecture, Mark Bain's practice involves exploring infrasound, seismological and vibrational data, often focussing on the "living" but inaudible sounds of buildings; and works by Bill Fontana, such as *Harmonic Bridge*, also use the technique of placing accelerometers on structures in order to reveal their inner vibrations. These practices focus not only on the open spaces between the walls of buildings or around the material structures, but also on the shapes and materialities of the structures themselves, the effects of external sounds and movements on them, and the travelling of sound and vibration through the structures. Another significant example of this is Jez Riley French's *Teleferica* project, in which he utilises contact microphones to listen to the length of the teleferica cables in Italy – long cabled mechanisms used to transport timber from mountains down to villages, for firewood or construction. In this project not only is the distance covered by the cable accumulated in the recordings, but the magnification of the vibrations caused by interactions with the cable from insects, leaves, birds and the breeze,

[41] "Jana Winderen: An Interview." *designingsound.org.*
[42] Touch, "Biography: Jacob Kirkegaard." *touch33.net.*

brings such events into an enlarged focus – as French writes, these are "small incidents that create monumental waves of sound".[43]

These practices all offer interesting spatial perspectives on the world. The processes of situating microphones in places that are inaccessible or unsuitable for our ears, or revealing sounds that are otherwise inaudible, bring into play the spatial constructions of inside and outside; of the embodiment of human/non-human scales; of auditory and visual space; immersion, submersion and exclusion; and material/physical and imagined spaces – serving to disrupt, bridge and question these boundaries.

The inaccessibility of the internal environment of the grain silo recorded for *Room* presented an opportunity to listen-in and, as outlined in the introduction to the work, this experience ultimately fuelled the concept behind the composition's spatial form. In exploring the internal sonic environment of the silo its reverberations and resonances were revealed in detail, listened to through contact microphones placed on the outside of the structure, and a mid/side microphone setup manoeuvred inside through a small hatch. This practice revealed something of the imagined interior space of the silo, giving it a sonic materiality, and allowing an experience, as recordist, of the opening up of auditory space, a sonic immersion inside the building. In this way the boundaries of inside and outside were brought into question, as the recording processes both revealed the internal soundscape of the silo and listened to the metal structure itself – the material manifestation of this threshold space.

As expressed previously the idea of boundary – this time an acoustically articulated one – is also explored through the process of listening-in with hydrophones in *Tangent Lines*. As recordist, I experienced the underwater cacophony of seal deterrent, fish and unidentifiable crackling sounds as at odds with the peaceful, still, auditory world above the surface, in which I was physically present. During the same excursion, I also made a number of recordings above the surface of the water, documenting this contrasting, but coinciding, soundscape. These recordings are mixed into the sound world throughout the composition, offering a sense of the dissipating of the boundary between these spaces that the process of listening-in under the surface offered me as recordist.

The recording session for *Isolation/Oscillation* similarly offered a glimpse into a sonic world that was imperceptible without a technologically enabled listening-in process. The sounds in the IGR laboratories were largely recorded using an electromagnetic pickup and contact microphone, and as such this process revealed sonic forms emitted by the equipment that were inaudible without the use of these technologies. This presented an approach to

[43] French, "personal | three positions", 14.

recording that reflected, in a sense, the broad aesthetic focus of the Touching Space-Time exhibition: *the translation of intangible cosmic events into sensible forms via various technologies.* As a consequence of this approach, the materials used to create the work provide, in themselves, an uninformed listener with little contextual or referential information, offering sonic forms that afford a largely abstract interpretation. The spatial image was therefore highly manipulable, and this allowed me to form a fabricated spatial narrative with these materials, processing and spatialising them to construct specific spatial forms that reflected on the IGR research.

* * *

The methods of recording associated with a process of listening-in often produce materials that afford abstract understandings, consequently producing a spatial and contextual ambiguity. Indeed, while such recordings can create a deeper understanding of our sonic environment, revealing intricacies and hidden sounds, the nature of the recording processes can in fact cause a de-contextualisation of these materials. In this case, if the spatial understandings of these sonic materials are intended to be drawn from the contexts from which they were taken, this information must be included in another way – by, for instance, layering contextualising recordings, or including text that provides this information. For example, in the case of French's *Teleferica* project (e.g. his recording of *Teleferica Wires Topolo*) the sense of distance (the length of the cables from the mountain down to the village) is not necessarily inherent in the spatial image that the sound materials themselves open out. In their abstract understanding the space that is opened out is intimate, due to the process of listening-in using contact microphones, which naturally produces a fairly close spatial image. However, in a context-based understanding, informed by accompanying text, the spatial image inferred expands out to incorporate the imagined length of the wire.

Similarly the processes involved in Bill Fontana's *Harmonic Bridge* afford a shift between an abstract and contextualised understanding of the constituent sound-spaces in the installation. The work involves processes of revealing and relocating sound by picking up the internal vibrations of the Millennium Bridge with accelerometers, and transmitting them to both the Turbine Hall at the Tate Modern and Southwark Underground Station. Fontana writes:

> "…not visible, but audible, … the presence of the sound sculpture became the apparent sound of the building…the presence of the live, relocated sound had a magical abstractness: pure sound becomes a sculptural medium, with a great power to transform our perceptions of space."[44]

[44] Fontana, "Objective Sound".

The "magical abstractness" of this sound is used by Fontana to open up sonically articulated spaces with the materials relocated from the bridge, but, as Salomé Voegelin suggests, the sites involved may be carried through this transformation, such that although the piece is not *about* these places, "it is about the process of inventing a place between those sites"[45]. Voegelin continues:

> "Fontana makes visible paths and connections not through the resulting sonic composition itself but through the production of these spaces via the temporality of a conceptual sound. The connections made are not visible, but visualized: drawn from the recorded sounds and their imagined relationship to the work as site… [T]he inhabiting 'I' of the spectator…is at the intersections of the work's sites and connects them through the concept rather than the actuality of listening."[46]

The negotiation of the relationships between space and place, as played out in the conceptual/actual layers of experience in Fontana's work, is an integral part of field recording practice and is inevitably rehearsed in the questions that arise within context-based compositional methods. Indeed, despite the focus on spatiality in this research, it must be noted that the sonic spaces formed by materials from field recording sessions are rooted in the locations in which they were made, and this raises the question of what might constitute *place* in the context of these works. This question pervades much of the portfolio as field recordings are utilised throughout in both manipulated and original forms. The recording locations were chosen for the presence of particular sonic agents, for their interesting spatial properties or as a place whose soundscape I particularly wanted to explore, but the located-ness of the recordings is, across the portfolio, variously concealed, ambiguous, and pronounced, negotiating in different ways the tensions between space and place, here and elsewhere. Indeed, while Tuan suggests that "space is transformed into place as it acquires definition and meaning"[47], the definitions and meanings communicated through sound can in fact shape, expand and enrich a *spatial* understanding of the materials, as is evidenced by both French and Fontana's works. Equally, however, the artistic processes involved in the recording and consequent mediation of materials can also shape the spatial understandings formed, but by creating illusions or entirely disguising any placial references the recording environment may have offered.

For example, while *Room* utilises the spatio-temporal disconnect of the mediation process to effect transformations of the recordings - creating an *ambiguity* with regard to the sonic agents involved – *Krafla* exhibits a contrasting practice through utilising only unprocessed recordings. In this work the decision to present the materials as non-manipulated recordings

[45] Voegelin, *Listening to Noise and Silence*, 146.
[46] Ibid.
[47] Tuan, *Space and Place*, 137.

keeps intact their referential potential in terms of place – transmitting something of this location through the work – but also (more importantly with regard to my approach) in terms of the actual materialities, spatialities and activities encountered in this environment.

Facilitating this approach, the recording process for *Krafla* was one rooted in exploration – a practice that delves into the sonic details of spaces and places in the manner observed by Hildegard Westerkamp as she writes:

> "the microphone alters listening… bring[ing] alerted awareness to the soundscape…It … often heightens the recordist's own curiosity and encourages him/her to venture into unknown territory."[48]

Within the expanse of the territory of the power station – in which a booming, all-encompassing low-frequency drone dominated the soundscape – the search for potential recording sites was, however, often visually guided. This particular mode of discovery reflects a further way in which Tuan defines place. He writes:

> "…place is whatever stable object catches our attention. As we look at a panoramic scene our eyes pause at points of interest…It is not possible to look at a scene in general; our eyes keep searching for points of rest. We may be deliberately searching for a landmark, or a feature on the horizon may be so prominent that it compels attention".[49]

At Krafla Power Station, metal pipes and dark red geodesic structures punctuated the environment of the lava field, offering such visually discovered *places* within the broad, resounding auditory space. On approach, the distinct sonic signatures of each resonating structure were revealed as their vibrations slowly masked the broader sound field. The lines drawn in spectral space by these resonances – situated within the rumbling ambiance of the place – reflected their visual intersection of the environment, but the focus drawn in the closer perspective recordings of these structures eliminates this context, isolating these contained sources as articulators of their own sonic worlds. Furthermore, the *internal* sonic worlds of a number of small pipes that were not audibly emitting sound out into the environment were investigated with contact microphones, probing the structures further to reveal their sonic life.

Similarly, at Hverir, the broad soundscape offered a mildly fluctuating, omnipresent "hiss", generated by the amassing of the sounds from the many sites of activity there. The investigation of each of these individual sites, however, offered a myriad of intricate textures accessed and magnified through the microphone, as well as violent eruptions of gases and steam whose sonic presence was extensive, even assaulting. The different perspectives and scales that were explored in this recording process provided both sonic details of the

[48] Westerkamp, "Linking Soundscape Composition and Acoustic Ecology", 53.
[49] Tuan, *Space and Place*, 161.

environment and a broader contextualising, "environmentalising" potential. This gathering of recordings from different perspectival positions was a technique recommended by Watson, as he suggests that a mix of these varying perspectives creates a better sense of the sound environments as we hear them, closer to that which we remember and recognise. Indeed, referring back to Westerkamp, the microphone alters listening, and such building and layering processes involved in arranging the materials form just another layer in the creative process – whether the outcome is designed to be a documentary or artistic work.

Indeed, in an interview conducted by Cathy Lane Francisco López cites the process of field recording as a "creative way of interacting with reality". He elucidates:

> "Of course there is an obvious connection between the act of field recording and the places or phenomena recorded, but to me that is only the first level of experience and there are other levels which do not concern this direct connection with reality but are more abstract and imaginary"[50].

In the recording sessions for *Interlude*, these two levels of engagement with the space and the sounds of the tunnel were fundamental to my approach. The recording process became an extended "pause" in the tunnel, rehearsing Yi-Fu Tuan's notion of *place as pause* as I practised a sonic exploration of the environment, discovering resonances, reflections, textures and movement in the tunnel. These explorations resulted in materials that afforded understandings based both on the connection of the sounds to the "reality" from which they were taken, and the other, "abstract and imaginary" levels upon which they may be understood. Reflecting upon Gaston Bachelard's daydream that hears the sound of traffic in Paris as the sound of the sea – "hearing what is, and what is not" – I employed extended recording techniques and listening-in practices that revealed some of the unheard sounds of the space.

For example, two DPA 4060 microphones that were fed into a small drainage opening in the wall of the tunnel revealed a pitch produced as the sound of the river passing by resonated through the pipe. This discovery brought to mind the installations of Sam Auinger, in which everyday environmental sounds are "tuned" by resonating pipes. Gernot Böhme, referring to Auinger's work, suggests that in these resonating bodies "the transformation of a given noise into music takes place on the spot, in actu…[This procedure] reproduces in material form what may be regarded as the origin of music altogether: the transformation of noises into tones by tuning"[51]. In exploring the "music" of the tunnel space, its "tuning" effects, as per Böhme's definition, were also drawn out of the resounding pitches of the voices of passers-

[50] Carlyle and Lane (Eds), *In the Field*, 101.
[51] Böhme, "The Great Concert of the World", 14.

by, and by sounding out the resonances of the space through the performative and improvisational processes of playing a violin there.

Sonic materials were also extracted from the intricate physical details of the environment. For example, the upper portion of the walls featured harling that, dimly lit from either end of the tunnel, cast shadows in which cobwebs had accumulated. The "topography" of this rough, harled surface was sounded out by running DPA 4060 and JrF contact microphones across the face of the wall, resulting in a textural sonority that became an imagined sound of the unsounding surface. These extended recording techniques became part of a process of discovery and exploration that contributed to an accumulated understanding and knowing of the space, but also expanded it, exceeding the sonic "reality" heard when passing through the tunnel. This approach was taken as a response to the imagined spaces opened up by darkness in the tunnel and the expansive acoustic qualities it exhibits, which appear to extend its space beyond the visible boundaries. It responds to the condition noted by Irving Hallowell, that "perhaps the most striking feature of man's spatialization of his world is the fact that it never appears to be exclusively limited to the pragmatic level of action and perceptual experience."[52]

As a contrast to this, a number of recordings were made with the SoundField SPS200 microphone that were intended to offer a sense of space rooted in the sonic reality experienced when one ventures into the tunnel. These recordings document the acoustic activations of the space as bodies passed through it, the expansive reverberant qualities experienced, and traces of scuttling leaves and litter blowing in the breeze through the tunnel. It was my intention, in the work produced with these materials, that this "what is" of the space would be contrasted with the imagined dream-space of the "what is not". The microphone choice was key here – the SoundField offers a broad, macro perspective on the sounding environment in contrast to the focussed, micro perspectives explored through the lavalier microphones and contact microphones.

* * *

In the majority of the recording sessions embarked upon for this research I worked through such spatial considerations as microphone placement, microphone choice and the impact of place and/or location in the recordings. However, in order to create materials that had no inherent spatial or location contexts I also worked with electronic sounds produced with an Elektron Monomachine synthesiser, along with recordings of electromagnetic interference made with a coil pick up. The (arguably) "blank" spatio-acoustic signature of electronically

[52] Hallowell, *Culture and Experience*, 187. Cited in Tuan, *Space and Place,* 87.

created sounds that have not, prior to their playback, travelled across acoustic space (accumulating reverberation/distance cues), offers a certain immediacy in the spatiality experienced. Of course spatialising effects may be applied to these sounds, and they do, often, have distinct mappings in spectral space, but in their original state their spatial images contain no contextual information.

In Alva Noto's *Funkbugfx* many of the materials exhibit this spatial quality, and therefore the panning of these materials has a particularly striking effect. Their positioning in the stereo field has a sense of pinpoint accuracy because there is no other spatial information contained in the sound material itself. For example at 01:03 the entrance of a repeated rhythmic sound is characterised by an alternating panning position between hard left and hard right. This surrounds a centrally panned "click" which is spatially immediate – right "here" (in the space of the listener). Such fine spatial structures are built up throughout the piece as different materials appear in pinpoint locations. These sound structures, although very finely shaped, draw upon glitch aesthetics, exploring and bridging, as Kim Cascone writes, "the gap between delicate and damaging"[53].

Influenced by the glitch aesthetic suggested by this type of sound material, a number of the works in the portfolio feature materials made with the synthesiser and coil pick-up. By positioning them in amongst sounds that carry inherent spatial characteristics, these materials are utilised to create a structure of interruption or interference in the spatial image.

In *CloudLines* these materials are extensively used in this way, contributing to the exploration of sound as agent of disturbance. For example, at 06:15, a recording made with the coil pick-up is used to fragment the flow of a recording of a train passing by. The sharp sound of the electromagnetic interference cuts through the path of the train recording to pre-empt a brief interjection of silence. This silence produces a momentary "vacuum" in the auditory space of the composition, a glitch in the progression of the sonic trajectories articulated by the train recording. Indeed this interjection not only serves to disrupt the spatiality, closing off the inherent dimensionality of the recording and cutting into its diagonal path across the space, but also interrupts the pitch trajectory caused by the Doppler Effect as the train passed by. After this brief interrupting silence, another iteration of the electromagnetic interference serves to release the listener from the vacuum-like space created, pre-empting the continuation of the sound of the train. It is worth noting also that this glitch-like disturbance structure serves to draw attention to the medium itself, in particular referencing the process of electronic sound mediation. This referential quality of the sonic

[53] Cascone, "The Aesthetics of Failure: 'Post-Digital' Tendencies in Contemporary Computer Music", 397.

intervention again serves as a layer of intrusiveness, with the potential awareness of the mediation process heralding a momentary break in the listener's immersion in the sound world of the work.

In *Adrift (Rain)* the spatial immediacy of material created using the Elektron Monomachine synthesiser was used to reflect upon the physical contact described by Hull in his listening experience:

> "I would press my nose hard against the window. And gradually it was as if the glass disappeared, because now my consciousness extended out from my nose pressed upon a panel of glass until it became unconscious, and I became aware that the sounds of the rain on the surrounding panels…were different"[54]

For Hull this initial awareness of the proximate field of perception articulated by the window serves as the frame of reference from which the rest of the environment expands out. In exploring this idea, the material created with the monomachine synthesiser was designed to create a central, *present*, field of reference making "contact" with the physical bodily space of the listener. I recorded a granular, textural sonic form, created with the FM synthesis module, in which there was no inherent space or distancing information (e.g. microphone space or perspective, environmental reverberations, resonances etc.). This recording forms the basis of the entire movement, which is built on the technique of "triggering" other sounds with the synthesised material, via a modified process of convolution reverberation. The technique of activating sounds with a constant trigger material engages with Hull's description of rain acting upon the broader surroundings, activating a wider field of sonic agents. It does not, however, lose touch with the reference point of the nose pressed against the glass, as the constant presence of the immediate textural material provides this frame of reference in the composition.

* * *

Another technique utilised to similarly create a sense of closeness/physicality in the material was the act of recording contact microphones being dragged across different textured surfaces. A range of materials and textures, as well as speeds and directions of motion, created diverse shapes in these recordings, but the sense of proximity in them was a constant. The continuous, evolving textures produced therefore provided a useful resource when developing intense, noisy or intrusive elements of the compositions.

For example, in *Adrift Movement 1: Wind*, one of the aesthetic qualities of the recording experience that I explored in the corresponding composition was the physicality of the wind.

[54] Hull, "Sound: Enrichment or State", 11.

As I listened to the expanding auditory space articulated by the sounds of the air moving and interacting with other elements of the environment, *I* was also being physically enacted upon by the wind, feeling its force on my body. The sonic impact that these contact microphone recordings provide was exploited for the purpose of exploring this element of the encounter within the composition. The recordings are compressed and distorted serving to enhance their immediacy, and from 03:35 to 04:21 and 06:56 to 08:09 they form the basis of an intensifying onslaught of sound. This is designed to fill the acoustic space occupied by the listener and engage through the textural forms an implied physicality, thus creating a potential imagined cross-sensory impact (or to use Smalley's term, transmodal perception[55]).

The materiality and tactility experienced through transmodal perception of sonic forms also plays an important role in the interconnecting of the audio and visual components of the multi-media installation work *Hagar and the Angel*. The material utilised to create the walls of Jørgensen's sculpture was a very thin plastic that created a subtle crackling sound when moved. In order to extend the materialities and movements of these plastic "walls" into the sonic space of the work, I made a number of recordings of the dustsheets in motion, capturing the delicate, distinctive textures of the shifting plastic. This textural material, which opens the audio work, presented a spatial extension of the visual environment into the auditory space, designed to effect a sense of liaison between the sound space and the environment created by the sculpture. The sonically extended spatiality of the visual material corresponded with the movement of the plastic itself, as the shifting sound-shapes mapped invisible traces of the plastic materiality across the sound field – almost, but not quite, graspable. Indeed the textural quality of this sound material offered potential cross-sensory, audio-tactile implications, such that the physicality of the visual environment was extended into the auditory space of the installation. This was designed to present an orientating/disorientating, locating/dislocating mechanism: the probable identification of the plastic as the source of the sound, due to the visual presence of the dustsheet walls, was played with in order to effect a deliberately apparent acousmatic dislocation as the sonic textures inhabited the space between these walls.

The "materialisation" of the sound through its association with the visible plastic was an important part of the collaborative process with Jørgensen. The semi-transparent walls of her sculpture play with a sense of dematerialisation as they question the linearity of the visual/material space. The semi-transparency is key – seeing through something questions its status as boundary-forming material object. Dawna Schuld, writing on installation artist Robert Irwin's work *Square the Room*, notes the visual effect of this. She writes about the

[55] Smalley, "Space-Form and the Acousmatic Image", 39.

piece of fabric that forms Irwin's work, which has varying degrees of transparency when experienced from different viewpoints:

> "As seen from a position before [another work in the gallery space], the scrim absorbed the light from above, appearing opaquely solid. Moving to the right, however, …the viewer might have been struck by a sense of dematerializing, an awareness that she could look not only at the wall but *through* it."[56]

In *Hagar and the Angel* the sense of dematerialising created by the motion and semi-transparency of the walls was countered and questioned by the implied materiality of the recordings of the dustsheets occupying the immaterial sound-space in between them. This interplay between the audio and visual components of the installation formed a key element of the aesthetic outcomes of this work. It explored a method by which, spatially speaking, the visual environment became far more than a setting for the audio, offering an intertwining of the spaces occupied by the material objects of Jørgensen's work, the acoustic spaces in-between, and the spaces of the gallery beyond the "walls" of the installation.

As exemplified in this chapter, the practices involved in recording and creating the sonic materials were explored and developed out of consideration of their spatial implications. The practices discussed engage with listening-in practices, the spatial experiences of both sonic environments and mediation processes, negotiations between space/place and real/abstract understandings of sound, and the immersive, disruptive and cross-sensory potential in the inherent spatial qualities of sound materials. In doing so it highlights the importance of the consideration of spatial aesthetics at this stage in the creative process, and begins to contextualise these considerations in reference to listening practices, materialities, mediation spaces and constructions of place.

[56] Schuld, "Practically Nothing: Light, Space and the Pragmatics of Phenomenology", 105.

Spatialisation

While spatiality is considered at each stage of the creative process, there are a number of points worth noting specifically about spatialisation methods. Firstly, it should be noted that the spatial design of the works is fixed, as opposed to live sound projection. Fixed spatialisation results in fully composed rather than performative, responsive or improvised spatial forms. In this way sound is treated - as artists such as Bill Fontana and Bernhard Leitner have suggested[57] - as a *sculptural medium*. Here it is shaped into a fixed form in the compositional process, producing prepared, electronically mediated spatio-acoustic forms designed to "transform our perceptions of space"[58]. It is thus the creation and organisation, by sonic means, of spaces that surround, permeate and situate the audience. In offering a rationale for working with fixed spatialisation in the context of this research, it is worth reiterating here the aim of exploring the ways in which sound opens out *its own* spaces. This approach can be understood in contrast to the traditional method of presenting acousmatic/electroacoustic music, which is designed to adapt the spatialisation of a stereophonic composition to different environments or speaker layouts. Denis Smalley describes this in an interview with Larry Austin, acknowledging that

> "there are varieties of spatial perspective composed into a piece. In a diffusion system, one should be able to expand these dimensions: in other words, make the distant more distant, exaggerate closeness, exaggerate distance, play with the height of the image, thereby adapting the space composed into the music to the dimensions of the listening space."[59]

The size of the space and loudspeaker layout not only affects the reverberant characteristics and the ratios between the perceived direct and reflected sound, but also the potential for the size of the listening area between the speakers, ultimately affecting the overall *scale* of the sonic image formed. The approach taken to specify exactly the speaker layout and the approximate size of the spaces in which the works are presented (in their ideal presentations, described in **Appendix 2**), was followed in order that the spatio-acoustic characteristics remain relatively unaffected, the scale of the sonic image remains constant, and thus a fixed spatio-acoustic image can be finalised at the composition stage.

Furthering this intention of creating stable spatio-acoustic images, the six multi-channel works employ ambisonics as a spatial mixing tool. This does, indeed, offer a degree of flexibility with regard to maintaining the spatial image where the desired specifications for presentation are not available (or a higher number of speakers is offered), and can therefore take the place of live diffusion in forming this adaptability in the work. However, for the

[57] See Fontana, "Objective Sound", and Leitner, *Sound:Space*.
[58] Fontana, "Objective Sound".
[59] Austin and Smalley, "Sound Diffusion in Composition and Performance", 12.

purposes of this portfolio, this decision was largely based on an awareness of the particular spatial qualities of this technology, which, as Francisco López notes, "[conveys] a more realistic sense of envelopment and an illusion of being-there"[60]. In *Sonic Experience* Augoyard and Torgue describe the quality of *envelopment* as "[t]he feeling of being surrounded by a body of sound that has the capacity to create an autonomous whole, that predominates over other circumstantial features of the moment"[61]. The particular aesthetic qualities of the ambisonic spatial image can serve to offer a sense of such an *autonomous whole* that is not reduced to or divided by the spatial constructions of the mediation processes. In utilising this technology the circumstances of mediation – of loudspeaker playback – are thus reduced in significance. Due to the nature of the ambisonic image, these circumstances can be *predominated* by the enveloping sonic structures produced, as these structures occupy the air and delineate spaces in-between and beyond the boundaries of the loudspeaker array.

The software programmes used for this ambisonic spatialisation were Bruce Wiggins' *Wigware* ambisonic encoder and decoder, along with the Surround Zone decoding software that accompanies the SoundField microphone. The ambisonic works were largely designed through combining the methods of encoding spatial information into monophonic source materials, and utilising ambisonic recordings made with the soundfield microphone. The former, spatially speaking, generally creates motions, trajectories and point source locations, whereas the latter offers broad fields of sound, articulated from all directions. A combination of these approaches was utilised in order to create spatial forms that variously open out, contract, cut across, and delineate acoustic space.

* * *

It is worth noting here two instances in which I approached the spatialisation in a particular way. In *Krafla Geothermal Power Station/Hverir*, *Iceland June 2014*, the majority of the recordings were made with the SoundField microphone, and as well as being unprocessed, they are also not actively "spatialised" as such, being left in their original spatial form as full ambisonic recordings. Where contact microphones were used the recordings were positioned centrally in the sound field. This approach meant that the spatial element of the recording process was central to the aesthetic outcomes of the work – the spatial image is formed solely from the locational, dimensional and perspectival characteristics *inherent* in the recordings due to the fact that no spatial manipulation or processing was applied afterwards. Microphone placement was therefore key in capturing a range of environmental perspectives – from the intricate textures to the omnipresent drones, the motion of steam inside the pipes to

[60] López, "Profound Listening and Environmental Sound Matter", 84.
[61] Augoyard and Torgue, *Sonic Experience,* 47.

the trajectories of aircraft across the sky. The overall spatial form of the work was thus constructed through the arrangements of the recordings – in layers and evolutions through time.

In *Movement 2: Rain* in *Adrift* the spatialisation is not about motion, or the creation of juxtaposed or complex spatialities. In comparison to other ambisonic works in the portfolio that are actively "spatialised" it has the simplest method of spatialisation. This was designed in response to Hull's description of his perception of the sound of rainfall, in which he writes of specific areas of the environment being revealed sonically, each by a slightly different sound of rainfall. For example he mentions the "differentiation between the little panels of glass", the "wider sound of the panels of glass where the rain hit them on the edges of the windows", the "distant rushing sound-a spout from the corner of the house"[62] and so on.

In the composition each track in the mix is positioned, utilising the ambisonic panner, to its own individual location in the sound field and it remains there for the duration of the work. The opening out of the space and the subsequent shifting formations are thus articulated by the starting and stopping of the various sonorities – each situated at a fixed location – rather than their motion across space. For example it is possible to identify the emergence of a pitched pizzicato sonority at 23:35, at 24:52 and again at 26:29, each time from the same location. This approach is designed to reflect the constantly evolving soundscape of rainfall interacting with a relatively static environment from a fixed listening position. It reflects on the revealing of different spaces as irregular dripping patterns start and stop, as water gathers and is released, as the wind blows the raindrops in all directions to meet different surfaces, as the intensity of the rainfall rises and falls, and, importantly, as the consciousness of the listener shifts and expands out and across the field of perception.

* * *

The two stereophonic works in the folio – *The Rinsing* soundtrack and *Tangent Lines* – are not spatialised using ambisonics. *Tangent Lines* was deliberately designed as a stereo work for playback on headphones, as mentioned previously in order to reflect upon the "contained" sonic space beneath the surface of water by containing the space of the work within the headspace of the listener. While many headphone works that are concerned with spatial images utilise binaural methods in order to localise the sound outwith the headspace of the listener, the internalising effect created through closed field listening was exploited in this work to produce the desired "contained" spatial images. This method of presentation will be discussed further in *Presentation Practices,* but in terms of the spatialisation practices

[62] Hull, "Sound: Enrichment or State", 11-12

employed in the creation of the work, the success of communicating senses of space within this contained field relied upon the microphone/hydrophone placements in the recording process, the movement and positioning of sound sources achieved through the use of stereo panning, the spaces implied by the subject matter of the recordings, the occupation and density of spectral space, and the depth of field created by the use of reverberation and filtration processes.

The other stereophonic work, *The Rinsing*, was mixed for television broadcast, and therefore was required to be delivered in a stereo format. Initially this requirement was, in terms of spatialisation, a restriction on the creative process. This restriction does, however, spatially align the sound with the screen space. By producing a stereo sonic image, the potential for the illusion of spatial extension beyond the physical dimensions of the screen/speaker space exhibits the same *framed* characteristic as the spaces visually articulated on screen. As Smalley notes "in the case of frontal stereo, the analogy with linear perspective vision can be striking: in looking through the 'stereo window' between the loudspeakers, the listener can apprehend spaces much broader than the real, space-breadth between the speakers, spaces which stretch beyond the confines of the listening space's actual depth."[63] In this way, the stereo image of the sound is able to occupy and delineate the spaces articulated on screen (the on-screen space), however acoustically it remains a "window" onto another space – a framed spatiality. In terms of creating an immersive spatial mix that was, under Smith's direction, supposed to draw the audioviewer into the mind of the female protagonist, the frontal stereo sonic "view" available offered a limitation on this process. However, given the theme of voyeuristic violence that the film explores, the spatial positioning of audience as spectator that the stereo sonic image promotes is, in fact, pertinent to the aims of the work. The mix suggests, at a number of key points, an "internalized" sonic space, from the point of audition of the primary female character. The resultant spatial juxtaposition of internalized sound with "audience-as-onlooker" serves to highlight the sense of violation and objectification that this film addresses. The aim behind the spatialisation of this soundtrack is therefore aligned with Denis Smalley's observation that "…in cinema, in spite of the frontal image, you are taken out beyond your watching and listening space – more a psychological engagement than a physical engagement with the performance space, though."[64]

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Another restriction encountered – this time in the spatialisation process for the ambisonic works – was due to limitations in playback setups both in the studio for creating the works,

[63] Smalley, "Spectromorphology", 122.
[64] Austin and Smalley, "Sound Diffusion in Composition and Performance: An Interview with Denis Smalley", 19.

and (usually) in the venues they were exhibited in. Due to the fact that these are not concert works (for which there are ample opportunities for playback on multi-channel systems), the relative difficulty and expense of requiring a speaker system with a height component for a single installation or playback meant that the works are not created with vertical (Z) information included in the B-format file. This decision was made in order that the spatial information could be designed fully in the studio (monitored on four to eight horizontally spaced speakers) and thus could be fixed as a horizontal-only file, remaining exactly the same regardless the availability of a speaker rig with height. In terms of creating fully immersive sound, the inclusion of vertical information could have been advantageous, however in terms of experimentation and fulfilling the aims of this research the horizontal-only spatialisation of audio allowed for a satisfactory level of spatial design.

Furthermore, the design of spectral space was utilised in some cases to suggest a sense of height. As Smalley notes "spectral space in itself produces space, without any need for actual spatial movement of sound, save for its projection into the arena within which we listen."[65] One of the key ways in which it does this is through suggestion of vertical (z-axis) space. Spectral space, according to Smalley, is "concerned with space and spaciousness in the vertical dimension – up, down, height, depth, along with infill and clearing."[66] Examples of the employment of such spectral spatial forms are apparent across the portfolio - for instance *Isolation/Oscillation* begins with two subtly rotating sonic "masses" (00:00-00:42), made from recordings panned alternately around and across the sound field. These forms occupy a high region of spectral space and are unsupported by lower frequencies, creating a form that Smalley terms "levitation" – the sense that sound is floating free in space[67]. The spatialisation here – including the spectral space – is designed to reflect the interactions between stars in binary star systems.

The technique is utilized again at 04:04, when a similar formation begins, this time with two high frequency pulsing shapes interacting across the space. The levitation produced here is followed by a structure that produces another of Smalley's spectrally created spatial forms – *gravitation*[68]. This, as its name suggests, is a grounding motion, presenting a trajectory from a higher to a lower frequency plane. *Isolation/Oscillation* ends with such a structure: beginning at 04:04, the small-scale form of the high-frequency pattern is slowly followed by a gravitating form that extends downwards until it "resolves" or "grounds" into a pulsating low-frequency tone at 05:34. The gravitating effect is further extended as the pulse is slowed

[65] Smalley, "Space-Form and the Acousmatic Image", 47.
[66] Ibid. 45.
[67] Ibid. 46.
[68] Ibid. 45.

between 05:40 and 05:54. This is achieved through the application of the principal of binaural beats – two pure tones are played simultaneously with a small difference in their frequencies, resulting in a beating tone being perceived. By slowly narrowing the difference in frequency (which defines the frequency of the pulsation), the pulse is slowed, creating a sense that the sound is travelling, despite the fact that it is not moving in the ambisonic field. Ultimately, this gravitating effect presents an exploration of scale, articulated in spectral space. The small-scale form of the high frequency pattern that begins the descent is, at 05:37, drawn into direct contrast with the large-scale, pulsing low-frequency sound. This formed a spatio-acoustic response to the notion that the ripples in space-time are, as described by the gravitational wave researchers, imperceptibly small, requiring extremely sensitive equipment to detect them, and yet these tiny fluctuations are produced by vast rotating structures in the universe. This, for me, was the most striking of the spatialities encountered in the IGR research, and thus the composition ends with this contemplation of scale.

As evidenced here the practice of "spatialisation" in these works was not conceptually or practically focused solely on traditional methods of spatialising audio compositions. In this part of the creative process the practices look outwards into their different creative contexts (such as film, headphone installation, surround sound composition), into the environments they draw from (through recording and presentation practices), and into the spatial forms created or implied through employment of other types of audio manipulation processes. In doing so these practices engage with the research aim of contextualizing the notion of sonic spatiality within a broader aesthetic framework.

Form/Structure

This chapter highlights some of the methods by which the materials were edited, arranged, and processed in order to shape the opening out of spaces, considering how these forms evolve and are revealed over time.

The spaces opened out by *Room* and *CloudLines* are designed to be unstable, shifting, and unpredictable. *Room* focuses on articulating the instabilities of immersion/exclusion, inside/outside and permeability/boundedness as encountered in the recording process at the grain silo. *CloudLines* – as a composition that focuses on sound as an agent of disturbance – utilises interruptions, intrusions, ruptures and interferences in acoustic space as the basis upon which the work is structured. Indeed, a number of acoustic forms in these works are designed to create what Augoyard and Torgue refer to as the *intrusion effect* - "the inopportune presence of a sound or group of sounds inside a protected territory [that] creates a feeling of violation of that space"[69].

In *CloudLines* this is explored by sharp edges of sound cutting through delicate sonic masses, as ubiquitous sounds, background noise, ambiances and field recordings are shaped in interaction with starkly articulated spatialities. For example, at 01:07 a sudden interjection of sonic material serves to interrupt the flow of the delicately textured sound world previously established from around 00:54. The aesthetic qualities of this interjection – in particular its opening out of large-scale but saturated acoustic and spectral space – serve to position it distinctly as a disturbing force, a block of noise. This technique is utilised further at a number of points in the composition (notably at 01:27; 01:45; and 03:50), serving to fragment the space, slicing through sonic environments, textures and tones to create a space of interference.

In *Room* the sonic spaciousness experienced through listening to the internal environment of the silo is established at the beginning of the work through a time-stretched (non-pitch corrected) version of material gathered there (introduced from 00:53). This processing method creates an exaggeration of the sense of spatial depth in the silo, both through the temporal extension of the reverberations and through the lower-frequency occupation of spectral space. At 01:22 a higher-frequency resonance appears in proximate space, as a disruptive, moving form in spectral contrast with the rest of the environment. This initiates a space of interference, which is developed further as the silo material is broken up in interaction with intruding sonic devices operating in proximate space (from 01:40 to 03:32). These structures are created from recordings of a Japanese Bell (whose clear pitch cuts through spectral space) and harshly proximate electromagnetic interferences recorded with a coil pickup. These materials are edited around fragmentations of the silo recordings, cutting

[69] Augoyard and Torgue, *Sonic Experience*, 65.

away from the established immersive spatiality of the reverberant silo into a section of shifting, destabilising morphologies. This is designed such that the embodiment of the space becomes fragile, drawing, out of the moments of absence created by fragmentation, an exclusion space that reflects the physical inaccessibility of the interior of the silo.

The idea of sonic intrusion is also explored in both works through the gradual building of noise structures. *CloudLines* contains two significant examples of this, forming key structural components of the work. The first of these is designed to engage with the way in which we can become de-sensitised to sound as our sonic environment slowly increases in intensity. The layers of noise built up from 02:13 gradually combine the contours of stormy winds, electromagnetic interferences, undulating low frequencies and a large-scale, booming mechanical sound to create a structure that ultimately fills acoustic space. As this dissipates, drawn into the distance by a recording of a passing train, it reveals an open, unoccupied acoustic space. For example, the reverberating footsteps heard at 02:53-03:04 create a sense of spaciousness and comparative emptiness that is all the more potent after the density of the preceding noise structure. This contrast reflects upon the distinction, as defined by R.Murrray Schafer, between "lo-fi" and "hi-fi" sonic environments[70] in which the contrasting spatialities of masking and revealing, proximity and distance, and spaciousness and crowding are brought into focus.

The second of the noise structures in *CloudLines* engages with the exhilarating, visceral effect of building sound pressure felt as an enveloping, permeating force. At 07:51 this escalation results in a billowing mass of sound that occupies and shifts the extension of acoustic space. The immediacy of distorted and compressed recordings made by dragging contact microphones across textured surfaces is combined here with various electromagnetic interferences recorded with a coil pickup. These materials are shaped around large-scale environmental noise – heavy vehicles in an underpass, stormy winds, and a construction site. At 08:16 this dense sonic structure collapses unexpectedly, resulting in a direct contrast between its inflating forms and the delicate, quiet materials that follow. This sharp cut raises the tensions between different responses to noise, questioning if the abrupt evaporation of this sonic intensity is relief or anti-climax.

This technique is based upon the effect that Augoyard and Torgue refer to as the cut out effect:

> "The cut out (*coupure*) effect refers to a sudden drop in intensity associated with an abrupt change in the spectral envelope of a sound or a modification of a reverberation (moving from

[70] Schafer, *The Soundscape*, 43.

> reverberant to dull spaces, for instance). This effect is an important process of articulation between spaces and locations; it punctuates movement from one ambiance to another."[71]

This effect is also explored in the culmination of the noise structure built between 03:52 and 06:19 in *Room.* Here the cut out process is designed to create instability in the spatio-acoustic form of the work, immersing the listener in a complex, full acoustic sphere before the cut out occurs. In this build-up of noise, increasingly distorted melodic bell-tone structures are entwined with and occasionally masked by a growing sonic formation that ultimately constitutes a barrage of sound. Built largely from heavily compressed and distorted textural contact microphone recordings, this enveloping, churning, noise-driven mass of sound is designed to fill spectral space and the physical listening space. This all-encompassing occupation of acoustic space offers a vibrating, immersing sonic structure that absorbs the listener into its forms. The cut out effect occurs at 06:19, when this soundworld is suddenly silenced, its abruptness being emphasised through the use of side-chain compression triggered by a low-frequency burst of sound. This is designed to create a sudden, unexpected exclusion from this spatiality, engaging further with the fragility of the sonic immersion encountered in the process of recording the silo. The transition that follows this cut out results in short phrases of rhythmic material that are spatialized in a diffuse, shifting manner. This continues the instability in the sonic environment as these fragmented and moving shapes emphasise the disintegration of the sound world, even as a new centring figure is established.

The sense of a centring or gravitation toward stability that occurs following this disintegration (06:20-06:47) is formed in tonal pitch space, created through the emergence and re-stating of pitched materials. These materials are included to harmonically resolve the melodic phrase articulated by the bell sounds throughout the build-up. Having previously been on the brink of being absorbed by enveloping noise textures, these pitched materials re-emerge as the dominant structural force. They are revealed through the breakdown of the distorted noise structure, carrying with them a trace of their trajectory towards a resolution. The folding in of the melodic shaping to this centring pitch is structured so as to present a musical sense of closure that may, as a part of the sonic environment, be embodied as a process of emplacing or grounding.

Indeed, this spectral shape draws a focus within the diffuse spatialities articulated by the percussive materials, offering a sense of stability in both the pitch structuring and its occupation of acoustic space. Such moments of emplacement form a key part of the overall structure of the work. They offer a "calm centre of established values"[72] that, upon its disruption, draws into the spatio-affective experience the tension and release encountered

[71] Augoyard and Torgue, *Sonic Experience*, 29.
[72] Tuan, *Space and Place*, 54.

between emplacement and dislocation, immersion and exclusion, and expansion and confinement.

* * *

In contrast to the unsettled, disrupting forms of *Room* and *CloudLines*, *Krafla Geothermal Power Station/Hverir, Iceland June 2014* is structured around long-form recordings and subtle transitions. In discussing this structuring process, I would like to refer back to Jean-Luc Nancy's concept of the *sonorous present* outlined in the introduction. The extended temporalities of the work are designed to effect a sense of absorption into the "inner world" of these sound environments – their sonorous present. To this end the materials are left simply to "be in motion"[73] for a while, with the gradually shifting perspectives ultimately being designed to afford a continuous *expansion of being* within which the environment of *Krafla* resounds. As Adrienne Janus writes,

> "the temporality of listening, for Nancy, is an embodied time, a time that "opens up" within and around the body of the listening self—that "hollows out," "envelopes or separates," "loops," "stretches out or contracts" within and around the listening being ... and is marked by a pulsive movement between the sonorous *attack* and the attendance to a resonance yet to come—the embodied time of listening necessarily opens into a resonant, vibrational space."[74]

The slow evolutions between perspectives and sonorities in *Krafla* are designed to open out such a resonant, vibrational space that will surround and permeate the listener. In this way its slowly evolving temporal form becomes another dimension of the space opened up by the work.

Within this extended time-space the work follows an exploration of the spatialities of the geothermal environment, experienced as recordist and captured through the microphone. The work begins and ends with a recording that reveals an expansive open field, articulated by a broad ambiance, repetitive birdcalls, and the shifting roars and drone of the boreholes. From 03:22 the textural materials of the mud/sulphur pools and steam vents begin to emerge. Here the bubbling, crackling and exploding textures are combined and separated in various layers in order to effect subtle changes in density, focus and spatial extension. These transitions are developed over the subsequent eleven minutes of the work (between 03:22 and 14:28), during which the vitality of these sonic emergences shape the acoustic space moment by moment.

[73] "Being in motion" here is used to avoid the sense of an "intransitive, stable, consistent" sense of being that opposes the "*coming* and *…passing…extending* and*…penetrating*" that characterise Nancy's sonorous present. See Nancy, *Listening*, 13.

[74] Janus, "Listening: Jean-Luc Nancy and the "Anti-Ocular" Turn in Continental Philosophy and Critical Theory", 193.

At 14:28 a broad perspective recording leaves the remote hiss of Hverir lingering in the air, providing a distant reflection on the preceding materials. This forms a key structural device as it also serves to effect a transition away from the exploding, uncontained, releasing spaces of the bubbling mud pools and steam vents, giving way at 15:23 to the comparatively controlled, enclosed spatialities of the pipes and chambers. These materials are developed over the second half of the work to create a gradual implosion of space. This structuring moves from intermittent or distanced sonic structures to large-scale, continuous close-up perspectives, followed by a contraction inwards to the contact microphone recordings which ultimately reveal the internal sonic spaces of the pipes (from around 20:45).

From 23:35 a gradual reopening of acoustic space is created through the reintroduction of the opening material, which through subtle crossfading ultimately reveals the expanse of the power station environment in isolation once more. In *Sonic Experience* Augoyard and Torgue position the crossfade effect as the opposite to the cut out effect (as utilised in *Room* and *Cloudlines*), stating that:

> "while the cut out effect describes an abrupt change from one sonic state to another, the term crossfade refers to a more progressive transition between states, accomplished through a decrease in intensity of the first state and increasing apparition of the second. We can experience this effect when crossing a mid-sized square in which reflections from the street or façade behind us slowly crossfades with sounds from the opposite direction."[75]

This effect formed the basis of the structuring of *Krafla*, which involved creating subtle transitions that explore patterns of approach and recession, offering shifting focuses between narrow and broad sonic perspectives on the environment. As such, it was the spatialities of drawing in close, retreating, centring and dissipating – as encountered in the processes of exploration and discovery whilst recording at Krafla – that suggested the compositional way through these materials.

* * *

Adrift Movement 2: Rain similarly explores an extended, subtly shifting spatial form, but this time focused on a fixed perspective. It imagines Hull at the window as a transfixed listener, absorbed into the subtleties of the sounding and resounding environment articulated by the rainfall. In Hull's experience he notes the subtle differences between the sounds of the rain on the various surfaces and at different distances from his vantage point. The complexity of the sound of the rain is significant here – it is dynamic, compound and contingent on environmental qualities and perspectival positions. The work is structured around this idea, using synthesised "raindrop" textures to trigger various sound materials via convolution

[75] Augoyard and Torgue, *Sonic Experience*, 29.

reverb processing. This plays with the idea of the rainfall sonically activating a multitude of different materials and surfaces. The sound materials used to replace the impulse response in the convolution reverb processor vary from water drops recorded in a glass, to other granular textures, to instrumental materials created with ukulele, violin and viola. The diverse spectral and temporal forms of these sonorities serve to reveal different portions of acoustic space as they are triggered, opening out a broad field of sonic potentiality.

The instrumental materials used are deliberately designed to sustain the pitches explored in the preceding movement of *Adrift*, and are harmonically fairly simple. This overall stability in pitch space offers a sense of situatedness – rootedness even – drawing upon the notion of a fixed point from which the spatialities of a largely static environment are opened out by the moving sonic agent of rainfall. This structuring process was influenced both by Hull's description and the recording that I made as a consequence of encountering Hull's lecture, listening to the rain from a fixed position inside a porch at night.

The other two movements of this work, *Wind* and *Waves,* are also structured as explorations of the spatio-acoustic forms produced by the natural processes featured in the recordings at the start of each movement. This process of exploring the spatial forms inherent in the recording originated with listening in the darkness, becoming, as recordist, more acutely aware of how the sound was behaving in space. As Frances Dyson notes, visual forms often "absorb" the ephemerality and dimensionality of sound, tying sound to the visual object[76]. Similarly, Gernot Böhme notes that "the "I" does not normally lose itself in the listening act, but protects itself by distancing the voices, tones and sounds, relegating them back to their sources, and thus leaping over the experience of the In-between"[77]. This often overlooked "in-between" or lived dimensionality of sound was focused upon as I listened and recorded in the darkness, and is explored in the spatial forms opened out by these compositions.

The outline structure of *Movement 1: Wind* engages with the ebb and flow of the windstorm, featuring phrases of intense sonic activity punctuated by subtle textures and silences. The fluctuating, unpredictable shifting between motion and stillness is one of the key characteristics explored in the composition. In the moments of calm the intimate and proximate spaces of the work are drawn back, effectively "draining" this portion of acoustic space, distancing the sonic forms of the work. For example, at 09:51 the thick, churning textures retreat to reveal a broad reverberant pitched sonority, emptying proximate space.

[76] Dyson, *Sounding New Media*, 76.
[77] Böhme, "Acoustic Atmospheres" 18.

This reflects on moments when the wind drops – silencing the foreground space – but its indistinct roar can still be heard in the distance.

The spaces opened out in the recording are revealed by the interactions of the wind with the objects and shapes of the surrounding environment. One of the ways in which I explored these interactions was by making another recording of the same windstorm, using two DPA 4060 lavalier microphones to capture the sound as the wind whistled through a gap in a window frame. This recording is layered with the original field recording, starting at 02:40, revealing several pitched resonances. The three prominent pitches from these resonances are drawn out of this recording, and extended into the rest of the movement via the instrumental materials. These materials are created with violin, viola, acoustic guitar, ukulele and Elektron Monomachine synthesiser, and are improvised, layered and developed around these pitches. At various points throughout its development, in particular between 10:16 and 11:18, the spatialisation of this instrumental material reflects the spatial contours of the field recording, and as such, suggests an interaction as if the sculpted forms of these materials are being shaped by the wind.

The inclusion of instrumental material inevitably produces a layering of spaces, bringing into play the implied performance and gestural spaces inherent in the associative understanding of this material. As such, they open out spaces that, while sculpted into acoustic shapes that contribute to the aesthetic exploration of the spatialities of the stormy winds, also refer to an entirely *other* space. This space, formed through references to the sound sources, does not belong to the acoustic environment established, does not nest within it, and neither does it specifically transcend this environment or become contained within it. It does, however, form a *part* of it, in its otherness.

This is used in the composition to engage with the space of imagination that was opened up in the darkness – as the wind dropped in the foreground, it opened a space of both volatile potentiality and calm, reflective imagination within the context of the roaring, resounding environment. This experience brought to mind a work by Scanner, entitled *Mountain Cabin*, which intersperses a field recording of walking out in the mountains with a recording of a piano being played. The spatial image of the piano material interjects a sharp contrast with the exterior sounds of the field recording, but situated in this context its spatial forms open out a quiet space of reverie – a dream space. The structuring of instrumental materials in *Adrift: Wind* draws upon this idea, as they emerge out of moments of stillness that punctuate the work. This experiments with the "otherness" of the space opened out as suggestive of the imagination space created by the quieting of the proximate field of perception in the wind recording.

The use of instrumental materials in *Adrift Movement 3: Waves* is similarly two-fold. The basis of the structuring of this work is a series of engulfing spatio-acoustic formations that engage with the perceived continuity of the sound of waves over large time-scales, and their simultaneous unpredictability in temporal and spatial *detail* - their individual shaping or "phrasing". The instrumental materials that appear throughout are sculpted into unpredictable approaching and receding shapes, as the internal worlds of short musical phrases are moulded through filtering, equalisation, distortion, and convolution reverberation processes. Throughout the work these materials surface inconsistently as if they were phrases of an instrumental composition fragmented in time, appearing as irregular waves of performance over the form of the movement.

This shaping of the materials engages with the aesthetic exploration of the spatio-acoustic forms of the field recording. However, beyond their shaping into wave-like phrase structures, the instrumental materials also play a role in exploring the spatialities of alienation encountered at the shoreline – the threshold between inhabitable and uninhabitable space, and the imagined space of submersion that the depths of darkness opened up.

The pitched sonorities of the instrumental materials offer a contrast to the broadband noise-world above the surface. This above-surface world is explored in the composition both through the use of the original sea recording and through various other noise-based sonic textures created in the studio. Exploiting the spectral contrast with these materials, the instrumental materials are used to open spaces of submersion into which there is a sense of descent, often articulated by a low frequency tone. For example, at 31:35, a phrase of viola/violin material is introduced by an undulating, reverberating bass sound. The recording of the sea that precedes this is absorbed into the depths of this sound, revealing a space out of which the reverberating tones of the instrumental material emerge. The consequently filtered sound of this space is designed to form a moment of submersion in a cavernous world revealed by the reverberant sonorities of the viola and violin. Here, a musical phrase unfolds before an ascension/resurfacing occurs through an opening out in spectral space, as the broadband sound of the waves is reintroduced.

These sonic spaces, in their otherness, explore both a sense of alienation from the environment beneath the surface of the sea – an uninhabitable, unknowable space – and the imagined space that opened out to infinity in the darkness at the shoreline. The integration of these sound-worlds engages with the idea of "mythical space" as defined by Yi-Fu Tuan, constituting something of the "world of fantasy" that is built as we construct "mythical geographies that bear little or no relationship to reality" when wondering, for example "what

lies on the other side of the mountain range or ocean"[78], or, indeed, what lies beneath the surface or out there, in the darkness.

* * *

The structure of *Interlude* also engages with the idea of coinciding physical and dream-spaces, this time those opened out by the tunnel environment the work is based upon. Produced solely from the materials gathered there, the composition works with the dynamic between the "what is" of the tunnel space and the "what is not", drawing upon the mediation and artistic processes to effect transitions and transformations between these spaces.

A sense of the physical space of the environment, the directional flows of the surroundings and the extended exploration of its acoustic properties are brought in to the composition largely by means of unprocessed or transparently processed field recordings. In these elements the sonic agents – traffic, dogs, river flow, birds, cyclists, pedestrians etc. – remained largely identifiable, and the inherent spatialities of the recording were left intact.

The coinciding dream-space that forms a part of the experience of this place is reflected in a number of aesthetic choices made when selecting, editing and processing the materials. For example, the conversations of passers-by, as recorded in the tunnel, were often unintelligible due to the many sonic reflections. These vocalisations are edited and utilised to draw the ear into straining to understand, whilst simultaneously delineating an expansive space. The listener may embody this reverb-articulated space as he/she is directed away from semantic listening through the alienating unintelligibility of the vocalisations. Examples of this can be heard at 02:21 and 02:52.

Furthermore, the overall form of the work reveals several "waves" of filtering, in which materials are processed or edited such that the broad ambience of the environment is eliminated, focussing on lower frequencies and pitched, resonant materials. These pitched materials include car horns (01:14) and vocal tones (06:10) that are temporally extended through convolution processing. This exaggerates the reverberant qualities encountered in the space, extending them beyond their reality, into the dream-space of the tunnel. This spectral shaping also reflects the life-world experience of entering and exiting the tunnel, as the walls of the structure filter a certain amount of the higher frequencies of the surrounding river and traffic. The filtered shapes of the sound materials serve therefore both to contribute to the sense of dream-space and to present something of the *actual* sonic experience of the place.

[78] Tuan, *Space and Place*, 86.

The reintroduction of the higher frequencies of the broadband ambience brings the physical sound-space back into focus, and this is used as a technique for creating a sense of *emergence* at the end of the work (from 07:00 onwards). The emergence occurs into a recording made outside the tunnel, beside the river, which features a waning evening chorus. In the recording the passing of time and a sense of impermanence is marked by the *event* of the ending birdsong, witnessed in my extended stay in the environment. This is juxtaposed with the continuous flow of the river, itself constantly in flux, but understood and experienced as a stable part of the environment. The stability of this element of the recording thus contributes to the idea of an experience of place constructed through a sense of permanence. The recording into which the listener emerges is therefore utilised to reflect upon the spaces of pause and flow in the construction of place, on the perceived stability of physical environmental features, and on the corresponding impermanence of the dream spaces they may open up.

* * *

The theme of permanence and impermanence in constructions of place addressed by the recording that ends *Interlude* is addressed again in the structuring of *Tangent Lines*. The form of the work is structured around two moments of "coincidence" that intersect continuous and subtly shifting sonic environments. These constructions draw upon directional, transitory sounds such as passing boats, aircraft, trains and waves, to form sonic trajectories that fleetingly pass through the environment of the work, engaging with the ideas of passing through, lingering effects and temporary presences.

The first moment of coincidence starts its trajectory at 01:26. Beginning with the introduction of a boat motor, several recordings are gradually layered. These layers intensify the crackling textures, introduce sounds of cod, draw out the sound of the seal deterrent and create a swelling density through the sounds of a breaking wave. At 03:45, as these textures combine to create a dense occupation of acoustic and spectral space, this trajectory is halted abruptly. At this point of impact, a micro-edited fragment of a close recording of the seal deterrent breaks through the textures, its pitch being extended out in a reverberant tail as the noise components of the build-up recede.

The second moment of coincidence emerges from the ensuing resonances that are drawn out of the electronic tones of the seal deterrent. This time the coincidence is created largely from layers of sound materials gathered above the surface, including waves crashing onto the shore, a passing train, and an aircraft. From 04:43 a recording of waves and wind in the trees introduces broadband noise fluctuations in amongst the resonances. Out of this a slow emergence is created as further, unfiltered recordings from above the surface are introduced.

These recordings, which include boats, a train and traffic on a bridge, combine and converge, ultimately being cut across by the trajectory of the sound of a low-flying aircraft. These sounds are both suggestive of passing motion through their identification with transportation, and through their shaping of acoustic space in the environment of the work.

The established underwater environment returns after this second coincidence of surface, air, and underwater sounds, returning briefly to a stability suggestive of a permanent sense of place. The filtered rumblings of a boat motor provide a steadily shifting form that supports this, however, this ultimately serves to underpin a number of emerging and receding structures. These include a number of distant recordings of the seal deterrent that are brought into approaching territory, along with subtle waves of surface material, hinting at further intrusions that never quite come to fruition. This leaves a lingering sense of disturbance in the work, suggestive of the long-term effects of impermanent industries.

At 08:54, as the sounds of the passing boat recede into the distance, a recording of waves, calmly lapping onto a slipway, is introduced. This contrasting spatiality forms again a "surfacing" device, serving to provide an *emergence* form that pre-empts the listener's re-emergence into the public sphere a minute later, via the removal of the headphones at the end of the composition.

In both *Interlude* and *Tangent Lines* something of a narrative structure is suggested, in particular by the sense of emergence created by the unprocessed recordings at the end of each work. Both of these narratives draw upon the idea of becoming immersed in the complexities and layers of an environment, articulating a spatio-acoustic journey that draws the listener in, through and out of these sonic environments.

In *Tangent Lines*, this was an important part of the method that contributed to the aims of transmitting or transducing knowledge through the audio work. While it does not "re-tell" the stories heard through a documentary or representational approach, it creates a spatial narrative that engages with the ideas inherent in them – the ideas of passing through, temporary immersion, permanence/impermanence and constructions of place. Similarly, the installation made for the "Touching Space-Time" exhibition - *Isolation/Oscillation* - which was also designed to explore methods of knowledge communication, draws upon the narrative told by the scientists at the IGR. However, rather than "telling" this story through the structure of the work, the structure engages with the spatial ideas communicated through their research, exhibiting configurations that reflect on the revolving binary star systems, rippling structures, and the contrasting scales between the star systems being studied and the impacts observed on earth. In a sense, both these works, in their transducing of knowledge, rely on a collaborative

process, with Winderen/Smith and the scientists at the IGR acting as storytellers, the sources of the information with which the works engage.

* * *

During the creation of the two projects (*The Rinsing* and *Hagar and the Angel*) in which the collaborations involved the intertwining of audio and visual/physical spaces, the structuring of the works was both enriched and guided by the collaborative process. For *Hagar and the Angel* the design of the audio component was developed alongside the visual elements, drawing both on Campbell's work *Jetties*, and, significantly in terms of the temporal form of the work, on the recordings made from Jørgensen's sculptural materials. Conversely, Smith largely developed the temporal form of the sound of *The Rinsing* prior to my involvement, cut to the picture as she edited. My purpose was to create a spatial mix of this material, and to provide additional sound design where the spatial structures required it.

In *The Rinsing*, one of the structural components that opened up significant potential for the spatial mix was the repeated words of the *acousmêtre*[79]. Throughout the film the same recording of a disembodied voice is used to robotically repeat the following:

> *Good news is - it's never too late to use this simple technique. If you are ready to find out for yourself then here is how to unlock his heart and get the love and devotion you want from him.*

In exploring the nightmare qualities of the film I intended, through the mixing process, to create a shifting sense of space that juxtaposed the central character's point of audition with unreal, disconnected spaces. The *unmixed* voice was identical in each iteration, and thus as a constant (material wise) throughout the film, this provided an opportunity to create inherently related passages into the mind of the character, into the on-screen environment, into a dream-like space juxtaposed onto the image, and into an ambiguous hovering between on- and off-screen space.

The first iteration (00:24-00:34) positions the voice as the all-encompassing acousmêtre. It is situated neither inside nor outside the image, occupying the ambiguous space created by the reverberation applied to the recording. This reverberation is designed such that it does not situate the voice undoubtedly within the onscreen space, but suggests an occupation of the entire environment of the film, spatially extending the "power" of this voice. This omnipresence is reinforced by the second iteration of the phrase. This time the voice is mixed such that it appears to occupy the environment that the female character is in, but it is edited over a cut of the image between two different rooms. The spatial characteristics of the voice

[79] Chion, *Audio-Vision: Sound on Screen*, 129.

change at the point of this cut, suggesting that it is present in both spaces. The sound of an air conditioner is introduced in the second room, in order to create a sense of space around the character, situating the voice within this ambience. This was designed as an additional point of diegesis, created through the spatial mixing of the sound in order to draw the audioviewer into the onscreen environment.

The distorted quality of the third iteration of the phrase (01:05-01:15), immediately opens out a *mediatic space*[80]. However, the positioning of an image of the female character in the centre of the screen suggests a *subjective* point of audition[81], as she appears to hear the words being spoken. This juxtaposition of mediatic and onscreen space begins to break up the coherent spatial image offered by the setting of the previous iteration *directly* in the onscreen space. The following iteration (01:14-01:24) continues this rupturing of the audiovisual world, positioning the voice as a *subjective internal sound*[82]. The spatial mix is this time intended to extend the power of these words into the internal fears and insecurities of the female character. While again a subjective point of audition is established by the centring of the character's image on the screen, the image here shifts in and out of focus. In treating the audio such that it engaged with the dream-like space this suggests, I replaced the impulse response in a convolution reverb processor with a recording of an extended metallic sound. This serves to create a large, but unreal quality to the spatial image within which the vocal is heard. The juxtaposing of this distanced, expansive soundfield with the unstable close-up image of the character is designed to suggest that this voice is still heard by the character, but not within the real space she inhabits onscreen. This creates a sense that it is, instead, a memory or a reiteration of the voice haunting the character, as the filtered, reverberating sound creates a disorientating reality that coincides with the nightmarish shifting focus of the image.

In these treatments of the acousmêtre I experimented with the intertwining of mediatic, subjective, disconnected and onscreen spaces in order to create both coherences and ruptures in the audiovisual world of the film, creating a sense of the shifting spaces of a nightmare. This contributed to the overall aim of extending the nightmarish qualities of the visual world

[80] Smalley defines the mediatic space as "compris[ing] an amalgam of spaces associated with communications and mass media, as represented in sound by radio and the telephone, and sonic aspects of film and television. Included are utterance spaces, such as the interview, the voiceover, DJ styles, the disembo- died voice (bathed in reverberation); transformations which signify distance, like the kinds of spectral crunching one hears when sound quality is poor; and the catalogue stretches to include mediatic genres like commercials, and communicational signals like ring- tones. Mediatic space creates not so much a direct spatial form, but an image of spaces and places, events, distances, which impinge on, and form part of the spaces within which we act." Smalley, "Space-Form and the Acousmatic Image", 39.

[81] Chion, *Audio-Vision: Sound on Screen*, 90.

[82] Ibid. 76.

of the film into the sonic spaces, tying in Smith's "confrontational" aesthetic approach as the audioviewer is drawn into the mind of the central character.

The collaborative process of relating of audio and visual spaces also played a role in the structuring of *Hagar and the Angel*. The shapes and contours of the recordings of the plastic dustsheets used in Jørgensen's sculpture were utilised to underpin the temporal structure of the audio work. The ebb and flow of these recordings, alongside recordings of the wind, was used to form the basis of the arrangement of the granular textures that animate the acoustic space. In this way thousands of tiny sonic grains were distributed across the sound field, at a surface level suggesting the dust and sand of the desert environment, shaped into storms and dunes by the wind. The allusion here to the desert environment was not designed as a representation of the desert soundscape, but rather took elements of the environmental qualities of the desert – texture, shape, ephemerality etc., - and articulated these ideas through sound. Beyond these environmental metaphors, however, the granularity of the sonic environment was also designed to create a fragmentation of space, articulated by various micro-edited materials that were diffused across the space of the installation. Seemingly always in motion, these materials are sculpted into ephemeral structures and disintegrated throughout the work, forming a shifting, nomadic spatiality. This engaged with the intentions behind the auditory intervention in the gallery space, creating juxtapositions of motion and stillness, uniformity and chaos, and displacement and emplacement.

Contributing to this splintering of acoustic space, and the nomadic aurality this creates, is the treatment of six recordings of the poem, recited by Algerian, French and Scottish voices. They are fragmented through micro-editing and granulation processing, which serves to disrupt the semantic content of the material, concealing it completely on occasion, and revealing it only through displaced words and phrases. This allows for different traces of meaning to be realised in engagement with the vocal material. Due to the fragmentation, these layers are not necessarily governed by the words themselves, but may in fact *augment* their meaningfulness. Through retaining the characteristics that allow these fragmented utterances to be identified as voices, the environment created is designed to draw the ear down transient paths of understanding, leaving it hanging as the word or phrase is cut off, masked or otherwise impeded. This is designed to create an alienating tension between the familiarity of the source and its apparently disjointed spatio-temporal formations in the composition. Indeed, the vocal material is spatialised such that multiple threads of motion may be followed, as the ear traces layers of meaning woven through the fabric of the sonic textures.

The incongruity of this spatial image with the recognition of the source was designed to present a sense of displacement, as identifiable voices advance and retreat, moving

incomprehensibly from near to far across the morphing sound field – until, perhaps, the listener may begin to embody these spatialities, listening *through* the voices, *through* the language, in order to make sense of the sonic structures which emerge out of this material as embodied spatiality. This process is aided by the intertwining of the audio with the space of Jørgensen's sculpture by the inclusion of the dustsheet recordings across the acoustic space. As mentioned previously, this, in a sense, enables the sculpture to become a part of the structure of the audio work – as a visual extension of the auditory space.

Indeed, the aesthetic worlds created by the works in the portfolio are intentionally not formed solely through their structuring in acoustic space, but rather involve too the environments in which they are presented – the specifics of which are discussed in the next chapter on *Presentation Practices*.

Presentation Practices

The presentation context can have a significant impact upon the way in which a sonic artwork may be understood, in particular regarding spatiality. Therefore, in **Appendix 2** the ideal installation and performance instructions for the works are described and illustrated. Notably from these instructions, the six works defined as ambisonic compositions (*Room*, *Interlude*, *Adrift*, *CloudLines*, *Isolation/Oscillation* and *Krafla*) are not composed as concert works for playback in undefined, varying spaces. In acknowledging that the spatial images created by each work are inevitably constituted in conjunction with the presentation environment, it became necessary to specify what these presentation environments should be. However, it must be noted that these works are not designed as direct *response* to the presentation contexts, drawing directly upon, for example, acoustic, architectural or other qualities of the environments in which they are installed. While this practice *could* be augmented to address such site-specific issues (and is, to a certain extent in the collaborative audio/visual installation *Hagar and the Angel*), the focus of these ambisonic compositions was to explore the sound environments created by *electronically mediated* sound, whose spaces are, inevitably, understood in relation to the environments they are played back in. Therefore the specificity of the site of presentation is illuminated such that the works are presented in a way that best facilitates the realisation of the intentions behind them.

Nonetheless, one of the key approaches to presentation was the situating of three of the works (*Room, Interlude* and *Adrift*) within dark space. While this "dark space" is essentially repeatable, re-locatable and mobile (undermining the fundamental principles of site-specific work) I argued in the introduction to *Hollowing out the Darkness* that it is treated here as a *site* within which the work is presented, as opposed to a *condition* of the performance. This gives this element of the work an environmental (spatial) emphasis as opposed to simply durational – the environment *itself* is dark as opposed to the lights being turned off for the duration of the performance. This was achieved in practice by establishing the darkness in the room before the audience entered the space, showing them to their seats by torchlight, and lining the space with blackout drapes to limit any reflection of the torchlight from the surfaces of the walls, therefore revealing as little of the size and shape of the room as possible. The three works in this section are fixed-duration works, with audience members entering at the start and exiting the space at the end of the composition, and the work is looped over a number of hours such that there is not a single "performance" of it. These approaches were intended to situate the experience as an *encounter* with an *environment*. In this way the darkness offers a different situation than, for example, that experienced by the listeners who opt to wear a blindfold during a performance by Francisco López. While López's intention to

shift attention from representation to being through an environmental or *profound* listening[83] is also reflected in my approach, the act of blindfolding employed by López suggests a deliberate visual deprivation – a hiding of the visible – as opposed to the process of entering into an environment of visual ambiguity. In the successful implementation of the latter, the desired visual spatial boundlessness becomes part of the overall environment of the work, arguably conforming to an element of site-specificity - the interrelatedness of the environment and the work – creating "an inextricable, indivisible relationship between the work and its site, and demand[ing] the physical presence of the viewer [and listener] for the work's completion"[84].

Indeed, this site of dark space is integral to the works. Unlike, for example, the physical spaces in which López presents his work, or, likewise, a white gallery space designed to diminish the visual significance of the environment on an artwork, the dark space here has its own significance as a *part* of the environment of the work. This sculpting of the presentation environment arguably then situates these as both sonically and visually designed installation works.

The importance of this became particularly apparent when an opportunity arose, in May 2014, to present *Room* in a concert. The work was included in a programme of electroacoustic works – *On the Occasion of the Performance of John Chowning's 'Stria'* – held in Spazio Bocciofila in Venice. Tearing the audio out of its dark space installation context, this manifestation of *Room* was a concert performance in a semi-lit white gallery space. The opportunity to have the work performed in such a setting presented an intriguing experiment in resituating and thus re-imagining a fixed work. The new context situated the spatialities of the work immediately as an *elsewhere* referred to through and by the work. In response to this, the decision was made to provide a programme note (read out as an introduction before the performance), which gave the spatialities of *Room* a placial, locative context. The grain silo site whose sounds the work is built from, and whose spaces guided the structure of the work, was referenced in this introduction, situating the "elsewhere" of this place as a part of the presentation context. The spaces opened out by the work were thus re-purposed as *enactors* of the meaning imbued upon them by the accompanying text.

As the sonic spaces already constituted an experience of *elsewhere* because of their incongruity with the physical presentation room, this approach was not inconsistent with or detrimental to the embodied spatial experience. Instead it offered a framework upon which to hang these juxtaposed spatialities of listening environment and work, furthermore serving to

[83] López, "Profound Listening and Environmental Sound Matter", 85.
[84] Kwon, *One Place After Another*, 12.

situate the processes involved in the work's creation as part of the aesthetic experience. However, this presented - spatially speaking - an entirely different experience to the initial manifestation of *Room* in the dark basement space in *The Arches*, raising the question as to whether this constitutes the same work at all.

This question arose a number of times when opportunities to present works at conferences and festivals were offered, but without the option or resources to provide the presentation environments as described in **Appendix 2**. For example, *Interlude* was first presented at the listening room at *Invisible Places/Sounding Cities* and *Jardins Efemeros* festival in Viseu, Portugal in July 2014. The listening room featured over 50 works, running throughout each day of the festival. The room was white, and although shutters were used to exclude some of the daylight, the setting was not dark. Visitors could enter and exit the space at their leisure, and a series of cushions were laid out on the floor in the centre of an octagonal speaker array.

The intended presentation environment for *Interlude* is a completely dark space, both in order to create a visual spatial boundlessness, and also, in part, as a reference to the darkness encountered in the tunnel environment that it is based upon. However, like the performance of *Room* in Venice, the inclusion of the work in the listening room programme presented an experiment in re-contextualising the work. Again, the placial references inescapably became an *elsewhere* in this presentation context – a phantom place brought in to haunt the space of the listening room for the duration of the work. The intention behind the work was therefore disrupted by this re-contextualisation, and yet, significantly, the questions it raised engage further with the ideas that motivated its creation. The line between a sonic "here" and "elsewhere" was precariously established in this presentation of the work, bringing into question the nature of the sonorous present it brought forth – a question that engages with the idea of opening up imagined spaces and reflects on Bachelard's notion of *hearing what is, and what is not*.

* * *

The multi-channel works in this folio have also been mixed for stereo playback, as a means of disseminating the pieces online, and for other specific opportunities (such as the inclusion of *Interlude* in the *A Quiet Position | Road* installation at the *End of the Road* festival). While these mixes have been crafted to retain as much of the spatial information as possible, this process does fundamentally change the spatial images created by the works, and the online dissemination releases them for multifarious, undefined playback settings. The decision to create these mixes was largely to allow engagement with established dissemination contexts for sonic artworks, thereby increasing the potential impact of the research and broadening its audience. Where text or a title accompanies the works (such as

their online dissemination via SoundCloud), they are qualified as “stereo versions” and in the context of this portfolio, the inclusion of the stereo mixes is for reference purposes only.

Ultimately, however, it must be noted that these works lose their full dimensionality when situated in such established presentation contexts. The flexibility required in order to take a large number of the opportunities in the field of sonic arts presents a trade-off between dissemination to a broader audience – via engaging with concert formats, online broadcasting and collective listening spaces – and the maintaining of the ideal presentation contexts that allow the dissemination of the complete aesthetic worlds of the works, thereby fully realising the intentions and purpose behind them.

Engaging with these alternative presentation contexts did, however, provide the opportunity for experimentation that in one sense verified the need for specified installation instructions for the works, but that also raised further questions pertinent to the research aims, - consequently influencing the development of subsequent works. For example the re-contextualisation of *Room* for its performance at Spazio Bocciofila and the listening room presentation of *Interlude* both influenced my approach to presenting *Krafla*, which is deliberately conceived of for installation in a white gallery space.

* * *

Krafla is designed to exist as a looped soundscape work, whose only accompanying information is the full title of the work printed at the entrance to the room – *Krafla Geothermal Power Station/Hverir, Iceland June 2014*. Having experienced the effect of the re-contextualisation of *Room* and *Interlude* as producing a sonic “elsewhere”, this work was deliberately designed to bring the absent geothermal soundscape into a gallery space, using the extended *temporal* form to offer a sense of emplacement in the environment of the work. As mentioned in the introduction to this work, the experience of “being” rather than “representation” described by López and Voegelin relies on a shift of attention to the ephemeral and transient sonorous present as opposed to any prescribed description of its meaning. In this work I was interested in engaging the borderline between presence and absence, experimenting with the idea that the sonorous present offered by the work may provide a transportation from or transcendence of the listening space, deliberately positioning the immersive sounds as from an absent elsewhere.

The title given at the entrance to the installation gives a small amount of contextual information that produces a geographical/placial framework upon which this sonic experience may be hung. It offers a context (the power station) for understanding the nature of the sonic agents behind some of the materials, but simultaneously retains in these understandings an

amount of ambiguity and inner life independent of this "aerial view" (Voegelin). This speaks to the possibility of López's *profound listening* – in this way the contextual information is not designed to *restrict the meaning or goal* to a representational level, or *dissipate the inner world* of sounds (López).[85]

Similarly where longer text (as for *Tangent Lines*) or other materials/exhibits (as in the *Touching Space-Time* exhibition) accompany the works in this folio, it is intended that these additions provide a story that constitutes a part of the environment I wish the audience to encounter. The information provided situates the sounds within a specific and intentional context that impacts upon their reception, revealing a geographical location, story or idea that shapes the imagined spaces, places and forms conjured up by the audience's engagement with the sounds. In his discussion of Jacob Kirkegaard's work *Four Rooms*, which explores the room tones of four abandonded spaces in Chernobyl, Seth Kim-Cohen acknowledges the impact of preceding knowledge about the nuclear disaster on the listener's reception of the work. He writes:

> "As listeners, the inflection we hear is not precisely that of radioactive particles and electromagnetic waves but of the story, the history, of them: the radioactive, electromagnetic *text*. We hear the hum of Kirkegaard's piece through the filter of what we know about Chernobyl. What we hear is haunted not by the actuality of the human beings who once inhabited the rooms but by their histories and by history. The actual is constituted by the intertwining texts of the sound, not in and of itself, but of what it takes from and gives to the stories that accompany it. What we are left with is *an* actuality, not *the* actual."[86]

Likewise, the text that accompanies *Tangent Lines* (see **Appendix 2.4**), for example, is intended to provide such a "filter", through which the sounds, spaces and places that are heard may be understood. It is intended to situate the work such that its forms are experienced as *taking from and giving to* the stories and places that are offered in text. The potential further knowledge of these stories and of this place that the listener himself may bring is a variable that offers another such filter, and, as Truax writes, such contextualised works can *invoke* the listeners' knowledge of the contexts[87], forming a key element of the work's reception. Therefore, in *Tangent Lines* the text, present on a plaque attached to the listening post, combines with the knowledge of the listener and the environment of the work to create the *actuality* of which Kim-Cohen speaks.

This "actuality" is further informed by its presentation as headphone work situated in a public space. Blesser and Salter note that

[85] López, "Profound Listening and Environmental Sound Matter", 85.
[86] Kim-Cohen, *In the Blink of an Ear*, 132.
[87] Truax, "From Epistemology to Creativity: A personal View".

> "headphone listening is socially important simply because it allows individual listeners to maintain the privacy of their acoustic arenas while in a public setting… enclosed performance spaces may have arisen from the need to create an acoustic boundary between a smaller private and the larger public acoustic arena."[88]

As mentioned previously, the decision to create a headphone work was a reflection on the spatial duality of the environment recorded – listening-in from above the surface of the water to the sonic environment contained below. This is echoed in the acoustic boundary established between the private and public sphere via the use of headphones. The temporary immersion in an "other" sonic world that the process of putting headphones on affords the listener is key in the overall design of the work, and situating this in a public (non-gallery) space is intended to accentuate this "otherness".

As well as reflecting on the process of listening-in to the underwater environment, this also engaged with the temporary constructions of place formed as a visitor, as the listener "visits" the sonic spaces revealed through the headphones. Furthermore, the idea of coinciding spaces explored in the work is reflected as the listener, engaged in the aesthetic world of the work, coincides with passers-by in the larger public space outside this acoustic arena, who are oblivious to this world. One of the key issues addressed by Winderen's work is the lack of awareness of the sonic environments of the oceans and the effects of underwater noise pollution. She writes, "in the depths of the oceans there are invisible but audible soundscapes, about which we are largely ignorant, even if the oceans cover 70% of our planet"[89]. The single listener perspective created by the headphone installation, surrounded by unaware "passers-by", is a reflection on this situation.

* * *

The social/public space of presentation also plays a role in *CloudLines*. As mentioned previously it is composed to be presented in a collective listening space, dimly lit solely by the venue's security lighting, and it is suggested that ideally the work should be played back as its own event – a "sonic happening" – as opposed to being included in a programme of a concert. These conditions are suggested in order that the presentation environment plays a role in the exploration of disturbances that this work presents. For example, having experienced on a number of occasions the undesirable effect of essential security lighting on the "dark space" required for the works in *Hollowing out the Darkness*, *CloudLines* utilises this disruption of the darkness deliberately in the performances of the work, specifying these disturbing light sources as a part of the aesthetic world encountered.

[88] Blesser and Salter, *Spaces Speak: Are You Listening?*, 191.
[89] Winderen, "Artist Statement" on www.janawinderen.com.

The *sonic* qualities of the shared listening space are also utilised deliberately in order to impact upon the experience of the work, and contribute to the exploration of disturbances. To this end the work begins with a very low level mix of a recording of rain hitting a window, positioned at the front of the sound field and designed to be barely audible. Unlike other works in this portfolio which begin with sonic structures designed to immerse the listener into the world of the work, this opening recording is positioned at a distance, and at the threshold of audibility, asking the listener to extend their field of perception across this distance to meet it, inhabiting this distal space insofar as its unstable presence, open to interference, will afford. This allows the sounds that will inevitably disrupt the imagined silence of the collective listening space – the creaking of a chair, a door opening, sounds of the weather, coughs, for example – to become potential agents of disturbance, bringing into play the social space of the presentation environment as the audience strain to hear the work, attuning to the quietude.

During this initial fifty-four seconds the sound is constructed such that the audience has the potential to "disturb" the work – intruding upon its distant, indistinct forms. However, beginning at 00:54, the sounds of the work itself are created to break this attunement to the quietude, as they permeate proximate space and mask the distant sound of the rainfall. The sonic forms that follow are designed to intrude upon the listening space, masking quieter sounds, filling acoustic and spectral space. The roles are thus reversed, as the work becomes a potential disturbance for the audience, intruding upon and shaping *their* space of being.

This notion of shaping a listener's space of being, as articulated by Böhme (quoted in the introduction to *CloudLines*), is fundamental to the practices behind these works. The spaces opened out by the sounds play a major role in this modifying of spatial experience, however in the context of this research the environment in which the listener hears the work is also considered to be an important element of the shaping of space, as a contributor to the aesthetic world he/she inhabits in the encounter with it.

Conclusion

To summarise, the principal aim of this research was to conduct an investigation into the process of "opening out" spaces with sound as a compositional approach, exploring the aesthetic potential of spatiality in sonic art works, the interaction of such sonic spaces with visual and physical environments, and the nature and potential of communicating or rendering knowledge through artistic sonic environments. This investigation focuses not only on the intrinsic spaces of sound-worlds, but also the extrinsic, lived, recorded, mediated and implied spatial constructs that emerge in spatial audio works. It views these equally as contributors to both the creative processes and aesthetic outcomes of the works. Thus in the compositions that form this folio, sonic spatiality is a key factor during every stage of the creative process. Rather than being accounted for largely at the spatialisation or mix stage of the creation of the work, the consideration of spatial aesthetics is behind the decision-making in the development of concepts and strategies that underpin the works, in the recording of materials, in the editing and manipulating of sounds, and in the presentation practices.

Approaches to spatiality in sonic arts vary widely across different practices. It is, for example, a significant element of the practices of artists conducting sonic explorations of spatial acoustic phenomena and/or physical or architectural spaces (e.g. Bernhard Leitner, Bill Fontana, Jakob Kirkegaard, Mark Bain, Sam Auinger). Spatiality is often considered also as an element of a broader or alternately focussed compositional practice, as in, for example the work of Francisco López, Jana Winderen, Jez Riley French, Chris Watson, and others whose works have been referenced in this commentary. The practices behind the works in this portfolio draw upon, respond to and are preceded by the research and practice approaches taken by these artists, but in their original outlook and aims they prioritise the composition, revealing, implying and opening out of sonic spaces by means of electronically mediated sound. In underpinning the practice with an exploration of spatiality – across varying approaches and contexts – this research contributes to an understanding of the aesthetic, affective and communicative potential of the spatial element of sonic art. It privileges understandings of lived space in the development of the works, and positions spatial aesthetics as the "trunk" of the creative process, out of which various branches may grow.

I suggest, by way of conclusion, that these explorations expand the notion of spatiality in sonic art to contribute to an understanding of sonic *environmentality*. These "expanding" perspectives were drawn out of and informed by the practices and writings of scholars across different fields of study, including sonic studies, new media, sound art, acoustic ecology, film, human geography, architecture, and philosophy. This provided a transdisciplinary basis for the development and employment of compositional processes, and for aesthetic decision-

making, reflection upon the work, and theorisation of the practices. The contextualisation of sonic spatiality within this broader aesthetic framework was an important part of the process behind the works in the portfolio, leading both to understandings of the relevance of spatial aesthetics in the field of sonic arts, and further questions regarding the ways in which sonic arts practices may contribute to the larger discourse on spatio-acoustic aesthetics in the life-world.

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Appendices

Appendix 1 - Excerpt from Hull, J. "Sound: An Enrichment or State"

"I learnt to listen to the sound of the rain. I learnt this first I suppose, through depression. I experienced some times of prolonged and deep depression, when I made an important discovery: that there are feelings so deep that you can't feel them. And I can remember times when, in my study at home, I would become conscious that there was a storm going on. I would forget about my disorientated and vacated interior and would become aware of the wind, thundering upon the corner of the house, whistling through the eaves. And then I would become aware of the rain, splattering on the windowpane. I would stand up. I would press my nose hard against the window. And gradually it was as if the glass disappeared, because now my consciousness extended out from my nose pressed upon a panel of glass until it became unconscious, and I became aware that the sounds of the rain on the surrounding panels—it was one of those windows made up of those little panels with beading between them—that the sound on the different panels of glass was different. Each tiny panel gave a different sound. And as I concentrated now on this sound—I don't mean to say I tried to concentrate, I was too depressed for that—as the sounds of these panels of glass became noticeable, became impossible *not* to notice, then it was as if my consciousness gradually spread out: first, the differentiation between the little panels of glass around my face, and then the wider sound of the panels of glass where the rain hit them on the edges of the windows, and beyond that, I realised I could I hear the rain hitting the wall. It was different, where it hit the wall from where it hit the window. Where it hit the window it reverberated with little echoes. Where it hit the wall it was dull. But then I realised I could hear the water running down the wall. And now I became aware of a distant rushing sound-a spout from the corner of the house, and the water was gushing down it. Beyond that something else…yes… the rain was falling upon a large bush, I could detect it. And what was this between the bush and the spout?…Yes…there was a different sound where the rain was hitting the lawn, from where the rain was hitting the path. I listened more acutely…'swish', 'swish' …I could hear cars going past in the road. The rain had turned the light on. I listened yet more intently. Was it possible that I could make out the rain falling on the houses on the opposite side of the street? That I could not be sure of. But certainly, beyond all of those details of the immediate and the surrounding world, there was a distant roar of the rain falling upon the world, upon the city. And as I listened to this, I realized I was no longer listening, because the rain was not falling into my ears, it was falling into my heart."[90]

[90] Hull, "Sound: An Enrichment or State", 11-12.

Appendix 2 – Installation and Playback Instructions/Layouts

2.1 Technical Information for Ambisonic Works

Each project folder (for *Room*, *Interlude*, *Adrift*, *CloudLines*, *Isolation/Oscillation* and *Krafla*) contains the following:

1. A B-format file - labelled *"[Title] – B-Format.wav"* containing three channels in the order W-X-Y.

   This needs to be decoded to the correct speaker set-up with an ambisonic decoder. (Download available at http://www.brucewiggins.co.uk/?page_id=78)

2. A four-channel decoded version – labelled *"[Title] – Decoded Square – FL-FR-BL-BR-Lfe.wav"*

   This version is decoded for four speakers (plus subwoofer if required), set up in a square configuration. The channels are routed to speakers as follows:
   - Channel 1: Front Left
   - Channel 2: Front Right
   - Channel 3: Back Left
   - Channel 4: Back Right
   - Channel 5: Subwoofer (Mono from W channel)

   Note: Channel 6 is silent and does not need to be routed anywhere (exports from Reaper can only be done with even numbers of channels).

3. A stereo mix – labelled *"[Title] – Stereo Mix.wav"*

   The stereo versions of ambisonic works are provided for reference purposes only.

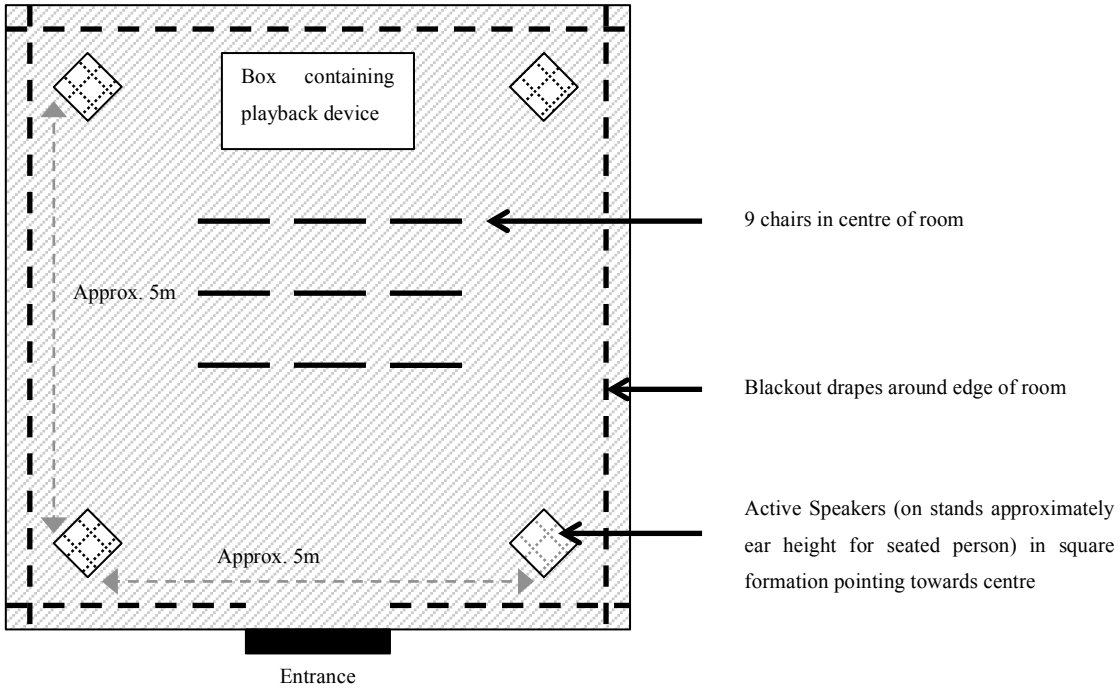
2.2 Hollowing out the Darkness

Room/Interlude/Adrift

Description

- Blackout drapes lining a room measuring approx. 6m x 6m, with closable entrance/exit.
- 4 x speakers with full frequency range down to 30Hz (or an additional subwoofer). The loudspeakers should be arranged in a square, approx. 5m square, pointing towards the centre of the square, set at approximately ear height when audience is seated. (Plus additional speakers within the same dimensions if available, for horizontal-only ambisonic decoding to e.g. octagon).
- 9 chairs set up in the centre of the square with back to entrance.
- No lighting inside the room - audience members enter and exit the area by torchlight.
- These are durational works, the audience enter prior to the beginning of the work and exit at the end.

Floor plan



2.3 Intertwining Spaces

CloudLines

Description

- Room large enough to accommodate speaker setup of approximately 8m x 8m (to produce a listening space large enough to seat around 30 people).
- Full range (down to 30Hz – or plus subwoofer) speakers (minimum of four, preferably eight) spaced around the room in formation suitable for horizontal-only ambisonic decoding.
- Around 30 chairs available for audience members.
- Safety lighting (fire exit signs and/or floor lighting) should be the only light source switched on in the room. Any windows should be draped if it is during daylight hours.
- This is preferably set up as its own event – a short sonic "happening" – as opposed to being part of a concert programme.

The Rinsing

Description

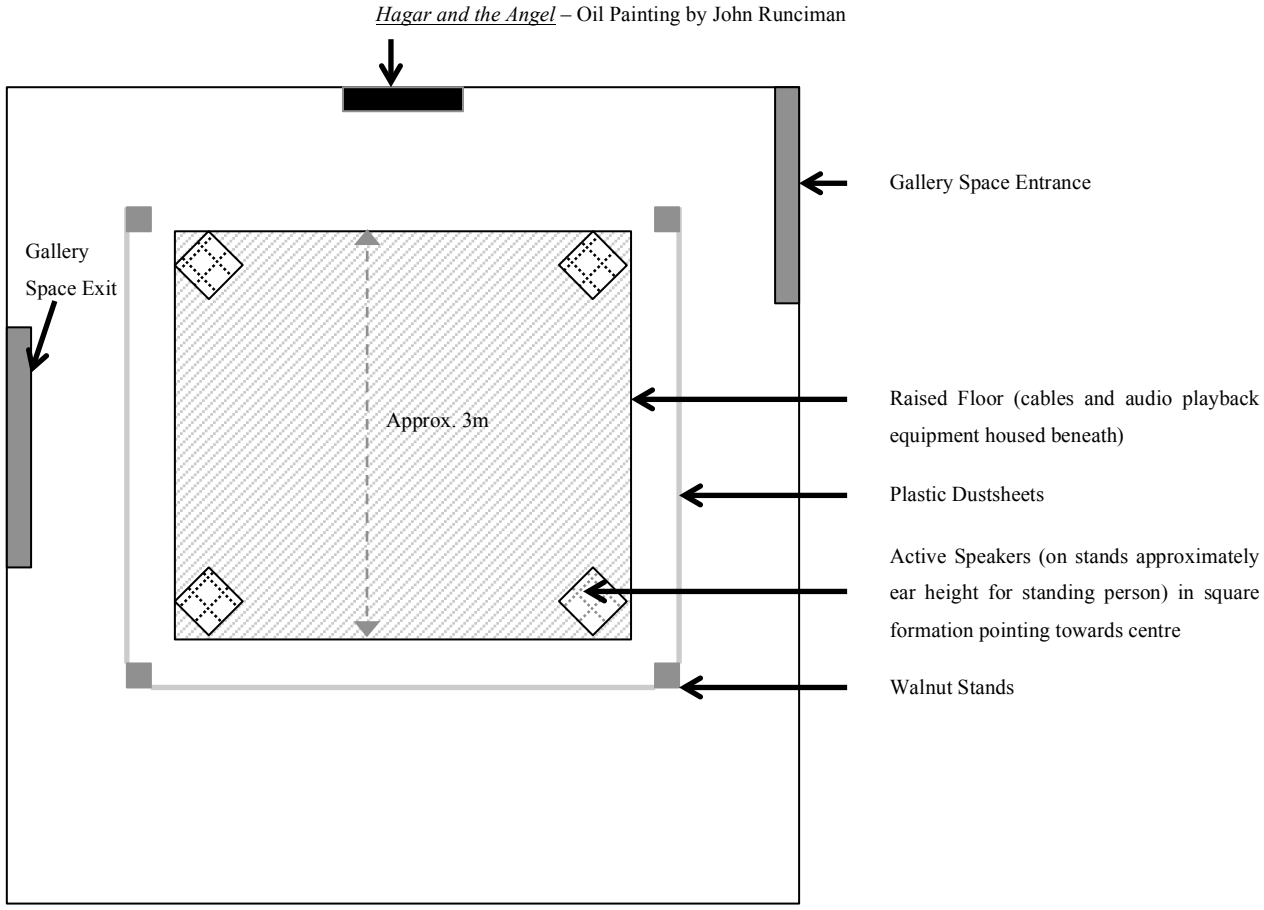
The work is made for television/online broadcast, requiring a screen and stereo speakers.

Hagar and the Angel

Description

Audio is played back over four loudspeakers in a square formation approximately 3m x 3m, pointing towards the centre of the square, situated inside the sculpture. The audio is looped and visitors can enter and exit at any time in the duration of the work.

Floor plan



Photographs

Photographs courtesy of Birthe Jørgensen

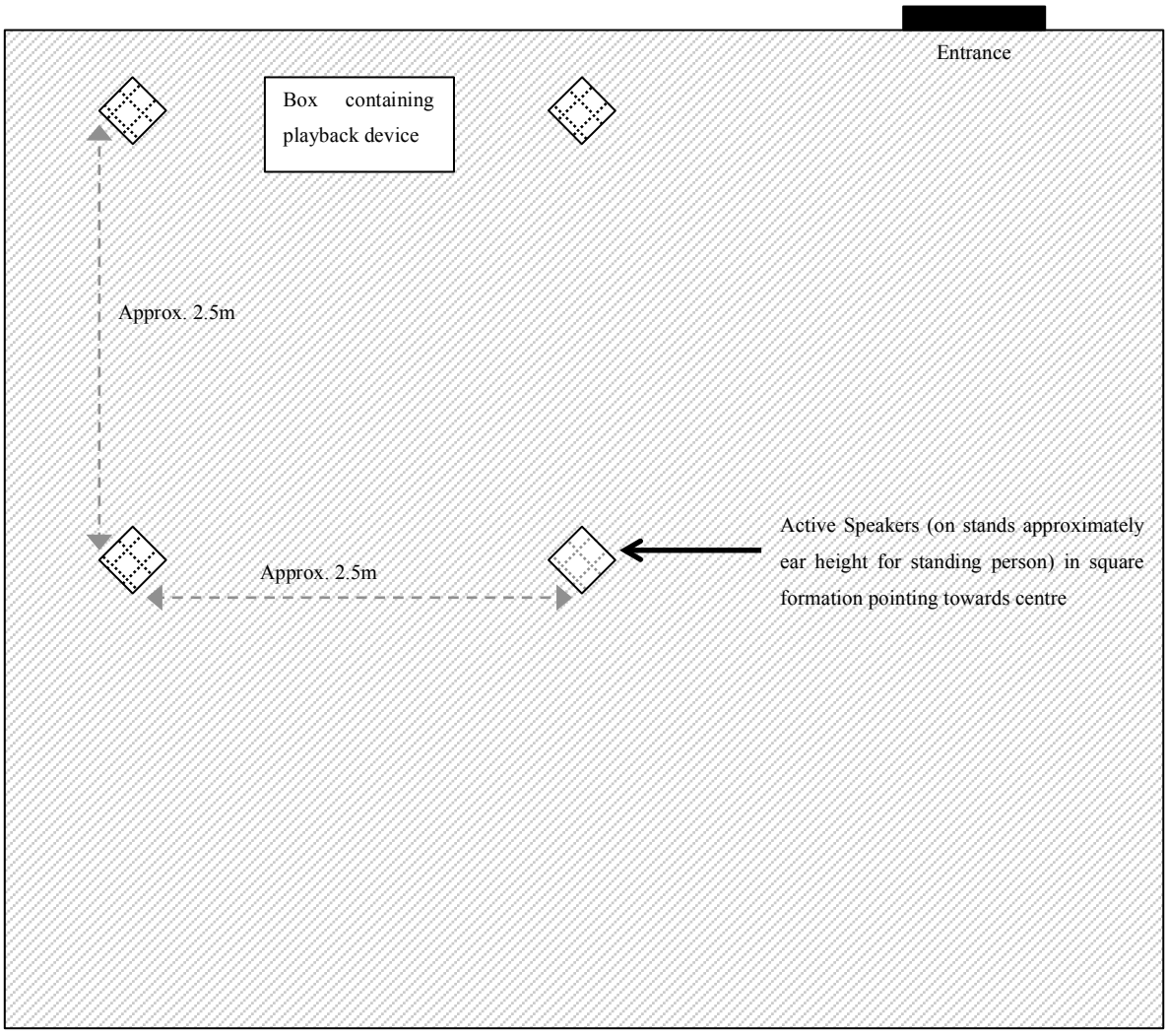
2.4 Transmission/Transduction

Isolation/Oscillation

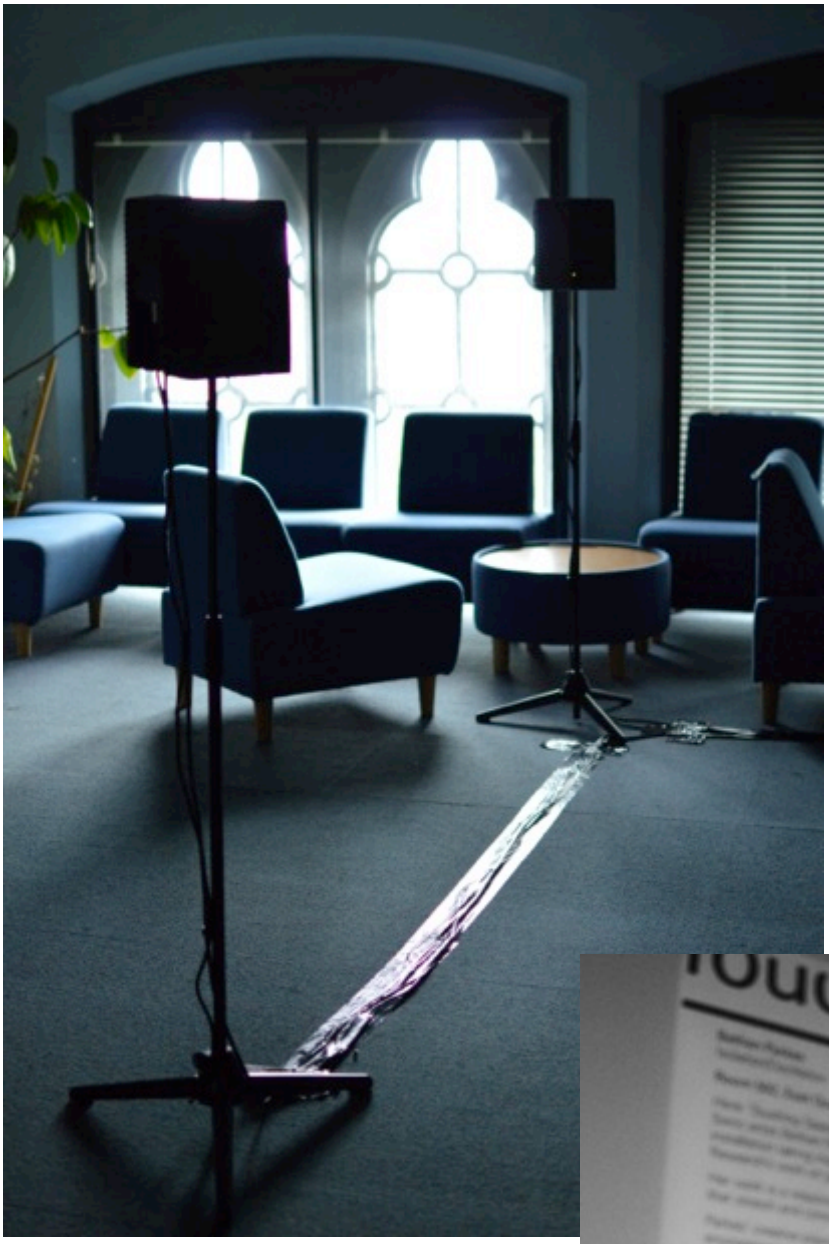
Description

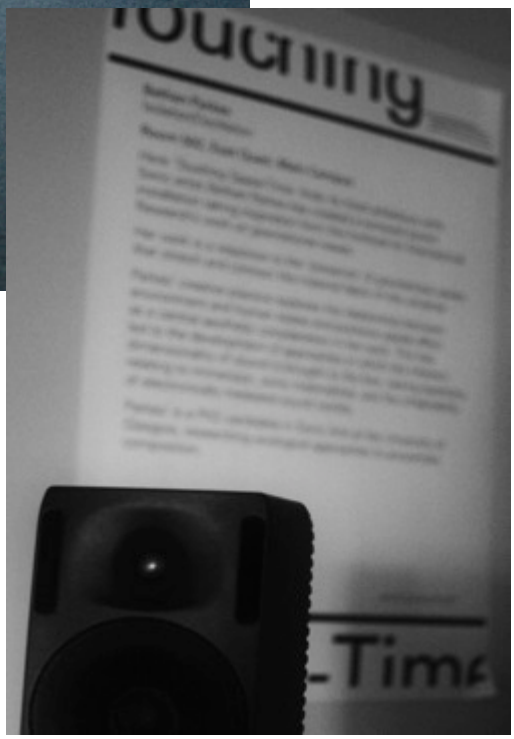
Isolation/Oscillation was commissioned as part of a multi-sited exhibition situated across the University of Glasgow campus. The sound installation was commissioned for the common room area of the Department of Geographical and Earth Sciences, inside the Gilbert Scott building on the main university campus. It took up a small portion (approx. 2.5m x 2.5m) of the room, such that visitors could enter the room and choose to enter the "field" of the exhibit as and when they pleased. It utilised four speakers in a square layout, with an additional subwoofer. The work was looped, playing continuously for the opening hours of the exhibition.

Floor plan



Photographs



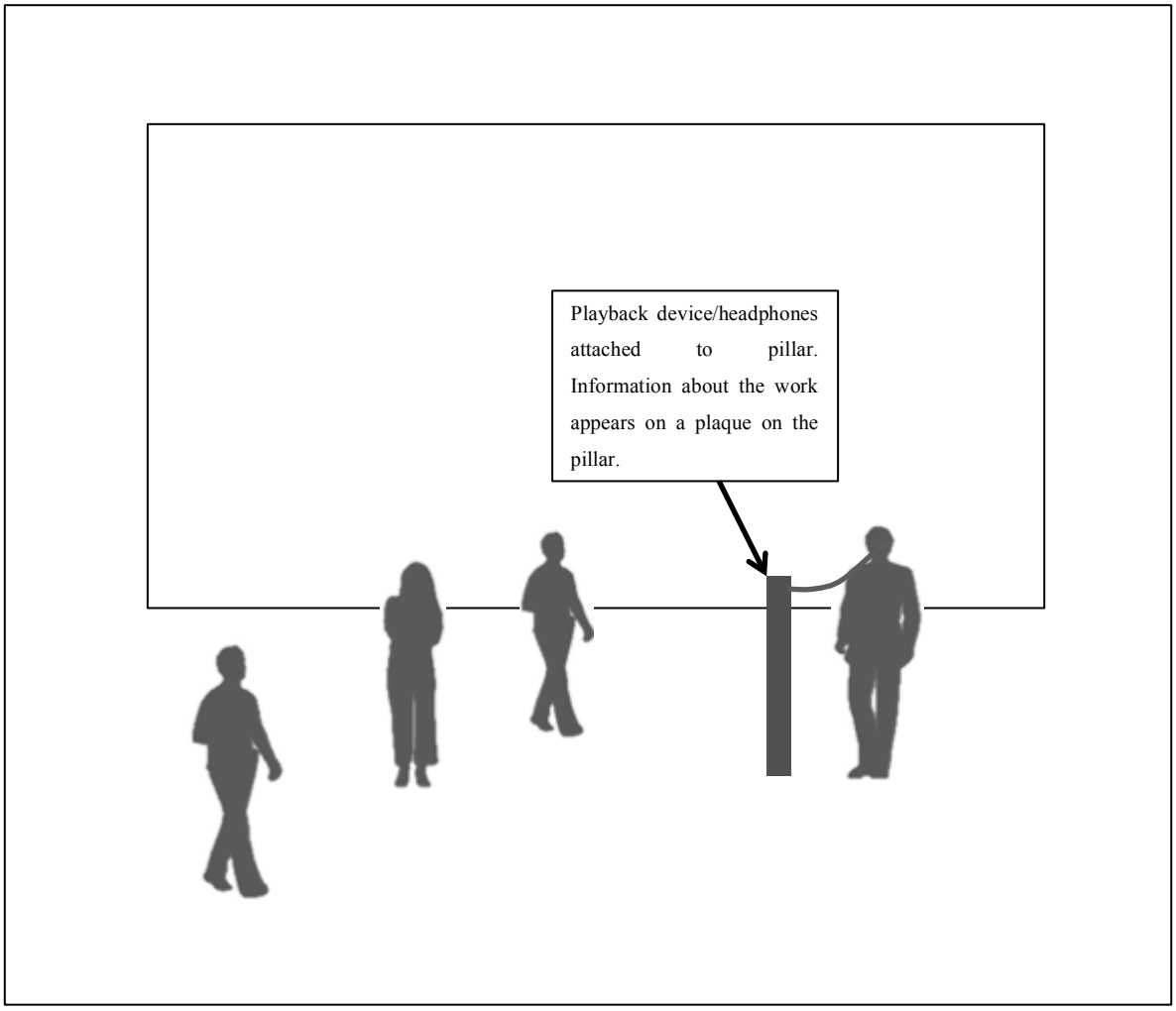


Tangent Lines

Description

- To be presented on a headphone listening post in a public space
- Include a plaque on the post with information about the work (see below)

Illustration



Information to accompany *Tangent Lines*

Tangent Lines is composed with field recordings from Loch Alsh in the north west of Scotland. It is, in a sense, a piece about this place, but it focuses on the temporal idea of passing through – the encounter with a place as a visitor. Tying in with stories heard of the effect of passing industry (trawlers and fish farms) on the waters around there – in particular on the seal and wild fish populations – the work questions the permanence/impermanence of place, and the coincidence of environmental and human durations.

Image

Krafla Geothermal Power Station/Hverir, Iceland June 2014

Description

- White gallery space.
- 8 speakers in octagonal array approximately 5m across (on stands approx. ear height for standing person)
- Audience enter and exit as they wish.
- The work is continuously looped, with no pause at end.
- The only contextual information given is the title of the work.

Floor plan