

Audiovisual Installation as Ecological Performativity: A creative research practice.

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ABSTRACT

Audiovisual Installation as Ecological Performativity lies in the fields of sonic arts and audiovisual practice, which experiment with developing non-linear installations from a temporally dynamic aesthetic. The project was initiated by my recent shift in artistic practice away from fixed-media audiovisual formats to non-linear procedures and by recent ecological discourses of human and nonhuman agency. The research aims to locate an ecology of practice that, rather than being autonomous and reductive, is directly affected by the specificity and proximity of connections made in practice and process on a relational level.

The submitted non-linear installations resulted from three field recording projects carried out between June 2014 and December 2015, spanning the west coast of North America from the Salton Sea in Southern California, to the northern regions of western Canada. From initial processes with practitioners from the fields of moving image, my iterative creative practice developed and applied computational methods to tease out co-creative apparatuses from the audiovisual material gathered. These techniques came to include convolution, data sonification, computer vision and improvisation as a means to explore non-linear processes. Barry Truax, Damián Keller, R. Luke Dubois, Andrea Polli and Jean-Marc Pelletier provided useful insights to contemplate these computational processes as co-creative devices.

The work *Undercurrent* incorporates material gathered from the Yalakom River in British Columbia, Canada, using visual material by media artist Shannon Harris. The remaining works—*Flight Variant*, *Cathedral* and *Piano at the End of a Poisoned Stream*—emerged from two audiovisual collection journeys through the south-western regions of the United States with filmmaker Andrew Denton.

My research was guided by the belief that non-linear creative processes exploring co-creative devices from the agency of material can elicit different sensibilities and lines of communication, providing an alternative way in which to be in creative practice and experience the world—one that is emergent, contingent and performative. Thus my project was drawn to concepts of material agency and performativity in the writings of Karen Barad, Jane Bennett, Judith Butler, Donna Haraway, Andrew Pickering, and Timothy Morton. In addition, the philosophical provocations of Timothy Ingold, Erin Manning, Brian Massumi, Isabelle

Stengers, and Thon Van Dooren were enlisted to locate my ecology of practice in a relational mode of experience that emphasized an ecological awareness.

From the position of creative research, attention to these theoretical discourses provided an opportunity to reconceptualise and ask new questions from the core of artistic practice. The result evolved into what I have come to call Ecological Performativity. This is a mode of practice that considers—in act and thought—the context and formative creative process, and the resulting artefacts, as a responsive embodiment of larger structures of phenomena. The outcome is a reorientation of my creative thinking-making procedures. The notion of creativity shifts from an anthropocentric understanding to a relational and performative ontology where the interactions between people, places and things constitute a dynamic mode of artistic practice.

Ultimately, my practice-based research is a multimodal endeavour deeply entangled in the mesh of the world: matter, materials, and modes of thinking. In line with the discussions on agency and performativity, this research considers the complex, emergent and dynamic encounters available through situated experience and experimentation. By considering the world as a network of phenomena that are fundamentally interconnected and interdependent, the result is a performative engagement and attunement with the world that functions as an aid to the imagination. Human activity is placed into a larger environmental context as it intersects with forces greater than those of human design, providing a multi-layered point of creative enquiry. This, I believe, works towards an artistic philosophy that purposes the way we imagine the world and how we act in it reciprocally inform one another. As such, the concept of Ecological Performativity developed alongside the iterative creative practice.

The creative and written components of this dissertation are two expressions of the practice, process and outcome and should be considered holistically. Documentation films and the creative code accompany all resulting artefacts, and are located on the external flash drive as indicated in the Appendix.

Aspects of my research have been published internationally during the course of my research.

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List of Publications

Journal articles:

Connors, Teresa and Andrew Denton. “In Environments: The convergence and divergence of practice,” *Organised Sound* 23, no. 1 (2018, in press).

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Oral presentations by referred abstract:

Connors, Teresa. “Ecological Performativity: a creative research practice.” Presented at the New Zealand Musicological Society Annual Conference, The University of Waikato, New Zealand, November 19–20, 2016. (won best paper award)

Connors, Teresa. “What Is Here? A Descriptive Account into Ecological Performativity: A creative research practice.” Presented at the FASSGRAD Interdisciplinary Conference, The University of Waikato, New Zealand, October 22–23, 2015 (won best paper on day 2).

Connors, Teresa. “Audiovisual Installation as Ecological Performativity.” Presented at CreateWorld, Brisbane, Australia, February 12–13, 2015.

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Exhibitions:

Cathedral — Toronto International Electroacoustic Symposium (TIES 2017), Toronto, Canada, August 9–12, 2017.

Flight Variant — (concert version) Waikato University Lilburn Trust Composition Awards, Hamilton, New Zealand, October 6, 2016. (won best multimedia/electroacoustic work).

Flight Variant — (gallery version) Sonic Environments Conference Brisbane, Australia, July 10–11, 2016; International Conference on Auditory Display Canberra (ICAD 2016), Canberra, Australia, July 3–7, 2016; Toronto International Electroacoustic Symposium (TIES 2014), Toronto, Canada, August 13–17, 2014.

Undercurrent — Balanced/Unbalanced Conference, Arizona State University, USA, March 19–29, 2015.

*Existence is not an individual affair [where entities] pre-exist their interactions,
but rather, an ongoing ebb and flow of agency where individuals and things
emerge through and as part of their entangled intra-relating.*

Karen Barad

*[E]verything is connected to something, which is connected to something else,
...the specificity and proximity of connections matter—
who we are bound up with and in what ways.*

Thom Van Dooren

PREFACE

As a creative practitioner I have explored many fields of artistic practice in the fine arts, opera singing, film scoring, acoustic/electroacoustic composition and multimedia installation arts. While music composition and opera singing became my focus, I owe a great deal of my creative curiosity to the formative years spent at the Nova Scotia College of Art and Design (NSCAD) in Halifax, Canada. I entered NSCAD as a teenager carrying my box of paints, charcoals, inks and colour contés, with the ambition of becoming a visual artist. This was an exciting time for my seventeen-year-old self as I was entrenched in a hub of creative activity and exposed to a plethora of artistic practices. While initial studies encompassed the traditional arts of painting, drawing and sculpture, for which my box needed constant re-supplying, another item would soon become the main creative tool: my father's old tape recorder.

Raymond first bought this device in the early 1970s as a means of recording our month-long family summer sojourns off 'The Rock.'¹ I can still recall the smell of that beige plastic device and the feel of the play/record/pause buttons. These audio travel diaries detailed our epic road trips all over North America, in which the day-to-day events were recounted amongst a backdrop of noisy children and camping activities. During the long cold snowbound Newfoundland winters, my parents and four siblings would periodically replay these tapes and chart the course of next summer's adventure.

I was intrigued by this tape-recorder and, at the sprightly age of seven, preceded to capture the sounds of my world. With microphone and recorder in hand, my early "field recordings" were those of household and backyard activities, sibling shenanigans, and sounds from the nearby gullies and forests. I would spend hours recording and playing back the gathered material, captivated by the audio representation of what was previously live.

By the time I entered NSCAD my relationship with sound was deep-rooted. Fortunately, during the 1980s, NSCAD was well known for its inter-media studies

¹ The Rock is common slang for the island of Newfoundland. Located on the most easterly point of North America, it has acquired this nickname as it comprises some of the oldest rock formations found on Earth. In parts, it is a windswept barren landscape consisting of ancient spindly spruce trees that grow horizontally along the ground in order to survive.

in installation, video and sound art, from which I grasped the creative potential for my pile of Maximum tapes and my father's beige tape-recorder. Once my foundation studies were complete, and with the encouragement of my instructors, I exchanged my box of paints, charcoals and contés for a reel-to-reel and began tape splicing audio fragments together.

All these years later, digital recording and the ubiquitous use of computers have replaced tape splicing and the two-track, and my youthful art school ambitions of becoming a visual artist have evolved into a career as a trained opera singer, composer and researcher. The one thing that has remained throughout, however, is the continued creative exploration of the day-to-day situated sounds and encounters in the real world. My field recordings have been collected all over Canada, the United States and New Zealand, and what was once a child's curiosity about her father's new toy has produced a catalogue of collaborative multimedia works that are intrinsically linked to geographical factors and everyday phenomena.

But what is it about these experiential encounters with the “stuff of the world”² that has held my curiosity? What significance does it have in my mode of artist practice, and how does this practice influence the conditions in which creative possibilities are activated, assembled, and processed? More specifically, what would motivate my collaborators and me to collect field recordings that place us in Death Valley at 153 degrees Fahrenheit, the polluted waste-lands of the Salton Sea in Southern California, the crowded sidewalks of Los Angeles and the tourist-filled paved pedestrian trails of Sequoia National Forest? Moreover, what purpose does making art from these lived and experiential encounters in the world have?

What I envisioned when embarking on this dissertation was a practice-based³ inquiry into my creative research from a temporally dynamic aesthetic, one

² Chris Salter, *Alien Agency: Experimental Encounters with Art in the Making* (Cambridge, MA: MIT Press, 2015), 4–5. I borrow this turn of phrase from Salter, who describes art works in which the agency and performative qualities of material and objects (the stuff of the world) “behaves and performs beyond us”, becoming co-creative components in the resulting artefact.

³ Linda Candy, “Practice Based Research: A Guide.” Accessed June 1 2013, <https://www.creativityandcognition.com/resources/PBR%20Guide-1.1-2006.pdf>. Candy defines practice-based research as “an original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice.” She further suggests that “the emphasis is on creative process and the works that are generated from the process: the artefact plays a vital part in the new understanding about practice that arise.” Candy's definition encapsulates the methodology used in my research.

embedded in the context of time and place. In developing the four new non-linear audiovisual installations resulting from three field recording projects during 2014–2015, non-linear processes were explored to tease out and locate emergent paradigms of expressions. In my research, I use the term non-linear rather than generative to foreground my shift away from the linear trajectory of fixed-media (pre-rendered) formats to explore processes that are not fixed in time. Non-linear thus refers to computational processes that have the capacity to alter the temporal alignment of the sonic and/or visual materials contained in the audiovisual installations.

Thus in this mode of artistic practice, creative openings negotiated a dynamic space of relational and situational experience that developed into a practice I refer to in this dissertation as Ecological Performativity. This is an artistic inquiry that shifts from the anthropocentric conceptualisation of creativity to a relational and performative ontology. The outcome is a reorientation of my creative thinking-making procedures where the “intra-actions”⁴ between people, places and things constitute a dynamic mode of artistic practice and are considered and explored as co-creative devices. Thus the context and formative creative process, and the resulting artefacts, are understood as a responsive embodiment of larger structures of phenomena.

As practice-based research, this dissertation traces the conceptual development of Ecological Performativity and its creative outcomes, and presents a range of contextualising theoretical and critical investigations that have influenced the direction of the research.⁵ Similar to other creative practitioners who have interrogated and theorized their own practice,⁶ my dissertation involves practice, theory, journal, history, and autobiography. Using this multi-modal approach the tools, methods and pathways of practice and thought co-evolve through transformative occurrence. My position is that an attunement to the complex polyphony of influences in the ongoing movement of practice is

⁴ Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press., 2007), Loc 795. Barad replaces interaction with “intra-action” as a method to rework the nature of relationality. I draw on Barad’s work in Chapter 3, The Relational Pathways.

⁵ Audience feedback was bracketed off from my research as I engaged in a practice-based methodology to tease out co-creative processes from the situated encounters in the field. Thus, my research focus is in the process of creating the works and not how they were received once installed.

⁶ Salter, *Alien Agency: Experimental Encounters with Art in the Making*, xii.

expressed to show how I arrived at the notion of *Audiovisual Installation as Ecological Performativity*.

Inherently this project is a transdisciplinary⁷ task, one that intertwines creative practice with different ways of making sense of the world, out of which new tendencies and relationships are contemplated and expressed.

⁷ Basarab Nicolescu, "Methodology of Transdisciplinarity – Levels of Reality, Logic of the Included Middle and Complexity," *Transdisciplinary Journal of Engineering & Science* 1, no. 1 (2010): 31. I use transdisciplinary, rather than interdisciplinary, to try and express the transversal nature of how my PhD research was conducted. This resonates with Nicolescu's notion of transdisciplinarity where: "The transdisciplinary values are neither objective nor subjective. They result from the Hidden Third, which signifies the interaction of the subjective objectivity of the transdisciplinary Object and the objective subjectivity of the transdisciplinary Subject."

1. INTRODUCTION

*Every practice is a mode of thought, already in the act.
To dance: a thinking in movement. To paint: a thinking through color.
To perceive in the everyday: a thinking of the world's varied ways of affording
itself. Each is a technique, or, springboard that sets in motion
a practice from within.*⁸

Erin Manning and Brian Massumi

The Mode of Thought

Erin Manning and Brian Massumi, in *Thought in the Act: Passages in the Ecology of Experience*, set the tone for how my research was conducted. As a practice-based PhD, the methods, pathways and objectives of the endeavour were that of an *inquiry* in creative practice rather than a means to answer any particular question, as is the case with traditional dissertations.⁹ Embedded in my creative activity, or mode of artistic thought, questions did emerge that responsively informed the *inquiry*, which set in motion an engagement with various critical, theoretical, and philosophical discourses. In turn this influenced the thinking-in-the-making procedures, and how I came to contextualise my practice and the resulting non-linear audiovisual installations as an Ecological Performativity act.

Accordingly, I was drawn to writers and practitioners who grapple with ideas of agency and the performative in relation to human and nonhuman bodies and to ecological, social, cultural and political concerns, and who raise and challenge long-standing narratives of human exceptionalism.¹⁰ Engaging with these discourses afforded a means to reorient, reconceptualise, and find new openings into elements that are integral to my creative research, including situated experiential encounters with the “stuff of the world,”¹¹ experimentation-as-process with non-linear devices in accord with those encounters, and experiencing artistic practice as an affective ecology of engagement. Consequently, the complex yet

⁸ Erin Manning and Brian Massumi, *Thought in the Act: Passages in the Ecology of Experience* (Minneapolis: University of Minnesota Press, 2014), Loc 52.

⁹ Robin Nelson, *Practice as Research in the Arts* (Basingstoke, UK: Palgrave MacMillan, 2013), 19–27. Nelson makes clear that a “research inquiry can be evident in the practice [...]. Both arts practices and research investigations take place in contexts.” My research aligns with Nelson in that it is the process of making the non-linear installations from the situated encounters in the different environments that constitute the inquiry, which evolved into the practice I call Ecological Performativity.

¹⁰ Andrew Pickering, “Producing Another World: The Politics of Theory with Some Thoughts on Latour,” in *Assembling Culture, Special Issue of Journal of Cultural Economy*, eds. T. Bennett and C. Healy (Taylor and Francis Online, 2008), 8.

¹¹ Salter, *Alien Agency: Experimental Encounters with Art in the Making*, 4–5.

tacit knowledge of creative practice became more explicit, evolving into the process of developing my dissertation as Ecological Performativity. My approach to practice came to consider notions of human and nonhuman agency and the performative capacities of such bodies as co-creative devices. Agency and the performative are thus intertwined in what Andrew Pickering describes as the performative idiom; that is, a shift away from representational modes of thought to one where the world is full of active matter that does (performs) things.¹² Thus, the dynamics of time, place and material and the creative processes that ensue resonate in an “ecology of practice,”¹³ from which results the artwork. This is non-linear in transmission and is an emergent method of praxis, which holds open space for the complex and interwoven aspects of our material world with us in it and within it.

My research concerns have therefore been to articulate and weave together the actively relational interplay between first person (my) experience in what Donna Haraway refers to as the *making-doing-thinking*¹⁴ of creative practice and that of the influences that accompany it. Haraway describes this figure of practice as a back and forth passing of patterns, similar to string figure games.¹⁵ In doing so, Haraway enlists anthropologist Marilyn Strathern’s provocation that:

It matters what thoughts think thoughts. It matters what knowledges know knowledges. It matters what relations relate relations. It matters which worlds world worlds. It matters which stories tell stories.¹⁶

Haraway provides a way to reflect on the iterative and non-linear nature of my research in that the *making-doing* of creative practice is the *thinking* out of which the artistic knowledge evolves. Accordingly, Haraway’s position is relational¹⁷ and aligns with my position of practice: one that operates porously between

¹² Andrew Pickering, “Art and Agency,” in *The Vibrancy Effect*, eds. Chris Salter, Harry Smoak, and Michel Van Dartel (Rotterdam: NAI Publishing, 2012), 36–37.

¹³ Isabelle Stengers, “An Ecology of Practices,” *Cultural Studies Review* 11, no. 01 (March, 2005).

¹⁴ Donna Haraway, 2014. “Staying with the Trouble: Sympoiesis, String Figures, Multispecies Muddles,” Public lecture, University of Alberta, Edmonton, accessed March 24, 2016, www.youtube.com/watch?v=Z1uTVnhIHS8

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Durham: Duke University Press, 2016), Loc 1334. Haraway’s 2016 publication expands her relational position by referencing sympoiesis. “*Sympoiesis* is a simple word; it means “making-with. Nothing makes itself; nothing is really autopoietic or self-organizing. [...] *Sympoiesis* is a word proper to complex, dynamic, responsive, situated, historical systems. It is a worlding-with, in company. Sympoiesis enfolds autopoiesis and generatively unfurls and extends it.”

subjective and objective, practice and theory, and embraces the value of such entangled configurations.

Along the way, the influences that accompany—other thinkers and doers—became entwined with my passing patterns of practice: the thoughts, knowledge, relationships, worlds, and stories. Analogous to what Manning and Massumi call “the friends,”¹⁸ these accompanying influences “activate[d] a process [and] force that acts as a differential within the ongoing movement of thought...creating an intensive passage between past and future outsides...a complex polyphony. [...] Thought not as already-constituted but as a force for creative thinking-feeling.”¹⁹ Here Manning and Massumi provide an interpretation of Deleuze’s notion of the intercessors: “the felt force that activates the threshold between thinking and feeling.”²⁰ Throughout my dissertation these “friends” will interweave with how I experienced, contextualised and ultimately described the *making-doing-thinking* of my creative research as an ecologically performative process.

Operating in this discursive register, from a research-creative core, gave me a platform for experimentation-as-process that contributed to my new ways of thinking by insisting that every practice is a knowledge that can speak and act through differences and emerging possibilities.²¹ Consequently, I have adopted what Jillian Hamilton calls the “connective dissertation” which “synthesize[s] differently situated perspectives, subject positions, styles, voices and accents [and] weav[es] them into a unified coherent and flowing text: [...] a polythesis.”²² I do so to express the different perspectives and threads of making and thinking activities contained in my research. This will become apparent as I traverse between journal entries made on field recording sessions, subjective thoughts in

¹⁸ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 1241.

¹⁹ Ibid., Loc 1253.

²⁰ Ibid., Loc 1243.

²¹ Natalie Loveless, "Practice in the Flesh of Theory: Art, Research, and the Fine Arts PhD," *Canadian Journal of Communication* 37, (2012): 102. Loveless argues that "the Fine Arts PhD serves doctoral level work that experiments with inherited formal constraints and challenges the lines delineating legitimate disciplinary labour. In this way the Fine Arts PhD contributes to new thinking in inter- and non-disciplinary pedagogy by insisting that we ask ourselves what gets to count as legitimate knowledge production, where, when, and how." Loveless's research is motivated by the current shift in Canada and the United States to take serious practice-based doctoral programs. The question of what constitutes knowledge resonates with my research inquiry, in that it is out of the *making-doing-thinking* of creative practice that new ideas evolve. This perspective represents a non-reductive process that opens alternative possibilities and challenges.

²² Jillian Hamilton, "The Voices of the Exegesis," in *Practice, Knowledge, Vision: Doctoral Education in Design*, ed. Ken Friedman and Lorain Justice (Hong Kong Polytechnic University, School of Design: Hong Kong, 2011).

the practice and processes of making the works, and the various positions of other thinkers and practitioners.

The non-linear audiovisual installations developed during my research are the result of three field recording projects that took place between June 2014 and December 2015. These situated experiences span the west coast of North America, from the Salton Sea in Southern California to the northern regions of western Canada. The work *Undercurrent* incorporates material gathered from the Yalakom River, located in British Columbia, Canada. The remaining works—*Flight Variant*, *Cathedral*, and *Piano at the End of a Poisoned Stream*—emerged from an audiovisual collection process in the southwestern regions of the United States. This gruelling three-week field recording session was undertaken with film and video artist Andrew Denton and architect Adrian McNaught who photographed the trip for documentation purposes, and involved extreme and often disturbing locations.²³ It was during this field recording trip that I asked: What does making art from these lived and experiential encounters in the world do? In other words, what is the purpose of an art form relationally situated in time and place?

In my dissertation, I seek to address this question by considering the artworks as artefacts that are part of a larger structure of phenomena and borrow the term *meshwork* from Tim Ingold (via Henri Lefebvre) to reflect this.²⁴ Ingold defines meshwork as a “zone of entanglement [where] there are no insides or outsides, only openings and ways through.”²⁵ I fold Ingold’s *meshwork* in with Haraway’s passing patterns and her suggestion of the need to “[...] make-with—become-with, compose-with—the earth-bound,”²⁶ provided me with a workable way to reflect on my experience and creative outcomes: one that operates in an “ecology of emergence.”²⁷

²³ One such location, the Salton Sea, has been described as being the most depressing place in California. Ransom Riggs, "Strange Geographies: Bombay Beach." Accessed July 20, 2014, <http://mentalfloss.com/article/24260/strange-geographies-bombay-beach>

²⁴ Timothy Ingold, *Lines: A Brief History* (Abingdon, UK: Routledge, 2007), 80.

²⁵ Ibid., 103.

²⁶ Haraway, "Staying with the Trouble: Symptoiesis, String Figures, Multispecies Muddles".

²⁷ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 53.

The Springboard

*The lived experience of our multifaceted relationship to the world is like finely-threaded interwoven lines, a 'meshwork'.*²⁸

Timothy Ingold

As noted in the Preface, my engagement with creative practice has traversed many artistic disciplines: I see myself as a wayfarer. As with any definition of wayfaring, for me it has to do with movement. Tim Ingold's notion resonates in describing wayfaring as a "movement of self-renewal or becoming."²⁹ Ingold equates the movement of the wayfarer—both human and nonhuman—with life that is lived along interwoven lines rather than one that goes from point A to B. The result of the movement, and the subsequent lines, creates an ever-evolving meshwork in which each wayfarer is embedded.³⁰ By examining life like this, Ingold recasts the linear orientation of past and present time to that of an interwoven narrative where the ways of inhabitant knowledge are "*alongly* integrated."³¹

Thinking of Ingold's wayfaring meshwork of *alongly* interwoven narratives provides a way to orient the conditions, influences and knowledges—past and present—from which my dissertation emerges. The approach constitutes a transdisciplinary dialogue where the creative practice resonates from the various strands of encounters—in the field, in my practice and in the writings and thoughts of other researchers.³²

Two strands that triggered my practice-based PhD emerged directly from my Master of Music in composition conducted at University of Waikato. Initially that thesis, titled *Multimedia Collaboration as Art Practice*, encompassed the *making* of works within the domain of music composition. As the research progressed and it became apparent the portfolio would consist entirely of

²⁸ Timothy Ingold, *Being Alive: Essays on Movement, Knowledge and Description* (London and New York: Routledge, 2011), 63 and 70.

²⁹ Ingold, *Lines: A Brief History*, 116.

³⁰ Ibid.

³¹ Ibid., 89. (Italics authors)

³² I acknowledge that audience response to the works is an aspect of the "*alongly* interwoven narrative." However, for my PhD, it was necessary to focus on the process of *making-doing-thinking* the non-linear installations to tease out co-creative devices from the materials gathered, which evolved into the practice I call Ecological Performativity.

collaborative works, I became interested to find reasons why this was so—what was the lure of collaboration?

To address my curiosity, I first researched previous collaborative endeavours between practitioners in music, dance and film.³³ While of interest, this quickly mutated to a dialogic engagement with research outside the domain of music and creative practice. Concepts from the social sciences, sciences and philosophy percolated to include citations that equated collaboration with interconnectivity and the liquid network; with open systems and as a field of activity; and with convergences, collision of differences and adjacent possibilities.³⁴ Here, Steven Johnson's thoughts on innovation and 'where good ideas come from' were enlisted as a method to explore and contextualise my research.

These ideas provided a supportive discourse on my practice, which had become a collaborative interdisciplinary activity over the course of twenty-five years. I began to think and describe collaboration from a systems theory perspective,³⁵ as that of an environment where the possibility of 'something to happen' could emerge. Within this "field of activity"³⁶ many outcomes become available; all of which are dependent on interaction with the existing components.

The strange and beautiful truth about the adjacent possible is that its boundaries grow as you explore those boundaries. Each new combination ushers new combinations into the adjacent possible.³⁷

For me, viewing collaboration as a "field of activity" encouraged a perspective that acknowledged the multi-layered complexities at work in any given encounter in a non-reductive way. Accordingly, during my PhD research, these complexities came to include human and nonhuman agency in the meshwork of *alongly* interwoven narratives. Thinking in this way required me to hold open

³³ Peter Murphy, "'I and I': Collaboration and the Double Act of Musical Creation," *Musicology Australia* 33, no. 2 (2011); Charles Green, *The Third Hand: Collaboration in Art from Conceptualism to Postmodernism* (Minneapolis: University of Minnesota Press, 2001); Twyla Tharp, *The Collaborative Habit* (New York: Simon & Schuster, 2009).

³⁴ Steven Johnson, *Emergence: The Connected Lives of Ants, Brains, Cities and Software* (London: Penguin Books, 2001); Steven Johnson, *Where Good Ideas Come From: The Natural History of Innovation* (London: Allen Lane, 2010), 163.

³⁵ Cynthia Jaffee McCabe, *Artistic Collaboration in the Twentieth Century* (Washington, D.C: Smithsonian Institution Press, 1984), 63.

³⁶ Shane Homan, "Collaboration: Creativity, Industry and Politics," *Musicology Australia* 33, no. 2 (2011): 159.

³⁷ Johnson, *Where Good Ideas Come From: The Natural History of Innovation*, 31. As cited in my Master of Music thesis.

space to the extent of the complexity without relying on reductive thinking procedures.³⁸

The second strand that surfaced during my masterate was the shift in my practice away from fixed-media formats to the exploration of non-linear systems. This was motivated by my growing curiosity to explore a more dynamic aesthetic that could include information contained in or about the respective environments beyond the audio and visual material. Non-linear audiovisual installations were built³⁹ that explored and incorporated components such as weather and the meteorological and environmental data gleaned from these situated encounters. In these works, the data was used to trigger volume controls on audio tracks containing recorded acoustic improvisations. Of interest to my PhD research was the method of redistributing creative processes to the agential potentials of the material resources.⁴⁰ This loosening-up of (my) human-centric control over the final artefact opened a *making-doing-thinking* process that I believe aligns with Natasha Myer and Joe Durit's proposed *affective entanglements of inquiry*.⁴¹ The authors describe this as a mode of inquiry in which the agency, responsivity, and relationships between the researcher (or actor via Latour),⁴² the object, the data and the instruments are entangled in an ongoing transformative occurrence inside the creative process of experimentation.⁴³ A dynamic space is entered, in which the process of meaning-making co-evolves improvisationally in what Myer and Durit call *haptic creativity*.⁴⁴ This aligns with the position of my practice in that the move towards non-linear systems began to redeploy my relationships with the

³⁸ Thom van Dooren, *Flight Ways* (New York: Columbia University Press, 2014), 39–44. I borrow to “hold open space” from van Dooren who acknowledges the “difficult task of taking seriously [...] different temporal horizons and their overlaps and intersections.” For me, this highlights the need to be in the complexity of any situated encounter without resorting to dualistic thinking that, as van Dooren suggests, “holds us apart from the rest of the world.” Thus my notion of Ecological Performativity evolved by engaging in co-creative processes with different human and nonhuman bodies, which opened alternative pathways for creative practice.

³⁹ All generative and non-linear works are created using the Cycling'74 *Max* software. I use this creative coding platform as it allows for a diverse range of audio and visual exploration.

⁴⁰ Andrew Pickering, *The Mangle of Practice: Time, Agency, and Science* (Chicago: University of Chicago Press, 1995), 6. In the first instance material agency references (through Bruno Latour) Andrew Pickering's proposition that the material world is active and performative... “and comes at us from outside the human realm.”

⁴¹ Natasha Myers and Joe Dumit, “Haptic Creativity and the Mid-Embodiments of Experimental Life,” in *A Companion to the Anthropology of the Body and Embodiment*, ed. Frances E. Mascia-Less (Oxford: Blackwell, 2011), 249.

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Ibid., 244.

situated encounters in the field, experimentation-as-process with materials and tools, and the creative outcomes that ensued.

In the preliminary stages of my PhD research these two strands set in motion an extensive reading period, covering diverse fields of knowledge. This included C. D. Broad's notion of emergent properties,⁴⁵ whereby properties of a system emerge at higher levels of complexity due to the relationship of all parts. The more common research approach at the time (1925) focused on the smaller parts of a system rather than the whole—that is, its dissection. Broad's theory encouraged an ecological perspective that later became known as systems thinking. Additionally, I was drawn to Fritjof Capra's work, particularly the *Web of Life* and *The Systems View of Life: A Unifying Vision*. The latter, co-authored with Pier Luigi Luisi, present a coherent systemic worldview that integrates the biological, cognitive, social, and ecological dimensions of life. They discuss the philosophical, social, political and spiritual implications of such a unifying vision, in an attempt to overcome, what they define as “a crisis of perception,”⁴⁶ or a human-centric use-value worldview. The broader intention of this book is to provide an appropriate framework for discussing one of the “great challenges of our time—the building and nurturing of sustainable communities.”⁴⁷

I then shifted to the cybernetic research of the 50s and 60s,⁴⁸ via Chris Welsby and Andrew Pickering (which I contextualise in Chapter 2), and then to the cognitive and embodied mind research of the 80s and 90s.⁴⁹ For me, in traversing these different research areas, highlighted the ontological shift that took place during the twentieth century—a shift away from the mechanistic, static representational model to a more interrelated, performative model. As shown by

⁴⁵ C.D Broad, *The Mind and Its Place in Nature* (New York: Harcourt, Brace & Company, INC., 1925), 34.

⁴⁶ Fritjof Capra and Pier Luigi Luisi, *The Systems View of Life: A Unifying Vision* (Cambridge, MA: Cambridge University Press, 2014), xi.

⁴⁷ *Ibid.*, 342.

⁴⁸ Andrew Pickering, *The Cybernetic Brain* (Chicago: University of Chicago Press, 2010); Chris Welsby, "Cybernetics, Expanded Cinema and New Media: From Representation to Performative Practice," in *Expanded Cinema: Art, Performance, Film*, eds. A. Rees, D. White, S. Ball, and D. Curtis (London: Tate Publishing, 2011).

⁴⁹ Humberto Maturana and Francisco Varela, *Autopoiesis and Cognition: The Realization of the Living* (Dordrecht, Holland: D. Reidel Publishing Company, 1980); Humberto Maturana and Francisco Varela, *The Tree of Knowledge: The Biological Roots of Human Understanding* (Boston: Shambhala Publications Inc., 1987); Francisco Varela, Evan Thompson, and Eleanor Rosch, *The Embodied Mind: Cognitive Science and Human Experience* (Cambridge, MA: MIT Press, 1991).

Chris Salter,⁵⁰ the trajectory of this shift occurred across all areas of creative practice. Within a few decades, theatre, dance, literature and music responded to this shift in ontological thinking to more performative, time-based and non-linear practices.⁵¹ New paradigms of expression and translation fostered the convergence and synthesis of artistic forms of which Salter writes: "...these new relationships and interactions of discrete aspects of experience [opened] deeper understandings of the nature of consciousness and the workings of the mind...the reorganization of human interaction and the reimagination of interrelatedness."⁵²

My attention was lured towards this "reorganization of human interaction and the reimagination of interrelatedness."⁵³ This resonated with my recent artistic explorations in non-linear processes and my thoughts on multimedia collaboration as an art practice, as well as my growing questions and concerns about the purposes of such an art practice. Since then, those preliminary navigations through diverse knowledge sets have traversed current critical, theoretical, and philosophical positions on human, nonhuman and material agency and the performative aspects of these bodies.

Engaging with these discourses from the core of creative research enabled the fundamental questions of my research to develop: What tendencies emerge in the *making-doing-thinking* of creative practice when human and nonhuman agency is considered as a co-creative device? What capacities do these tendencies have in the creative process and how do they affect the resulting artefact? Would a broadened understanding of agency and performativity provide different vocabularies of communication? Could those different vocabularies encourage alternative ways to sense the world? And if so, as a creative practitioner within the field of sonic arts and audiovisual installation practice, what is my response and response-ability?⁵⁴

⁵⁰ Chris Salter, *Entangled: Technology and the Transformation of Performance* (Cambridge, MA: MIT Press, 2010).

⁵¹ Welsby, "Cybernetics, Expanded Cinema and New Media: From Representation to Performative Practice," 276–287.

⁵² Salter, *Entangled: Technology and the Transformation of Performance*, xxxv–xi.

⁵³ Ibid.

⁵⁴ Donna Haraway, "Anthropocene, Capitalocene, Chthulocene: Donna Haraway in Conversation with Martha Kenney," in *Art in the Anthropocene: Encounters among Aesthetics, Politics, Environments and Epistemologies*, eds. Heather Davis and Etienne Turpin (London: Open Humanities Press, 2015), 256; Carla Hustak and Natasha Myers, "Involutionary Momentum: Affective Ecologies and the Sciences of Plant/Insect Encounters," *differences* 23, no. 3 (2012): 106. The term "response-ability" first aligns with Haraway's notion of a "cultivation through which we render each other capable, that cultivation of the capacity to respond [...] as irreducibly collective and to-be-made" and, secondly, with Hustak and Myers's "feminist ethics of 'response-ability' in which questions of species difference are always conjugated with attentions to affect, entanglement, and rupture [...] in which creativity and curiosity characterize the experimental forms of life of all kinds of practitioners, not only the human ones."

The Purpose

In April 2011 researchers from the natural and social sciences, the humanities and a variety of creative practitioners gathered in Rotterdam, The Netherlands. Using the title *The Vibrancy Effect: An Anti-Disciplinary Meeting*, their focus was to discuss and “explore the aesthetic-political-technical-ethical effects of vibrant matter.”⁵⁵ *Vibrancy*, here, is in direct reference to Jane Bennett’s concept of vibrant materiality or “thing-power” that, as Bennett claims, attempts to give voice to the energetic vitality intrinsic to matter and the active, earthy, and complex entanglements of humans and nonhumans.⁵⁶

Meeting participants presented their unique understandings, approaches, and concerns for considering vibrant materiality, or, as previously noted, what sociologist of science Andrew Pickering calls “material agency”—“material that comes at us from outside the human realm.”⁵⁷ In Figure 1, the variety of disciplines, terms, crossovers and paralleling conditions that can be traced for each practitioner underpins the *telos* in which this meeting resonated—one of a transdisciplinary, or rather, “antidisciplinary”⁵⁸ enterprise that focused on matters of human, nonhuman and material agency. For Pickering, the use of this term “antidisciplinary” signifies that “the practices of the participants themselves already defied convenient categories of art, natural and social science.”⁵⁹

The interwoven lines of this chart weave a narrative or meshwork (via Ingold) that exemplifies recent efforts to integrate diverse knowledge sets in order to challenge, or disrupt, the long-standing perspective of human exceptionalism.⁶⁰ Of this, research-creator⁶¹ Chris Salter asserts: “As techno-science increasingly reaches into every aspect of life, formerly fast held distinctions between the inert and the active, the human and nonhuman and life and matter are cracking.”⁶²

⁵⁵ Chris Salter, “The Vibrancy Effect: An Anti-Disciplinary Expert Meeting,” in *The Vibrancy Effect*, eds. Chris Salter, Harry Smoak, and Michel Van Dartel (Rotterdam: NAI Publishing, 2012), 8.

⁵⁶ Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham & London: Duke University Press, 2010), Loc 333.

⁵⁷ Pickering, *The Mangle of Practice: Time, Agency, and Science*, 6.

⁵⁸ Andrew Pickering, “Ontology and Antidisciplinarity,” in *Interdisciplinarity: Reconfigurations of the Social and Natural Sciences*, eds. A. Barry and G. Born (London and New York: Routledge, 2013), 209–225.

⁵⁹ Salter, “The Vibrancy Effect: An Anti-Disciplinary Expert Meeting,” 19.

⁶⁰ Pickering, “Producing Another World: The Politics of Theory with Some Thoughts on Latour,” 16.

⁶¹ Research-creator is the Canadian term used for a practise-based researcher. As Salter works at Concordia University in Montreal, I include this term to align with the terminology used in Canada.

⁶² Salter, “The Vibrancy Effect: An Anti-Disciplinary Expert Meeting,” 17.



Figure 1. The Vibrancy Effect: An Anti-Disciplinary Meeting.⁶³

⁶³ Salter, "The Vibrancy Effect: An Anti-Disciplinary Expert Meeting," 14.

Following this, in May 2012 at a gathering of scholars at the University of Wisconsin, Milwaukee under the rubric of *The Nonhuman Turn*, and similar to *The Vibrancy Effect*, the discourses that emerged further explored the agency of human and nonhuman bodies. Jane Bennett suggests the relevance of *The Nonhuman Turn* is “to find new techniques, in speech and art and mood, to disclose the participation of nonhumans in “our” world.”⁶⁴ Erin Manning further suggests that the “art of participation does not find its conduit solely in the human.”⁶⁵

Art also does its work without human intervention, activating fields of relation that are environmental or ecological in scales of intermixings that may include the human but don’t depend on it. How to categorize as human or nonhuman the exuberance of an effect of light, the way the air moves through a space, or the way one artwork catches another in its movement of thought. This is surely the force of curation: its choreographic capacity to bring to life the lingering nonhuman tendencies that bridge fields activated by distinct artistic processes. Artfulness is always more than human.⁶⁶

According to the conference book, *The Nonhuman Turn* evolved from a variety of intellectual and theoretical developments that occurred within the last decades of the twentieth century (Figure 2).⁶⁷ Broadly speaking it can refer to objects such as “climate change, drought, and famine; to biotechnology, intellectual property, and privacy; to genocide, terrorism, and war.”⁶⁸ Such wide-ranging perspectives on what constitutes an object and nonhuman are, as Salter proposes above, a disruption of distinctions. And as Timothy Morton suggests, given the many concerns arising in the twenty-first century—in the epoch of the Anthropocene—the turn towards the nonhuman has particular relevance to “exit modernity.”⁶⁹

⁶⁴ Jane Bennett, “Systems and Things. On Vital Materialism and Object-Oriented Philosophy,” in *The Nonhuman Turn*, ed. Richard Grusin (Minneapolis: University of Minnesota Press, 2015), 224–225.

⁶⁵ Erin Manning, “Artfulness,” in *The Nonhuman Turn*, ed. Richard Grusin (Minneapolis: University of Minnesota Press, 2015), 72.

⁶⁶ Ibid.

⁶⁷ Richard Grusin, ed. *The Nonhuman Turn* (Minneapolis: University of Minnesota Press, 2015), viii–ix.

⁶⁸ Ibid., vii.

⁶⁹ Timothy Morton, *Realist Magic: Objects, Ontology, Causality*, ed. Graham Harman and Bruno Latour, New Metaphysics (University of Michigan Library: Open Humanities Press, 2013), 80; Timothy Morton, *The Ecological Thought* (Cambridge, MA: Harvard University Press, 2010), Loc 77. For Morton, modernity references the time period of the last two and a half centuries.

- *Actor-network theory*, particularly Bruno Latour's career-long project to articulate technical mediation, nonhuman agency, and the politics of things
- *Affect theory*, both in its philosophical and psychological manifestations and as it has been mobilized by queer theory
- *Animal studies*, as developed in the work of Donna Haraway and others, projects for animal rights, and a more general critique of speciesism
- The *assemblage theory* of Gilles Deleuze, Manuel De Landa, Latour, and others
- New *brain sciences* like neuroscience, cognitive science, and artificial intelligence
- The *new materialism* in feminism, philosophy, and Marxism
- *New media theory*, especially as it has paid close attention to technical networks, material interfaces, and computational analysis
- Varieties of *speculative realism* including object-oriented philosophy, neovitalism, and panpsychism
- *Systems theory*, in its social, technical, and ecological manifestations

Figure 2. The Nonhuman Turn.

The purpose in highlighting these gatherings is twofold: first, to identify an area of critical thinking I was drawn to that influenced my creative research and how I subsequently contextualised my practice as Ecological Performativity; and second, to introduce some of the key thinkers (the friends) that accompany the *making-doing-thinking* of this project: Jane Bennett, Erin Manning, Brian Massumi, Timothy Morton, Andrew Pickering, and Chris Salter. Adding to this list are the theoretical and philosophical positions of Karen Barad, Judith Butler, Donna Haraway, and Chris Welsby. To contextualise the co-creative computational processes explored, I draw on the creative research of Barry Truax, Damián Keller, R. Luke Dubois, Andrea Polli and Jean-Marc Pelletier. Each, through their unique voice, offered a perspective on thinking in terms of agency and the performative that amplified and complicated (in the best way possible) the creative openings I sought to tease out. Their critical, theoretical, philosophical and artistic positions operate, not as triggering devices that directly incite my creative practice; but rather, as different entry points to *alongly* contemplate and

contextualise the thoughts and processes at work in my research, which evolved into considering the creative act as an ecologically performative event.

Structure of the Thesis

Following this Introduction chapter, I give an account of the initial pathways that set in motion my PhD research. In Chapter Two, *The Lure Towards the Performative*, I position the research in what Isabelle Stengers describes as an “ecology of practice.” I describe subjective experiences that underpin my beliefs of interconnectivity and highlight the motivation for my creative practice and early influences that directed my PhD research. This includes a review of creative practitioner-theorist Chris Welsby’s installations in relation to the non-linear processes I came to explore, and then of philosopher of science Andrew Pickering and his notion of the “dance of agency.” Accordingly, I examine my early experimentation-as-process procedures, which in turn influenced the trajectory of the research that ensued.

Chapter 3, *The Relational Pathway*, locates theoretical and philosophical provocations that have contributed to my research with the aim of exploring non-linear creative processes. These include writers who engage with the notion of agency and performativity in different ways, including Karen Barad’s “intra-action,” Judith Butler’s thoughts on performativity, Jane Bennett’s “thing-power,” and Timothy Morton’s dark ecology project, including his notion of the hyperobject and the aesthetics of causality. Each of these thinkers provides different entry points and lines of thought to think through the performative agency of human and nonhuman bodies.

In Chapter Four, *Ecological Performativity*, I offer a contextual review of techniques that focus on the computational processes employed in my practice to tease out co-creative devices from the materials gathered. Accordingly, I review other practitioners who have linkages with these procedures. From the position of thinking through the use of convolution as a co-creative device within an ecological discourse, I turn to practitioners Barry Truax and Damián Keller. Luke Dubois and Andrea Polli provided useful insights on the sonification of data, while Jean-Marc Pelletier’s work on computer vision offered a substantial resource to consider the use within a non-linear audiovisual installation.

In Chapter Five, the Portfolio, I describe the *making-doing-thinking* and *feeling* of each creative artefact that has emerged in my PhD research project. This includes a descriptive account of each work, incorporating journal entries from field recording sessions as well as technical considerations. To further contextualise these works, I borrow and deploy discourses reviewed in Chapter Two and Three and interweave these into my pathways of practice.

In Chapter Six, *Alongly Integrated*, I conclude and reflect on the trajectory of my practice-based inquiry and the contribution it has made to research. Additionally, I suggest my future avenues of creative research.

Recapping the Questions to Emerge.

What tendencies emerge in the *making-doing-thinking* of creative practice when material agency is explored as a co-creative device? What capacities do these tendencies have in the creative process and how do they affect the resulting artefact? Might a broadened understanding of agency and performativity provide different vocabularies for creative communication? Could those different vocabularies encourage alternative ways to sense the world? And if so, as a creative practitioner in the field of sonic arts and audiovisual practice, what is my response and response-ability?

Recapping the Process.

My PhD incorporated a practice-based methodology to experiment and tease out co-creative devices from materials gathered in different environments. As defined by Linda Candy, practice-based research is “an original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice.”⁷⁰ The focus of this methodology is the “creative process and the works that are generated from the process: the artefact plays a vital part in the new understanding about practice that arise.”⁷¹ It is out of the *making-doing-thinking* of creative practice that new knowledge emerges. Thus my research focused on the making of the non-linear installations, which came to include the thinking companions (friends) who currently grapple with the notion of human and

⁷⁰ Candy, "Practice Based Research: A Guide."

⁷¹ Ibid.

nonhuman agency. To restate Manning and Massumi these friends “activate[d] a process [and] force that acts as a differential within the ongoing movement of thought...creating an intensive passage between past and future outsides...a complex polyphony. [...] Thought not as already-constituted but as a force for creative thinking-feeling.”⁷² The outcome of my practice-based research came to consider the resulting artefacts as a responsive embodiment of larger structures of phenomena, which in turn resulted in my notion of Ecological Performative.

⁷² Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 1253.

2. THE LURE TOWARDS THE PERFORMATIVE

“Thinking issues of agency through the experiential encounters with the ‘stuff of the world’ encourage a radically different vision of the world—dynamic, temporally emergent, contingent, and performative.”⁷³

Chris Salter

The Ecology of Practice

Throughout my research I have engaged with the notion of agency and the performative to connect the aspects of my creative practice, through which I explore non-linear audiovisual installations in a co-creative way. Restating Ingold’s wayfaring meshwork of *alongly* interwoven narratives, various lines of engagement provided a complex relational flow⁷⁴ with other writers and practitioners in my artistic inquiry. Incorporating these influential strands in my own work required both an acceptance of their commonality and differences in opinion. Anna Tsing refers to *differences* as the “zone of awkward engagement” calling such moments “‘friction’: the awkward, unequal, unstable, and creative qualities of interconnection across difference.”⁷⁵ Making space for these encounters contributed to my “ecology of practice,”⁷⁶ from which I discuss, contextualise, and position my research. Isabelle Stengers says:

[A]n ecology of practice is a tool for thinking through what is happening, and a tool is never neutral. A tool can be passed from hand to hand, but each time the gesture of taking it in hand will be a particular one—the tool is not a general means, defined as adequate for a set of particular aims, potentially including the one of the person who is taking it, and it does not entail a judgment on the situation as justifying its use. [...] Here the gesture of taking in hand is not justified by, but both producing and produced by, the relationship of relevance between the situation and the tool.⁷⁷

⁷³ Salter, *Alien Agency: Experimental Encounters with Art in the Making*, xi–5.

⁷⁴ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 2148.

⁷⁵ Anna Tsing, *Friction: An Ethnography of Global Connection* (Princeton NJ: Princeton University Press, 2005), 4; Loveless, "Practice in the Flesh of Theory: Art, Research, and the Fine Arts Phd," 109. I am indebted to Natalie Loveless’s account of Tsing’s notion of *friction*.

⁷⁶ Isabelle Stengers, "An Ecology of Practices," *Cultural Studies Review* 11, no. 01 (2005): 184.

⁷⁷ *Ibid.*, 185.

Approaching my research in this way emphasised a mode of practice that is situational, emergent, and able to diverge and converge⁷⁸ in the process of experimentation. I consider these components as creative tools and techniques in that the *relationship of relevance* (via Stengers) draws forward the *thinking-feeling* that can traverse different movements of experience. Technique, as understood by Manning and Massumi, “belongs to the act” and is a springboard that sets in motion “a practice from within.”⁷⁹ Here, then, the subjective and objective are not positioned on opposite planes but rather move in a relational field that mobilises and transforms the work.⁸⁰ Thus, my position of creative research cannot be compartmentalized but unfolds in a mode of becoming in the artistic “thought in the act”⁸¹ of practice. Of this Manning and Massumi reflect: “Thought gathers in the work. It is the event of the work’s unfolding. Not into language, but painting, on a canvas that seeks to activate a new way of seeing, a new effort at participation.”⁸² In my research, this canvas equates to non-linear audiovisual installations as outputs, while the effort to participate is experienced in the field and in the act of *making-doing-thinking*.

In identifying the position these techniques have in my research, it became equally important to identify two subjective threads that have tacitly motivated my interest in agency and performativity—my experience as an opera singer, and my fundamental belief in the interconnectedness of life on Earth. Once these two were associated, my research branched out to include writers and practitioners who negotiate agency and performativity, which in turn amplified how I experienced creative practice and, consequently, became entangled in my ecology of practice.

Agency and the performative are thus intertwined in what Andrew Pickering describes as the performative idiom;⁸³ a means of knowing that moves away from the representational model—where “people and things tend to appear

⁷⁸ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 2072. I include divergence and convergence via Manning and Massumi’s interpretation of William James’s idea that “there is no such thing as pure chaos. There is quasi-chaos: a field of divergences and convergences, coming-together and going-apart, concatenation and separation, already tending to sort itself out in the determination of a thisness. Chaos, in and of itself, can never be experienced. What is experienced is the commotion of determinations-to-come vying for expression in an overfull field of potential relations.”

⁷⁹ Ibid., Loc 71.

⁸⁰ Ibid., Loc 1218.

⁸¹ Ibid., Loc 52.

⁸² Ibid., Loc 1233.

⁸³ Pickering, *The Mangle of Practice: Time, Agency, and Science*, 5.

as shadows of themselves”⁸⁴—to one in which “the world and all its heterogeneous multiplicity is full of agency.”⁸⁵ While the idea of agency and the performative is nothing new, and in Western thought has evolved from a variety of philosophical, scientific and artistic research over the last century,⁸⁶ the recent reinvestigations into these notions are, as Salter suggests above, “encouraging a radically different vision of the world.”⁸⁷ In considering the purpose of my creative research inquiry, Salter highlights the importance of addressing such “high-stake questions” from a “lived, bodily, experiential encounter with the material torrent of the world [as that] is the very stuff of artistic practice.”⁸⁸

Two Subjective Threads

As a singer, thinking in terms of agency and the performative is entrenched in my practice. I consider the process of singing a visceral transmission of energy embodied in the movement of the breath, the vibration of the vocal cords and the emotional intentions behind the endeavour. This is an entangled process of relationships in which I have been embedded for many years. I have contemplated the experiential and psychological attributes of singing and consequently engaged with practitioners⁸⁹ whose understanding of the singing body is contextualised as being more than a human-centric entertainment apparatus.

On a different note, David Dunn speculates that sound (including singing) is an intrinsic part of the fabric of life.⁹⁰ “What we hear from other forms of life, and the environment they reside in, is information that is unique and essential about patterns of relationship in context. It is an experiential basis from which we can shape an understanding of the ‘integrated fabric of mind that envelops us.’”⁹¹ Referencing here what Gregory Bateson referred to as the sacred, Dunn further

⁸⁴ Ibid., 6.

⁸⁵ Pickering, “Art and Agency,” 29.

⁸⁶ Grusin, ed. *The Nonhuman Turn*; Salter, *Entangled: Technology and the Transformation of Performance*; Capra and Luisi, *The Systems View of Life: A Unifying Vision*.

⁸⁷ Salter, *Alien Agency: Experimental Encounters with Art in the Making*, xi.

⁸⁸ Ibid., 5.

⁸⁹ These practitioners include Richard Armstrong at the Banff Center for Art in Canada, Juerg Roffler and Alisa Korts at the Middendorf Breath Experience in Berkley, USA, and Vancouver, Canada.

⁹⁰ David Dunn, *Why Do Whales and Children Sing?* (Sante Fe, NM: Earth Ear, 1999), 87.

⁹¹ Ibid., 89; David Dunn, “Nature, Sound Art and the Sacred,” in *The Book of Music and Nature: An Anthology of Sounds, Words and Thoughts*, ed. David Rothenberg and Martha Ulvaeus (Middletown, CT: Wesleyan University Press, 2009), 3.

suggests: “[...] music may be a conservation strategy for keeping something alive that we may now need to make more conscious. A way of making sense of the world from which we might refashion our relationship to nonhuman living systems.”⁹² While different cultures have various forms of singing, my view (similar to Dunn’s) is that the differences are situational and relationally linked to the environment. From Inuit throat singing and Mongolian overtone singing to the Delta crooning blues and the operatic vocalisations of Chinese opera, the resulting sounds are vastly diverse. Ultimately, then, my experience of being *in* the act of singing—the agency of *making-doing-thinking* singing—is a performative act.

Dunn’s speculations on “patterns of relationship” in the “experiential integrated fabric of life” segue to the second thread that subjectively influences my interest in agency and the performativity—my fundamental belief of the interdependence and interconnectedness of all levels of life. From personal experience, growing up on the windswept, weather-beaten island of Newfoundland on the east coast of Canada, thinking in terms of patterns of relationships (agency and the performative) is not strange⁹³: one cannot help but be immersed in the active torrents of the day-to-day encounters in this environment. The common forecast was: “Today’s weather will be rain, drizzle, and fog with variable skies.” These variabilities consisted of different shades of grey, depending on which way and with what force the winds altered the density of cloud and fog. Living in such environments, the agency of such forces is relational.

In addition, fifteen years’ experience as a reforestation worker (treeplanter) in British Columbia, Canada encouraged my beliefs on interconnectivity. Exposed to the elements ten to twelve hours a day—the rain, the cold, the snow and the heat—this work was physically and mentally tough. There is no escape from these forces, and being in these environments tests one’s ability to acclimatize. While this exposure viscerally fostered my beliefs in the principles of interconnectivity, the current pine beetle epidemic that has decimated forests on the west coast of North America amplified this belief. During my time in

⁹² Dunn, *Why Do Whales and Children Sing?*, 87.

⁹³ Within my dissertation I return to the sensation of strangeness (via Morton’s Dark Ecology) in relation to specific field recording projects.

reforestation I planted over one million trees, mainly pines. Western Canadian reforestation practices during the latter half of the 20th century implemented a mono-species programme, which, as it happened, has resulted in pine-tree-only forests in higher elevations across the province. The combination of these mono-species plantations and the increasing average winter temperatures cultivated an environment in which the pine beetle could flourish. Currently, over 20 million hectares of British Columbian forests alone have been destroyed.⁹⁴ During the writing of this dissertation, the fires that swept through Fort McMurray (May 2016) became part of a larger pattern of relationships. The dried forests that were noted as “fueling the fire,”⁹⁵ are some of the dead trees (tinder) from the mono-species plantations decimated by the pine beetle epidemic.

From these subjective accounts, my creative practice, my response, response-ability and ecology of practice is an attempt to hear, see, and be in the world that *make-think-feels* interconnectivity. As such, the position of human exceptionalism is fundamentally unthinkable. This perspective aligns with Thom van Dooren who advocates “everything is connected to *something*, which is connected to something else.”⁹⁶ Rather than the holistic ecological philosophy of “everything is connected to everything”⁹⁷ van Dooren suggests that “the specificity and proximity of connections matter—*who we are bound up with and in what way*.”⁹⁸

In narrating the stories of bird species extinction, van Dooren makes clear the need to do away with human exceptionalism in order to understand and be *in* the “process of entangled becoming”⁹⁹ in this more-than-human-world. Living now in what some consider the Earth’s sixth mass extinction,¹⁰⁰ the human exceptionalist framework is problematized as playing a central role.¹⁰¹ Van Dooren writes: “Situated *inside* this time of extinctions, the particular nature of

⁹⁴ Dirk Brinkman, "Editorial," *Silverculture Magazine* Spring, (2012).

⁹⁵ Bryan Alary, "Fort McMurray Blaze among Most 'Extreme' of Wildfires: Researcher." Accessed July 12 2016, <http://www.rr.ualberta.ca/en/RenewableResourcesNews/2016/May/FortMcMurrayblazeamongmostextreme.aspx>

⁹⁶ van Dooren, *Flight Ways*, 109.

⁹⁷ Ibid.

⁹⁸ Ibid.

⁹⁹ Ibid., 108.

¹⁰⁰ R. T. Kingsford et al., "Major Conservation Policy Issues for Biodiversity in Oceania," *Conservation Biology* 23, no. 4 (2009).

¹⁰¹ van Dooren, *Flight Ways*, 240.

the ethical claim made on us to hold open space for other species requires an understanding of the complex histories and inheritances that draw us into responsibility and relationship with others.”¹⁰² Other thinkers, such as Val Plumwood, suggest:

When we hyperseparate ourselves from nature and reduce it conceptually, we not only lose the ability to empathise and to see the nonhuman sphere in ethical terms, but also get a false sense of our own character and location that includes an illusory sense of agency and autonomy. So human-centred conceptual frameworks are a direct hazard to non-humans, but are also an indirect prudential hazard to Self, to humans, especially in situations where we press limits.¹⁰³

In accord with these thinkers, I believe that a way of being in the world that operates primarily from a human-centric use-value worldview has cultivated a state of disassociation (numbness) to the levels of destruction (agency) the human species has inflicted (performed) on the world, manifested in the current ecological crisis in which we now live. Thus, from the perspective of my creative research, being lured to issues of human and nonhuman agency and performativity became a way to contextualise and explore the communicative networks that are operating between the components that make up my ecology of practice: the people, the places and the things.

Out of this emerged a concept of the practice that makes space for all the encounters and multiplicities of thought in such environments. As such, my notion of Ecological Performativity is deeply transdisciplinary and inhabits a mode of practice that does not settle neatly into a singular reductionist narrative; but rather, is open to the emergent complexities and expansiveness of the “thought in the act”¹⁰⁴ and embraces the worth of such entangled non-reductive configurations.

¹⁰² Ibid., 75.

¹⁰³ Val Plumwood, “Nature in the Active Voice,” *Australian Humanities Review* 46, (2009): 117.

¹⁰⁴ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*.

Initial Pathways and Influences

As previously noted, my shift in creative practice from fixed-media formats to non-linear explorations activated a contextual review of knowledge that is *alongly* (via Ingold) intertwined in a *complex polyphony* (via Manning & Massumi) with the creative pathways explored during my practice-based PhD. These intertwining pathways moved in a way that activated diverse moments of connections and “zones of entanglement.”¹⁰⁵ The distinctions between practice and theory thus cannot be compartmentalized into specific devices that triggered one or the other. Rather, as in Ingold’s meshwork, “openings and ways through” were found.¹⁰⁶

At one point of my journey, my attention was drawn to the cybernetic research of the 50s and 60s, first by way of creative practitioner Chris Welsby¹⁰⁷ and then, as cited by Welsby, via philosopher of science Andrew Pickering.¹⁰⁸ Both researchers enlist various strands of the cybernetic movement as a way to address matters of ontological concern. In Welsby’s case, he tackles what he considers to be a “long-overdue ontological shift in the way we see ourselves in relation to nature.”¹⁰⁹ For Pickering, it provided an avenue to further develop his concept of the “dance of agency”, his ontological vision “in which both the human and the nonhuman are recognized as open-endedly becoming.”¹¹⁰ Pickering notes that the cybernetic movement, rather than being a specific moment in history, can be understood as “part of [a] much larger cultural assemblage, [...] as an experimental form of life [that] offers us a whole range of models for future practices that also stage an ontology of unknowability and becoming.”¹¹¹

In the context of my dissertation, researching Welsby and Pickering was useful to transition to non-linear processes in practice and philosophical thoughts.

¹⁰⁵ Ingold, *Lines: A Brief History*, 103.

¹⁰⁶ Ibid.

¹⁰⁷ Welsby, "Cybernetics, Expanded Cinema and New Media: From Representation to Performative Practice."

¹⁰⁸ Pickering, *The Cybernetic Brain*.

¹⁰⁹ Chris Welsby, "Technology, Nature, Software and Networks: Materializing the Post-Romantic Landscape," *Leonardo* 44, no. 2 (2011).

¹¹⁰ Andrew Pickering, "New Ontologies," in *The Mangle of Practice: Science, Society and Becoming*, eds. A. Pickering and K. Guzik (Durham, NC: Duke University Press, 2008), 1.

¹¹¹ Pickering, *The Cybernetic Brain*, 396.

Both researchers propose a non-dualist mode of thought whereby the divisions between mind and body, human, nonhuman and nature are reconfigured into entangled processes of emergence.¹¹² Enlisting both practitioners at the early stages of my research was pivotal to help me contemplate and reposition my practice as an emergent, dynamic and temporal creative process.

Chris Welsby — creative practitioner influence

“The idea of an ontological shift in the way we see ourselves in relation to nature is no longer a matter of abstract speculation.”¹¹³

Chris Welsby

Prior to my PhD research, I had experienced Welsby’s film installation works but not his reflective and theoretical writings. I view Welsby as a practitioner-theorist due to the rigour with which he interrogates his practice. From the position of thinking through the creative potentials of non-linear art, Welsby became an important influence in contextualising my own decision-making procedures in practice. Moreover, Welsby’s environmental concerns and commitment align with my position on the subject of interconnectivity.

Welsby’s creative practice, which began in the early 70s, is strongly influenced by structural materialist film theory, systems theory, cybernetics and the cognitive research of Humberto Maturana and Francisco Varela.¹¹⁴ Schooled in Britain, where Roy Ascott had introduced cybernetic theory into art education,¹¹⁵ Welsby notes the influence Gregory Bateson’s *Steps to an Ecology of Mind* had at that time.¹¹⁶ Welsby’s interest in cybernetics, systems theory and love of landscape thus influenced his early artistic direction:

What interested me about both structural film and complex systems theory was the possibility of creating work based on the interconnectedness of these systems, work where landscape was not secondary to the filmmaking process or the filmmaking process to landscape, but process and structure, as revealed in both, could carry information and communicate ideas. In all

¹¹² Pickering, *The Mangle of Practice: Time, Agency, and Science*, 26; Welsby, "Cybernetics, Expanded Cinema and New Media: From Representation to Performative Practice," 276–287.

¹¹³ Welsby, "Technology, Nature, Software and Networks: Materializing the Post-Romantic Landscape," 102.

¹¹⁴ Ibid., 103; Welsby, "Cybernetics, Expanded Cinema and New Media: From Representation to Performative Practice," 276. Chris Welsby, "Films and Installations—a Systems View of Nature," in *Experimental Film and Video*, ed. Jackie Hatfield (Eastleigh, UK: John Libbey Publishing, 2006), 26–35.

¹¹⁵ Roy Ascott, "Cybernetics - Letter to the Editor," *Studio International* 176, no. 904 (1968): 8.

¹¹⁶ Welsby, "Cybernetics, Expanded Cinema and New Media: From Representation to Performative Practice," 282.

my films and installations I use the simple structuring capabilities of moving-image technologies, such as variable-frame rate, in-camera editing and multiple projection, in combination with natural phenomena such as wind and tides and the rotation of the planet, to produce works in which mind, technology and nature are not experienced as separate things divided along Cartesian lines but as interconnected parts of one larger, dynamic system.¹¹⁷

I was intrigued by Welsby's generative installations that incorporated live-streamed elements sourced from natural phenomena. Welsby's installation *Tree Studies* (Figure 3) is created with data streamed from weather stations located on four different continents. In this work the speed and direction of the wind is streamed via Internet to a custom-made program¹¹⁸ that processes the incoming data and, in turn, selects different pre-recorded audiovisual material. The visual component is of a single tree captured at three different angles using time-lapse photography. Each shot spans several hours and, as Welsby states, "emphasize[s] the changing visual relationship between the tree branches and the cloudy sky."¹¹⁹ Accordingly, the audio component includes pre-recorded environmental sounds of birds, passing planes, human voices, and "the simulated harmonics of an Aeolian harp."¹²⁰ As the installation system responds to the incoming wind data, the various audiovisual elements are selected and projected onto three separate screens and six surround-sound speakers.

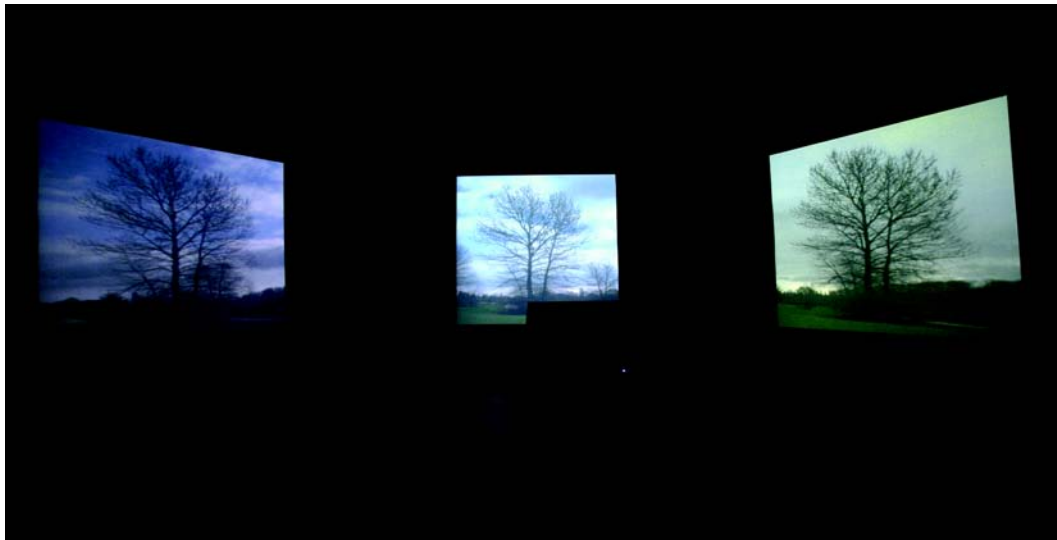


Figure 3. *Tree Studies* (2006). Photo C. Welsby.

¹¹⁷ Welsby, "Technology, Nature, Software and Networks: Materializing the Post-Romantic Landscape," 102.

¹¹⁸ Ibid., 105. The software Max/MSP was used.

¹¹⁹ Ibid.

¹²⁰ Ibid.

When I first encountered *Tree Studies* my music composition and audiovisual collaborations were realised exclusively in fixed-media formats. Experiencing *Tree Studies* encouraged my shift of practice as Welsby's non-linear approach offered an alternate creative sensibility that was not available in my fixed-media collaborations. In my experience, the lack of a temporal line and the ever-varying elements draws forward a different mode of attention than do fixed-media works. It is a contemplative state that suspends the forward trajectory of beginnings, middles and ends of fixed-media formats. While a gust of wind is a common occurrence, using winds from different continents as a creative apparatus alters the space in which the artwork resonates—both physically and in contemplation. Of this Welsby says: "It is my hope that in such a space it may be possible to consider our selves and our technologies not only in relation to any particular landscape but also in relation to the larger more inclusive body of the planet as a whole."¹²¹

To contextualise his weather-driven works Welsby uses concepts such as interconnectedness, processes of emergence, and autopoiesis.¹²² This, I believe, aligns his praxis with what Chris Salter describes as "the reorganization of human interaction and the reimagination of interrelatedness."¹²³ Welsby outright rejects Descartes's dualist vision of the world, along with the Heideggerian located "enframing" of nature¹²⁴ and tries "to produce works in which mind, technology and nature are not experienced along Cartesian lines but as interconnected parts of one larger, dynamic system."¹²⁵ Thus, Welsby's environmental concerns and commitment to a non-dualist mode of thought informs a creative practice that is imbued with a sense of urgency to promote what he consider "a long-overdue change in human perception"¹²⁶ in how we relate to the rest of the world.

¹²¹ Ibid., 104.

¹²² Ibid., 106.

¹²³ Salter, *Entangled: Technology and the Transformation of Performance*, xxxv–xi.

¹²⁴ Welsby, "Cybernetics, Expanded Cinema and New Media: From Representation to Performative Practice," 276; Martin Heidegger, "The Question Concerning Technology," in *Martin Heidegger: Basic Writings*, ed. D. Krell (New York: Harper & Row, 1977), 20–27. In rejecting the "enframing of nature," Welsby draws on Heidegger's essay "The Question Concerning Technology." In Heideggerian terms, enframing (from the German word *Ge-stell*), denotes humans "ordering attitude" and activity of dominating and "demand[ing] that nature be orderable as standing-reserve." Heidegger believed this to be a dangerous perspective as it gives rise to a delusionary understanding of humans position on earth: "exalts himself to the posture of lord of the earth, [and] endanger[s] man in his relationship to himself and to everything that is; [...] it drives out every other possibility of revealing."

¹²⁵ Welsby, "Technology, Nature, Software and Networks: Materializing the Post-Romantic Landscape," 102.

¹²⁶ Ibid.



Figure 4. *At Sea* (2007). Photo C. Welsby.

To further his interrogation of practice and to contextualise installations such as *At Sea* (Figure 4) Welsby enlists Humberto Maturana and Francisco Varela's cognitive research from the 1980s. Similar to *Tree Studies*, *At Sea* is a multi-projection work that, as Welsby states, draws the viewer's contemplative cognitive state of engagement into the creative process.¹²⁷ Captured off the West Coast of British Columbia, this work is comprised of four visual projections of the ocean and the soundscape activities of Vancouver harbour. While viewing this work I experienced a drift in time as the long shots of sea and fog lulled me into a meditative state. It is in this slowed-down state that Welsby believes the viewer can access a state of contemplation and reverie and "take back control of their thoughts and perceptions."¹²⁸ Welsby considers the experience (both for the maker and viewer) as one that is continuously being brought forth in the process of cognition.¹²⁹ When contextualising *At Sea* Welsby states, "...this bringing forth of an unknowable subject, in this case the incomprehensible vastness of the ocean, may be read both literally and as a metaphor for the process of cognition itself."¹³⁰

Welsby's "bringing forth" is a direct reference to Maturana and Varela's Santiago Theory of Cognition in which they proposed that "to live is to know"

¹²⁷ Ibid., 103–104.

¹²⁸ Ibid.

¹²⁹ Ibid., 103.

¹³⁰ Ibid.

and that cognition is a “continual bringing forth of a world through the process of living.”¹³¹ The particular world that is brought forth depends, first, on the structure of the organism, and, second, on its relationship to its environment.¹³² At the time of its introduction, this theory was a profoundly new view of cognition that included all processes of life such as perception, emotion, action, and emergence. It involved the concept of mind as a process, not a thing, and extended the act of cognition to all living systems, including organisms that do not have a brain, such as simple-celled organisms.¹³³ Accordingly, the Santiago Theory of Cognition was noted as having provided the comprehensive scientific framework necessary to challenge the Cartesian division between mind and body, and afforded a “new synthesis of mind, matter, and life.”¹³⁴

Maturana and Varela respectively expanded on this theory of cognition that, in Varela’s case, would evolve into what is now widely accepted in cognitive science as the “embodied mind.”¹³⁵ Varela et al. introduced this term in the early 1990s with the central thesis that cognition, including knowledge, meaning, and emotion, is intrinsically linked to the body, to the active living of that body, and to the environment in which these activities, or “enactions” take place.¹³⁶ Since then, the concept has widened to include the very structure of human reason as arising from our bodies, brains and bodily experience evoking a quality of emergence and agency. The concepts “embodiment” and “enaction” are now part of the lexicon of contemporary creative researchers.¹³⁷ For my research purposes, it was of interest to note Maturana’s own reflections on art and technology:

As different technologies open and close different relational dimensions, they offer different possibilities for social and nonsocial coexistence, as well as different possibilities for the artist to create the relational experience that he or she may want to evoke. In all cases, though, whatever he or she does, the artist will be a participant creator of some virtual reality that may or not become a grounding reality in the course of human history.¹³⁸

¹³¹ Maturana and Varela, *The Tree of Knowledge: The Biological Roots of Human Understanding*, 245.

¹³² Capra and Luisi, *The Systems View of Life: A Unifying Vision*, 256–257.

¹³³ Ibid.

¹³⁴ Fritjof Capra, *The Web of Life* (New York: Doubleday, 1996), 172–175; Capra and Luisi, *The Systems View of Life: A Unifying Vision*, 256–257.

¹³⁵ Varela et al., *The Embodied Mind: Cognitive Science and Human Experience*, xvi–12.

¹³⁶ Ibid.

¹³⁷ While theories of embodiment and enaction are of interest to me, it was necessary to bracket off those lines of inquiry as it lay outside the scope of my PhD research.

¹³⁸ Humberto Maturana, “Metadesign.” Accessed April 2, 2014, <http://v2.nl/archive/articles/metadesign>

For me, the essence of this statement is: “the different relational dimensions, [that] offer different possibilities [...],” as this resonates with the research intentions that are woven throughout my dissertation. In my ecology of practice, the relational dimension has become a reoccurring refrain when considering the creative and theoretical pathways of non-linear processes. Where the relational dimension is identified, thoughts on agency and the performative are intertwined. The key here is that it matters who and what constitutes that relationship. As I experienced in Welsby’s weather-driven works, these relationships can open creative lines of inquiry that offer different ways of experiencing, contemplating and being in the world.

Thus, during my research, being drawn to Welsby’s practice motivated my decision to investigate non-linear creative procedures. And, as it happened *alongly*, in researching Welsby I was introduced to the writings of sociologist of science Andrew Pickering. If Welsby inspired me toward non-linear creative processes, Andrew Pickering offered compelling ways to contemplate those procedures as being part of an interlinking “dance of agency” between people, places and things.¹³⁹

Andrew Pickering — sociologist of science influence

A Dance of Agency
 “...a vision of the world as a place of continuing interlinked performances.”¹⁴⁰
 Andrew Pickering

Andrew Pickering’s notion of the “dance of agency” was enlisted early in my PhD to help contextualise the creative research I set out to explore. My switch to non-linear processes brought with it different sensibilities, both in the field while recording projects and in the *making-doing-thinking* methods of practice. My quest to find new vocabularies to support those sensibilities became an important aspect of my research. In this respect, Pickering’s “dance of agency” was influential as it provided a way to broaden my thinking around the interaction of people, places and things. This emphasised the performative qualities at work in my creative practice and helped position my research within a temporally

¹³⁹ Andrew Pickering, "Being in an Environment: A Performative Perspective," *Natures Sciences Sociétés* 21, (2013): 2.

¹⁴⁰ Pickering, *The Cybernetic Brain*, 21–22.

dynamic aesthetic. Pickering has been a *friend* of my research from the onset and remained an important thinker throughout its course.

I first encountered Pickering's "dance of agency" in *The Cybernetic Brain* (2010). Similarly to Welsby, Pickering's interest in cybernetics focuses on the British strand, including Ross Ashby, Gregory Bateson, Stafford Beer, and Gordan Pask.¹⁴¹ Viewing these researchers from a "broader cultural assemblage,"¹⁴² Pickering proposes an ontological reading of cybernetics by shifting the lens from a representational model to a performative idiom. From this perspective, the interaction between researcher and materials is understood as a process of temporal emergence, or dance, where the agency of human and nonhuman is constitutively interwoven.¹⁴³ Borrowing from Bruno Latour¹⁴⁴ and Martin Heidegger,¹⁴⁵ Pickering proposes a reading of cybernetics from a "nonmodern stance of revealing rather than enframing" in which "different acts of ontological theatre" are staged.¹⁴⁶ In this "dance of agency", practice and performance are brought to the foreground as having their own structure. Any knowledge that might result from this dance is part of the performance.¹⁴⁷ Thus the taken-for-granted dualist split between people and things is replaced with a temporal and emergent process.¹⁴⁸

While Welsby's interest in cybernetics sprang from his artistic curiosities, Pickering was motivated by his previous analysis of scientific practice. In *The Mangle of Practice* (1995) he describes the emergent and entangled "mangling"¹⁴⁹ processes at work between people (the scientists) and things (their tools). In this ontology a "mode of performative engagement with the world" is proposed.¹⁵⁰

¹⁴¹ Ibid., 4.

¹⁴² Ibid., 396.

¹⁴³ Pickering, *The Mangle of Practice: Time, Agency, and Science*, 24.

¹⁴⁴ Pickering, *The Cybernetic Brain*, 18.

¹⁴⁵ Pickering, "Being in an Environment: A Performative Perspective," 6. Similarly to Welsby, Pickering references Heidegger's "The Question Concerning Technology," to express his own concerns for enframing the world. To this effect, Pickering suggests: "We turn the world into scientific representations, figure out how to dominate those, and then remake the world in line with our calculations. This [...] is where emergence disappears and where things can go wrong." Pickering argues that a process of revealing (via Heidegger) rather than enframing could provide an alternative way of being in the world. It is out of this process of revealing that Pickering suggests "that our being in the world is at root performative."

¹⁴⁶ Pickering, *The Cybernetic Brain*, 28.

¹⁴⁷ Ibid., 381.

¹⁴⁸ Ibid., 19; Andrew Pickering, "The Ontological Turn: Taking Different Worlds Seriously," *Social Analysis* 61, no. 2 (Summer 2017).

¹⁴⁹ Pickering, *The Mangle of Practice: Time, Agency, and Science*, 23.

¹⁵⁰ Pickering, *The Cybernetic Brain*, 19.

Out of this Pickering arrives at his “vision of the world and our place in it, [...] in which both the human and the nonhuman are recognised as open-endedly becoming—taking on emergent forms in an intrinsically temporal ‘dance of agency’.”¹⁵¹ He argues against the idea that scientists “represent” the world, and suggests that the world “is continually doing things, things that bear upon us not as observation statements upon disembodied intellects but as forces upon material beings. Think of the weather. Winds, storms, droughts, floods, heat and cold—all of these engage with our bodies as well as our minds [...].”¹⁵² As Pickering notes, all his subsequent work grew out of that move away from the representation model toward a performative idiom.¹⁵³

What I take from Pickering’s theory is that there are ways of being in practice and being in the environment that are ecologically performative. What resonated with me was Pickering’s conviction that in this “dance of agency” between the human and nonhuman, “there *is* another way of understanding our being in the world [...] and that grasping that other way can make a difference in how we go on.”¹⁵⁴ Here, Pickering discloses his desire to challenge the hegemony of modernity and see what other possible futures might be imagined.¹⁵⁵ Of this he says: “A nonmodern ontology would immediately and continually remind us that we never know the future and that we should always expect unexpected consequences to accompany our projects.”¹⁵⁶ In other words, placing care and consequence into the mix of modernity would inject more variety and provide other possible futures.¹⁵⁷ Pickering’s line of discourse moves away from the idea that agency is specific only to humans, or to what he refers to as human exceptionalism,¹⁵⁸ and proposes that the world, in all its heterogeneous multiplicity, is full of agency and processes of emergence.¹⁵⁹ By exploring these processes and performative relationships between things, including those beyond

¹⁵¹ Pickering, “New Ontologies,” 1.

¹⁵² Pickering, *The Mangle of Practice: Time, Agency, and Science*, 6.

¹⁵³ Pickering, “Being in an Environment: A Performative Perspective,” 1.

¹⁵⁴ Pickering, *The Cybernetic Brain*, 390.

¹⁵⁵ *Ibid.*, 394.

¹⁵⁶ *Ibid.*, 395.

¹⁵⁷ *Ibid.*, 390.

¹⁵⁸ Pickering, “Art and Agency,” 40.

¹⁵⁹ *Ibid.*, 18.

the human realm, he suggests that we invite the “possibility of [...] open-ended extensions.”¹⁶⁰

For Pickering and Welsby, promoting this nondualist perspective brings to the foreground a mode of thought where the “ontology of unknowability and becoming”¹⁶¹ are not considered weak positions of practice; rather, they stimulate a *making-doing-thinking* that is expansive and open to the possibilities that might emerge. This perspective helped position my practice away from the human-centric conceptualization of creativity and toward a non-linear process that enlists material agency as a co-creative apparatus. In this mode of artistic practice, immediacy, unpredictability and surprise register in a relational “intra-action”¹⁶² of process and material, forming an open-ended experimentation process that embraces the unexpected. As Chris Salter suggests, experimentation-as-process... “takes its materials or entities as active, dynamic, and changeable, rather than passive, inert, and immutable... [transforming them] into agents or actants that have actual effects in the world.”¹⁶³

This mode of practice is a risky endeavour, one where a space is opened in which creative responses emerge out of the situated encounters. As the works in my portfolio are derived from experiential encounters in different environments, it was necessary to contextualise the effects these places had in my ecology of practice. Pickering’s notion of the “dance of agency” from a performative idiom contributed to this task and thus became a key refrain in my research, with the objective of exploring non-linear creative processes. Reflecting once again on Myers and Dunitz (via Pickering), a contact improvisational dance is set in motion where the resulting research “aims to evidence the *affective entanglements of inquiry*.”¹⁶⁴ This, in turn, has the potential to draw the practitioner into new understandings, relationships, capacities and pathways of practice.

¹⁶⁰ Pickering, *The Cybernetic Brain*, 390.

¹⁶¹ Ibid., 28.

¹⁶² Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Barad’s concept of “intra-action” is reviewed on pages 41–43 of this dissertation.

¹⁶³ Salter, *Alien Agency: Experimental Encounters with Art in the Making*, 14.

¹⁶⁴ Myers and Dunitz, “Haptic Creativity and the Mid-Embodiments of Experimental Life,” 244.

Early Pathways in Practice

It is helpful to reflect on early experimentation-as-process procedures that occurred in my PhD research, which influenced the trajectory of the resulting audiovisual installations. My intention here is not to draw blunt lines between theory and practice but rather to reflect on aspects of practice as it *alongly* progressed in moments of emergence. My position is that an attunement to the complex polyphony of influences within the ongoing movement of creative practice can be made felt as to how I arrived at the notion of *Audiovisual Installation as Ecological Performativity*.

A springboard for my preliminary experiments was the audiovisual work *Aspects of Trees*, a previous collaboration with film and video artist Andrew Denton. The subject of this work is the escalating pine beetle epidemic that has decimated forests on the west coast of North America, as previously described (pages 20–21). This work is the result of a two-year field recording process that comprises video footage and stills from the infected forests, as well as audio captured inside and on the surface of pine trees.¹⁶⁵ As Denton and I both worked in reforestation in British Columbia before, during and after the epidemic, we have subjective multilayered emotional and physical experiences embedded through concentrated encounters with this particular landscape. Because of our shared tacit knowledge, a reflective practice emerged during the collection and postproduction process that resulted in three iterations of the work: a multiscreen live concert with cello and laptop (*Okta: NZ 2013, Toronto Electroacoustic Symposium 2013*), an audiovisual installation (*Balance/Unbalance: Australia 2013*), and a single channel fixed-media version (*Tehran International Film Festival 2016, Jihlava International Documentary Festival 2015, New Zealand Film Festival 2015*). The trajectory of these iterations encouraged my tendency towards a non-linear aesthetic. It is of interest to note here that within the ecology of Denton's and my extensive collaborative practice, *Aspects of Trees* is now recognised as a main point of divergence. Denton was drawn toward

¹⁶⁵ David Dunn (www.acousticecology.org/dunn/solit.html) and Felix Wilson (www.felixwilson.com) provided additional field recordings of internal and external tree sounds.

fixed-media formats imposing formal constraints on the collected material, while I was lured toward the performative and agential capacities of non-linear devices.¹⁶⁶

My research on *Aspects of Trees* comprised the construction of the ‘tree instrument’,¹⁶⁷ which amalgamated a variety of compositional and computational processes for live improvisation with laptop, cello and visual projections. This “composed instrument”¹⁶⁸ would come to include sonification of still and moving images, an eight-part canonic system based on the numerical ratios taken from tree growth, live granulation and transposition, and live convolution of improvised cello with field recordings. While there are generative elements embedded in this laptop instrument, the creative sensibilities I wanted to explore were not available due to the fixed media realisation of the visual component. Therefore, my subsequent research included methods to engage the materiality of the visual component through non-linear processes and thus become a co-creative device.

A key instance from *Aspects of Trees* is the closing section of the single channel fixed-media version (Figures 5, 6, 7). This three-minute segment contains a single video reassembled into nine panels. Using Adobe After Effects, Denton applied a random offset effect that altered the playback speed of each panel, resulting in a slight temporal shift.¹⁶⁹ The resulting visual patterns appealed to my ‘musician’s eye’ as resembling polyphony. My immediate response was to develop a non-linear system where the visual and sonic patterns could continuously transform. Rather than locking off pre-rendered visuals, my research set about configuring a non-linear method where the visual patterns could continuously alter and in turn affect the sonic layers. In this way, my intention was to explore the creative tendencies that emerge in a non-linear system—opening possibilities for a transformative dynamic aesthetic.



Figure 5. Photo still from *Aspects of Trees*. Photo A. Denton.

¹⁶⁶ Teresa Connors and Andrew Denton, "In Environments: The Convergence and Divergence of Practice," *Organised Sound* 23, no. 1 (forthcoming).

¹⁶⁷ Teresa Connors, "Multimedia Collaboration as Art Practice" (Master's thesis, The University of Waikato, 2013).

¹⁶⁸ Richard Dudas, "'Comprovisation': The Various Facets of Composed Improvisation within Interactive Performance Systems," *Leonardo Music Journal* 20, no. 1 (Winter, 2010): 29.

¹⁶⁹ Andrew Denton, "Personal Communication," (2016).



Figure 6. Photo still from *Aspects of Trees*. Photo A. Denton.



Figure 7. Photo still from *Aspects of Trees*. Photo A. Denton.

Using Cycling74 program Max 6, the initial explorations proved challenging due to the computer processing power required. A series of conversions to the video codec and process in which Max translated those files enabled me to build a nine-panel segment, similar to the final section of *Aspects of Trees*. Using Karlheinz Essl's Max external *random-rampf-urn*, I offset the speed of three identical videos, resulting in an ever-changing visual pattern system. The next intended step was to construct a method to translate these patterns into a sonic generative layer but, as it happened, Denton presented a version of his technique implementing a 16x12 grid (Figure 8).



Figure 8. Photo still from 16x12 assemblage. Photo A. Denton.

For me, this expanded visual pattern resembled an elaborate moving fabric. The potential to do the same in a non-linear system was compelling. Hence my coding efforts focused on expanding my nine-panel system. In those initial efforts, I could manage an 8x6 matrix (Figure 9) using three identical videos before the system slowed down. Fortunately, during my research, Cycling74 updated the functionality of its video engine, improving the playback capacity of this program. Much later in my research, this update enabled me to construct a 24x16 grid using six videos (Figure 10).

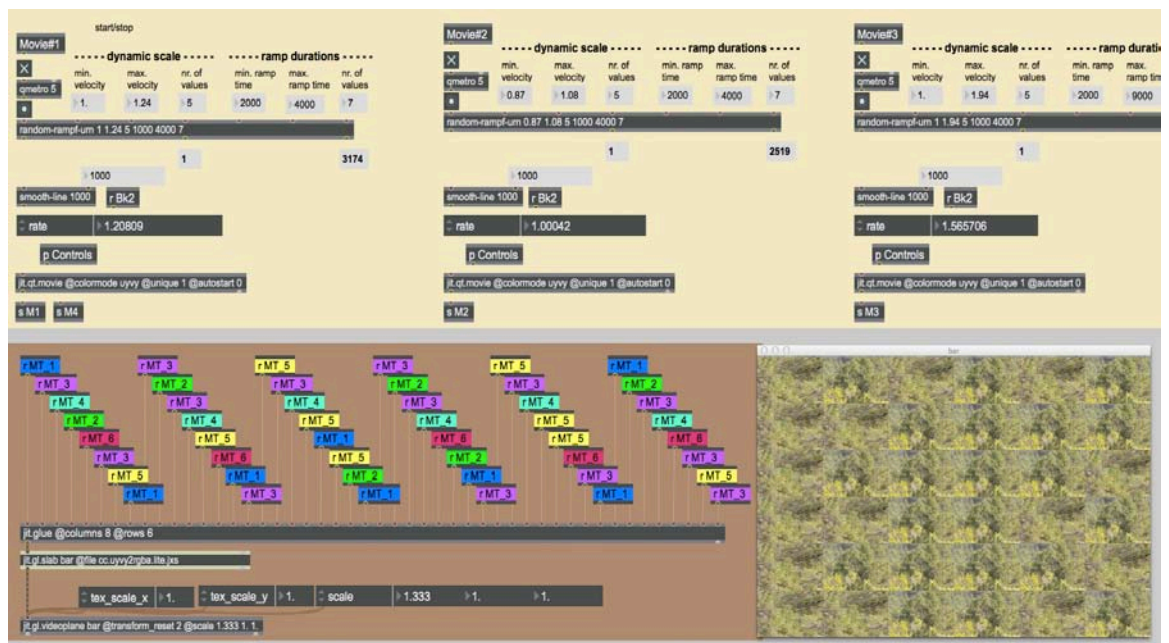


Figure 9. 8x6 Max 6 patch matrix in presentation mode.

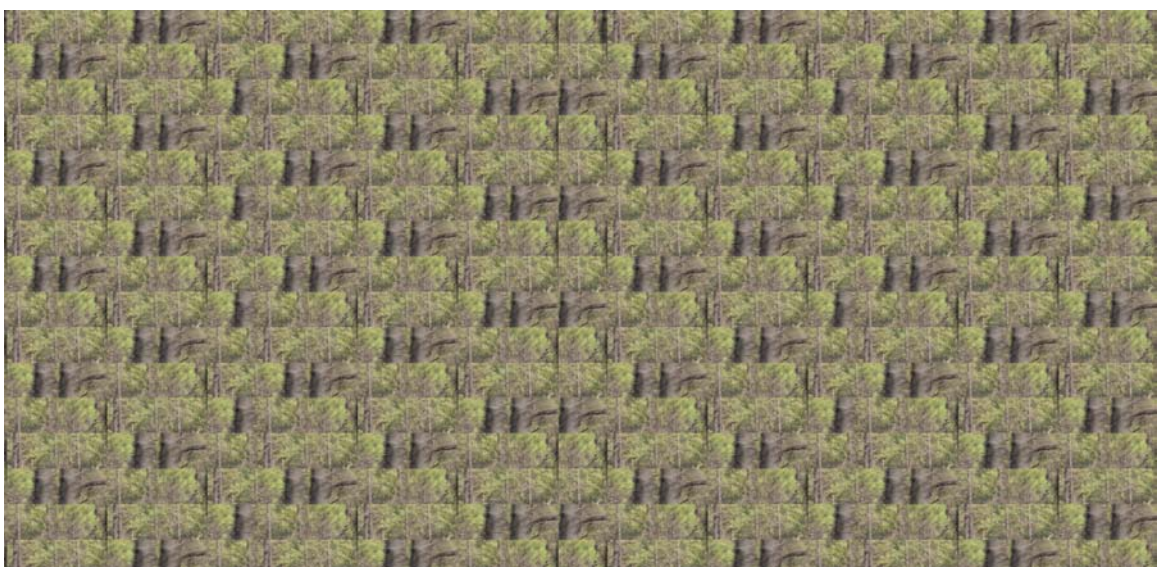


Figure 10. 24x16 construction in Max 7.

During those initial explorations, I also experimented with a variety of images including a series of jet stream videos (Figure 11) captured by Denton on a previous field recording project.¹⁷⁰ Accordingly, I processed these results into the projection-mapping program VPT 7 to expand the possibilities of the system (Figure 12) and began to explore computer vision techniques as a generative sonification device (Figure 13).



Figure 11. Jet Stream. Photo A. Denton.

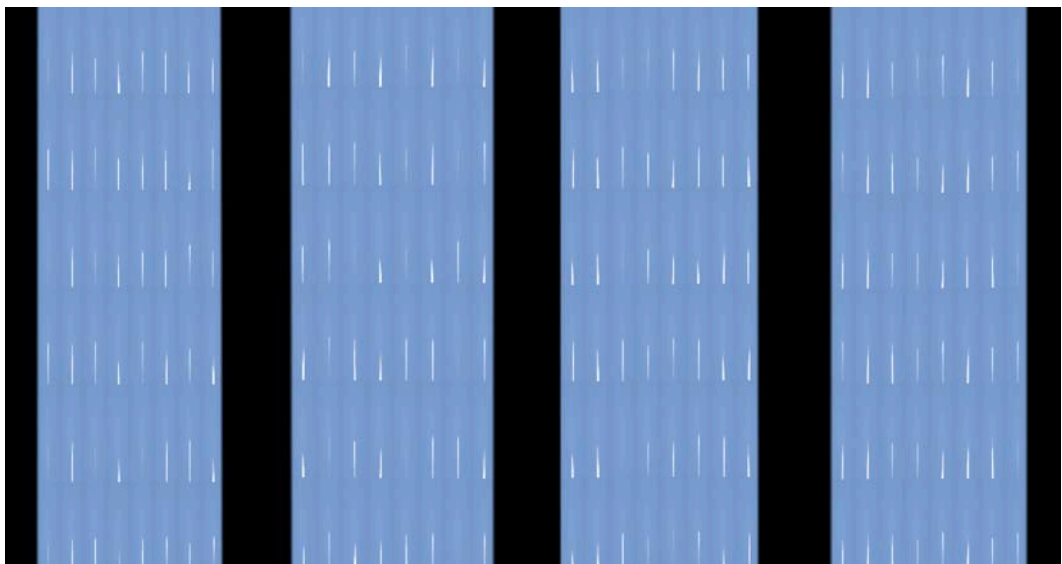


Figure 12. Projection mapping.

¹⁷⁰ Denton would use a selection of these jet stream videos to create the fixed-media film *Flight*, which contains no sound or music. For my research, I incorporated a number of the jet stream footage in the non-linear audiovisual installation *Flight Variant*, described in the portfolio section of this dissertation (pages 82–89).

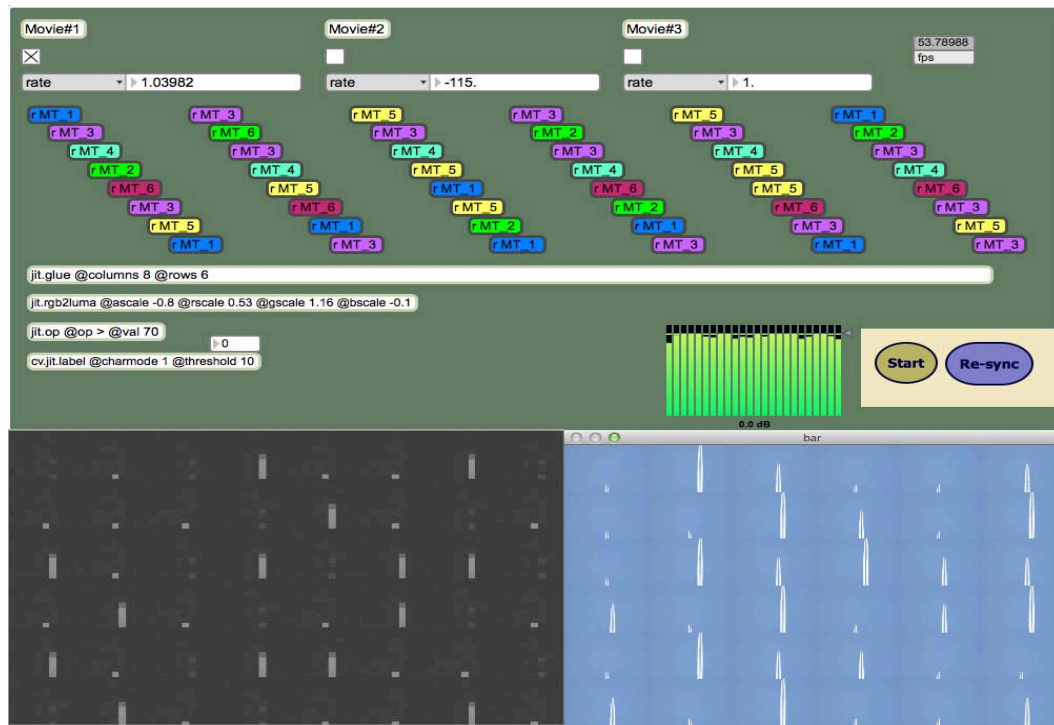


Figure 13. Computer Vision.

These initial experiments took place in the first six months of my PhD, before the specific field recording projects were embarked on for my thesis. Initially, these experiments did not result in completed works, but rather, influenced the subsequent collection of recorded material and the installations that ensued. Moreover, configuring these Max patches, where the materiality of the visuals became triggering agents, led to my contemplating such apparatuses as co-creative devices. Beyond technical considerations, these ideas introduced a way of thinking and being in artistic practice that, as described by Manning and Massumi, is “*an environmental mode of awareness*.”¹⁷¹

The making-felt of a co-compositional force that does not yet seek to distinguish between human and nonhuman, subject and object, emphasizing instead an immediacy of mutual action, an associated milieu of their emergent relation. This co-compositional engagement with the associated milieu of emergent relation is an *environmental mode of awareness*.¹⁷²

Given the creative research context in which I work, making and thinking with co-creative and emergent relations opened a pathway to consider the performative aspects at work in my practice and in the situated encounters experienced during the different field recording ventures. Consequently, I sought thinking companions to provide a broader dimension to these considerations. If the early influences and

¹⁷¹ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 164.

¹⁷² Ibid.

pathways of practice described in this chapter motivated me to explore the creative tendencies that emerged in non-linear processes, then the writers discussed in the next chapter provided alternative vocabularies and thoughts to contemplate and articulate the relational entanglements and pathways at work in the different environments and resulting audiovisual installations.

3. THE RELATIONAL PATHWAYS

“[...] the experience’s just-beginning-to-stir in a more-than of its own coming activity—is the relational dimension of the event’s occurring. It is the event under the aspect of its immediate participation in a world of activity larger than its own.”¹⁷³

Brian Massumi

As a way to explore co-creative and performative devices in an agential and dynamic space, *Audiovisual Installation as Ecological Performativity* has experimented with non-linear processes. This chapter places my research in a relational dimension to expand and consider what other vocabularies might be at work within the creative practice, all of which compel me to think anew about the agency of time, place, and bodies (human and nonhuman). From the position of the research outlined here, Karen Barad and, to a lesser degree, Judith Butler influenced my insights into a relational understanding of practice by reconfiguring and taking into account the various places and particularities in which performance occurs. Barad’s notion of “intra-action”, which replaces interaction, proposes a way of thinking that reworks traditional ideas of relationality and causality and other core philosophical concepts.

In addition, Jane Bennett’s concept of “thing-power” and Timothy Morton’s notion of the hyperobject located way of thinking about the shifting sensibilities and tendencies that emerged in my practice while on field recording sessions and influenced some of the *making-doing-thinking* of my non-linear works. These theorists act as entry points to contextualise my ecology of practice from broader vocabularies and dimensions of thought. Their commonalities and differences—Tsing’s moments of friction—provided alternative forces through which to consider my creative research. Manning and Massumi philosophise these forces as a “tending-forth [... that] comes from the outside, attracted by conditions for its shaping. Coming in, it shifts the work toward its own uneasy outside. This outside is intensive, tightly wound in its interloping, in the interweaving of elastic relations with all else incipiently in-act.”¹⁷⁴

¹⁷³ Brian Massumi, *Semblance and Event: Activist Philosophy and the Occurrent Arts* (Cambridge, MA: MIT Press, 2011).

¹⁷⁴ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 1290.

Karen Barad — Intra-Actions

“The world is an open process of mattering through which mattering itself acquires meaning and form through the realization of different agential possibilities.”¹⁷⁵

Karen Barad

In the past decade, Karen Barad’s body of work, particularly *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (2007), has attracted much attention from a variety of theoretical, critical, and philosophical thinkers. Subsequently, many of the ideas developed by Barad such as “diffraction” methodologies, “intra-action” and “agential realism” have contributed to transforming an understanding of knowledge-making practices and the methods in which the differences therein come to matter.¹⁷⁶ Specific to my research is Barad’s concept and handling of performativity, which provided me with insightful ways to ask new questions from the core of my creative practice as it progressed in the field and studio. Barad’s notion of performativity as an “intra-action” expanded and complicated, in the best way possible, my thinking in the making tendencies that, in turn, drew forward different capacities of engagement and alternative vocabularies for contextualising my creative inquiry.

Similar to Pickering, Barad problematises representationalism¹⁷⁷ and human exceptionalism¹⁷⁸ to locate her position on natural-cultural and knowledge-making practices and, like Pickering, does so by rethinking the role that material agency plays in understanding scientific practices. Barad goes to great lengths to give a performative account of technoscientific and other natural-cultural practices in what she defines as agential realist ontology;¹⁷⁹ that is, “a causal explanation of how discursive practices are related to material phenomena.”¹⁸⁰ Phenomena, for Barad, are understood via the work of quantum physicist Neils Bohr, particularly his materialist understanding of the relationship between concepts and material-

¹⁷⁵ Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Loc 2821.

¹⁷⁶ Karin Sellberg and Peta Hinton, "Introduction: The Possibilities of Feminist Quantum Thinking," *Rhizomes*, no. 30 (2016).

¹⁷⁷ Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Loc 2706.

¹⁷⁸ *Ibid.*, Loc 2726.

¹⁷⁹ *Ibid.*, Loc 772.

¹⁸⁰ *Ibid.*, Loc 1005; Karen Barad, "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter," *Signs: Journal of Women in Culture and Society* 28, no. 3 (2003): 820–821. Barad defines discursive practices as “specific material (re)configurings of the world through which local determinations of boundaries, properties, and meanings are differentially enacted. That is, discursive practices are ongoing agential intra-actions of the world through which local determinacy is enacted within the phenomena produced. Discursive practices are causal intra-actions.”

discursive apparatuses.¹⁸¹ Bohr's analysis of experimental practices radically reconceptualised the relationship between subject-object and the "inseparability of 'object' and 'agencies of observation.'"¹⁸² Barad, accordingly, reworks Bohr's relational position to propose her notion of "intra-action" in which human and nonhuman, matter and meaning, subjects and objects, experiment and phenomena are always in the making, co-evolving from a "direct material engagement with the world."¹⁸³ Barad is very clear that phenomena are understood as a particular material entanglements¹⁸⁴ "not as objects-in themselves, or as perceived objects (in the Kantian or phenomenological sense), but as specific intra-actions."¹⁸⁵ Thus intra-action, rather than interaction, signifies the on-going process of becoming and reconfiguring of the world in a performative ontology.¹⁸⁶

[...] the world's radical aliveness comes to light in an entirely nontraditional way that reworks the nature of both relationality and aliveness (vitality, dynamism, agency). This shift in ontology also entails a reconceptualization of other core philosophical concepts such as space, time, matter, dynamics, agency, structure, subjectivity, objectivity, knowing, intentionality, discursivity, performativity, entanglement, and ethical engagement.¹⁸⁷

While Barad situates "intra-action" in a posthumanist perspective, she is adamant that posthumanist refers to: "a refusal to take the distinction between 'human' and 'nonhuman' for granted, and to found analyses on this presumably fixed and inherent set of categories."¹⁸⁸ Further to this Barad states:

"Intra-actions reconfigure the possibilities for change. In fact, intra-actions not only reconfigure spacetime-matter but reconfigure what is possible. [...] Questions of responsibility and accountability present themselves with every possibility; each moment is alive with different possibilities for the world's becoming and different reconfigurings of what may yet be possible."¹⁸⁹

¹⁸¹ Karen Barad, "Quantum Entanglements and Hauntological Relations of Inheritance: Dis/Continuities, Spacetime Enfoldings and Justice-to-Come," *Derrida Today* 3, no. 2 (2010): 253; Barad, "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter," 822–823. Barad proposes that "material-discursive practices are specific interactive enactments—agential intra-actions—through which matter is differentially engaged and articulated (in the emergence of boundaries and meanings), reconfiguring the material-discursive field of possibilities in the iterative dynamics of intra-activity that is agency."

¹⁸² Barad, "Quantum Entanglements and Hauntological Relations of Inheritance: Dis/Continuities, Spacetime Enfoldings and Justice-to-Come," 253.

¹⁸³ Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Loc 1096.

¹⁸⁴ *Ibid.*, Loc 8874 (fn 13).

¹⁸⁵ *Ibid.*, Loc 2587.

¹⁸⁶ *Ibid.*, Loc 795; Levi R. Bryant, "Phenomenon and Things: Barad's Performative Ontology," *RHIZOMES* 30, (2016), Loc 771.

¹⁸⁷ Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, 795.

¹⁸⁸ *Ibid.*, Loc 771.

¹⁸⁹ *Ibid.*, Loc 3664.

My project lays no claim to upholding a posthumanist position; rather, most relevant to my research is Barad's performative reworking of key ideas like "[...] causality, dynamics, and agency."¹⁹⁰ Through a critical reading of Judith Butler's influential theory of gender performativity, Barad reformulates the notion of performance by shifting the focus away from the human body to thoughts on the nature of matter.¹⁹¹ From this perspective, Barad proposes: "All bodies, not merely "human" bodies, come to matter through the world's interactive intra-activity—its performativity."¹⁹² Thus, Barad's "intra-activity" constitutes a conceptual shift from traditional notions of causality¹⁹³ by taking into account the performative aspects of "material bodies (both human and nonhuman)."¹⁹⁴

In my ecology of practice, a performative reading via Barad's "intra-action" provided a broader dimension to articulate the ongoing entanglements at work in the different environments and in the creative pathways explored from which the audiovisual installations emerge. The anthropocentric understanding of creativity shifts to one of a relational and performative ontology where the "intra-actions" constitute a dynamic mode of artistic practice. In my experience, this mode of artistic practice necessitates a responsiveness that is similar to improvisation, in that the creative outcomes are generated from a capacity to respond. As suggested by Haraway, it is out of this capacity to respond that "response-ability" is cultivated; that is, "a [...] luring, desiring, making-with."¹⁹⁵ Likewise, Barad (via Haraway) regards the ability to respond and responsibility as the heart of her philosophical commitments:

There is no solution: there is only the ongoing practice of being open and alive to each meeting, each intra-action, so that we might use our ability to respond, our responsibility, to help awaken, to breathe life into ever new possibilities for living justly. The world and its possibilities for becoming are remade in each meeting.¹⁹⁶

¹⁹⁰ Ibid., Loc 1103.

¹⁹¹ Ibid., Loc 814. Barad's critique is specific to Butler's work done during the 90s. Since then, Butler has reworked her performativity theory as it related to bodies other than humans.

¹⁹² Ibid., Loc 3059.

¹⁹³ Ibid., Loc 2808.

¹⁹⁴ Ibid., Loc 2778.

¹⁹⁵ Haraway, "Anthropocene, Capitalocene, Chthulocene: Donna Haraway in Conversation with Martha Kenney," 257.

¹⁹⁶ Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Loc 112.

Judith Butler — Performativity

While Barad problematizes Judith Butler's theoretical positions on performativity, I want to acknowledge Butler's contribution to performativity that I have drawn on. Since the early 1990s Butler's writings and philosophical commitments on performativity have covered a spectrum of issues across gender and race in *Gender Trouble: Feminism and the Subversion of Identity* (1990) and *Bodies that Matter: On the Discursive Limits of "Sex"* (1993) and extended to ideas of the speech act of language and the powers of politics in *Excitable Speech: A Politics of the Performance* (1997). While Butler's concepts of performativity have undergone significant transformations, her contribution remains influential in relation to "the difficult questions of social change."¹⁹⁷

Most relevant to my research is Butler's recent line of discourse on the performative. With the growth of performance studies throughout the world,¹⁹⁸ Butler recently proposed a rethinking of performativity by considering the various places where performance occurs.¹⁹⁹ During her keynote presentation, *When Gestures Becomes Event*, at the 2014 Theater, Performance, Philosophy conference held in Paris, Butler foregrounds performance as an action or practice that can "happen in the street or in the mall, in ordinary life and [...] in every possible instance of motion and stillness."²⁰⁰ Accordingly she asks: "Are the human and object worlds that together make a performance possible also what make up the performance? Are such worlds carried and conveyed, made or unmade in the performances that we do and are—the ones we see and hear, the ones that *lay claim to our responsiveness* and by acting on us tacitly restructure how we sense the world and come to act as we do?"²⁰¹ Butler's reconceptualisation of the performative within this relational framework, folded in with Barad's notion of "intra-action", provided insights to contextualise the responsive tendencies that emerged while I was in the field:

¹⁹⁷ Vicki Kirby, *Judith Butler: Live Theory* (New York: Continuum, 2006), 36.

¹⁹⁸ www.performancephilosophy.org

¹⁹⁹ Judith Butler, 2014. "When Gesture Becomes Event," Theater Performance Philosophy – International Conference, accessed May 19, 2016, www.youtube.com/watch?v=iuAMRxSH--s

²⁰⁰ Ibid.

²⁰¹ Ibid. (emphasis mine)

Sequoia National Forest, California, July 2014.

The field recording in Sequoia National Forest was strange. I found being bused to the entrance of a long descending walkway, coupled with the overwhelming amount of tourists, all coming to gaze (and capture through their cameras) the largest giant Sequoia trees in the world, disturbingly sad—a weird procession. The way the sunlight shafts popped through the trees from my dust covered window on the bus looked like stained glass (Figure 14). Once off the bus and ‘plugged in,’²⁰² I became transfixed by the sonic qualities of this environment. The natural reverb of the forest is similar to a very large cathedral. The chatter of the tourists, interjected with the scurrying flip-flops of children, footsteps of their parents and the haunting sounds of crow calls created a weird musical polyphony (Figure 15). Descending the paved trail to finally arrive at the main attraction, General Sherman (Figure 16)—the largest Sequoia tree in the world—the concentration of voices became sonically dissonant. The overlapping languages coupled with the natural reverb of the forest morphed into a strange, yet beautiful choir—like in a cathedral. Punctuating this vocal polyphony were the various mechanical and digital sounds of cameras (Figure 17).

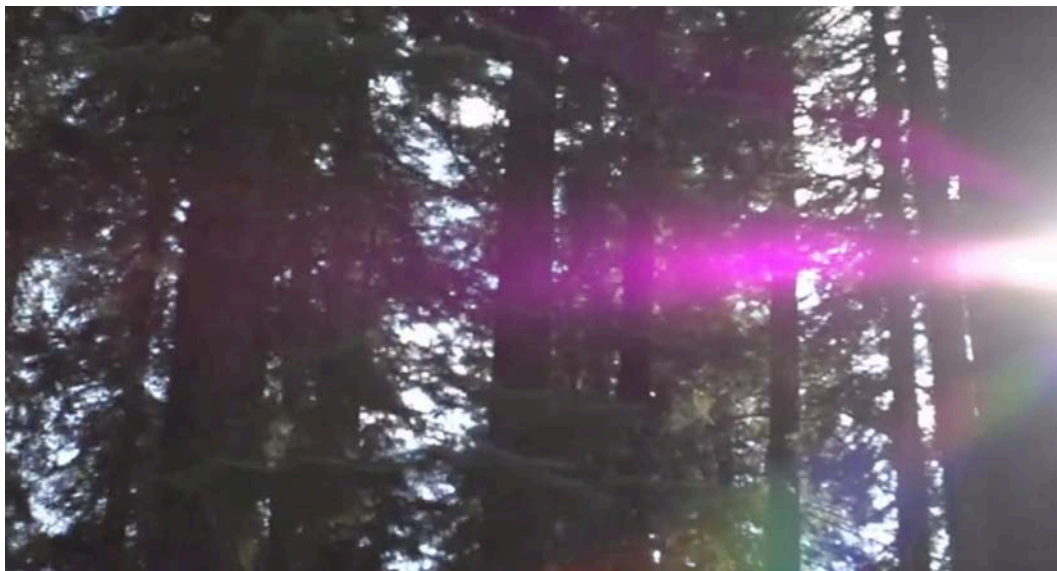


Figure 14. Sequoia National Forest. Photo A. Denton.

²⁰² Being ‘plugged in’ refers to having my headphones on and recording. I use this term to tell my colleagues ‘do not disturb.’



Figure 15. Sequoia National Forest. Photo A. Denton.²⁰³

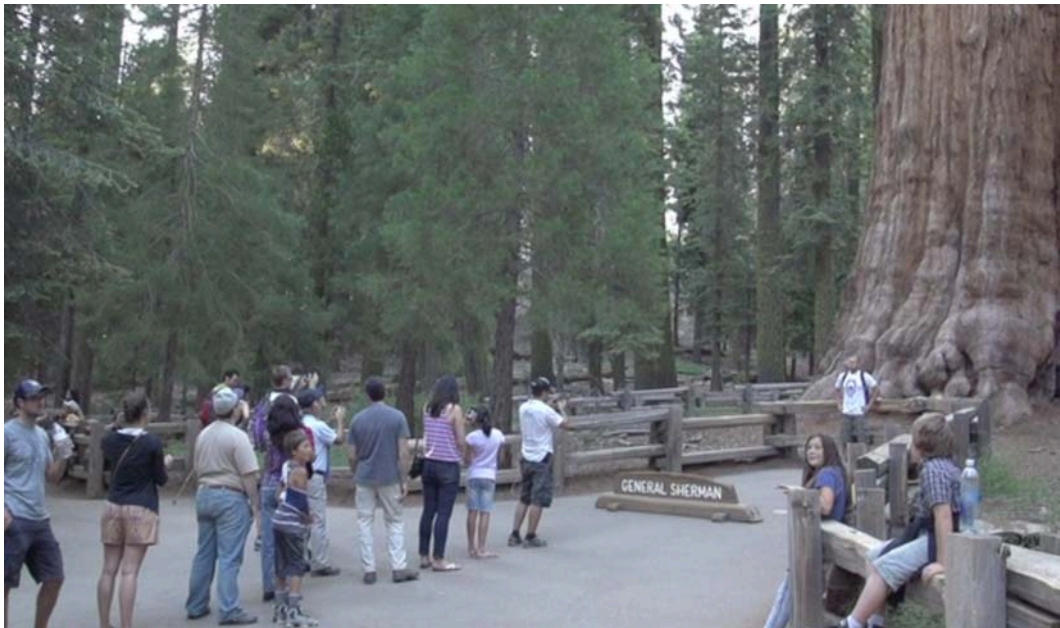


Figure 16. Sequoia National Forest. Photo A. Denton.²⁰⁴

²⁰³ Andrew Denton, *Crude* (Monash University Art Gallery, 2016), High Definition Video.

²⁰⁴ Ibid.



Figure 17. Sequoia National Forest. Photo A. Denton.²⁰⁵

This journal entry was made during my first field-recording trip for my PhD research, and recounts the shift of attention that being in this environment had on my responsive listening and recording tendencies and, in turn, the creative pathways that ensued. Qualities and sensibilities emerged that took over and influenced the experience and methods of recording, which I now consider to be performative: (restating Butler) “[...] the ones we see and hear, the ones that lay claim to our responsiveness and by acting on us tacitly restructure how we sense the world and come to act as we do [...].”²⁰⁶ The tendencies that surface are intrinsically linked to being in these environments. What is set in motion is a complex relational flow between the inside and outside, attunement to which takes time. According to Jane Bennett it requires: “a cultivated, patient, sensory attentiveness to nonhuman forces operating outside and inside the human body.”²⁰⁷ While field recordings often begin with the matter-of-fact process of dealing with equipment (making sure all batteries are charged etc.), these functional and environmental influences become an operative (performative) agent in the collection of materials and making the installations. The contexts of being in these environments—including their history and present condition, my history and desires, the tools of capture and “other nested and overlapping

²⁰⁵ Ibid.

²⁰⁶ Butler, “When Gesture Becomes Event”.

²⁰⁷ Bennett, *Vibrant Matter: A Political Ecology of Things*, Loc 169.

matrices”²⁰⁸—are entangled. Being in an environment, as such, is a process of emergence.

Combine the term emergent with attunement and we are directed towards Manning and Massumi’s notion of “emergent attunement.”²⁰⁹ Adapted from Daniel Stern’s concept of relational attunement, Manning and Massumi ask: “How does an event create an emergent attunement?”²¹⁰ It was during the Sequoia National Forest field recording session that the following question emerged: What does making art from these lived and experiential encounters in the world do? In other words, what is the purpose of an art form relationally situated in time and place?

In my ecology of practice, the choice to be in these different environments with my fellow creative practitioners is the event out of which responsiveness (and response-ability) emerges and is attuned to the specificity of the “intra-actions.” These encounters are transformative and thus bear some agential, affective and multi-layered creative capacities with unforeseen outcomes.²¹¹ This way of thinking and being in environments, as part of an ecologically performative act, motivated me to look for ways of rethinking interconnectivity. I became interested to upscale my subjective thoughts on interconnectivity (as described on pages 18–21) with other thinkers, to see what configurations might emerge in creative practice. If Barad and Butler helped me to contemplate performativity and “intra-actions” more broadly, it was Jane Bennett’s notion of “thing-power,” and Timothy Morton’s dark ecology project that were enlisted as methods to consider anew interconnectivity. Bennett and Morton reconfigured interconnectivity and holistic thinking in reference to ecology as a method to disrupt the romantic notion of Nature, and thus, for me, further complicated the anthropocentric notion of creativity. Moreover, Bennett and Morton’s writing provided a context to unpack the uncanny and strange/weird affect these environments evoked during my field recording procedures.

²⁰⁸ Seth Kim-Cohen, *Against Ambience and Other Essays* (New York: Bloomsbury Academic, 2016), 59.

²⁰⁹ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 2045.

²¹⁰ *Ibid.*, Loc 2067.

²¹¹ Salter, *Alien Agency: Experimental Encounters with Art in the Making*, 14.

Jane Bennett — Thing-Power

“ ... music [...] is better suited for acknowledging and translating the call of things.”²¹²

Jane Bennett

Bennett’s discourse on “thing-power” articulates the lure and effective capacity various objects have had on my field recording sessions and in turn the making of the non-linear audiovisual installations contained in my research. A crucial implication of “thing-power” is Bennett’s recasting of everyday inert objects into active and vibrant material. In so doing, Bennett breaks with the “subject” and “object” dichotomy by giving agency to the energetic vitality intrinsic to matter, and the active, earthy, and complex entanglements of human and non-human encounters.²¹³ “Earthy bodies, of various but always finite durations, affect and are affected by one another. And they form noisy systems or temporary working assemblages that are, as much as any individuated thing, loci of effectivity and allure.”²¹⁴

While Bennett locates “thing-power” within the traditions of Baruch Spinoza’s “conatus,” Henry Thoreau’s “force of the *Wild*,” and Lucretius’ “primordia,”²¹⁵ her project is more a literal response to a particular set of objects. This “call of things”²¹⁶ occurred one sunny spring day in Baltimore over a storm drain grate and included: “one large men’s black plastic work glove, one dense mat of oak pollen, one unblemished dead rat, one white plastic bottle cap, one smooth stick of wood.”²¹⁷

Bennett’s surprise encounter with this assemblage of things or, to use Latour’s term, “expressive actants,”²¹⁸ set in motion an experience that oscillated between “stuff to ignore, [...] stuff that commanded attention” and a sensation of disgust and dismay.²¹⁹ Consequently, Bennett negotiates a line of discourse that

²¹² Jane Bennett, 2011. “Powers of the Hoard: Artistry and Agency in a World of Vibrant Matter,” The Vera List Center for Art and Politics, accessed June 06, 2016, <https://vimeo.com/29535247>

²¹³ Bennett, *Vibrant Matter: A Political Ecology of Things*, Loc 333.

²¹⁴ Bennett, “Systems and Things. On Vital Materialism and Object-Oriented Philosophy,” 233.

²¹⁵ Bennett, *Vibrant Matter: A Political Ecology of Things*, Loc 319.

²¹⁶ Bennett, “Powers of the Hoard: Artistry and Agency in a World of Vibrant Matter”.

²¹⁷ Bennett, *Vibrant Matter: A Political Ecology of Things*, Loc 344.

²¹⁸ Bennett, “Powers of the Hoard: Artistry and Agency in a World of Vibrant Matter”.

²¹⁹ Bennett, *Vibrant Matter: A Political Ecology of Things*, Loc 347.

contemplates the “active expressive or calling capacity of things.”²²⁰ Thus, in *Vibrant Matter*, Bennett “turn[s] the figures of “life” and “matter” around and around, worrying them until they start to seem strange, in something like the way a common word when repeated can become a foreign, nonsense sound.”²²¹ It is out of this turning that her vibrant materialist concept of “thing-power” emerges.

Bennett is clear that her brand of materialism is not that of the long tradition of Vitalism, which infuses spirit, soul or God into objects.²²² Her goal instead is to acknowledge and give greater recognition to the affective and agential capacities of natural and artifactual things.²²³ Thus, Bennett’s “thing-power” is an attempt to “tune the human body, for rendering it more susceptible to the frequencies of the material agencies inside and around us.”²²⁴ Bennett claims her reasons for doing so are:

[...] to see what happens to our writing, our bodies, our research practice designs, our consumption practices, our sympathies, if this call from things is taken seriously. Taken, that is as more than a figure of speech, more than a projection of voice onto some inanimate stuff, more than an instance of the pathetic fallacy. What if things really can in some underdetermined way hail us and offer a glimpse through a window that opens of lively bodies that are unparsed into subjects or objects.²²⁵

Bennett, therefore, turns to the rubric of material agency, believing it to be a more potent way to problematize human exceptionalism—“the human tendency to understate the degree to which people, animals, artifacts, technologies, and elemental forces share powers and operate in dissonant conjunction with each other.”²²⁶ Bennett thus develops her theory of distributive agency via Spinoza’s “affective bodies” and Deleuze and Guattari’s “assemblage theory.”²²⁷ To support her theory Bennett examines different sites and occurrences of distributive agency: the 2003 North America power blackout; American consumption practices and the crisis of obesity; the call of things for hoarders; and, more recently, during the Nonhuman Turn Conference, through the agency of the text-

²²⁰ Bennett, “Powers of the Hoard: Artistry and Agency in a World of Vibrant Matter”.

²²¹ Bennett, *Vibrant Matter: A Political Ecology of Things*, Loc 55.

²²² Bennett, “Powers of the Hoard: Artistry and Agency in a World of Vibrant Matter”.

²²³ Jane Bennett, “The Force of Things: Steps toward an Ecology of Matter,” *Political Theory* 32, no. 3 (June, 2004): 349.

²²⁴ Bennett, “Powers of the Hoard: Artistry and Agency in a World of Vibrant Matter”.

²²⁵ Ibid.

²²⁶ Bennett, *Vibrant Matter: A Political Ecology of Things*, Loc 883.

²²⁷ Ibid., Loc 639.

body of poetry. Bennett's account of Walt Whitman's *Leaves of Grass* and James Joyce's *Finnegan's Wake* resonates most succinctly with my research as she brings attention to the particular kinds of agency, distinctive effects and capacities available in the material configuration of the text-body of the poems.²²⁸ Bennett ably shows how, in reading a certain configuration of words, one's sensibilities can change and attune in different directions. For example, after reading Whitman's *Leaves of Grass*, Bennett cannot help but think of the uncut hair of Graves while stepping on her lawn. Of this Bennett says:

[...] the effectivity of a text-body, including its ability to gesture toward a something more, is a function of a distributive network of bodies: words on the page, words in the reader's imagination, sounds of words, sounds and smells in the reading room, and so on, and so on—all these bodies co-acting are what do the job.²²⁹

For my purposes, I replace the text-body and poem with sonic-body and non-linear audiovisual installation. The sonic-body is understood here not as sound in itself—in the manner of reduced listening or Pierre Schaeffer's *objet sonore*—but as being embedded in the different agential “intra-actions” (via Barad) of the material world. The “distributive network of bodies” of the sonic-body includes the object and space in which the sound is *ensounded*²³⁰ and the forces that influence the sonic resonance to occur. Similarly to Bennett, the sonic-body can be considered as a “function of a distributive network of bodies” including the situated environments and their histories. Thus, my situated encounters with certain assemblages of sounds in the context with which they resonate have the capacity to attune my *making-doing-thinking* practice in different directions. An example of this occurred while recording the sounds of jet planes landing at the Los Angeles airport. Situated directly under the flight path landing area, my initial thoughts and actions were attuned to the massive sonic bandwidths generated by these machines and how best to record them. During recording, my thoughts shifted from those functional aspects to ideas on migration and family, economics and pollution, overpopulation, travel and a feeling of nostalgia. In this

²²⁸ Bennett, “Systems and Things. On Vital Materialism and Object-Oriented Philosophy,” 234.

²²⁹ Ibid. Bennett's statements are in reply to the Q&A session which followed her paper presentation at the Nonhuman Turn conference from which this book chapter emerges. Accessed October 10, 2015. <https://www.youtube.com/watch?v=pYxy-MlypUU>

²³⁰ Ingold, *Being Alive: Essays on Movement, Knowledge and Description*, 136–139. I use Ingold's notion of *ensounded*, which suggests that we hear *in* sound rather than hearing sound. I elaborate on this in Chapter 4 in reference to Ingold's objection to the term soundscape, which he believes positions sound as an object rather than an experience.

way, my sensibilities became attuned in different directions via the sonic-body of the jet. Accordingly, these directions of thought incited my inquiry into the daily occurrences of flights in the world that subsequently lured my creative process to include aviation statistical data and streamed flight data as a co-creative and “expressive actant” (via Latour) in the audiovisual installation *Flight Variant*, detailed in Chapter 5.

My creative process, in some ways, resonates with the sort of materialist theory of sound that Christoph Cox offers. In *Beyond Representation and Signification: Towards a Sonic Materialism*, Cox suggests a rethink of the theoretical models used to give an account of sonic arts (and art in general).²³¹ Like Bennett, Cox draws on Deleuzian philosophies to critique and “eliminate the dual planes of culture/nature, human/non-human, sign/world, text/matter.”²³² Theories of textuality, representation and signification are thus problematized to develop his materialism sonic philosophy. Of sound, Cox writes:

Sound is not a world apart, a unique domain of non-signification and non-representation. Rather, sound and the sonic arts are firmly rooted in the material world and the powers, forces, intensities, and becomings of which it is composed. If we proceed from sound, [...] we might begin to treat artistic productions not as complexes of signs or representations but complexes of forces materially inflected by other forces and force-complexes.²³³

Likewise, Seth Kim-Cohen (via Cox and Morton) offers his ontological view of sound as having a material existence; “[as] a wave, a dynamic fluctuation in air pressure. [...] but also of socioeconomic conditions and of geo-historical exigencies.”²³⁴ Drawing on Morton’s style of object-oriented ontology (OOO),²³⁵ Kim-Cohen is interested (as is Cox) in rethinking, challenging and expanding the methods currently in place for theorizing music and sonic arts practices.²³⁶ To this end, I believe Bennett’s “thing-power” provides a viable way to do so by introducing a new vocabulary that gives an account of the types of sonic relations, responses and response-ability we find ourselves entangled in. As Bennett

²³¹ Christoph Cox, “Beyond Representation and Signification: Toward a Sonic Materialism,” *Journal of Visual Culture* 10, no. 2 (2011): 145.

²³² *Ibid.*, 148.

²³³ *Ibid.*, 157.

²³⁴ Kim-Cohen, *Against Ambience and Other Essays*, Loc 877.

²³⁵ *Ibid.*, Loc 410.

²³⁶ *Ibid.*

suggests: “sound and music is the most fecund of sites to annunciate the call of things.”²³⁷

Ultimately, Bennett’s “thing-power” is grounded in an ecological discourse, with the caveat of a comprehensive revision of the holistic platform of deep ecology.²³⁸ “Thing-power” is a method to achieve this goal as it fosters a “greater recognition of the agential powers of natural and artifactual things, greater awareness of the dense web of their connections with each other and with human bodies, and, finally, a more cautious, intelligent approach to our interventions in that ecology,”²³⁹ and “with less violence towards a variety of bodies.”²⁴⁰ Thus, being in creative practice with Bennett’s “thing-power” provided a theoretical position from which to break with the duality of subject and object and comprehend the different directions and sensibilities at work in various encounters and assemblages of things.²⁴¹

If Bennett’s position succeeds in reworking the holistic platform through the device of “thing-power”, then Timothy Morton makes a similar contribution through his dark ecology project. To this end, Bennett and Morton have overlapping commitments; however, for my project, Morton’s philosophical writings offer a version of ecological awareness that draws out the “weird” and shifting temporalities at work within the environment. Morton thus helped position my research into non-linear processes, with the aim of locating co-creative devices, within an ecological discourse when he suggests that:

[...] all art—not just explicitly ecological art—hardwires the environment into its form. Ecological art, and the ecological-ness of all arts, isn’t just about something (trees, mountains, animals, pollution, and so forth). Ecological art is something, or maybe does something. Art is ecological insofar as it is made from materials and exists in the world.²⁴²

²³⁷ Bennett, “Powers of the Hoard: Artistry and Agency in a World of Vibrant Matter”.

²³⁸ Ibid.

²³⁹ Bennett, “The Force of Things: Steps toward an Ecology of Matter,” 349.

²⁴⁰ Bennett, “Powers of the Hoard: Artistry and Agency in a World of Vibrant Matter”.

²⁴¹ Jim Murphy, Dugal McKinnon, and Mo H. Zareei, “Lost Oscillations: Exploring a City’s Space and Time with an Interactive Auditory Art Installation,” in *International Community on Auditory Display* (Canberra, Australia: 2016), 4. Murphy, McKinnon and Zareei also reference Jane Bennett to contextualise their interactive sound art installation, *Lost Oscillations*, in reference to the situated location of Christchurch, New Zealand from which the work emerged. Of this, they write: “Jane Bennett’s Vibrant Matter serves to further couple *Lost Oscillations* to the location in which it is installed.” For my research, it is of interest the method used to build the interactive interface, which represents the city centre of Christchurch.

²⁴² Morton, *The Ecological Thought*, 11.

Timothy Morton — Dark Ecology

*“With dark ecology, we can explore all kinds of art forms as ecological: not just ones that are about lions and mountains, not just journal writing and sublimity. The ecological thought includes negativity and irony, ugliness and horror.”*²⁴³

Timothy Morton

Timothy Morton’s dark ecology project and his books *The Ecological Thought* and *Hyperobjects: Philosophy and ecology at the end of time* have intersected at different moments with some of the thinking in the making practice of Ecological Performativity. Morton’s ecological thoughts propose a way of thinking and being (in which he considers thinking, in and of itself, an ecological event) that embraces ambiguity, uncertainty and the uncanniness of the entangled mesh. Drawing on Graham Harman’s object-oriented ontology (OOO) philosophy,²⁴⁴ Morton offers his notion of the “strange strangers”²⁴⁵ and “weird weirdness”²⁴⁶ as an alternative form of ecological awareness in which “hesitation, uncertainty, irony, and thoughtfulness are put back into ecological thinking.”²⁴⁷ Morton is a strong advocate for music and art, stating: “art forms have something to tell us about the environment, because they can make us question reality.”²⁴⁸

Similarly to Ingold, Morton describes “the mesh” with words like “finely woven,” “threading,” “interconnectedness” and “entangled.”²⁴⁹ His discourse, however, quickly moves to the core of his dark ecology project; that is, to identify the uncanniness that results when realising the immensity and, at the same time, the nearness of “the mesh.”²⁵⁰ Accordingly, Morton substituted these descriptive terms with “the mesh” as a way to disrupt some of the sentimental rhetoric of deep ecology²⁵¹ and to challenge the Romantic perspective of Nature as “That

²⁴³ Ibid., 17.

²⁴⁴ Timothy Morton, *Hyperobjects: Philosophy and Ecology after the End of the World* (Minneapolis: University of Minnesota Press, 2013), Loc 128.

²⁴⁵ Morton, *The Ecological Thought*, 14–15, 17–19, 38–50; Morton, *Hyperobjects: Philosophy and Ecology after the End of the World*, Loc 190.

²⁴⁶ Timothy Morton, *Dark Ecology: For a Logic of Future Coexistence* (New York: Columbia University Press, 2016), Loc 155.

²⁴⁷ Morton, *The Ecological Thought*, 16.

²⁴⁸ Ibid., 8.

²⁴⁹ Morton, *Realist Magic: Objects, Ontology, Causality*, 75; Morton, *The Ecological Thought*, 28; Ingold, *Lines: A Brief History*.

²⁵⁰ Timothy Morton, “Thinking Ecology: The Mesh, the Stranger Stranger, and the Beautiful Soul,” *Collapse* 6, (2010): 275.

²⁵¹ Morton, *The Ecological Thought*, 59; Timothy Morton, *Ecology without Nature: Rethinking Environmental Aesthetics* (Cambridge, MA: Harvard University Press, 2007), 2 and 6.

Thing Over There.”²⁵² Of this Morton claims: “The more we know about life forms, the more we recognize our connection with them and the stranger they become.”²⁵³ Thus Morton’s “strange strangers”²⁵⁴ emerge from his ecological thought that imagines a multitude of entangled life forms²⁵⁵ and the radical intimacy²⁵⁶ that dwells therein. For Morton, there is much to be gained in this intimacy with the “strange stranger,” in that we realize how hopelessly we are entangled in “the mesh.”²⁵⁷ With this realization comes responsibility, out of which the idea of the upper case ‘N’ of Nature is problematized and abandoned.²⁵⁸ What emerges from this ontological shift is a causal dimension that, as Morton proposes, is the aesthetic dimension.²⁵⁹ Thus, for Morton, aesthetic events:

[...] are not limited to interactions between humans or between humans and painted canvases or between humans and sentences in dramas. They happen when a saw bites into a fresh piece of plywood. They happen when a worm oozes out of some wet soil. They happen when a massive object emits gravity waves. When you make or study art you are not exploring some kind of candy on the surface of a machine. You are making or studying causality. The aesthetic dimension is the causal dimension.²⁶⁰

For my creative research, thinking in terms of the mesh and aesthetic events aided to develop my notion of Ecological Performativity, as they provided a method to consider the interwoven conditions and influences out of which emerged the practice and non-linear audiovisual installations. Accordingly, Morton’s dark ecological considerations of the “strange stranger” offered insightful ways to reconfigure my ideas of interconnectedness and thus identify with the weirdness that often surfaced while on field recording projects. Here, Morton’s notion of the “weird weirdness” resonates most succinctly.

²⁵² Morton, *Ecology without Nature: Rethinking Environmental Aesthetics*, 1.

²⁵³ Morton, *The Ecological Thought*, 17.

²⁵⁴ Morton, "Thinking Ecology: The Mesh, the Stranger Stranger, and the Beautiful Soul," 275.

²⁵⁵ Morton, *The Ecological Thought*, 15.

²⁵⁶ *Ibid.*, 8.

²⁵⁷ Morton, "Thinking Ecology: The Mesh, the Stranger Stranger, and the Beautiful Soul," 293.

²⁵⁸ Morton, *Ecology without Nature: Rethinking Environmental Aesthetics*, 1. Morton further suggests that “the very idea of ‘nature’ which so many hold dear will have to wither away in an “ecological” state of human society.”

²⁵⁹ Morton, *Realist Magic: Objects, Ontology, Causality*, 24.

²⁶⁰ *Ibid.*, 19–20. Morton’s idea “that causality is wholly an *aesthetic* event,” draws on Graham Harman’s object-oriented ontology philosophy. As Morton suggests, “an OOO theory of causality can, for instance, include shadows and fear, language and lipstick, alongside billiard balls and photons. The reason why art is important is that it’s an exploration of causality [...] entities interact in a sensual ether [...]”

Morton consolidates his notion of *weird* by first drawing on the Old Norse meaning of the word, *urth*, meaning “twisted” or “in a loop.”²⁶¹ Subsequently, *weird* is identified to mean causal, destiny, worth and becoming.²⁶² From his dark ecology project, Morton’s “weird weirdness” is: “a turn or twist or loop, a turn of event. [... the] *strange of appearance*, [... that] flickers a dark pathway between causality and the aesthetic dimension, between doing and appearing [...].”²⁶³

The capacity to experience the aesthetics of causality in the field and in an experimentation-as-process practice, requires, as Bennett suggests, “that one is caught up in it. One needs, at least for a while, to suspend suspicion and adopt a more open-ended comportment. If we think we already know what is out there, we will almost surely miss much of it.”²⁶⁴ In this mode of attention, the incurred moments of “weird weirdness” become an operative co-creative element. In turn, responsiveness to such weird encounters became an affective and performative aspect in my ecology of practice. Thus, the art apparatus emerges from the on-going “intra-actions” within these (strange) environments...

Research Journal:
Bombay Beach, Salton Sea, California June 2014.

The indexical signs of the human and nonhuman now litter Bombay Beach, which has been described as “the most depressing place in California.”²⁶⁵ Once Denton and I had adjusted to the initial shock of this environment, we proceeded to record these indexical signs. Denton finds himself visually drawn to the monotonous awe of water reflections, birds in flight and the seemingly endless convoy of cattle trains that shimmer in the desert heat, on their journey from Mexico (Figure 18). For my part, I became transfixed with the numerous objects scattered throughout this landscape: rusty metal objects sticking out of the ground, wooden refuse from dilapidated buildings, sections of concrete slab, plastic bags entangled and flapping in dead bushes, and a lone broken piano (Figure 19). Using contact microphones, I recorded the sonic textures and tones by tapping, plucking and playing these objects. Equally striking was the sound resounding at the water’s edge. Primarily comprised of crushed fish and bird bones (Figure 20), the sonic quality activated by wave and human footsteps has a sharp percussive high-pitched resonance. I captured this using a hydrophone mic.

²⁶¹ Morton, *Dark Ecology: For a Logic of Future Coexistence*, Loc 131.

²⁶² Ibid.

²⁶³ Ibid.

²⁶⁴ Bennett, *Vibrant Matter: A Political Ecology of Things*, Loc 200.

²⁶⁵ Riggs, “Strange Geographies: Bombay Beach.”



Figure 18. Bombay Beach Train. Photo A. Denton.



Figure 19. Bombay Beach piano. Photo A. McNaught.



Figure 20. Bombay Beach dead fish and birds. Photo A. Denton.

Morton describes these indexical signs as being the result of hyperobjects: agents or objects so massively distributed in time and space as to transcend localisation, such as the biosphere, global warming, or the sum of all the whirring machinery of capitalism.²⁶⁶ Being present in an environment with these signs is, as Morton describes, “a shifting, ambiguous stage set. [...] The appearance of things, the indexical signs on the seashore, is the *past* of a hyperobject. [...] Its causal traces float in front of it, in the realm of appearance.”²⁶⁷ When considering Morton’s idea of the hyperobject, the creative practice of making works from these field recordings becomes multifaceted. When one reflects on the interwoven interactions that occur in any given encounter; between what is seen and unseen, heard and inaudible to our human ears, the complexity and causality of the mesh is immense. Its “weird weirdness” can be made felt and in turn alter how we experience the world. In relation to the Salton Sea field recordings, this “weird weirdness” was compounded by my ability to record in this location. With the stench of rotting fish and bird carcasses, intensified by the silty air and sweltering heat, I felt physically ill and ended up physically drained.

In my experience, negotiating the “weird weirdness” from the core of creative practice opens a pathway for a recalibration to the intimacy and ambiguity of coexistence and to the ecological situation in which we now live. Thus through Morton’s theoretical and philosophical provocations I began to consider my artistic interest in non-linear procedures from an ecological awareness that considered the “dark-depressing” and “dark-uncanny.”²⁶⁸ Not only from the context of being in different environments—from which the works evolve—but as a way to be in and sense the world differently.²⁶⁹ As such, the creative nexus attends to the frailty, vulnerability and performative substance of time and place. Morton surmises “to be located ‘in’ space or ‘in’ time is already

²⁶⁶ Morton, *Hyperobjects: Philosophy and Ecology after the End of the World*, Loc 107.

²⁶⁷ *Ibid.*, Loc 1606.

²⁶⁸ Morton, *Dark Ecology: For a Logic of Future Coexistence*, Loc 128.

²⁶⁹ Marie Højlund and Morten Riis, “Wavefront Aesthetics: Attuning to a Dark Ecology,” *Organised Sound* 20, no. Special Issue 02 (2015): 249. While sonic arts practitioners have quickly embraced Morton’s Dark Ecology project (<http://www.sonicacts.com/portal/dark-ecology-project/overview>), Højlund and Riis give an in-depth ‘Dark Ecology’ analysis of their respective works, *Lys*, *Landskab og Stemmer* and *Opaque Sounding*, with the aim to “test the implications, limits and potentials for future use and development.” For my research, Højlund and Riis’s analysis was useful as it provided a written example of creative practitioners engaged in “an ecological awareness of causal aesthetics where objects time and space [meet] each other. This contrasts with traditional analysis of music and sound art, which is based on the assumption that time and space are containers in which sound and music unfold.” I, in turn, broadened the potential use of Morton’s Dark Ecology project by drawing on his “dark-depressing” and “dark-uncanny” to contextualise the *making-doing-thinking* of my creative research.

to have been caught in a web of relations.”²⁷⁰ From a sonic arts perspective Kim-Cohen suggests that: “Every work of art is a response to the conditions within which it is produced and received [...], the assumptions and problems inherent to its time and place.”²⁷¹ Or, perhaps, by choosing to engage with the materiality and context in these environments, from within my creative practice of non-linear audiovisual processes, provides the opportunity to see, hear and be in the world differently. The artwork becomes an apparatus of change. To this effect Morton says:

Thus the art in the time of hyperobjects explores the uncanniness of beings, the uniqueness of beings, the irony and interrelationships between beings, and the ironic secondariness of the intermeshing between beings.²⁷²

Morton and the other theorists discussed in this chapter have become *alongly* woven into the thinking and making processes behind *Audiovisual Installation as Ecological Performativity*. Each provided alternative vocabularies to broaden and contemplate the various performative entanglements in my ecology of practice. Barad opened up pathways to meditate the on-going process of becoming and reconfiguring of the world through her “intra-action” ontology, while Butler encouraged me to think of the performative responsiveness that can influence my actions and how I come to sense the world. Bennett lured me into her notion of “thing-power” and the distinctive effects and capacities available in the material configuration of the sonic-body, while Morton’s dark ecology project and notion of the hyperobject encouraged an alternative form of ecological awareness. While all of these concepts resonate at their own frequency, they have provided productive ways to think through and inform my practice and the creative processes and outcomes described in the next two chapters.

²⁷⁰ Morton, *Realist Magic: Objects, Ontology, Causality*, 21.

²⁷¹ Kim-Cohen, *Against Ambience and Other Essays*, 7.

²⁷² Timothy Morton, 2011. "Dawn of the Hyperobjects 2," accessed July 21, 2015, www.youtube.com/watch?v=zxpPJ16D1cY

4. ECOLOGICAL PERFORMATIVITY

“Agency is the relation and emergent product of material engagement. It is not something given but something to be realized [...].”²⁷³

Lambros Malafouris

Ecological Performativity: A Creative Research Practice

The attention paid to the critical, theoretical, and philosophical discourses in the previous chapters provided an opportunity to ask new questions from the core of my practice. These discourses also offered new vocabularies and perspectives from which to consider and contextualise my mode of artistic practice. My intention was to contribute to these discourses in an artistic, experiential, and dynamic way, and this evolved into the practice I call Ecological Performativity.

I introduced this term to mesh my artistic practice with the theoretical and philosophical ideas presented. In summary, these ideas included Welsby’s concept of an ontological shift being how we as humans relate to nature; Pickering’s “dance of agency” that recognises the temporal and emergent processes between human and nonhuman; Barad’s conceptual shift from interaction to “intra-action” that signifies the on-going process of becoming and the reconfiguring of the world in a performative ontology; Butler’s definition of performance as an action or practice that can occur in different instances; Bennett’s “thing-power” that draws attention to the active, affective and agential capacities of natural and artifactual things; and Morton’s Dark Ecology project, which proposes a way of thinking and being that embraces the weird weirdness and dark-depressing and the ambiguity, uncertainty and uncanniness of the entangled mesh.

The result for me was a reconceptualisation of my creative thinking-making procedures, including the subjective experiences of time, place and the performative agency of human and nonhuman bodies. In this mode of artistic practice, the anthropocentric understanding of creativity shifts to one of a

²⁷³ Lambros Malafouris, *How Things Shape the Mind* (Cambridge, MA: MIT Press, 2013), 149.

relational and performative ontology where emergence constitutes a temporally dynamic *making-doing-thinking*. It is inherently non-linear in transmission and thus holds open space for the complex polyphony of the thoughts in the act.²⁷⁴ In this way, *Audiovisual Installation as Ecological Performativity* evidences the aesthetics of causality by being embedded in time and place.

Studio Practice

In my creative research, the making process and resulting non-linear audiovisual installations are considered as embodied responses to larger phenomena. These include the visceral, in-person engagement in the chosen environments, the agency of the collected material explored through the development of specially designed computational systems, the subsequent recordings of improvisations that responded to the collected material, and the engagement with the resulting artefact, where reflection and contemplation, in turn, become a co-creative element. As such, my notion of Ecological Performativity operates porously between subjective and objective, practice and theory, and is open to the emergent complexities of such entangled configurations.

Similar to other ecologically-grounded creative practices,²⁷⁵ Ecological Performativity explores the relationships of environment, process and material, and derives from an intensive data-gathering procedure and immersion in the respective environments. At the same time, by considering the performative agency of components through non-linear creative procedures, Ecological Performativity attempts to explore different vocabularies and creative pathways in the thinking and making procedures.

The post-production exploration of materials is done in part through the development of specifically designed computational systems. These systems vary in construction and are intrinsically linked to the collected data—audio field recordings, moving images and photos—as well as other environmental data gleaned from these situated encounters. The techniques of research include computer vision, data sonification and convolution to engage the agency of

²⁷⁴ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*.

²⁷⁵ Terms used to denote other ecologically-grounded creative practices includes performance ecosystems (Simon Walters), EcoSon (Matthew Burtner), eco-composition (Damián Keller), sonic ecologies (Leah Barclay) and audible ecosystemics (Agostino Di Scipio).

material and thus construct the non-linear audiovisual installations. What emerges does so in an iterative, non-deterministic manner, which allows open-ended interaction in my 'ecology of practice.'

Subsequently, this ecology of practice has come to involve the recording of musical improvisations in response to the developed system. This has become an important component of Ecological Performativity, that is, within the iterative development of these systems out of the material gathered, musical improvisation and/or comprovisations²⁷⁶ are included in the process as a method to further engage and explore responsiveness within the evolving system. What this provides is a cumulative database that can be folded back into the final audiovisual installation.

Motivated by the desire to explore non-linear systems, the installation platform provides a space where the constraints of beginnings, middles, and ends are eliminated. Simon Emmerson supports the idea that installation art erases the boundaries between listener, performer and composer by "encouraging contemplation and concentration...[which is] defined by the individual listener/observer."²⁷⁷ Chris Welsby claims installation art can give the viewer the time and space to consciously engage with the work, with its production, and with its presentation.²⁷⁸ Practitioners Evelina Domnitch and Dmitry Gelfand suggest that installation art can "exist as an ever-transforming phenomena [which can allow] the observer to transcend the illusory distinction between scientific discovery and perceptual expansion."²⁷⁹ The artwork can then exist as a transformative apparatus. These techniques were explored to various degrees and using a range of methods for the realisation of each work contained in my portfolio, described in detail in Chapter Five.

²⁷⁶ Dudas, "'Comprovisation': The Various Facets of Composed Improvisation within Interactive Performance Systems."

²⁷⁷ Simon Emmerson, "From Dance! To 'Dance': Distance and Digits," *Computer Music Journal* 25, no. 1 (2001): 19.

²⁷⁸ Welsby, "Films and Installations—a Systems View of Nature," 35.

²⁷⁹ Evelina Domnitch and Dmitry Gelfand, "Mesoscopic Phenomenology," in *The Vibrancy Effect*, eds. Chris Salter, Harry Smoak, and Michel van Dartel (Rotterdam: NAI Publishing, 2012), 22.

Contextual Review of Techniques

To contextualise the techniques to make the works, I considered various ways to engage the different elements experienced in each environment. These considerations changed my way of being in these environments, and the manner in which I engaged with time and place. For example, in Sequoia National Forest, the sunlight through the trees, coupled with the natural reverb of the forest and the multi-layered chatter of tourists, became the milieu that activated the creative practice that followed. Restating Manning and Massumi, these forces create a complex polyphony that sets in motion “a practice from within.”²⁸⁰ The question that repeatedly emerged during my research was how best to engage the different elements found in each environment as a co-creative and performative device, and what effect would they have in a non-linear audiovisual installation platform. From my early experiments with different techniques, I searched for co-creative methods and, in the end, came to employ the processes of convolution (live and rendered), computer vision, and data sonification. It is my position that in the context of each location, using the elements found there as co-creative devices in a non-linear audiovisual installation platform enables different directions of creative practice that bring forth alternative ways to experience and think about the world. What follows is a summary of these techniques, including the work of other creative practitioners whose explorations and contextualisations have links with my own.

Convolution

In my sonic arts practice, convolution has been an important process and technique, which I have explored in various ways. For me, there is a poetic conversation between the sonic materials chosen; in some ways this is similar to painting in that sound colours blend (convolve) to create new sonic tones. While Curtis Roads ably provided computer music composers with the theory of convolution in *The Computer Music Tutorials* and *Microsound*,²⁸¹ this process became more widely available when Tom Erbe released his software *SoundHack* in 1991.²⁸²

²⁸⁰ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 81.

²⁸¹ Curtis Roads, *Microsound* (Cambridge, MA: MIT Press, 2001), 209–34; Curtis Roads, *The Computer Music Tutorial* (Cambridge, MA: MIT Press, 1996).

²⁸² Tom Erbe, "Soundhack." Accessed December 28, 2016, <http://www.soundhack.com/freeware/>; Barry Truax, "Convolution." Accessed October 6, 2016, <http://www.sfu.ca/~truax/conv.html>

I have used *SoundHack* extensively since its release and in my early sonic explorations with convolution, I created a large catalogue of fixed-media soundscape compositions and multimedia works. Beyond the traditional method of using a “dry recording within a reverberant space by convolving it with the impulse response of that space,”²⁸³ my application of convolution varies and is intrinsically linked to the context of each work. Consequently, I have used convolution with the environment source material, with text and vocal material, with rhythmic inputs, and with pre-recorded acoustic motifs. Because of my extended use of convolution, when immersed in environments I can often begin to think in terms of this process; that is, while *in* sound, I get a sense of what might be a meaningful convolution. The most easily identified from my dissertation is the natural reverb field recordings from Sequoia National Forest. Once attuned to this environment, I began to sonically envision a work using these recordings as impulse responses with vocal improvisations. Another example is the field recording at the Los Angeles airport. While shifting from the functional aspects of recording this sound to broader considerations and sensibilities, I contemplated what sonic elements might work best when convolved with the jet sounds as an impulse response. As it occurred, short cello motifs of two or three notes were convolved with the jets as a sonic element in the audiovisual installation *Flight Variant*.

For me, then, being *in* sound with the process of convolution *in* mind is organic and elemental; like mixing blue and yellow to create green. In this way, my method of applying convolution is grounded in the ecology of each project. Thus, being *in* these environments is essential to the capacities of practice. I italicise the preposition *in*, to reference Timothy Ingold’s notion of *ensounded*,²⁸⁴ which suggests that we hear *in* sound rather than hearing sound. This highlights Ingold’s objection to the term soundscape, which he believes positions sound as an object rather than an experience. Thus, Ingold compares sound to light and not vision (we see *in* light, not *in* vision). Accordingly, electroacoustic composer Barry Truax, when commenting on Ingold’s objections to soundscape, considers *ensounded* as a useful way to address some of the criticism of Murray Schaffer’s definition of soundscape by moving “away from the objectification of sound [which then] emphasises the process.”²⁸⁵ From this perspective, my use of convolution as a co-creative apparatus embedded *in* the

²⁸³ Barry Truax, "Sound, Listening and Place: The Aesthetic Dilemma," *Organised Sound* 17, no. 3 (2012): 197.

²⁸⁴ Ingold, *Being Alive: Essays on Movement, Knowledge and Description*, 136–139.

²⁸⁵ Barry Truax, 2014. "Soundscape: Interview with Barry Truax," accessed November 21, 2016, www.youtube.com/watch?v=JFuRgnqyAJA&feature=youtu.be&t=292

context of each environment has conceptual linkages with Truax and his method of applying and contextualising this process.

Truax, who is well known for his research in soundscape composition, including the World Soundscape Project, Acoustic Communications, and the development of the *PODX* granular synthesis system at Simon Fraser University, has extensively explored convolution in his most recent compositions: *Chalice Well*, *The Way of the Spirit*, *Temple*, and *The Shaman Ascending*.²⁸⁶ Before these works, Truax's compositional method involved primarily granular synth processes. Of his shift in practice, Truax states that convolution "presents an efficient technique for simulating certain kinds of environmental sound textures."²⁸⁷ Rather than the "purely synthetic sound design for environmental sounds" or the "processing of recorded environmental sounds"²⁸⁸ Truax considers convolution as a hybrid approach that enables the realisation of "imaginary soundscapes."²⁸⁹ For Truax, these representations of the world have the capacity to incite "memory, symbolism and metaphor"²⁹⁰ as co-creative devices in experiencing his works. Thus the "listener's mental participation and interaction with [the] sounds [are] equally important."²⁹¹ What is critical in Truax's practice is "the knowledge of context [that] depends on a deeply understood relation to the context of the work, whether a place, a culture or a story."²⁹² For Truax, then, "context-based composition is a powerful artistically and socially motivated means of re-engaging both the composer and the listener with real-world contexts [...]."²⁹³

I benefitted from studying with Truax in the late 90s, so I have worked in the milieu of the World Soundscape Project in Vancouver. While I do not contextualise my current research as soundscape composition, some linkages resonate with Truax's statement on context-based composition. I apply the technique of convolution to engage the materiality and context of these environments as experienced in the field. Thus, the event and context from which each work evolves is "deeply understood" and directly enlisted as a co-creative device. Out of this, I believe, an ecological awareness in the manner of Massumi and Manning is understood as an "event based

²⁸⁶ Truax, "Convolution."

²⁸⁷ Truax, "Sound, Listening and Place: The Aesthetic Dilemma," 198.

²⁸⁸ *Ibid.*, 197.

²⁸⁹ *Ibid.*

²⁹⁰ *Ibid.*, 198.

²⁹¹ *Ibid.*

²⁹² Barry Truax, "Paradigm Shifts and Electroacoustic Music: Some Personal Reflections," *Organised Sound* 20, no. 1 (2015): 29.

²⁹³ *Ibid.*, 31.

ecology of experience.”²⁹⁴ From this perspective, my use of convolution has further linkages with Damián Keller’s research into convolution as an ecologically grounded compositional process.

Keller, who also studied with Truax, has done considerable research on “compositional processes from an ecological perspective.”²⁹⁵ His artistic and written research has proposed various ecological approaches to music composition. Drawing on J.J Gibson’s ecological approach to psychology²⁹⁶ and the cognitive research of Francisco Varela,²⁹⁷ Keller introduced the term *eco-composition* into the lexicon of music composition to denote “the relationships between the compositional processes and the geographical, ethnographical and historical factors that inform[s]”²⁹⁸ the creative processes. Thus, like Truax, *context* for Keller is an integral aspect of the work.²⁹⁹

Keller’s use of convolution as a compositional tool is framed within what he defines as an “ecologically-based event”.³⁰⁰ Invert and bring these three words forward in time and we arrive at Manning and Massumi’s “event based ecology.”³⁰¹ Thus for Keller, sound events comprise the cyclical transmission of sound input and dissipation and “are constrained by the properties of the vibrating bodies, by the behaviours of the excitation agents, and by the acoustics of the surrounding space.”³⁰² Using the process of convolution in his compositions thus expanded Keller’s ability to “work at several temporal levels on a single sound source.”³⁰³ Accordingly, Keller says: “Given that the sonic environment and the listener are engaged in a process of mutual determination, ecologically based composition provides us with tools to shape the sounds that surround us and to change the way we perceive these sounds.”³⁰⁴

Keller’s most recent research at the Amazon Center for Music Research, in conjunction with the Ubiquitous Music Group, has summarized the current trend in

²⁹⁴ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 91.

²⁹⁵ Damián Keller, “Compositional Processes from an Ecological Perspective,” *Leonardo Music Journal* 10, (2000).

²⁹⁶ *Ibid.*, 55.

²⁹⁷ Damián Keller and Ariadna Capasso, “New Concepts and Techniques in Eco-Composition,” *Organised Sound* 11, no. 01 (2006): 57.

²⁹⁸ *Ibid.*, 58.

²⁹⁹ *Ibid.*

³⁰⁰ Damián Keller and Jonathan Berger, “Everyday Sounds: Synthesis Parameters and Perceptual Correlates,” in *VIII Brazilian Symposium of Computer Music* (Fortaleza, CE: 2001), 1.

³⁰¹ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 91.

³⁰² Keller and Berger, “Everyday Sounds: Synthesis Parameters and Perceptual Correlates,” 1.

³⁰³ Damián Keller, “An Ecological Approach to Composition.” Accessed March 12 2016, www.sfu.ca/sonic-studio/srs/EcoModelsComposition/EcoComp.html

³⁰⁴ Keller, “Compositional Processes from an Ecological Perspective,” 59.

ecologically-grounded methodologies and has proposed that “ecological approaches to creative practice may provide “an alternative to the mainstream anthropocentric and disembodied acoustic-instrumental paradigms.”³⁰⁵ Thus for Keller and his colleagues, being “*embedded* in the context of everyday phenomena [provides] multimodal events as units of action-perception.”³⁰⁶

For my research, “action-perception” segues to agency and performativity by drawing on different theoretical and philosophical ideas and vocabularies. Accordingly, my position adds support and broadens the method to consider creative practice with co-creative and “intra-active” forces. This enables different directions to be explored from the core of creative practice that, in turn, prompts new questions and theoretical positions. Thus, thinking and making with the various intercessors or “friends”, as outlined in this dissertation, emphasised an understanding of my creative practice as being Ecologically Performative.

In my research, I expanded the use of convolution as an Ecologically Performative device by using the HISSTools Impulse Response Toolbox (*HIRT*). Developed by Alex Harker and Pierre Tremblay at the University of Huddersfield, and released in 2012, this set of *MaxMSP* externals enables real-time convolution rather than the pre-rendered method used in *SoundHack*. As noted by Harker and Tremblay, “The primary motivation for the *HIRT* was to provide tools for improving the concert presentation of electronic music (especially when combined with acoustic instruments).”³⁰⁷ In this way the composer, when preparing a work for a specific concert environment, can use the impulse response from those spaces, and proceed accordingly. In essence, it involves bringing the concert hall into the studio in order to avoid any “unexpected and potentially highly detrimental alterations in concert.”³⁰⁸

Since the release of *HIRT*, I have used these tools in various configurations; from live concert improvisations to non-linear installations. As my use of convolution is particular to the ecology of each work, sound impulses have varied to include environmental source material, rhythmic inputs and text-based sound samples. I have created a way to dynamically change the impulse, thus allowing for various colours and configurations of convolution in a live and non-linear platform. An

³⁰⁵ Damián Keller and Victor Lazzarini, “Ecologically Grounded Creative Practices in Ubiquitous Music,” *Organised Sound* 22, no. 1 (2017): 61.

³⁰⁶ Damián Keller, “Behavioural Ecologies in Ubimus,” in *VI Ubimus* (Växjö, Sweden: 2015), 5.

³⁰⁷ Alexander Harker and Pierre Alexandre Tremblay, “The Hisstools Impulse Response Toolbox: Convolution for the Masses,” in *The International Computer Music Conference* (Ljubljana, Slovenia: 2012), 149.

³⁰⁸ Ibid.

example from my PhD portfolio is the installation *Flight Variant*. I constructed this Max patch with the ability to shift between two text-based sound samples as the convolution impulse on a piano source.

Computer Vision Processes

As with convolution, I have done much research into the use of computer vision as a creative tool. Using visual movement as a trigger to influence sonic elements has fascinated me for some time. I have experimented with various computer vision systems including David Rokeby's *Very Nervous System (VNS)*, Miroslav Spasov's *ENACTIV*, Alexander Refsum Jensenius's *Motiongram* (available in the Max/MSP Jamoma modules), and Jean-Marc Pelletier's *cv.jit* library. While all these systems offer exciting avenues of creative exploration, Pelletier's *cv.jit* library has informed my research into non-linear installation systems.

At the time of release, (2004) Pelletier's *cv.jit* library for Cycling74 Max program provided a more open-ended approach to computer vision and musical performance. The various methods available in this library include motion flow, shape analysis, morphology, image segmentation, and statistics.³⁰⁹ The implementation of these methods depends on the image material, be it live or prerecorded, and on the intended usage.

Specific to the non-linear installations in my dissertation was the ability to use illumination points in the different video materials as a triggering device. For example, the movement of sunlight is a characteristic visual feature in the installations *Undercurrent* and *Cathedral*. Exploring this as a co-creative device became an important aspect in the process of constructing these installations. Having studied Pelletier's *cv.jit* library, I was able to construct a method to use these changes of light as a creative tool. Moreover, Pelletier's exploration of and written reflections on computer vision have provided the sonic arts community with a substantial research resource for these processes. On computer vision as sight reading, Pelletier says:

For a composer who uses this framework frequently, it is important to cultivate the eye like a musician would normally cultivate an ear. Once the composer has established a number of favorite mappings and sound synthesis strategies, he or she should learn how to "read" sounds into the shapes and motions of the

³⁰⁹ Jean-Marc Pelletier, "Sound and Sight: Composition for Image Analysis Systems" (Master's Thesis, Institute of Advanced Media Arts & Sciences, 2004).

world. In many cases patterns that are visually interesting may not yield interesting sounds, just as interesting sounds may be produced from less interesting visuals. A great part of the sonifying artist's practice is to learn to hear the sonic potential of visual motions.³¹⁰

Like convolution, my previous explorations in computer vision enabled my PhD research into co-creative devices to occur in a transformative manner. As a result, my approach to the visual experiences in the field incite different responses to the specificities of these encounters. In the context of creating non-linear systems, these responses have significant influences on how I relate to being in these environments, in that the triggering mechanisms that influence my creative processes function in a broad interplay. Compared with fixed-media parameters, where the materials will eventually be 'locked in', the sensibilities that emerge in non-linear audiovisual processes allow for a *making-doing-thinking* process that can alter perception while in the field and thus open different vocabularies and pathways in practice. For example, the light shafts from the dust-covered bus window, as described in my journal entry on page 45, became more than a visual experience in light. I considered them as potential triggering apparatuses within a non-linear system, altering how they were perceived, which in turn opened different directions and pathways of practice. Elements are therefore contingent and take on a transformative character and functionality in a non-linear system, which can alter how different elements are sensed in the field. Consequently, the components that eventually make up the non-linear systems require the context from which the aesthetics of causality can dynamically arise. My previous research into computer vision provided an alternative way to be *in* these environments and thus allowed me to consider different ways to enlist the performative aspects of the visual experiences I encountered.

Data Sonification

If the processes of convolution and computer vision are enlisted to explore a dynamic aesthetic, then data sonification extends that exploration into the realm of the 'not readily perceivable.' In my PhD research, data sonification is specific to using information, or rather, data sets relating to the subject of the works in which it is used—like converting flight data into musical notes in the installation *Flight Variant*.

³¹⁰ Jean-Marc Pelletier, "Perceptually Motivated Sonification of Moving Images," in *International Computer Music Conference* (Montreal, Canada: 2009), 4.

The formal definition of sonification is “the transformation of data relations into perceived relations in an acoustic signal for the purposes of facilitating communication or interpretation.”³¹¹ A more recent account refers to sonification as “[...] the data-dependent generation of sound, if the transformation is systematic, objective and reproducible [...].”³¹² Inherently, sonification is a vastly interdisciplinary field of research that encompasses various languages and usages. As noted in the *Sonification Handbook*:

Sonification is so inherently interdisciplinary that it is easy to become disoriented and overwhelmed when confronted with its many different facets, ranging from computer science to psychology, from sound design to data mining. In addition, each discipline uses its own jargon, and—because the research comes from such diverse areas—there are few agreed upon definitions for the complex concepts within the research area.³¹³

In the context of my creative research, the definition of sonification as systematic and objective is replaced with performative and transformative. I consider data as matter and draw from Bennett’s concept of “thing-power”—as being part of the “active, earthy, a complex entanglements of human and non-human encounters.”³¹⁴ Accordingly, the material configuration of the data-body, like the text-body, can change one's sensibilities to attune in different directions. Like Bennett, who can no longer walk on grass without thinking about the “uncut hair of Graves,” I can no longer see a plane in the sky without thinking about the number of flights per day, which in turn draws forward other sensibilities. Here again, the subject and object dichotomy is replaced with a complex polyphony of forces in the entanglement of the mesh.

The exploration of sonification data by creative practitioners R. Luke Dubois and Andrea Polli provided me with useful insights to consider it as a co-creative device. Both artists enlist data sonification as a way to extract and layer meaning related to the subject of their works. In Dubois's case, his initial exploration into the use of data was to “look at the intersection between sound and image,”³¹⁵ and he subsequently moved to more political considerations by using material gleaned from

³¹¹ G Kramer et al., *The Sonification Report: Status of the Field and Research Agenda. Report Prepared for the National Science Foundation by Members of the International Community for Auditory Display*. (Santa Fe, NM: International Community for Auditory Display (ICAD), 1999).

³¹² Thomas Hermann, “Taxonomy and Definitions for Sonification and Auditory Display,” in *14th International Conference on Auditory Display (ICAD)* (Paris, France: 2008).

³¹³ Thomas Hermann, Andy Hunt, and John G. Neuhoff, eds., *The Sonification Handbook* (Berlin, Germany: Logos Verlag, 2011), Preface.

³¹⁴ Bennett, *Vibrant Matter: A Political Ecology of Things*, Loc 333.

³¹⁵ Luke DuBois, 2016. “Insightful Human Portraits Made from Data,” accessed January 12, 2017, http://www.ted.com/talks/r_luke_dubois_insightful_human_portraits_made_from_data

real world issues. For Polli, sonification is deeply rooted in ecological issues and is used to bring public awareness to issues of pollution and global warming.

Dubois, who was initially trained as a composer, expanded his practice into new media because of his interest in computer coding.³¹⁶ Well known as the co-author of *Jitter* for Max/MSP, Dubois's considerable creative coding skills have since produced a body of work that includes large-scale public installations, interactive arts and generative computer works.³¹⁷ With regard to sonification, Dubois has explored many methods for the use of data and often uses the term "data mining" to contextualise his practice, comparing it to music, "the original 'information art', in that at its essence music is a stream of abstract information 'sonified' through performance."³¹⁸ As Dubois describes:

People will tell me that 100 years ago folks like me [people who use data as an artistic tool] did not exist, that it was impossible, that art made with data is a new thing, it's a product of our age, it's something that's really important to think of as something that is now—and that is true. But there is an art form that has been around for a very long time that's really about using information, abstract information to make emotionally resonant pieces and it's called music. We've been making music for tens of thousands of years and if you think about what music is: notes and chords and keys and harmonies and melodies—these things are algorithms, these things are systems that are designed to unfold over time to make us feel.³¹⁹

Dubois's early works like *Plant* (2002) did achieve the exploration of sound and image. In this case, the work includes algorithms based on plant biology to create a musical score that, when performed live, is transcoded into a generative visual drawing.³²⁰ With each subsequent work, Dubois's practice moved into a political discourse by incorporating data from real world issues. For example in *Hard Data* (2009), Dubois uses statistical data from the American military actions in Afghanistan and Iraq as a creative device.³²¹ Initially intended as an interactive web page, *Hard Data* evolved into a six-movement score for amplified string quartet, created from the casualty statistics from this war. When speaking about *Hard Data* Dubois says: "The idea was that the Iraq war, as an 'American' war, is the first large-

³¹⁶ Robert Raines, *Composition in the Digital World: Conversations with 21st-Century American Composers* (New York: Oxford University Press, 2015), 284.

³¹⁷ Luke DuBois, "In the News: R. Luke Dubois at the Ringling." Accessed December 5 2016, www.ringling.org/events/r-luke-dubois-now; *ibid.*; *ibid.* www.ringling.org/events/r-luke-dubois-now

³¹⁸ Luke DuBois, "Hard Data and Hindsight: Interview with R. Luke Dubois." Accessed December 10 2016, <http://idiommag.com/2010/08/hard-data-and-hindsight-interview-with-r-luke-dubois/>; *ibid.* <http://idiommag.com/2010/08/hard-data-and-hindsight-interview-with-r-luke-dubois/>

³¹⁹ DuBois, "Insightful Human Portraits Made from Data".

³²⁰ *Ibid.*

³²¹ Luke DuBois, "Hard Data." Accessed December 10 2016, <http://lukedubois.com>

scale conflict in which the average American has more data than knowledge, which is to say: we have lots of facts and figures about the Iraq war [...].³²² “My concept was to compose an emotionally resonant piece out of facts that are getting spewed out on television and the Internet about the war.”³²³ Dubois’s initial intention was to take this data and make an open-source dataset that different composers could set to music.³²⁴ As it happened this idea did not come to fruition; however, *Hard Data* does exist as a web page and Dubois’s own string quartet score.

In the gallery installation *Take a Bullet for This City* (2014), Dubois uses real-time online data to visualise 911 emergency calls relating to gun shootings in the city of New Orleans. This work comprises an encased gun connected to a computer program, coded to fire whenever a shooting is reported to the New Orleans police department. Using blanks (rather than real bullets) during the installation, the encasement containing the gun fills with empty shells—and on average, there are five reports made per day in the city of New Orleans. I consider this installation to be a disturbingly profound work. When speaking on this method of data-visualization Dubois says: “when [done] right it’s illuminating, and when you do it wrong, it’s anesthetizing—reducing people to numbers.”³²⁵

Dubois also explores data-mining in texted-based installation platforms, as a way to extract key words from the subject. In *Hindsight Is Always 20/20* (2011), Dubois extracted the most frequently spoken words from every American presidential State of the Union address. Placed in descending order of occurrence, the top 66 words spoken are mounted in light boxes, similar to eye-testing charts. Dubois describes these eye charts as a method to “[test] the presidents’ visions” and as “a comment on the role of rhetoric in American history.”³²⁶ For example, George Washington’s top word is ‘gentlemen’ while George W. Bush’s is ‘terror’ and, as Dubois notes: “how you get from gentlemen to terror in 43 easy steps tells us a lot about American history and gives you a different insight than you would looking at a series of paintings.”³²⁷

In his more humorous texted-based work, *A More Perfect Union* (2010) Dubois turns to online dating profiles as an alternative method for census-taking in the

³²² DuBois, “Hard Data and Hindsight: Interview with R. Luke Dubois.”

³²³ Raines, *Composition in the Digital World: Conversations with 21st-Century American Composers*, 292.

³²⁴ DuBois, “Hard Data and Hindsight: Interview with R. Luke Dubois.”

³²⁵ DuBois, “Insightful Human Portraits Made from Data”.

³²⁶ Ibid.

³²⁷ Ibid.

USA.³²⁸ Rather than the typical information of census reports: where you live, job description, language spoken, ethnic background, Dubois uses the corpus of data contained in 21 online dating services to find more descriptive accounts of peoples lives, including their dreams and aspirations.³²⁹ Dubois joined these online services and using different profiles, including gay man/woman, and straight man/woman, proceeded to download 19 million dating profiles from every zip code in America: “that's close to twenty per cent of the adult population of the USA.”³³⁰ Using a word analysis computer program, Dubois extracted the frequent words from each zip code and proceeded to translate these at a cartographic level. By replacing the names of cities and towns with the top word, Dubois reconfigured the America map by renaming places like Seattle to Heartbreak, Los Angeles to Acting, San Francisco to Gay, and New York City to Now. This process was done on a granular level giving Dubois a macro account of people's preferences.³³¹ When speaking about *A More Perfect Union*, Dubois considers the project to be a form of a “more democratic method of American portraiture, something that's more about my country and how it works.”³³²

The notion of portraiture thus becomes a way for Dubois to contextualise his artistic practice, and to “evoke and find symbolism.”³³³ For me, Dubois's use of data as a creative tool resonates with Butler's account of ‘performativity.’ I consider the data material as an agential by-product of the “instance[s] of motion” in ordinary life, and a result of how “we tacitly restructure [...] the world and come to act as we do.”³³⁴ Through this lens, *Hard Data* evidences the agential motion and politics of war, *Take a Bullet for This City* evidences the agential action of shooting another person, *Hindsight Is Always 20/20* evidences the agential rhetoric in American history, and *A More Perfect Union* evidences the agency of human desires, aspirations and how people come to describe their identity.

Andrea Polli's use of sonification also evidences human motion. By merging art, science and technology³³⁵ Polli has explored sonification to focus on

³²⁸ Brian Greene, “What One Artist Learned About America from 19 Million Dating Profiles.” Accessed January 15 2017, <http://ideas.ted.com/what-one-artist-learned-about-america-from-19-million-dating-profiles/>

³²⁹ DuBois, “Insightful Human Portraits Made from Data”.

³³⁰ Ibid.

³³¹ Ibid.

³³² Ibid.

³³³ Ibid.

³³⁴ Butler, “When Gesture Becomes Event”.

³³⁵ Andrea Polli, “Particle Falls.” Accessed December 5 2016, <http://forecastpublicart.org/public-art-review/current-projects/2015/03/particle-falls/>

environmental issues such as pollution. Her creative practice has strong links with Schafer's Soundscape project, the World Soundscape Project of Vancouver, Hildegard Westerkamp's Soundwalk project, and the Acoustic Ecology movement and thus, for me, folds into Morton's notion of the hyperobject. If, as Morton suggests, one can best sense the presence of hyperobjects from their traces and indexical signs, (like global warming and pollution), then Polli's use of data extracted from these signs, in turn, draws these hyperobjects forward into the realm of perception.

Polli, who is a founding member of the Social Media Workgroup (SMW) at the University of New Mexico, has spearheaded much research into the sonification of environmental data. Her early works, like *Atmospherics/Weather Works* and *Heat and the Heartbeat of the City*, used meteorological and atmospheric data to create multi-channel sonifications to, as she suggests, promote social awareness and change in cultural practices.³³⁶ Accordingly, Polli introduced into the lexicon of creative practice the term geosonification to denote: "the sonification of data from the natural world inspired by the soundscape."³³⁷ On the use of data sonification from environmental sources Polli writes:

Although the radical nature of the process of audification and data sonification may seem to take one out of his or her environment, this process of reshaping and reordering information may actually bring one closer to the natural world.³³⁸

In her latest work, *Particle Falls*, Polli uses real-time air quality data to generate a large-scale public artwork.³³⁹ This installation provides a visual representation to passers-by as to the quality of air wherever the work is installed. Depending on the levels of fine particles associated with pollution, bursts of bright colour increase or decrease over a constant background of falling blue light.³⁴⁰ First mounted in Philadelphia, noted for having the worst air pollution in the United States,³⁴¹ and subsequently installed throughout North America, *Particle Falls* evidenced air quality through the use of data.

Dubois and Polli's use of sonification exemplifies many creative possibilities available through data-mining and gave me meaningful ways to consider the agency

³³⁶ Andrea Polli, "Soundscape, Sonification, and Sound Activism," *AI & Society* 27, (2012): 257.

³³⁷ Ibid., 262.

³³⁸ Ibid.

³³⁹ Andrea Polli, "Particle Falls."

³⁴⁰ Ibid.

³⁴¹ Ibid.

of data as a co-creative device. While political and environmental issues do not directly drive my application of sonification, as they do for Dubois and Polli, sonification provides a broader sense of different agential apparatuses in different environments. In my ecology of practice this broader sensibility has further motivated my turn to non-linear creative processes, while evoking an alternative way of contemplating the question “What is here?” in any given environment.

Given the enormous amount of data readily available, sonification has much to offer creative practice. As an object or material, data is situated in time and place and therefore can expand the material dimensions in which one can experience, consider and explore the capacities of different encounters. Using such data in an artistic practice can thus offer a multi-layered platform for creative inquiry by drawing the invisible or inaudible into the realm of perception. In addition, with the various discussions, languages and uses for sonification, Hermann, Hunt and Neuhoff offer this perspective:

[T]he field [sonification and auditory display] faces the challenge of developing and using a common language in order to integrate many divergent "disciplinary" ways of talking, thinking and tackling problems. On the other hand, this obstacle often offers great potential for discovery because these divergent ways of thinking and talking can trigger creative potential and new ideas.³⁴²

A Shift in Collaboration Praxis

As my move towards non-linear systems began to redeploy my creative practice—that is, my relationship between the encounters in the field, experimentation-as-process with materials and tools, and the creative artefacts that emerged—it became necessary to separate out what I had previously regarded as collaborative praxis. While I still consider the works in my portfolio as emerging out of a “field of activity,” including who or what I am bound up with (via Van Dooren), it became necessary to recognise that the works contained in my research did not fit into what I had formerly described as collaborations.

My turn to non-linear audiovisual installation processes is in direct contrast to the research intentions of my collaborators, in that their current media works are embedded in fixed-media formats and use no music. For example, during my PhD research, Shannon Harris (*Undercurrent*) and Andrew Denton (*Flight Variant*, *Cathedral*, and *Piano at the End of a Poisoned Stream*) enlisted me for sound design

³⁴² Thomas Hermann, Andy Hunt, and John G. Neuhoff, "Introduction," in *The Sonification Handbook* (Berlin, Germany: Logos Verlag, 2011), 2.

work on their respective film projects: *To Taste the Ground*³⁴³ and *Crude*.³⁴⁴ In both cases, these practitioners were insistent that their fixed-media films contain only locational sound and no musical elements. So, while I do use footage recorded by these accomplished practitioners, my research explores the exact opposite format.

My turn towards non-linear devices is, in some ways, a response to the parameters imposed by fixed-media procedures. My lure toward the performative is an attempt to find new pathways in practice that suspend the linear trajectory of fixed-media works to explore an alternative dynamic aesthetic. Thus, the way I previously described collaboration from a systems theory perspective (pages 6–7) has evolved in the course of my research to include a different vocabulary to contextualise the process.

In the first instance, Karen Barad's understanding of the nature of matter as an "intra-action" rather than an interaction resonates. Thinking of the differences in creative intentions between my fellow media practitioners and me as an "intra-action" highlights the "iterative and mutually constitutive working out"³⁴⁵ nature of practice. Thus, to experience the relational dimension in experimentation-as-process within the divergence of practices negotiates a space that is open to the *friction* of differences. These moments of friction, or "zone[s] of awkward engagement"³⁴⁶ are transformative and feed into an accumulative tacit knowledge from working relationships that span twenty-five years, which in turn form their own 'ecologies of practice.' For my part, these zones of engagement agitate and challenge my creative research, which draws on the different agency of artistic practices.

Secondly, Donna Haraway's reference to string figure games provided an alternative vocabulary for considering these creative "intra-actions." Here, Haraway's passing pattern of figures and ideas on relays, knottings, and the picking up of threads that occur in such moments of "intra-action" resonate with the sort of space that inhabited my research. Of this Haraway says:

In making string figures one hand is still, while the other moves. Patterning requires many digits, [...] and that the patterns are relayed and past on, both thru the generations as well as thru the actual materiality of string figuring, [...] [they] are a kind of genre and kind of worlding, a kind of story making with

³⁴³ Shannon Harris, "To Taste the Ground," (Montreal, Canada: 2014).

³⁴⁴ Denton, *Crude*.

³⁴⁵ Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Loc 101.

³⁴⁶ Tsing, *Friction: An Ethnography of Global Connection*, 4.

deep materiality's that work through relays, and knotting's and dropping threads and somebody else picking a thread and a mutation and a pattern happens that you didn't intend that perhaps ruins the pattern. But perhaps also suggests something interesting and fun and [...] mobile.³⁴⁷

For me, Haraway's manner of thinking and use of language is expansive and operates in a way that is attuned to the complex polyphony that inhabits any back-and-forth exchange of ideas and perspectives. As a reference for my own creative endeavours, which incorporate material from different environments and other creative practitioners, it serves as a reminder of the worth of such complexities and entangled configurations.

Thirdly, Manning and Massumi pose insightful questions regarding the nature of collaboration as an “event based ecology of experience.”³⁴⁸ Here they ask: “What new forms of collaborative interaction does [...] research-creation-based speculative pragmatism imply? What kinds of initial conditions are necessary? What does it mean to organize for emergence?”³⁴⁹ For me, “initial conditions” and “organizing for emergence” are important considerations in how I have come to consider the processes from which emerge the works contained in my portfolio. An example from my thesis would be the three-week field recording session with Andrew Denton and Adrian McNaught. For my part, I had no programmatic structure as to what I would record or what works would emerge. In essence, the choice to participate in this trip with these people was the initial condition out of which *emergence* was organised and enlisted as a technique. Of this, Manning and Massumi say:

This idea of research-creation as embodying techniques of emergence takes it seriously that a creative art or design practice launches concepts in-the-making. These concepts-in-the making are mobile at the level of techniques they continue to invent. This movement is as speculative (future-event oriented) as it is pragmatic (technique-based practice).³⁵⁰

To conclude, working with other creative practitioners became an initial tool and technique through which the process of *emergence* was organised, becoming an essential method of my practice—an event and working-out process that mobilizes an exchange of perspectives, which mutates in the passing back and forth of ideas (patterns) in an ecology of practice that is emergent, contingent and performative.

³⁴⁷ Donna and Anna Tsing Haraway, 2015. “Tunneling in the Chthulucene,” *ASLE Conference*, University of Idaho, Moscow, accessed June 25, 2016, www.youtube.com/watch?v=FkZSh8Wb-t8

³⁴⁸ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 91.

³⁴⁹ Ibid., Loc 1615.

³⁵⁰ Ibid., Loc 1609.

5. PORTFOLIO

“a [...] luring, desiring, making-with.”³⁵¹

Donna Haraway

Introduction

The non-linear audiovisual installations developed are the result of three field recording projects that took place between June 2014 and December 2015. These situated experiences span the west coast of North America, from Southern California to the northern regions of Western Canada. The works *Flight Variant*, *Cathedral*, and *Piano at the End of a Poisoned Stream* emerged from field recordings that began at the Salton Sea in Southern California and proceeded up into the Sequoia National Forest. Except for *Flight Variant*, which incorporates some footage previously captured by Denton, these three works are in response to this three-week journey. The remaining installation, *Undercurrent* emerged from a separate field recording at the Yalakom River in British Columbia, Canada.

Each project has influences and narratives from which the non-linear installations emerge. To recount each work, and the overall trajectory of my research, I present the works in the order in which they were made and not the time frame of the field recordings. I present the creative works in this sequence to show the evolution of the *making-doing-thinking* of my creative research as it progressed in moments of emergence. To restate Ingold, these moments traversed many interwoven lines, creating an ever-evolving meshwork in which the practitioner (the Wayfarer) and the practice are embedded; where the ways of inhabitant knowledge are “*alongly* integrated.”³⁵²

The route travelled explored many locations. Starting in Vancouver, I spent a week recording the sounds in and around this city. At the same time, and having previously discussed possible avenues of research, Shannon Harris was capturing audiovisual material at the Yalakom River in Northern British Columbia, which was later used in the installation *Undercurrent*.

³⁵¹ Haraway, "Anthropocene, Capitalocene, Chthulocene: Donna Haraway in Conversation with Martha Kenney," 257.

³⁵² Ingold, *Lines: A Brief History*, 89. (Italics authors)

From Vancouver, I flew to Los Angeles and joined Andrew Denton (filmmaker) and Adrien McNaught (architect) for a three-week field recording journey that brought us first to the Southern part of California and then to Los Angeles and subsequently into Death Valley, Sequoia National Forest, Reno, Salt Lake City and onward to Glacier Park. While the works to emerge from this three-week trip comprise material gathered from three locations: the Salton Sea, Los Angeles Airport, and Sequoia National Forest; there were many sites visited and field recordings made along the way. As I had no pre-programmed idea of what I would record or what works would result, my method of practice, as described on page 77, was *organised for emergence*.

In this three-week field recording session, an emotional state emerged, similar to what Morton calls the “dark-depressing” and “dark-uncanny.”³⁵³ For my part, along with the numerous disturbing locations explored, the moments of being ‘pulled aside’ by security guards (with guns) questioning what I was doing in various locations were influential. On one occasion, I thought I would either be thrown in jail or escorted to the Canadian/USA border. So, as this trip proceeded, a “dark-depressed” emotional state settled in. As we moved through locations like Death Valley, where the daily temperatures were 153 degrees Fahrenheit and the ability to be in this environment was significantly reduced—I could only record for 10-minute time periods because of the heat—I again contemplated: “What is the purpose of an art form that is embedded in time and place?” By the time we arrived in Reno and submerged ourselves in the casino environment, my fellow practitioners and I were emotionally exhausted. From the polluted wastelands of the Salton Sea to the addictive gambling activities of Reno, the performative agency of human and nonhuman bodies was overwhelmingly disturbing.

When I initially considered my question—the purpose of an art form embedded in time and place—I had no answer. I could only reflect on the fact that I had been capturing and exploring the day-to-day situated sounds and encounters in the world for some time (since my father’s beige tape recorder), and that these activities were motivated by my various creative curiosities. On engaging with the researchers presented in the previous chapters, I began to contextualise the *making-doing-thinking* and *feeling* of my ecology of practice as part of a larger performative “intra-action” with the world (via Barad); something that lays claim

³⁵³ Morton, *Dark Ecology: For a Logic of Future Coexistence*, Loc 128.

to my responsiveness, out of which I come to act as I do (via Butler). The lure to record objects found in different environments is, as Bennett describes it, the “call of things”, which music is “better suited for acknowledging,”³⁵⁴ and that the “weird weirdness” I have often felt in different field recording encounters can be thought through with Morton’s dark ecology project, which is attuned to “[the] shifting, ambiguous stage set.” The result, for me, was a deeper connection with the worth of such an artistic practice and a broader method and sensibility for considering the entanglements at work between different bodies (human and nonhuman), in a non-reductive and contingent way.

Furthermore, Haraway’s *Staying with the Trouble* offers an additional thinking thread to address my question:

Staying with the Trouble in a multispecies way is truly my effort to remain alive, non-cynical, non-skeptical, non-defected, but also not in denial about the levels of destruction which we inherit and hold in our hands whether we want to or not. That the pattern is truly in our hands whether we asked for it or not and the possibility of flourishing on this earth is truly at stake. And the temptations to cynicism or defeatism, to despair, to various forms of avoidance and denial are extreme. My view is it’s not possible to stay with the trouble among us without the practice of joy; that the practices of joyful—collective and individual pleasure—are essential to the arts of living on a damaged planet.³⁵⁵

How this manifests in my ecology of practice is that embedded in the *making-doing-thinking-feeling* of artistic inquiry, including working with other practitioners and the curiosities that motivate my creative directions, is the joy out of which I cultivate a way of being in the world that short-circuits any temptation for avoidance and denial. I believe that in this mode of artistic practice dwells response and response-ability. From a sonic arts perspective, Agostino Di Scipio has recently proposed a similar line of thought and further suggests what is at stake:

In a world so profoundly structured by unseen, unheard and aproblematically accepted delegations, assumptions of responsibility may be uneasy, and often perceived as disturbing. To many, it is simply meaningless to raise such questions in considering mundane activities such as music and listening. Yet, there we see a political (or simply pedagogical) function of sound-based practices across the broader social scenario: a function to draw attention, through the ‘relational’ and the ‘situational’ dimension of the medium, to the social ecology of lived auditory experience. After all, it seems reasonable –

³⁵⁴ Bennett, “Powers of the Hoard: Artistry and Agency in a World of Vibrant Matter”.

³⁵⁵ Haraway, “Staying with the Trouble: Symptoiesis, String Figures, Multispecies Muddles”.

and auspicious – to assume that the mutual recognition and the joyful coming together of individuals able to account for their personal involvement are ultimately very good motivations behind our efforts as either practitioners or listeners.³⁵⁶

³⁵⁶ Agostino Di Scipio, "The Politics of Sound and the Biopolitics of Music: Weaving Together Sound-Making Irreducible Listening, and the Physical and Cultural Environment," *Organised Sound* 20, no. 3 (2015): 286.

Flight Variant

“The ambient sound of jet engines “destroys the actuality of nature as [...] an object of poetic celebration.”³⁵⁷

Timothy Morton



Figure 21. *Flight Variant*. Photo A. Denton.

Research Journal:
Industrial park near Los Angeles Airport
California, June 2014.

This is the closest I’ve externally been to a jet plane in flight. The sound in my headphones was intense, and when recording the first plane, I had the levels too high. The saying “so loud it made my ears bleed” is an accurate description—it took a while for my ears to recover.

I could hear planes advancing well before seeing them, so I became the lookout person signalling to Andrew with a “yip” that a plane was approaching. This gave him the time to capture his high definition slow motion footage. For my part, I could detect, in sound, the size of an aircraft before seeing it, as the jet engine pitch is different. I became fixated on these different pitches and the weird sonic moment that occurs just as a plane passes overhead—you can hear the swirl of the jet engine’s exhaust. It feels like a sonic disruption.

³⁵⁷ Morton, *Ecology without Nature: Rethinking Environmental Aesthetics*, 124.

I have often encountered ‘moments of friction’ while attempting to record a pristine Nature—one without the sounds of human activity and machinery. Over time, these ‘frictions’ have challenged my field recording practice as to the purpose of recording pristine nature. Morton’s quote (above), and his dark ecology project suggest the need for an ecological awareness that replaces the upper case ‘N’ of Nature with a lower case. For Morton, thinking of (N)ature in Romantic terms as being “That Thing Over There,”³⁵⁸ impedes any meaningful ecological engagement with other species and the earth and becomes a form of escapism. Such forms of escapism, according to Haraway, have led to denial of the current state of the ecology that we all now inhabit.³⁵⁹

Morton’s philosophical writings reflect in words the transformation in my field recording practice that, in turn, has influenced the methods and pathways of my creative research into non-linear systems. What I once regarded as disruptive human-generated sounds in a pristine (N)ature are now considered part of the situated encounters. Rather than experiencing these human sounds as ruptures of the pristine, my mode of attention has altered to consider these sonic occurrences as being embedded in the mesh of the situated ecologies. In saying that, I do appreciate the efforts of sound practitioners such as Bernie Krause, who has dedicated enormous amounts of time to recording ‘wild’ environmental soundscapes.³⁶⁰ For my research, however, it has become necessary to bracket off this mode of inquiry into natural soundscapes to engage in a practice that is attuned to the “material situations” encountered in any given environment.³⁶¹

One such encounter, which has become a recurring motif, is the sound of jet planes in flight. Depending on the location, the occurrence of such sonic moments is unavoidable. While easily fading into the background of everyday life, the sound of passing planes becomes amplified during field recording projects. In the audiovisual installation, *Flight Variant*, this sonic-body became the locus and material configuration from which the sensibilities and different

³⁵⁸ Ibid., 1.

³⁵⁹ Haraway, "Staying with the Trouble: Symptomatology, String Figures, Multispecies Muddles".

³⁶⁰ Bernie Krause, *Wild Soundscape: Discovering the Voice of the Natural World* (Birmingham, AL: Wilderness Press, 2002). I would add to this list Leah Barclay’s work with Biospheres Soundscapes, Ricardo Dal Farra’s Balance-Unbalance project and Garth Paine’s The Listenⁿ project.

³⁶¹ Salter, *Alien Agency: Experimental Encounters with Art in the Making*, 26–27. I borrow “material situations” from Salter’s descriptive account of the installation works of O+A who, similar to my practice, are interested in exploring “a life-world of vibrating matter.”

pathways of practice emerged. Like Bennett's text-body of poetry (pages 50–52), the sonic-body of planes landing at the Los Angeles International Airport (LAX) drew my attention to the particular kinds of agency, distinctive effects and capacities available in this environment.

At this stage of the three-week field recording project with Denton and McNaught, we had already finished a week of recording at the Salton Sea and were next heading inland to Death Valley. Denton had also previously captured a series of jet stream videos from which I had made preliminary experimentations with non-linear systems. As described on pages 33–39, these initial experiences did not lead to a finished installation but did influence the different directions and pathways of practice for *Flight Variant*. By the time we had set up in the industrial park, directly under the arrivals flight path near LAX, I knew this non-linear installation would incorporate these jet stream videos. This location was perfect for recording material as the planes were at very low altitudes—plus I was not confronted with security guards, as was the case for much of this trip.

My thoughts during this LAX airport field recording session shifted from the functional aspects of recording to ideas on migration and family, economics and pollution, overpopulation, travel and a feeling of nostalgia. These ideas and sensibilities eventually directed my creative explorations to inquire about daily flights around the world. Accordingly, I contacted Dr Jim West, Program Manager Boeing Commercial Airplanes, Seattle, WA. West is a close friend of mine and very knowledgeable about the aviation business. At that time, West's role at Boeing was with the E-Enabling Implementation & Deployment Team that supported the integration of airplane systems and software for the 787, 777, 747 and 737 programs.³⁶² West directed me to information I might find of interest, particularly the *Current Market Outlook 2014* for Boeing. This document contains estimates on the number of new airplanes needed (36, 800) to service the emerging air travel growth of 100 million new passengers per year.³⁶³ The 2016 *Current Market Outlook* has increased the number of planes to 39,620.³⁶⁴ From

³⁶² Jim West, Personal Communication, 2016.

³⁶³ Jim Billing, "Boeing Current Market Outlook 2014–2033." Accessed December 1 2014, http://www.boeing.com/assets/pdf/commercial/cmo/pdf/Boeing_Current_Market_Outlook_2014.pdf

³⁶⁴ Jim Billing, "Boeing Current Market Outlook 2016–2035." Accessed January 28 2017, http://www.boeing.com/resources/boeingdotcom/commercial/about-our-market/assets/downloads/cmo_print_2016_final_updated.pdf

West's information, I researched statically data on flights-per-day worldwide (90392)³⁶⁵ and daily air traffic at LAX (1578).³⁶⁶

The information contained in the *Current Market Outlook* and the air traffic data influenced my shifting directions of thought in the making of *Flight Variant*. Morton's "weird weirdness" resonates here, as the sheer scale of human motion in the air became a triggering agent that attuned my creative sensibilities. This data can be understood as an indexical sign of the "human hyperobject (the human as geophysical species)"³⁶⁷ all performing to form a "shifting ambiguous stage set."³⁶⁸ Thus, the contrails in the sky, so eloquently captured on HD video by Denton, I consider (through Morton) as the "causal traces float[ing] in front, in the realm of appearance, the aesthetic dimension."³⁶⁹

The creative process for *Flight Variant* thus included aviation statistical data as a co-creative and performativity device. This was first incorporated into the installation code by dividing the number of flights that land and take off from LAX per day by the number of seconds in a day, which equated to an average of one every 55 seconds. This figure was then used to trigger the random video selection and elements of the piano score, as described on pages 86–87. Other aviation data coded into the system included dividing the number of seconds in a day (86400) with the average number of planes that are in the air at any given time (7400)³⁷⁰ equaling 11.676 seconds, and the same division on the number of worldwide flights-per-day, which equated to 1.046 flights-per-second. These figures are respectively used to trigger sound samples and aspects of the piano score, described on the following page.

The sonic aspect of *Flight Variant* evolved in the studio practice I have described in Chapter 4. A folder of audio samples was realised from the raw field recordings and recorded musical improvisations in response to the installation

³⁶⁵ The World Bank, "How Many Airplanes Fly Each Day." www.quora.com/How-many-airplanes-fly-each-day-in-the-world

³⁶⁶ Airport Council International, "Airport Council International: The Voice of the World's Airports." <http://www.aci.aero/Data-Centre/Monthly-Traffic-Data/Aircraft-Movements/12-months>

³⁶⁷ Morton, *Dark Ecology: For a Logic of Future Coexistence*, Loc 817.

³⁶⁸ Morton, *Hyperobjects: Philosophy and Ecology after the End of the World*, Loc 1605.

³⁶⁹ Ibid.

³⁷⁰ This number (7400) is an average based on www.flighttradar24.com data. In reality, the number of flights in the air will fluctuate given the time of day. Looking at the flight data collected by The World Bank in 2015, 32960402 flight departures were logged worldwide, which on average equals 90392 flights per day. Divide that number by the hours-in-a-day equals 3762.

system as it iteratively evolved. A cumulative database of sonic material was created and in turn coded into the final audiovisual installation, all of which are randomly triggered by the flights-per-second equation. These sonic layers include convolved field recordings with improvised musical motifs, text-based sound bites gleaned from YouTube and Sirius Satellite Radio³⁷¹ that contain different opinions on global warming and other philosophical positions, and a piano score randomly created from pre-composed and streamed flight arrival information from the LAX airport web page.

The improvised musical motifs were realised with a convolution instrument I created in Max. This ‘comprovised’ instrument includes the *multiconvolve~* object found in the HISS Tool externals and the Vienna Symphony cello and clarinet library. Five impulse responses were coded into this instrument, comprised of the Los Angeles airport field recordings of planes. Over the course of creating this work, I recorded several improvisation sessions, which were folded back into the installation system.

The piano score is realised using three methods. The first uses a series of short motifs created through improvisation in response to the audiovisual system as it developed. Stored as MIDI data, these motifs are successively coded to randomly scramble the order of notes and rhythm when triggered by a video. The second uses a list of airport symbols like YYZ (Toronto), transcoded into integers and subsequently into piano chords and also triggered by the entry of videos. The third method involves streaming LAX flight arrival times off the Internet, which are then transcoded into piano notes. For this portion of my research, I was inspired by Gregory Reeves’s AERO app, which downloads and converts flight data into a musical score by sourcing four different airports: Los Angeles (LAX), New York (JFK), Seattle-Tacoma (SEA), and Washington DC/Dulles IAD.³⁷² I corresponded with Reeves to learn his coding method and subsequently constructed a similar approach using the *jit.uld1*. Using the LAX flights-per-second equation, this object downloads the LAX arrival times *url* every 55 seconds, which are then converted into a text file. Once converted, numbers are

³⁷¹ During the three-week field recording trip I would periodically record sound off the car radio from different channels, which provided a large folder of sound bits that cover many topics.

³⁷² Gregory Reeves, "Aero." Accessed June 1 2015, <https://gregoryreeves.bandcamp.com/album/aero>

extracted from the other data at an interval based on the worldwide flights-per-second equation and subsequently transcoded into piano notes.

In addition, the audio output from the piano instrument is routed to convolve with two text-based impulse responses. One is a Barack Obama sound sample stating: “*This is not something in the distant future; climate change is already affecting us now*” and the other is Marina Abramović saying: “*What is important is from which state of mind you are doing what you are doing.*” These impulses are coded to switch every 55 seconds. Thus, a multi-dimensional sonic element is layered into the *Flight Variant* installation system. Using the HISS Tool external *multiconvolve~*, these text-based impulses can be convolved with either a live input piano or with the Vienna Symphony Library piano samples. Consequently, two versions of *Flight Variant* emerged as I began to consider the possibility for a live concert version as well as the gallery installation version.

While the concert version does alter the non-linearity of this work with the beginning, middle and end parameters of live performance, the overall random functionalities of this system maintain the same contemplative state available in the non-linear gallery installation version and ensure that each performance is different. The only other difference between these two versions is the number of videos available for random selection—the gallery installation has 40 while the live version has 20. I reduced this number in consideration of the time allotted for the live performance version and proceeded to select videos with the greatest variety of flight path angles, removing any that contained clouds. I performed the live version of *Flight Variant* at Waikato University’s Lilburn composition awards (Figure 22).³⁷³ Having done this, and having installed the gallery version on three separate occasions, the differences between the two versions motivated my thinking and making procedures to consider ways in which non-linear audiovisual installations can be experienced. While not the main focus for my PhD research, these considerations have informed my future research intentions.

³⁷³ *Flight Variant* won the 2016 New Zealand Lilburn award for best multimedia electroacoustic work.

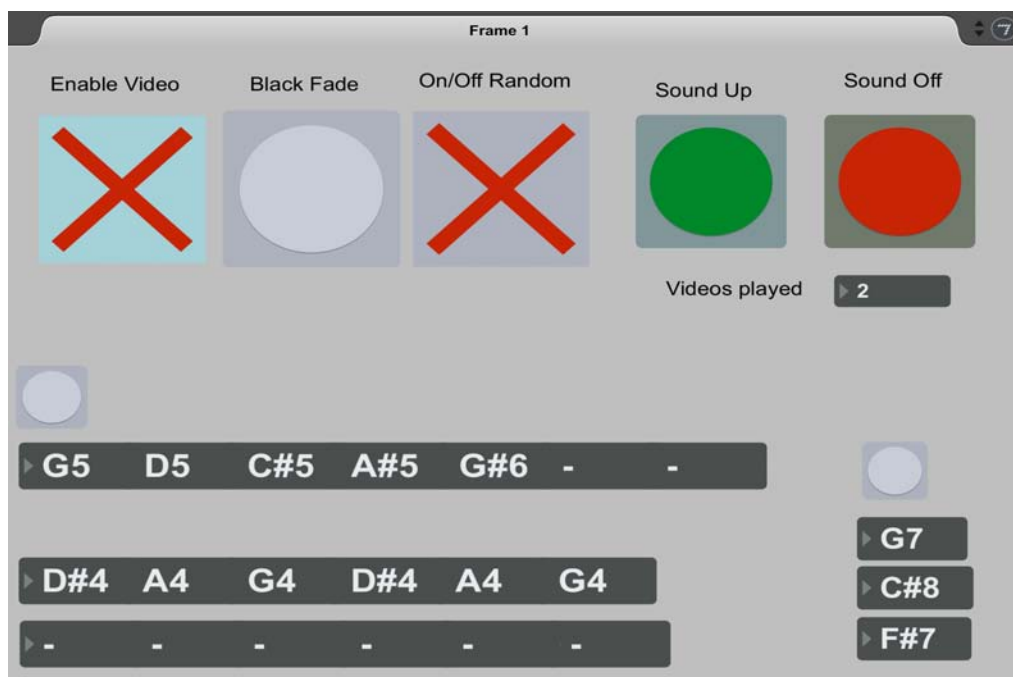


Figure 22. Max 7 components on an iPad using *Mira* for concert performance.

The gallery version of *Flight Variant* premiered in August 2014 at the Toronto International Electroacoustic Symposium in Canada (TIES 2014). Under the working title *Lines*, I considered this rendition of the installation a work-in-progress as some of the core elements of my research were not fully realised. For example, because of the video playback issues in the Max 6 program at that time, a random functionality on a folder of jet stream videos did not run smoothly. The short-term solution for the TIES conference comprised a fixed-media version of the flights set to continuously loop. Constructed by Denton, this skilfully edited version did allow for a smooth video playback realisation but compromised the core purpose of my research into a non-linear and dynamic aesthetic.

This caused me to re-examine the purpose of non-linear operations in the visual component of this work. Denton's edited version is well crafted with a high level of artistic choices and sensibilities. I concluded, however, that to dispense with the random functionality placed the *Flight Variant* visual element into the realm of linear fixed-media sensibilities, which was the opposite intention of my research. Consequently, over the course of creating the installation code, various methods for video playback were explored. I focused on constructing a system that could randomly play the video files without having to downgrade the high-resolution quality of Denton's jet stream videos, ProRes 422 1920 x 1080. Fortunately, during my research, Cycling 74 upgraded the video playback

capabilities of the Max 7 program, which enabled playback of much higher quality videos. As the research for *Flight Variant* occurred before, during, and after these upgrades, this installation went through many iterations to create the most robust system.

Accordingly, working on *Flight Variant* shifted my creative practice to more readily include the coding of the visual elements, which has further informed my shift of collaborative praxis. Previous to *Flight Variant*, my artistic focus in collaborative processes has encompassed the sonic/music elements. Because my research has veered towards non-linear processes, it has become necessary to include the coding of the visual components as part of my practice. This, in turn, has influenced my *making-doing-thinking-feeling* procedures of practice, as I am motivated to explore, at the onset of each project, the various elements that make up the works: the visual and the sonic. My initial artistic pathways reflect Ingold's meshwork, in which the threads of different lines feed into the overall pathways travelled. Moreover, like Bennett's text-body—where certain configurations of words can change one's sensibilities—the visual, sonic-body and data-body can attune in different directions in a transformative mode that gives an account of the types of relations, responses and response-ability I find myself entangled in.

Undercurrent

“We are the generations that are overseeing the loss of so much of the diversity of living forms on this planet, the generations that are perhaps yet to fully understand and respect the significance of the intimately entangled, co-evolved, forms of life with which we share this planet.”³⁷⁴

Thom van Dooren



Figure 23. *Undercurrent*.

As presented at the Balanced/Unbalanced 2015 International Conference in Tempe, Arizona, *Undercurrent* is a non-linear installation that features a five-panel video projection and surround sound. Using underwater footage captured by Shannon Harris (filmmaker), an audiovisual installation was created that uses computer vision as a co-creative device with the captured material. The pathways travelled to make this work encompass narratives beyond the particularities of the initial environment. In the development of my research, it bridges *Flight Variant* and the work that follows, *Cathedral*. Components of my creative code are expanded along with the thinking in the making procedures, which *alongly* wove into the mesh of my research.

I first met Harris when we were tree planters in British Columbia and, like Denton, her creative explorations in visual media have a multi-layered response to landscape embedded in environments. Since those gruelling days of reforestation, Harris and I have worked on several audiovisual projects; I have come to consider

³⁷⁴ van Dooren, *Flight Ways*, 21.

her method of capturing images as ‘chasing light.’ I believe her still and moving images to be an exquisite and evocative use of light and landscape.

We first discussed using her water footage for my non-linear research in relation to ocean footage captured off the West Coast of British Columbia (Figure 24). This footage contains punctuated sunlight reflecting off the water, which stimulated my interest in exploring computer vision as a sonic triggering device. These initial conversations took place just prior to my three-week field recording trip in the Southwestern regions of the United States, and Harris’s journey to the Yalakom River in British Columbia. The specificity of her journey was unknown to me at that time; however, we had an understanding that I was interested in video footage that captured sudden movements of light.

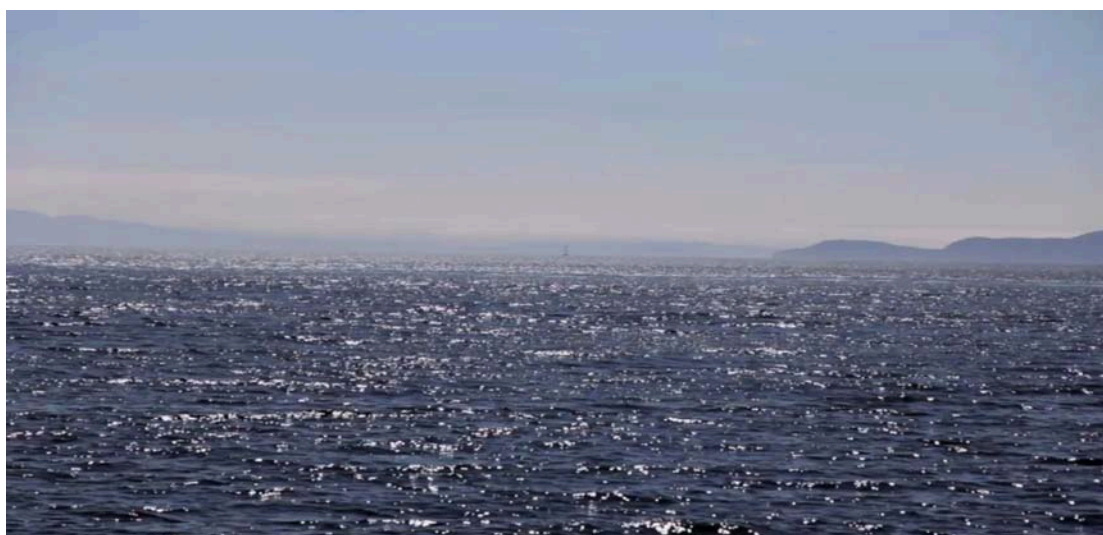


Figure 24. Ocean footage off the British Columbia coast. Photo S. Harris.

As it happened, the footage Harris captured at the Yalakom River was eventually explored for the installation *Undercurrent*. This footage emerged from what was initially a personal journey for Harris. Her visit to this location was a pilgrimage in memory of her recently deceased father, as they had camped often in this region. Of this Harris says: “I had no intention of filming on this pilgrimage but usually bring my cameras wherever I go. As I spent time by this quick river listening to the ‘shrush and bubble’ I was filled with a profound sense of completion—of cycles and patterns, beginnings and endings. I started shooting,

watching light.”³⁷⁵ Thus, Harris’s creative process is embedded in presence, place, and time in which the camera “becomes embodied, my eye/I, my experience.”³⁷⁶

Through refined experimentation, and with breaks to warm her hands from the glacial freeze, the *Undercurrent* footage was eventually captured while “try[ing] to find the light under water.”³⁷⁷ It was the quality of light that prompted my decision to use this footage in a non-linear installation. Imbued with a hypnotic play of light, these underwater shafts of sunlight with the movement of water morph at times into a painterly quality (Figure 25).

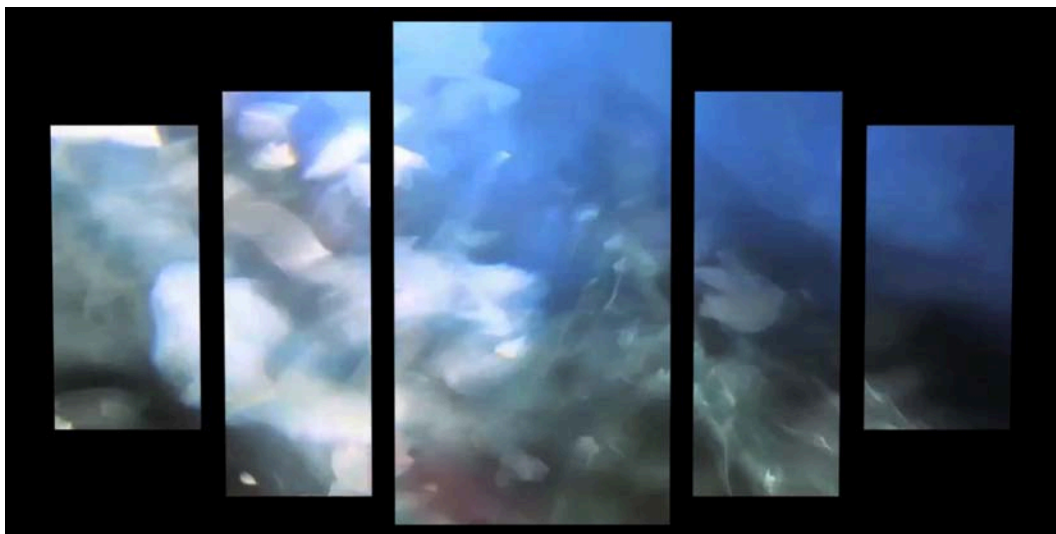


Figure 25. *Undercurrent*.

With no prior knowledge of Harris’s intention of a “pilgrimage,” the concurrent audiovisual collection process throughout the Southwestern drought regions of the United States additionally influenced my visceral response to the underwater play of light. As noted, this gruelling three-week journey took me to many polluted and bleakly sunbaked landscapes. The lack of water and its pollution was at the forefront of my mind.

When the 2015 *Balanced-Unbalanced* conference call for proposals was posted with the theme “Water, Climate, Place: Re-Imagining Environments,”³⁷⁸ I took that opportunity to proceed with my research and submit *Undercurrent* for presentation. Having attended the 2013 *Balanced-Unbalanced* conference in

³⁷⁵ Shannon Harris, “Personal Communication,” (2015).

³⁷⁶ Ibid.

³⁷⁷ Ibid.

³⁷⁸ “Balance-Unbalance.” Accessed January 5 2015, <http://www.balance-unbalance2015.org>

Noosa, Australia and installed two audiovisual installations: *Beads* and *Aspects of Trees*, I had come to appreciate the research of Ricardo Dal Farra.

Farra launched the *Balanced-Unbalanced* conference in 2010 “to develop the role of the media arts and artists in dealing with environmental challenges”³⁷⁹ As Farra states: “Everyone has a responsibility in the construction of the future, electronic artists too. We can reflect, research and create. We can act and also invite others to reflect, engage, envision and act.”³⁸⁰

With this in mind, the research for *Undercurrent* quickly followed. I selected a single underwater video from Harris’s footage (Figure 26), and subsequently divided it into five panels (Figures 23 and 25). From there, I constructed a computer vision system that would respond to sudden changes of bright light on the centre video panel (demonstrated on the documentation film located on the external hard drive). Accordingly, these changes were coded to randomly trigger sonic material created using the method described in Chapter 4, and similar to the process for *Flight Variant*. A databank of sonic material comprised of field recordings, convolved samples, sonification and pre-recorded improvisations were placed into the installation system, all of which are randomly activated by the underwater movement of light captured on video.



Figure 26. Single underwater video. Photo S. Harris.

³⁷⁹ Ricardo Dal Farra, "Breaking Paradigms: Electronic Arts & Humanitarian Actions," in *International Symposium on Electronic Art* (Vancouver, Canada: 2015), 2.

³⁸⁰ Ibid.

From these initial pathways, other influences began to mesh into this non-linear installation. Like *Flight Variant*, where the sonic-body of planes landing at LAX shifted my sensibilities in different directions, Harris's underwater footage led me to consider larger structures of phenomena in relation to water. And, like Bennett, where the "effectivity of a text-body, including its ability to gesture towards something more, is a function of a distributive network of bodies,"³⁸¹ the pathways explored for *Undercurrent* gestured towards other material bodies, which influenced the final realisation of this work. These included the accumulation of plastics in the world's oceans³⁸² and a range of sonic materials that have been recorded in this body of water by Ocean Conservation Research.³⁸³

I was initially drawn to the topic of plastics while on the three-week field recording trip in the USA. As we travelled, I would randomly record audio off the car radio while tuning in to different channels. These audio samples contain a plethora of items, but one news clip that caught my attention was the recent death of a number of whales in the stretch of ocean known as the North Pacific Garbage Patch.³⁸⁴ Now thought of as "The Seventh Continent,"³⁸⁵ this area is noted for having a high concentration of plastics.³⁸⁶ These whales had starved to death after ingesting these plastics and becoming unable to digest food.

I was sickened and saddened by this information, which inevitably fed into the "dark-depressed" (via Morton) emotional state that was emerging because of the disturbing environments already explored on this journey. The ramifications of human agency were everywhere. On this topic, Thom van Dooren emphasises dualistic thinking as being "the core of a human exceptionalism that holds us apart from the rest of the world and, as such, contributes to our inability to be affected by the incredible loss of this period of extinctions, and so to mourn the ongoing deaths of species."³⁸⁷ Van Dooren's research focuses on the effects the "Seventh Continent" has had on the bird species in this area. Accordingly, he suggests that taking grief seriously might "work to undermine our sense of human

³⁸¹ Bennett, "Systems and Things. On Vital Materialism and Object-Oriented Philosophy."

³⁸² Antonio Scarponi, "The Seventh Continent—Musings on the Plastic Garbage Project." Accessed October 2014, <http://www.domusweb.it/en/design/the-seventh-continent-musings-on-the-plastic-garbage-project>

³⁸³ "Ocean Conservation Research." <http://ocr.org/sound-library/>

³⁸⁴ Scarponi, "The Seventh Continent—Musings on the Plastic Garbage Project."

³⁸⁵ Ibid.

³⁸⁶ van Dooren, *Flight Ways*, 58.

³⁸⁷ Ibid., 40.

exceptionalism—in particular, by highlighting both a deep evolutionary continuity between humans and other social animals, and our ecological entanglement in a more-than-human world.”³⁸⁸

Subsequently, while researching Van Dooren, I was introduced to the American photographer Chris Jordan’s series of photos “Midway: Message from the Gyre.”³⁸⁹ This series of photos shows the decomposed bodies of albatross chicks—the bones and feathers—intermixed with the contents of the animal’s stomach, a pile of multicoloured plastics and other debris.³⁹⁰ Of this project Jordan writes: “For me, kneeling over their carcasses is like looking into a macabre mirror. These birds reflect back an appallingly emblematic result of the collective trance of our consumerism and runaway industrial growth.”³⁹¹ Jordan’s photos resonated with me in regards to Denton’s and my field recordings at the Salton Sea and the overwhelming number of dead bird and fish carcasses we saw, caused by that area’s pollution (Figure 27). While both scenarios are embedded in different locations, these processes of “entangled becoming[s]”³⁹² and the agency of the human and nonhuman bodies, for me, further problematized human exceptionalism. Further to this, Van Dooren, via Morton’s notion of the hyperobject, says:



Figure 27. Salton Sea dead fish and bird remains. Photo A. Denton.

³⁸⁸ Ibid., 41.

³⁸⁹ Chris Jordan, "Midway: Message from the Gyre." Accessed August 5 2016, <http://www.chrisjordan.com/gallery/midway/#CF000668%2016x21>

³⁹⁰ van Dooren, *Flight Ways*, 58.

³⁹¹ Chris Jordan, "Midway: Message from the Gyre—About." Accessed August 5 2016, <http://www.chrisjordan.com/gallery/midway/#about>

³⁹² van Dooren, *Flight Ways*, 129. Via Karen Barad.

We have become members of a society with the capacity to recognize the specific harms that our ways of life are producing and to reflect critically on the consequent ways in which we are undermining the sustainability of our living planet. [...] And so, as a result of diverse, interwoven patterns of inheritance over immense temporal horizons, we have emerged as beings whose lives are lived ‘in the shadow of all this death’ but simultaneously under the weight of an ethical claim to work towards more ‘livable worlds’. [...] The Black-footed Albatross like any other species, is not a flight way through an empty void, but an entangled way of life, bound up in and becoming as part of a specific multispecies community.³⁹³

Thinking and being with these “interwoven patterns of inheritance” and “entangled way[s] of life,” elicited different pathways in the *making-doing-thinking-feeling* of *Undercurrent*. While the events out of which this installation emerged began with Harris’s ocean footage and then her river footage, the engagement with this material drew forward a co-creative process that *alongly intra-acted* with other subjects and objects in an on-going process of becoming.³⁹⁴ Out of this, the question of response and response-ability emerged and as my research proceeded, I would *in practice* consider these questions.

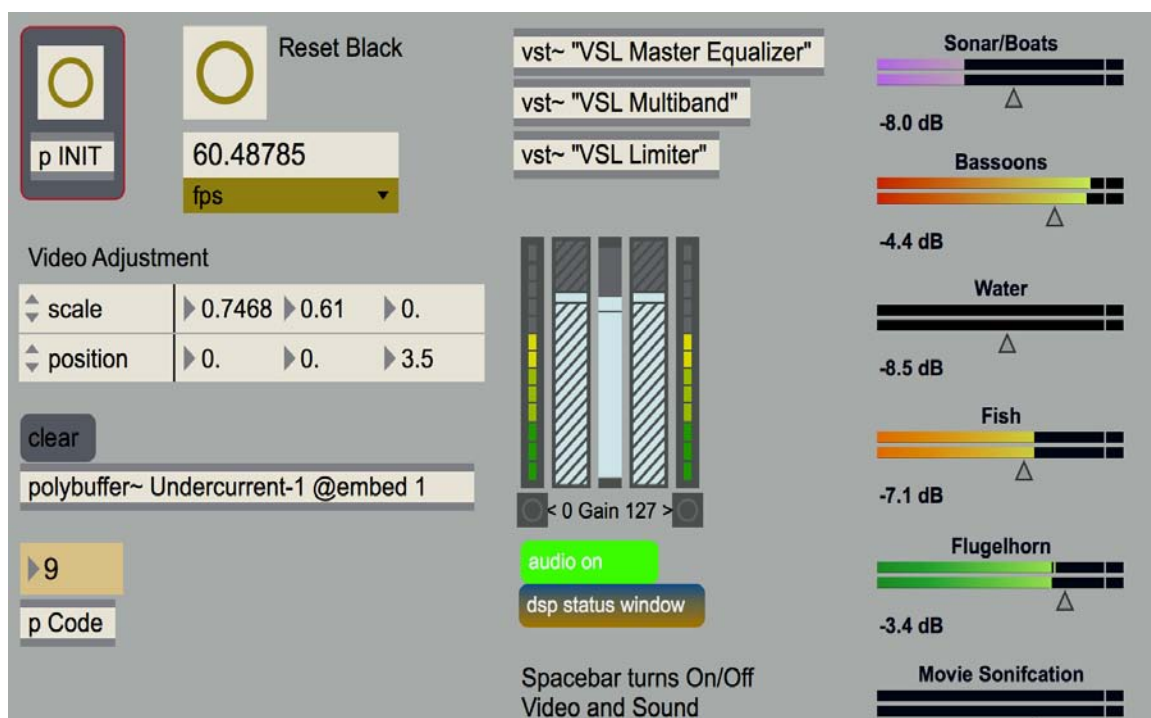


Figure 28. *Undercurrent* Max 7 patch in presentation mode.

³⁹³ Ibid., 77–78.

³⁹⁴ Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Loc 1096.

With regard to the sonic materials recorded in the ocean, I obtained a folder of audio samples recorded by the Ocean Conservation Research.³⁹⁵ These included seismic surveying signals, mid and low frequency sonar, underwater airguns and boat noise, and the sounds of a variety of sea creatures. Thus, the final *Undercurrent* installation contains an audio folder that includes convolved field recordings with improvised musical motifs and the conservation samples. The improvised motifs were realised using a similar convolution instrument to that created for *Flight Variant*. The impulse responses used include an underwater sound sample captured at the Yalakom River and a short Blue Whale call. In response to the whale impulse, I improvised using the Vienna Symphony Bassoon library, and for the underwater impulse I used the Vienna Symphony Flügelhorn library. Short improvisations were recorded in an accumulative folder and successively placed into the installation system, randomly triggered by the sudden changes of light.

The final sonic apparatus layered into this work was a video sonification device. This coding component implements Christopher Dobrian's³⁹⁶ movie sonification code to generate a sonic layer directly from the installation video. Using this device, the hue of the video is mapped to pitch and the level to intensity, which is sonically realized through the Max 7 *ioscbank~* object (an interpolating oscillator bank). Subsequently, I convolved the output of the oscillator with an underwater impulse captured at the Yalakom River using the *multiconvolve~* object. The volume of this device sequentially turns 'off' or 'on', based on the random activation of the underwater movement of light analysis.

Having installed *Undercurrent* at the 2015 *Balanced-Unbalanced* conference in Arizona, once I was back in New Zealand, the work for *Cathedral* began. As stated on page 90, components of my creative code were expanded upon with each successive work and *alongly* woven into the mesh of my research. The link between *Undercurrent* and *Cathedral* is the use of computer vision as a triggering device in response to sudden movements of sunlight. For *Cathedral*,

³⁹⁵ "Ocean Conservation Research." "Ocean Conservation Research."

³⁹⁶ Christopher Dobrian, "Movie Sonification." Accessed February 7, 2017. <https://cycling74.com/forums/topic/stereo-sonification/#.WKEf2BR3Zsg>

however, the sunlight was captured through the trees of the Sequoia Nation Forest in the Sierra Nevada region of the United States.

All of these sonic, visual, and experiential elements thus fed into “an associated milieu of the emergent relation[s]” that made up the co-creative forces informing my research. Restating Manning and Massumi, these emergent relations constitute an “*environmental mode of awareness*” [...] that does not yet seek to distinguish between human and nonhuman, subject and object, emphasizing instead an immediacy of mutual action [...].”³⁹⁷

³⁹⁷ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 157.

Cathedral

“What art really does is generate “far off balances” from everyday life and to that effect, it actually de-frames and shakes up the quotidian.”³⁹⁸

Chris Salter via Félix Guattari



Figure 29. *Cathedral*.

Research Journal:
Sequoia National Forest, California, July 2014.

The voices of the tourists in this forest became hypnotic. In my headphones, it was as if I were listening to a weird Gregorian chant. I slipped into a slowed down, somewhat meditative state. While all the people scurried around trying to get their pictures taken next to General Sherman, I became transfixed on the melodic lines of the overlapping languages and the punctuated rhythms of footsteps and cameras.

³⁹⁸ Chris Salter, "Exploring the Performative: Interview with Chris Salter," in *VIDA: Art and Artificial Life International Awards*, ed. Pau Waelder (2014).

By volume of wood, the giant sequoia is the largest tree in the world.³⁹⁹ Native to the Sierra Nevada region of the United States, this species of tree was first discovered in the 1830s⁴⁰⁰ and, because of its enormous size, attracted admirers and loggers alike. There is a substantial history surrounding the conflict between these two groups and subsequent legislation passed on September 25, 1890, that designated the Sierra Nevada region a protected national park.⁴⁰¹ In the last decade, on average, one million tourists annually have visited the Sequoia National Forest⁴⁰² to view the giant sequoias, particularly the largest tree in the park, General Sherman.

The audiovisual installation *Cathedral*, created from the field recordings captured in the Sequoia National Forest in July 2014, is a response to this environment and constructed space. The initial research that informed the making of this non-linear installation occurred before the field recording and, as described on pages 33–39, was set in motion by the previous collaboration with Andrew Denton on *Aspects of Trees*. Those early explorations focused on building a multi-panel non-linear 'video fabric' (Figure 30) that incorporated computer vision techniques as a co-creative and sonification device. At the time of the Sequoia National Forest field recording, I had previously experimented with a variety of video footage



Figure 30. Early 'video fabric.'

³⁹⁹ National Park Service. "The Giant Sequoia of the Sierra Nevada: Introduction." Accessed January 27 2017, www.nps.gov/parkhistory/online_books/science/hartesveldt/chap1.htm

⁴⁰⁰ Ibid.

⁴⁰¹ Ibid. Along with Kings Passage Canyon National Park, legislation was passed on September 25, 1890 to created the Sequoia National Forest.

⁴⁰² National Park Service. "Nps Stats: Annual Park Recreation Visitation." [https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Annual%20Park%20Recreation%20Visitation%20\(1904%20-%20Last%20Calendar%20Year\)?Park=SEQU](https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Annual%20Park%20Recreation%20Visitation%20(1904%20-%20Last%20Calendar%20Year)?Park=SEQU)

in the ‘video fabric’ apparatus, including that of other forests. Those forests shots, however, were specific to the pine beetle epidemic in British Columbia, and had a different narrative to that of Sequoia National Forest.

My journal entries, on pages 45 and 99, best convey the shift of experience (Morton’s weird weirdness), or Guattari’s “*far off balances*,” that occurred during this field recording session: from the stained glass metaphor of light through the dust-covered bus window, to feelings of strangeness being transported to the descending walkway that leads to General Sherman, to hearing the overlapping voices reverberating in the forest as a cathedral-like polyphony punctuated with footsteps and different camera sounds. My responsiveness to these elements informed the *Cathedral* installation.

Later, when listening to the audio field recordings, the quality of the voices in this environment reinforced the cathedral metaphor, from which a complex polyphony of thinking-feeling emerged. This included subjective experiences as a singer, along with thoughts on the Catholic Church and constructed spaces of worship. As a singer, I have performed in various spaces including large cathedrals and, on a visceral level, understand how environments affect a singer’s performance abilities. Over time, I have developed a physical responsiveness to particular spaces: for example, long reflective reverbs like those found in a large cathedral (or that experienced in a Sequoia forest) make me to want to sing. I do, however, have issues with Catholicism, having grown up in a society predominantly Catholic or Protestant. Listening to my audio field recordings agitated a complex polyphony internally, which motivated the title of this work. It is important to note that this installation is not a commentary on religious beliefs and teachings; but rather, a responsiveness in creative practice that acknowledges the situatedness of the encounter—including (restating Kim-Cohen) “other nested and overlapping matrices.”⁴⁰³

When reviewing Denton’s Sequoia National Forest footage, I was drawn to those items that captured the shafts of sunlight through the trees (Figure 31) and ones that contained lens flares (Figure 32). Accordingly, the stained glass metaphor was reinforced and it motivated my decision to use this footage in an expanded version of the ‘video fabric’ device (Figures 33 and 34).

⁴⁰³ Kim-Cohen, *Against Ambience and Other Essays*, 59.



Figure 31. Sequoia National Forest. Photo A. Denton.



Figure 32. Sequoia National Forest. Photo A. Denton.



Figure 33. 'Video fabric.'



Figure 34. 'Video fabric.'

Like the footage in *Flight Variant*, Denton captured the Sequoia Forest at very high speeds (slow motion) using a high-definition camera. Also, his uses of extreme wide (12-16mm), or super telephoto (400-800mm) lens alter the perspective in which the shots were captured.⁴⁰⁴ In regards to lens flare, Denton describes his method of capture as “surfing the light wave.”⁴⁰⁵ By positioning the camera at a particular angle to the sun, he was able to capture a series of flares that produced the vibrant purple, turquoise and red that periodically punctuate this footage.⁴⁰⁶ It was these moments of punctuated sunlight and lens flares, coupled with the sonic sensation of a cathedral-like polyphony that motivated the pathways of practice traversed for this portion of my creative research. It is of interest to note that while Denton’s method of capture aimed for a smooth motion, for me, the more interesting patterns in the ‘video fabric’ system occur during bumpier moments.

Similar to *Flight Variant*, the coding for the video portion of the *Cathedral* installation occurred over many iterations. The first ‘video fabrics’ were constructed before the significant upgrades to the Max 7 program and continued throughout the course of my research. Hence, the early ‘fabrics’ were not as responsive or robust as I wanted. In those early explorations, three videos were redistributed onto an 8x6 matrix. Each video was individually coded for continuous playback at random ramp speeds between 0.80–1.20. These varying speeds created slight temporal shifts in the

⁴⁰⁴ Andrew Denton, “Cinematic Affect in a Time of Ecological Emergency” (Monash University, 2016), 28.

⁴⁰⁵ Denton, "Personal Communication."

⁴⁰⁶ Ibid.

matrix and resulted in what I call ‘video fabrics.’ At that time, the random ramp rate was based on a metro set to 1/10th of a second.

As my research progressed and I was able to construct a more responsive and robust system, I allocated this rating to computer vision, specifically the sudden movement of brightness (sunlight) in each video, illustrated in Figure 35.⁴⁰⁷ Building on the research done for the *Undercurrent* installation, I devised a method where sudden changes in brightness in the forest footage became a triggering device. This additional variant, governed by Denton’s footage, added a quality to the *Cathedral* installation that aligned with the type of non-linear and agential, co-creative qualities I sought to tease out from the field recording material.

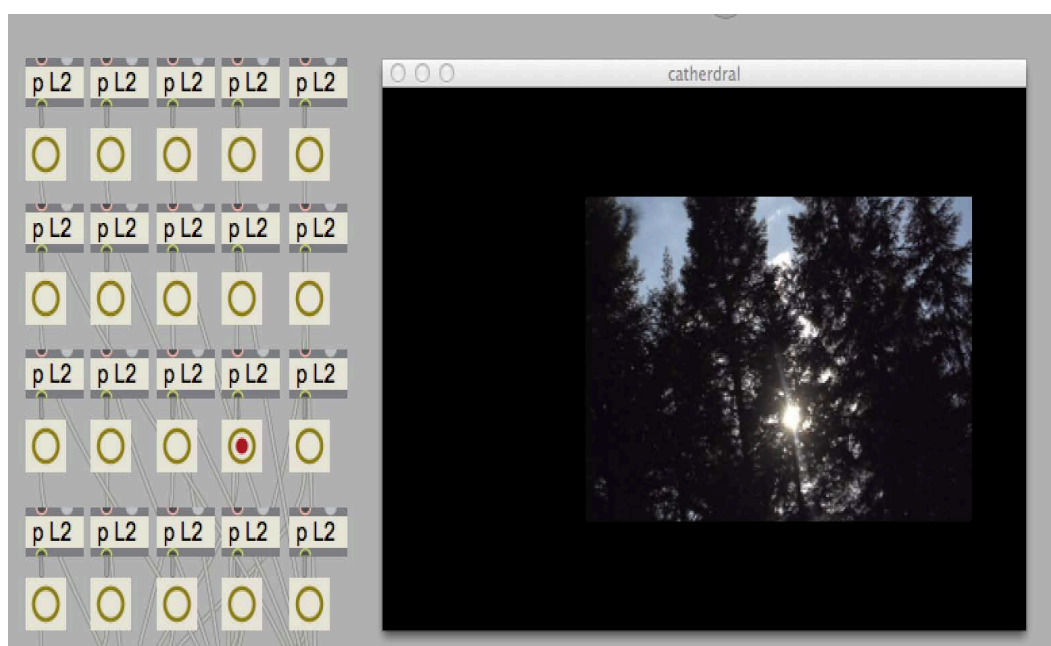


Figure 35. *Cathedral* Max 7 patch computer vision.

In total, thirty of Denton’s Sequoia National Forest videos were selected, all of which contained various sunlight movement or lens flares. For the final installation, and after constructing different matrix sizes, I settled on a 10x10 grid (100 screens). I choose this grid size after projecting the ‘video fabric’ onto various surfaces where the clarity of the footage became important. For example, with the larger 24x12 grid (288 screens), each screen is reduced to a size where the footage is completely unrecognisable. This result was unsatisfactory as the moments of shifting from knowing what the image is to moments of abstraction were lost.

⁴⁰⁷ I include the button object in this picture for demonstration purposes. All buttons were replaced with a more effective method of coding in the final installation patch.

Onto this 10x10 grid, I routed six identical videos on simultaneous play. I randomised the selection of these concurrent videos by routing a loop notification from each *jit.movie* player to the Max *buddy* object, which sends one bang after all videos finish (Figure 36). Linking this bang to Karl Essl's *xrandom* object, the random selections of concurrent videos are loaded into a *prepend set* object that, in turn, is triggered by the loop notification of each *jit.movie*. In this way, the random selection of videos will not repeat a number until all thirty excerpts are played. Accordingly, the video fabric is affected by the playback of the six videos, which continuously varies based on the random ramp rate governed by the movement of sunlight. In this way, the captured sunlight footage runs the whole installation and becomes a co-creative and performative agent.

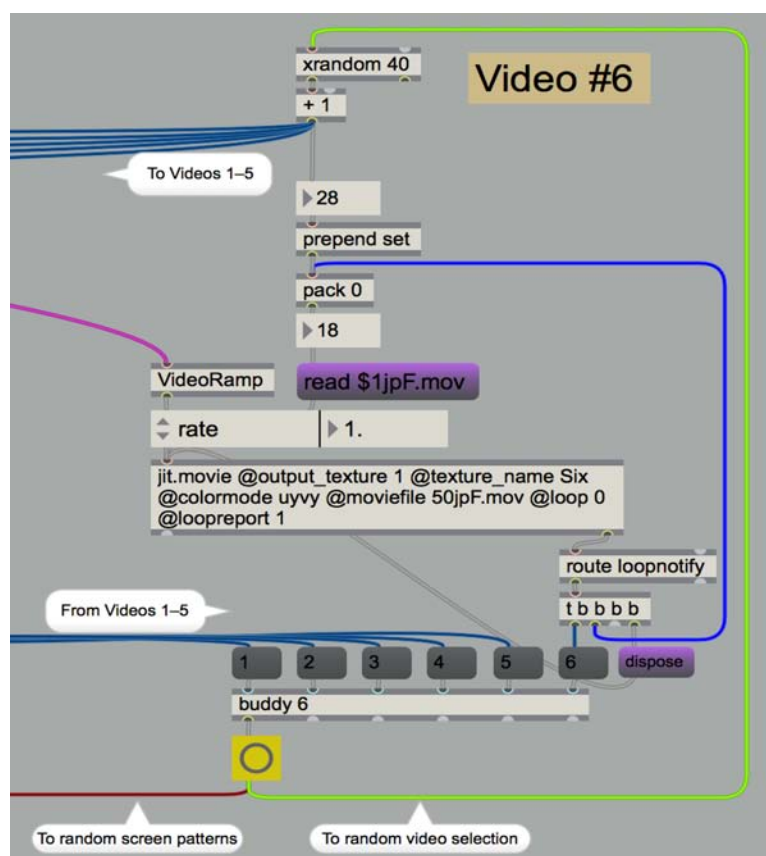


Figure 36. Video #6 + buddy system and xrandom object.

Barad's use of the phenomenon of diffraction to develop her performative ontology of "intra-action" articulates, for me, the entanglements at work in *Cathedral*. Barad (via Haraway) uses diffraction to denote her methodological approach to investigate the "entangled effects differences make."⁴⁰⁸ For Haraway (as

⁴⁰⁸ Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Loc 1590.

cited by Barad), diffraction is used as a metaphor to counterpoint the critical practice of reflexivity,⁴⁰⁹ which she believes is too “caught up in the geometries of sameness.”⁴¹⁰ Accordingly, Haraway attends to the effects and relational nature of differences by claiming “a diffraction pattern does not map where differences appear, but rather maps where the effects of differences appear.”⁴¹¹ Barad picks up Haraway’s thread and builds on the notion of entangled differences by exploring the quantum phenomenon of diffraction and its philosophical implications by thinking “about the nature of difference, and of space, time, matter, causality, and agency [...]”⁴¹² Thus, for Barad (and Haraway), the nature of entanglements is “highly specific configurations.”⁴¹³

From the situated encounters experienced in the Sequoia National Forest, the differences and entangled configurations at work, and those that later occurred in creative practice, were highly specific to being *in* this environment. The agency and causality of such entanglements (space, time, matter), as explored in a non-linear and dynamic aesthetic, is a means to artistically and philosophically contemplate (and be *in*) the complexities and differences at work in a non-reductive way. Thus, the ‘video fabric’ and sonic aspects that emerge for the *Cathedral* installation embraces the multi-layered and highly specific variables found in this location.

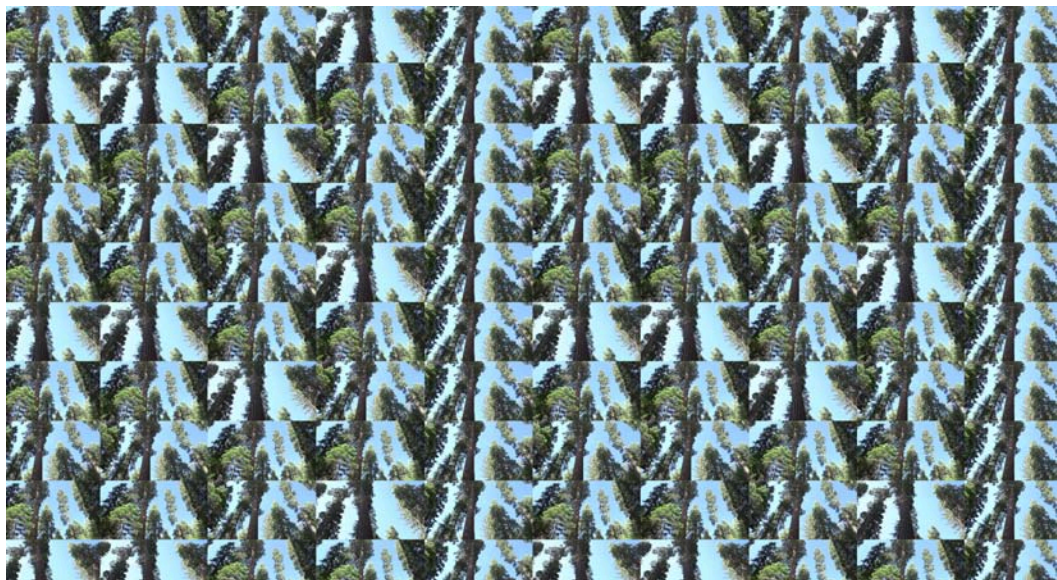


Figure 37. ‘Video fabric.’

⁴⁰⁹ Ibid., Loc 1541.

⁴¹⁰ Ibid., Loc 1552.

⁴¹¹ Ibid., Loc 1559.

⁴¹² Ibid., Loc 1587.

⁴¹³ Ibid., Loc 1596.

Another pathway of practice to emerge during the making of *Cathedral* included a series of pattern formations based on the dynamic placement of the videos in the 10x10 grid. The following video allocation graph is an example (Figure 38), in which an X pattern is realised in the ‘video fabric’ (Figure 39). Different punctuated lighting and colour patterns occur based on what video is playing, coupled with the varying playback speeds.

Six	Two	Three	Four	Five	One	Two	Three	Four	Six
One	Six	Three	Four	Five	One	Two	Three	Six	Five
One	Two	Six	Four	Five	One	Two	Six	Four	Five
One	Two	Three	Six	Five	One	Six	Three	Four	Five
One	Two	Three	Four	Six	Six	Two	Three	Four	Five
One	Two	Three	Four	Six	Six	Two	Three	Four	Five
One	Two	Three	Six	Five	One	Six	Three	Four	Five
One	Two	Six	Four	Five	One	Two	Six	Four	Five
One	Six	Three	Four	Five	One	Two	Three	Six	Five
Six	Two	Three	Four	Five	One	Two	Three	Four	Six

Figure 38. Code pattern ‘X’.

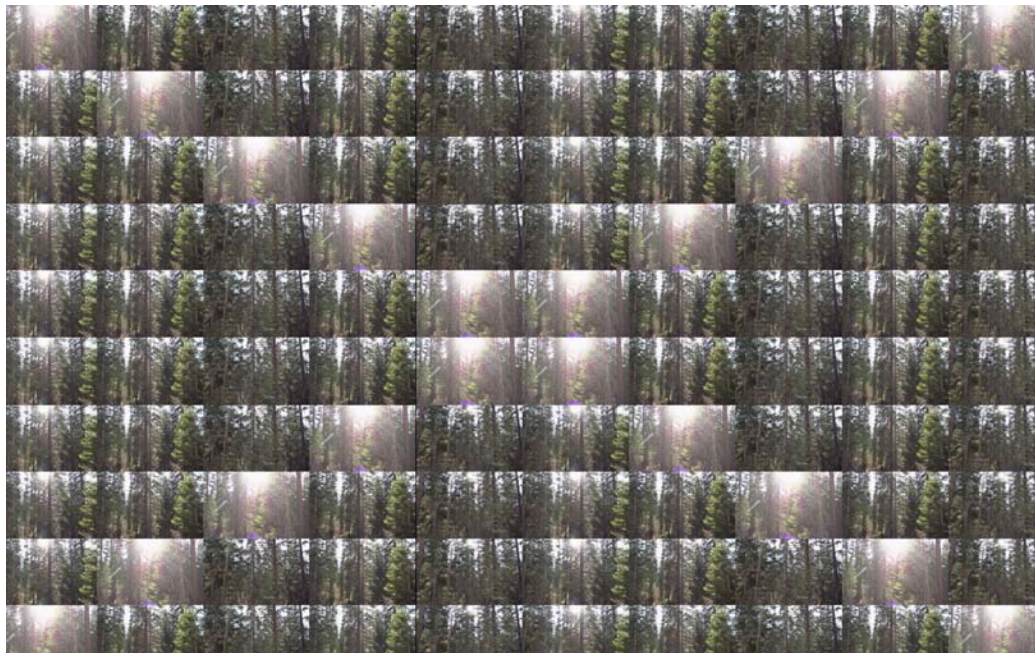


Figure 39. Code pattern ‘X’ in ‘video fabric’.

In my attempt to find agential and co-creative devices from this situated encounter I, in turn, devised a coding system that created text patterns based on Sequoia tree data information. For example, the following two patterns were constructed using the tree seedling cone ratio of 3/5.⁴¹⁴ This ratio coding system sequentially translates the numbers into video selections. The first translation pattern (Figures 40 and 41) uses five videos while the second uses six (Figures 42 and 43).

One	One	Two	Three	Five	Three	Three	One	Four	Five
Four	Four	Three	Two	Five	Two	Two	Four	One	Five
One	One	Two	Three	Five	Three	Three	One	Four	Five
Four	Four	Three	Two	Five	Two	Two	Four	One	Five
One	One	Two	Three	Five	Three	Three	One	Four	Five
Four	Four	Three	Two	Five	Two	Two	Four	One	Five
One	One	Two	Three	Five	Three	Three	One	Four	Five
Four	Four	Three	Two	Five	Two	Two	Four	One	Five
One	One	Two	Three	Five	Three	Three	One	Four	Five
Four	Four	Three	Two	Five	Two	Two	Four	One	Five

Figure 40. Pattern based on Sequoia ratio 3/5 using 5 videos.

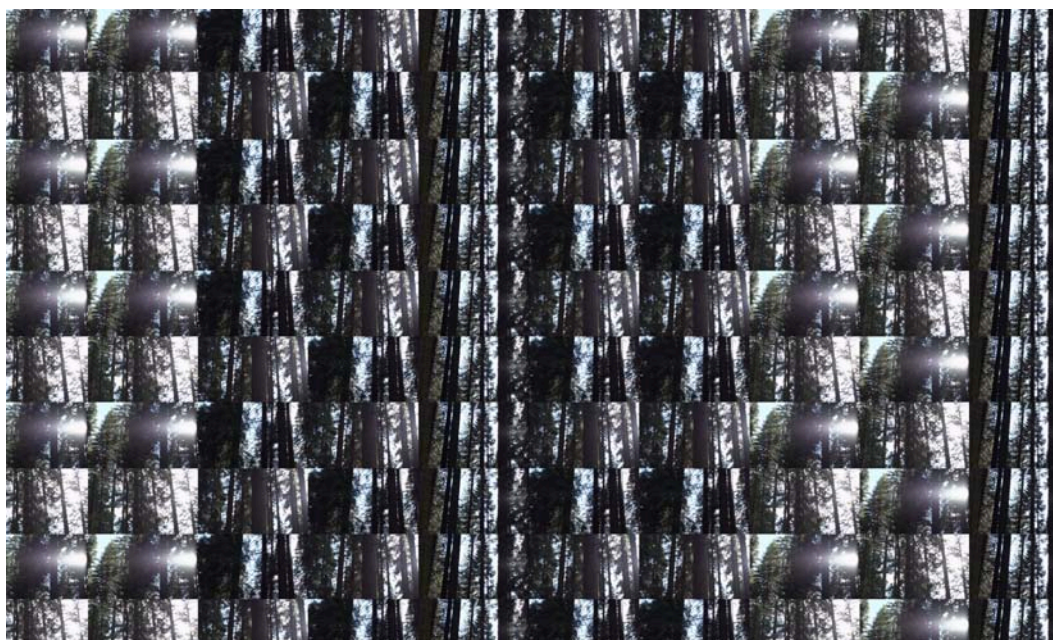


Figure 41. Realisation of pattern with 5 videos

⁴¹⁴ Richard Campbell, "Finding Patterns in the Redwoods: It's Easy as 1, 1, 2, 3..." Accessed September 5 2016, www.savetheredwoods.org/blog/wonders/finding-patterns-in-the-redwoods-its-easy-as-1-1-2-3/

One	Three	Five	Two	One	Three	Four	One	Five	Six
Five	Five	Four	Three	One	Four	Five	Three	Five	One
Six	One	One	Two	Three	Five	Two	One	Three	Four
One	Five	Six	Five	Five	Four	Three	One	Four	Five
Three	Five	One	Six	One	One	Two	Three	Five	Two
One	Three	Four	One	Five	Six	Five	Five	Four	Three
One	Four	Five	Three	Five	One	Six	One	One	Two
Three	Five	Two	One	Three	Four	One	Five	Six	Five
Five	Four	Three	One	Four	Five	Three	Five	One	Six
One	One	Two	Three	Five	Two	One	Three	Four	One

Figure 42. Pattern using Sequoia 5/3 ratio using 6 videos.



Figure 43. Realisation of pattern with 6 videos.

Nine patterns were created, the selection of which was eventually allocated to trigger when certain videos were chosen to play. Thus, each horizontal bank of ten screens in the ‘video fabric’ is preceded by a text file containing the pattern code unique to that row (Figure 44). These pattern-triggering videos are comprised of what I describe in the following paragraph as ‘line videos’ and were made in response to Denton’s lens flare footage.

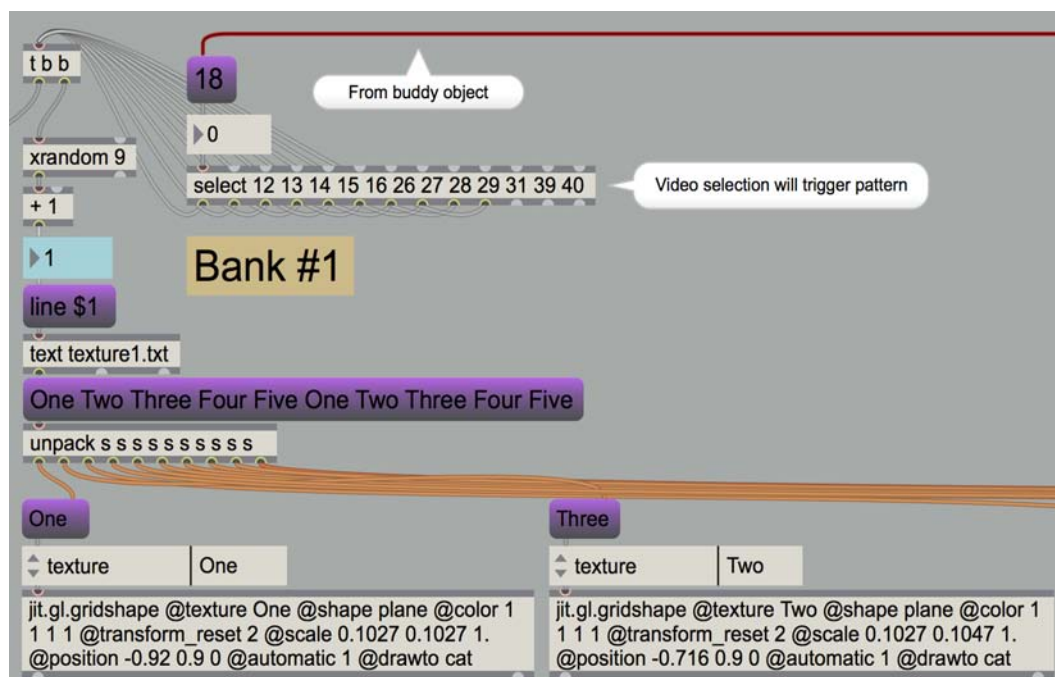


Figure 44. Bank #1 screens 1 & 2.

Once my *Cathedral* system was more responsive and robust, I made a palette of colours extracted from Denton's lens flare occurrences (Figure 45). From these, I created a series of videos, which eventually morphed into short line videos (Figures 46 and 47). Again, my motivation was to further draw out elements from the material captured from this environment as a co-creative device. In total, 8 line videos were created and subsequently placed into the overall installation. I also included two short black slug videos, bringing the total number of videos for random select to 40.

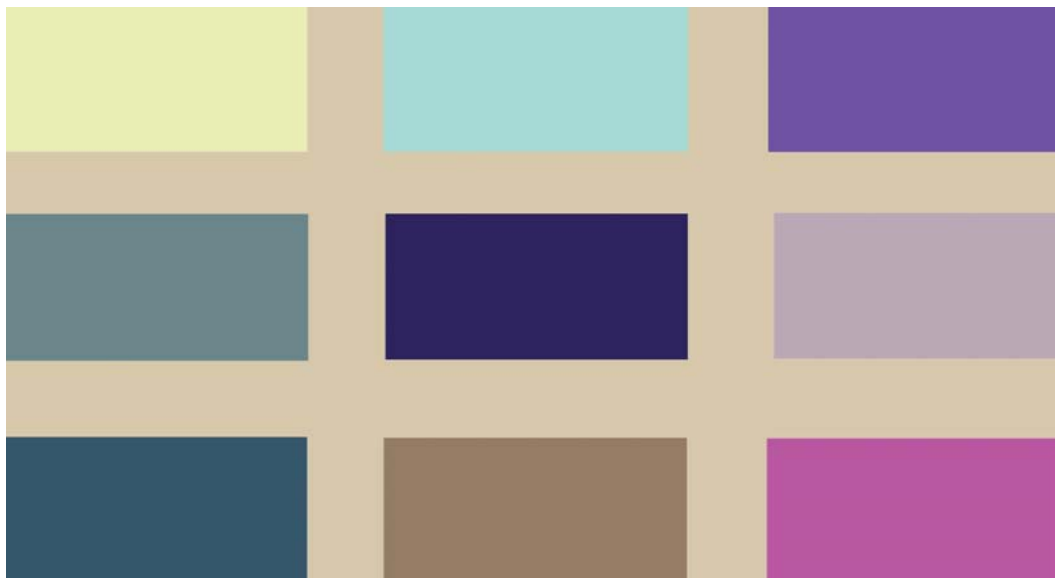


Figure 45. Colour palette extracted from video lens flares.



Figure 46. Line video #1 (screen capture).

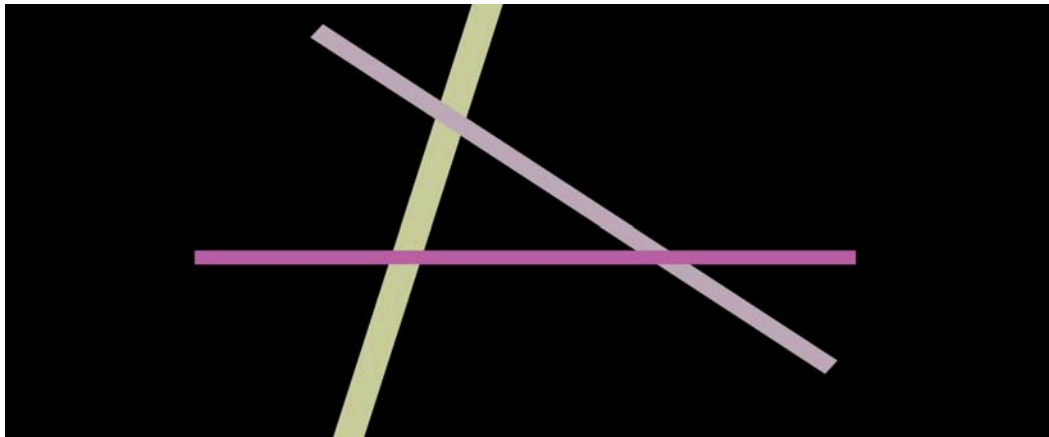


Figure 47. Line video #2 (screen capture).

These line videos have no spikes of brightness; hence, the random playback speeds temporarily stop on the last selected number, which can cause overlapping movie selection (Figure 48). For me, these line videos within the non-linear system become moments of abstraction and operate in what Donna Haraway (via Stengers) refers to as the lure of abstraction. Of this Haraway says:

Isabelle Stengers has taught me the lure of abstraction. [...] she has explained to me in exquisite technical detail the way abstraction works as a lure—that to which one is drawn in a movement, a pressure, an affective pressure of desire. That abstractions are those things which lure us for holding together the components of a question, of a problem, of a world and that abstractions break—the care and fitting of abstractions is an art. Far from being those things which alienate and objectify, abstractions are those things which lure for their promise of a fragile and mortal coherence—and then that it's in their breaking that the desire for other abstractions, for abstractions that might work otherwise or do something else is born and activated.⁴¹⁵

⁴¹⁵ Haraway, "Staying with the Trouble: Symposiosis, String Figures, Multispecies Muddles".

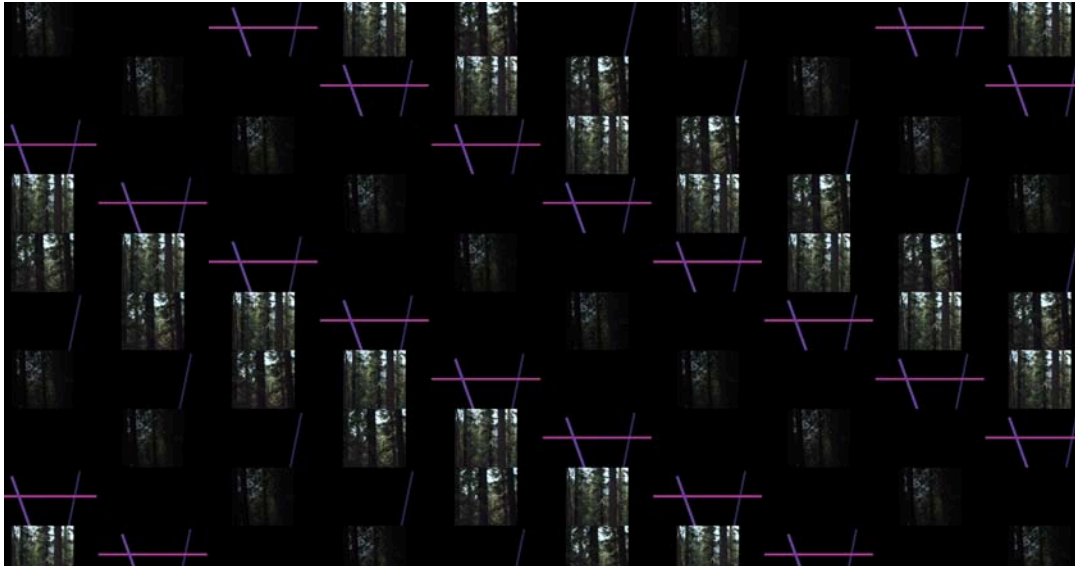


Figure 48. Overlapping lines and tree videos.

I am drawn to these moments of abstraction in the same way Haraway describes—as a movement and pressure that lure me in. In the trajectory of my artistic practice and training (including my fine art studies) I have consistently been attracted to abstract fine art forms. While the historical subject of abstract fine art is outside the scope of my PhD research, many works from 20th and 21st century fine arts have often ‘lured me in’. Within the non-linear audiovisual installation platform, these abstract moments operate in a state of flux, from which emerges other luring-toward movements and pressures. I believe this lure of abstraction, within the dynamic non-linear aesthetic I am exploring, aligns with Manning and Massumi’s interpretation of Paul Klee’s “pure and simple line,”⁴¹⁶ as “events of expression’s dynamic[ly] unfolding.”⁴¹⁷ Here, Manning and Massumi are referring to event-based ecologies that begin in “creative chaos [from which emerges] the self-drawing of a pure and simple line, running from the commotional fullness of an impossible “what if” to the “here now” of an event risking its own singular individuation.”⁴¹⁸

For my research, I *alongly* wove Manning and Massumi in with Haraway’s (via Stengers) lure of abstraction, in that the event out of which unfolds the *making-doing-thinking-feeling* of practice is the beginning of a line (and lure) that travels on different pathways and entangled configurations (the mesh). Thus, the

⁴¹⁶ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 2079.

⁴¹⁷ Ibid.

⁴¹⁸ Ibid.

video lines using colours extracted from Denton's lens flares, recorded in the situated encounter of the Sequoia National Forest, emerge out of "creative chaos" and in turn are rendered into simple lines of expression: "the generative forces informing the aesthetic event."⁴¹⁹

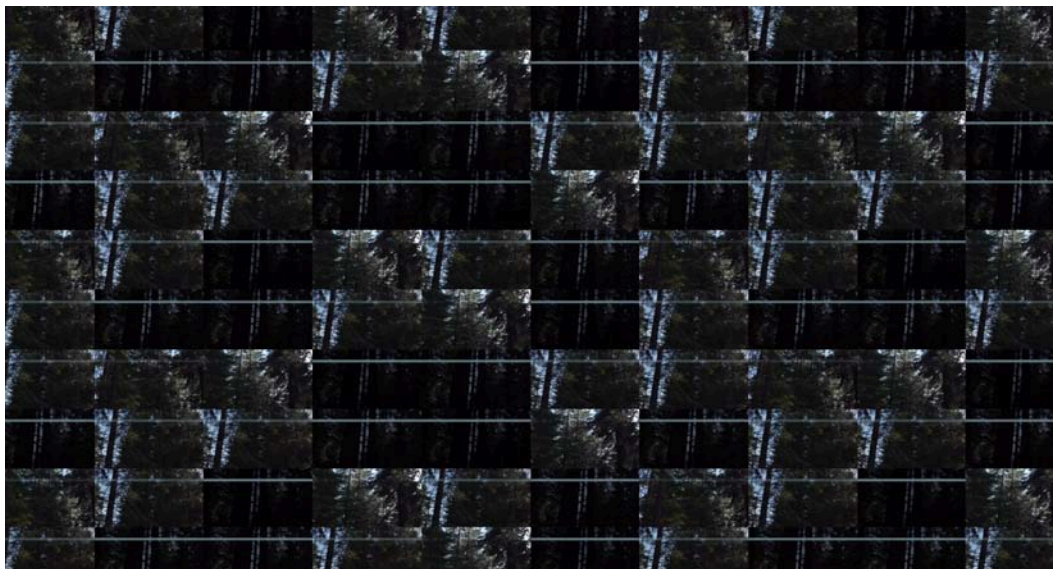


Figure 49. 'Video fabric.'

For the sonic aspect of *Cathedral*, a large portion of the field recordings from the Sequoia Nation Park contained tourists speaking different dialects and languages. Each language and speaker had different rhythms, timbres and pitches that, in the natural reverb of this forest, overlapped into a polyphonic sonic element. After constructing the 'video fabric' system, including the computer-vision, and after the title of *Cathedral* emerged, I became interested in bringing these voices into this non-linear installation without overtly focusing on the specificities of the spoken words. The process of auto-convolution; that is, convolved with itself,⁴²⁰ seemed a suitable compositional technique with which to achieve this aim. Consequently, these text-based files doubled in length, but rather than sounding as if time stretched, the strong frequencies became stronger while the weaker ones dropped out. Applying auto-convolution again to the resulting files strengthened those frequencies and what emerged were small melodic motifs.

⁴¹⁹ Ibid.

⁴²⁰ Barry Truax, "Convolution Techniques." Accessed August 10, 2016, www.sfu.ca/~truax/Convolution%20Techniques.pdf

I was pleasantly surprised with the results of auto-convolution applied to text-based recordings, as this was not a technique I had previously explored to such a degree. Accordingly, a series of short melodic motifs emerged, as illustrated in Figures 50–52. Here, the indicated pitches are a simplified approximation of the resulting audio files, which contain a more intricate sonic layering.

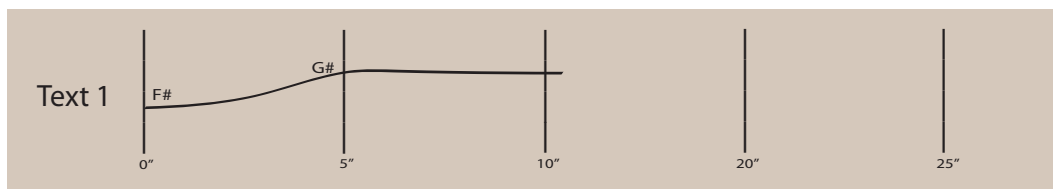


Figure 50. Melodic motif.

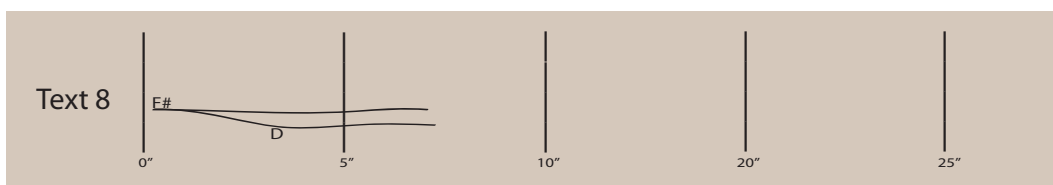


Figure 51. Melodic motif.

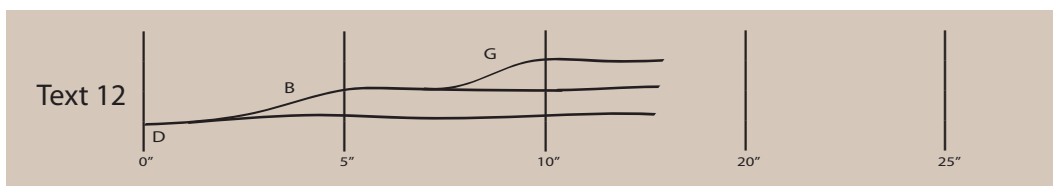


Figure 52. Melodic motif.

These motifs in turn influenced a series of short singing improvisations I recorded. These vocalisations were done while immersed in the *Cathedral* system—the ‘video fabric’ and sonic layers. I chose this method of practice to embed my improvisations into the ecology of the work. Accordingly, I constructed a real-time convolution instrument for recording my voice. Constructed in Max 7, this ‘cathedral instrument’ contains a delay system set to the first 8 numbers of the 5/3 ratio and live convolution. Using the HISSTools Impulse Response Toolbox, five impulse responses were extracted from the field recordings, which contained the natural reverb of the forest. During these improvisation sessions, the capacity to switch between these impulses was available (Figure 53).

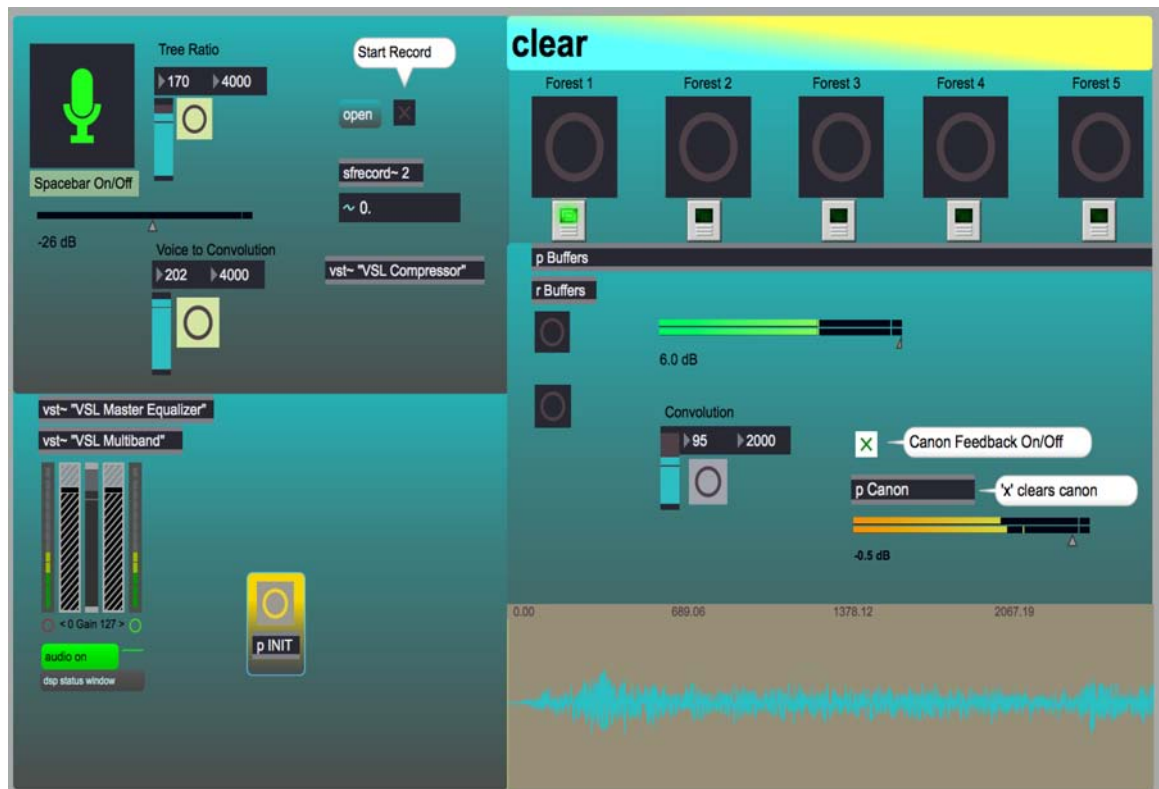


Figure 53. *Cathedral* vocal improvisation patch.

Auto-convolution was also applied to raw field recordings containing machine sounds such as the bus; human movement such as the sound of running children's flip-flops; and bird songs. Thus the *Cathedral* installation contains a large folder of audio files: raw field recordings, and auto-convolved text-based and vocal improvisations, all of which are randomly triggered by the computer vision analysis based on the burst of sunlight through the trees. The final sonic apparatus incorporated in this work was a *poly~* polybuffer-sampler (Figure 54). With this device, the selected audio is routed to a MIDI pitch sampler, randomly triggered by the incoming video analysis. For this instrument, I selected four vocal improvisations, two camera samples, one bus sound, one crow and a footstep sample.

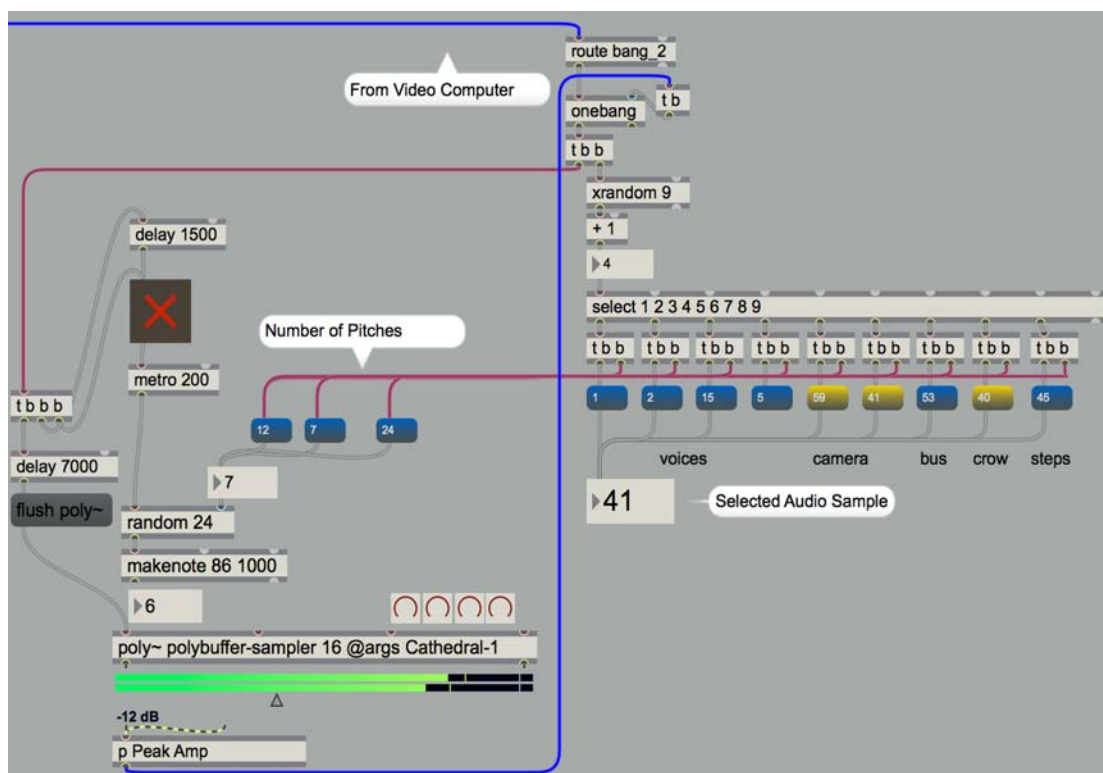


Figure 54. *Cathedral* poly~ polybuffer-sampler.

Like *Flight Variant*, *Cathedral* can be exhibited as a gallery installation or as a live audiovisual work with voice. My initial configuration for the gallery version had two ‘video fabrics’ hung opposite to one another, a centrepiece made of up two monitors (Figure 55), and the sonic element. Displayed on the centrepiece is a high-resolution close-up video of General Sherman’s bark, which continuously pans upwards (Figure 56). This endless upward motion occurs as two similar videos fade between one another. For the final installation, I elected to hang one ‘video fabric’ rather than two (Figure 57) due to the amount of flickering light in the gallery space—at times it became distracting. Using two laptops, the ‘video fabric’ and sonic elements are linked via a computer-to-computer network. The computer vision analysis, located on the ‘video fabric’ laptop, sequentially sends the triggering data to the sound laptop. A third laptop is used for the centrepiece display.



Figure 55. *Cathedral* gallery version (3D mock-up).



Figure 56. Close-up of General Sherman's bark. Photo A. Denton.

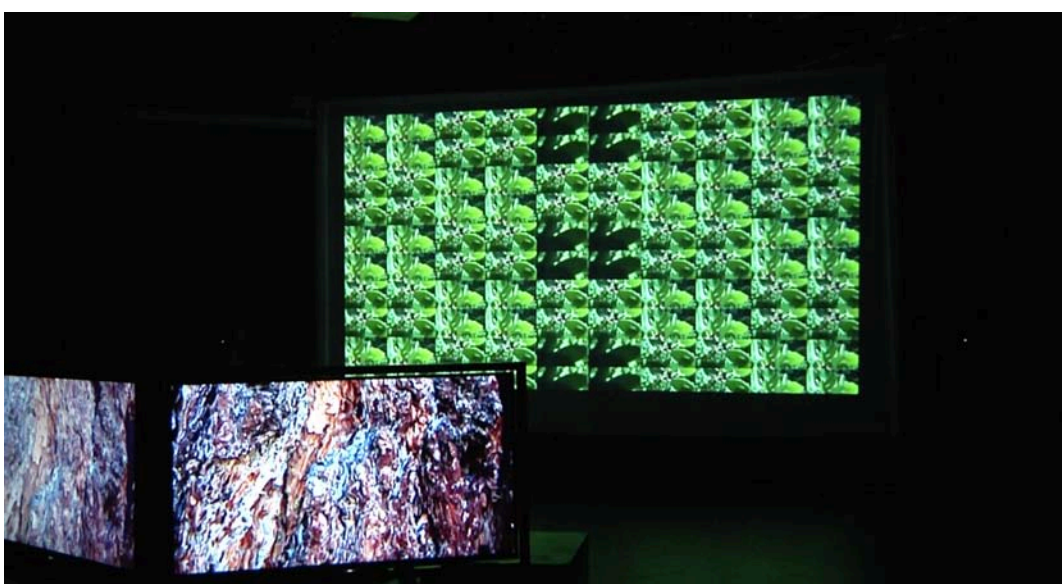


Figure 57. Waikato University installation. April 1–2, 2017.

To conclude, while the initial research for *Cathedral* took place in the first six months of my research, the making of this work traversed many interwoven lines and pathways of practice. In line with the discussions on agency and performativity, this research considers the complex, emergent, and dynamic encounters available through situated experiences and experimentation. The tendencies to emerge are deeply entangled in the mesh of the world, which provided a multi-layered point of creative enquiry. The result is a performative engagement with the world that functions as an aid to imagination and opens new capacities and vocabularies for creative research.

Piano at the End of a Poisoned Stream

*"A co-poiesis is occurring here."*⁴²¹

Manning and Massumi



Figure 58. Burnt piano at Bombay Beach. Photo A. Denton.

Research Journal:
Bombay Beach, California, December 2015.

I knew what to expect on this second visit to Bombay Beach, but it was still a shock to the system getting out of the vehicle. There is a weird feeling of venturing into a post-apocalyptic world. Everything is covered in a grey mud dry dust coupled with the smell of the ever-present decaying bodies of dead fish and birds.

This second trip to Bombay Beach was motivated by the piano found on the shore over a year ago (July 2014). Since then, I have found other people who have made recordings playing this instrument. To my complete dismay, however, when pulling into the site where I expected the piano to be—it was gone. One of the local residences of Bombay Beach informed me that it had been burned only two weeks before, and pointed to the location of the remains. I was gutted. But then, with Morton's dark ecology and Bennett's "thing-power" resonating in my thoughts, decided to move forward and record a different 'piano ecology' (Figure 59).

⁴²¹ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 1270.



Figure 59. Burnt piano at Bombay Beach. Photo A. Denton.

In 1905, when the Colorado River swelled and breached its banks, the water ran into the Salton Sink, a geographical region 220 feet below sea level. After two years of continuous flow, a 15-by-35 mile lake formed that became known as the Salton Sea.⁴²² Taking advantage of California's newest and now largest lake, the Salton Sea became a favourite getaway spot for nearby Los Angeles and San Diego residents. During the 1950s and '60s, Bombay Beach, which is located on the lake's eastern side, became a prosperous resort town filled with sunbathers, water-skiers, and yacht club parties. During the 1970s, however, it had become clear that the ecosystem of the Salton Sea was quickly deteriorating. With no drainage outlet and little to no annual rainfall, the inflow of industrial pollutants and untreated sewage began to increase the lake's salinity and caused the water to deoxygenate. What had become an angler's well-stocked paradise quickly transformed into a rotten layer of dead fish and birds.⁴²³

On the first field recording trip to this location in June 2014, after parking the vehicle and venturing into this environment, the odour itself stopped me in my tracks. The shoreline was littered with dead fish and birds and human objects in varying stages of decline, all of which were covered with a dusty white mixture of salt and dried mud. Once I had adjusted to the initial shock of this environment, I

⁴²² The Salton Sea Authority. "A Brief Description of Its Current Conditions, and Potential Remediation Projects." Accessed August 10 2015, <http://www.sci.sdsu.edu/salton/Salton%20Sea%20Description.html>

⁴²³ Troy Paiva, "Lost America: The Salton Sea." Accessed September 2015, <http://lostamerica.com/photo-items/the-salton-sea/>

proceeded to record the indexical signs of the human and nonhuman that now littered Bombay Beach. As noted in my journal entry on page 56, I became transfixed with the numerous objects scattered throughout this landscape: rusty metal objects sticking out of the ground, wooden refuse from dilapidated buildings, sections of concrete slab, plastic bags entangled and flapping in dead bushes, and a lone broken piano.

At the time of the first field recording, I had not yet researched the theoretically and philosophical positions of Jane Bennett and Timothy Morton. However, this experience at the Salton Sea motivated me to find ways to identify and engage with the feeling of strangeness that surfaced while recording in this location. For example, objects I would normally ignore transfixed me and I felt compelled to record them; for example, rusty pipes or a plastic bag flapping in a dead bush. During the first field recording, I responded and recorded accordingly. However, after engaging with Bennett's "thing-power" and Morton's *Dark Ecology*, I was able to consider the effects these objects had upon me, which in turn informed the second Salton Sea field recording that took place in December 2015.

Bennett's development of "thing-power" from her chance encounter with a "glove-pod-rat-cap-stick"⁴²⁴ resonated with my chance encounter with the objects found at Bombay Beach and in turn influenced the direction of my research and the outcomes of the practice. As Bennett says: "Thing-power gestures toward the strange ability of ordinary, man-made items to exceed their status as objects and to manifest traces of independence or aliveness, constituting the outside of our own experience."⁴²⁵ Thus, the objects found at Bombay Beach had "a certain effectivity of their own, [an] irreducible degree of independence from the words, images, and feelings they provoke in us."⁴²⁶

These objects, or indexical signs of what Morton describes as hyperobjects, evoked a feeling of strangeness (weird-weirdness)⁴²⁷ that remained throughout the field recordings, and would subsequently influence the pathways of practice that emerged. Accordingly, Morton's *Dark Ecology* project offered ways to consider

⁴²⁴ Bennett, "The Force of Things: Steps toward an Ecology of Matter," 350.

⁴²⁵ Bennett, *Vibrant Matter: A Political Ecology of Things*, Loc 218.

⁴²⁶ Ibid.

⁴²⁷ Morton, *Dark Ecology: For a Logic of Future Coexistence*, Loc 155.

the ambiguity and uncanniness of this environment. There was much to be gained in embracing the “weird-weirdness” of this situation as it offered an intimacy with a multitude of life forms and objects and the entanglement of the mesh⁴²⁸ — including the negativity, irony and ugliness.⁴²⁹

Of the locations explored during my research, Bombay Beach was the only place I returned to. As noted, the first field recordings occurred in July 2014, and the second in December 2015. Because of this, and because it was the last work explored for my research, *Piano at the End of a Poisoned Stream* emerged from a process that negotiated all the *making-doing-thinking-feeling* pathways of practice *alongly* travelled. To this effect, the final installation benefitted from all the moments of connection made during my researching—in practice and thought.

When I started working with the audiovisual material from Bombay Beach, I envisioned three separate installations titled *In the Flicker*, *Lines* and *Piano at the End of a Sympoetic Stream*. Each work began by exploring different location subjects including water (Figure 60), birds in flight (Figure 61) and the broken piano (Figure 62). As my research progressed, however, it seemed appropriate to blend these works into one larger installation. Consequently, I found the multi-layered complexity of this environment was better expressed, as each component was nested in the mesh of the work.

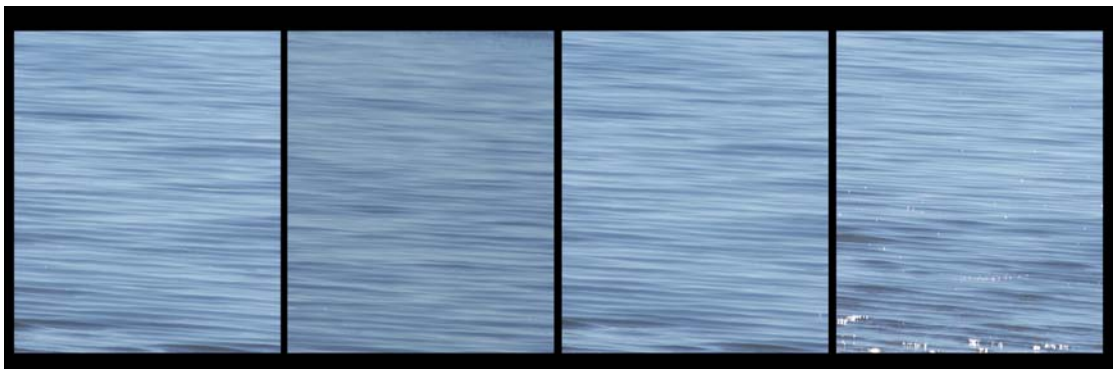


Figure 60. *In the Flicker*.

⁴²⁸ Morton, *The Ecological Thought*, 15.

⁴²⁹ *Ibid.*, 17.



Figure 61. *Lines.*



Figure 62. *Piano at the End of a Sympoetic Stream.*

To combine these elements, I reconsidered the placement of each component within the gallery space. The four-panel water projection (Figure 60) remained as is and was projected on a large fabric screen along the back wall. The piano videos were individually routed to three 42-inch TV monitors and positioned on the floor, while the bird footage was reduced to a single panel image and routed to two 20-inch monitors and separately onto six iPads positioned around the gallery (Figure 63). Apart from the iPad videos, each component was allocated to an individual Mac Book Pro laptop and coded to randomly select between a folder of videos: 14 in the water folder, 30 in the piano folder, and four in the bird folder. For the six iPads, I recorded a series of movies using the bird Max 7 patch using five additional videos, which included various bird flight pattern formations (Figures 64 and 65). These nine videos are then randomly selected during playback/record with the resulting videos successively loading onto an iPad.

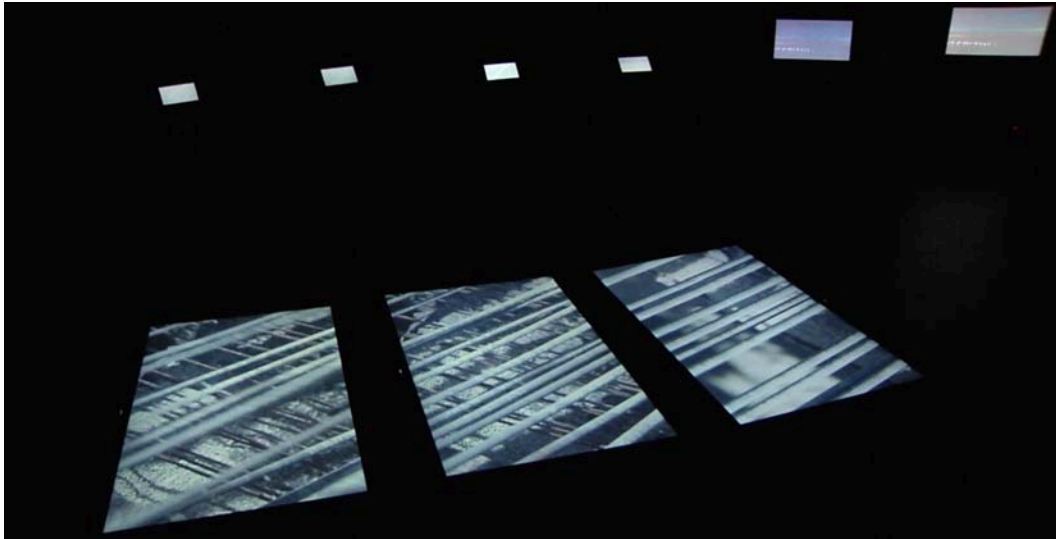


Figure 63. Waikato University gallery installation April 21, 2017.



Figure 64. Flight Patterns. Photo A. Denton.



Figure 65. Flight Patterns. Photo A. Denton.

Concerning the *In the Flicker* Max patch, there are two styles of video footage; the clear blue water image (Figure 60) and more abstract water footage I call ‘the sparkles’ (Figure 66). The ‘sparkle’ footage contains blown out sun-on-water reflections plus one industry-in-the-distance image (Figure 67). The patch is coded to randomly select between 8 clear blue water videos and 6 ‘sparkle’ videos. As illustrated in Figure 69, the selection for each panel is unique to the two styles of video footage. For example, if the initial random number is between 0–7 the video selection for each panel will be chosen from the 8 clear blue water video; otherwise the selection is made from the 6 ‘sparkle’ videos. I also coded a functionality on the fade-in and cross-dissolve times for each of the four video players (Figure 69).

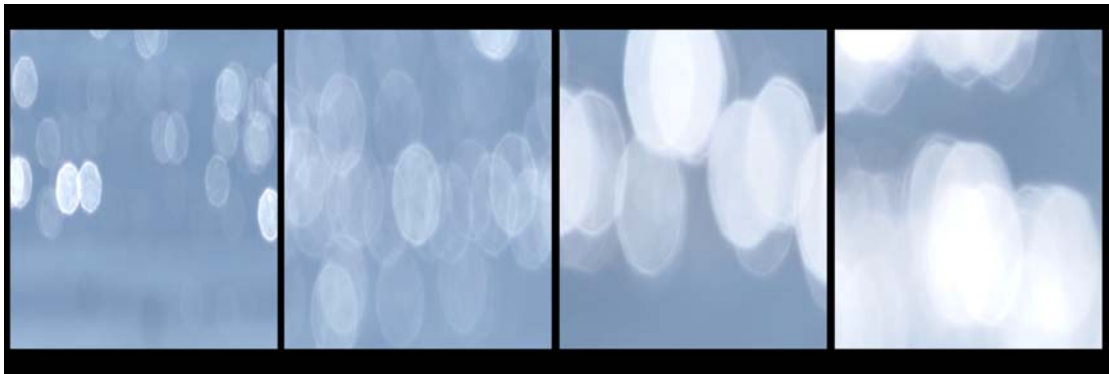


Figure 66. The ‘sparkles’ footage.



Figure 67. Industry-in-the-distance. Photo. A. Denton.



Figure 68. The 'sparkles' with industry.

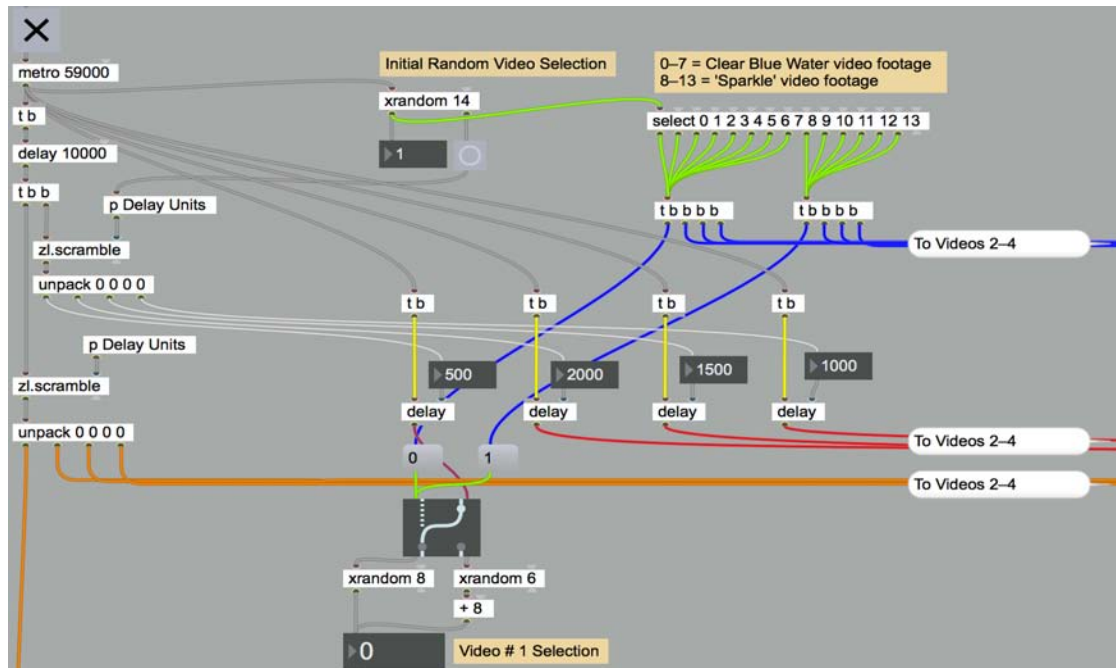


Figure 69. Video selection device.

The *Piano at the End of a Poisoned Stream* visual footage was recorded using a similar process to that for *Flight Variant*. Denton shot at 200 frames per second, which causes a slowing down process that draws out visual elements that would not otherwise be captured in normal mode.⁴³⁰ For example, the close-up footage of the burnt piano strings, captured at 200 frames per second, draws out subtle movements in the shadows of the strings. For me, this footage is very hypnotic beautiful and disturbing, and becomes a transformative element in the installation. Similarly, the blue water footage and birds in flight were captured at 200 frames per second using an 800mm lens. Specific to “the sparkles” water footage (Figure 66), Denton states that this method of capture enabled him to “isolate certain elements of the frame that can be in focus and others that

⁴³⁰ Denton, "Cinematic Affect in a Time of Ecological Emergency", 58.

aren't."⁴³¹ Additionally, Denton overexposed the sun, "so it's blowing out on the chip which gives it an intense abstraction."⁴³² For me, (via Manning and Massumi) combining these three elements into the final installation—the water, birds and piano—enabled the complex polyphony of this ecology to be explored.

In the Flicker, *Lines* and *Piano at the End of a Sympoetic Stream* were coded to use computer vision as a co-creative device. *In the Flicker*, like *Undercurrent* and *Cathedral*, used the sudden changes of sunlight on the water as a triggering device. *Lines* and *Piano at the End of a Sympoetic Stream* used the motion of the birds and piano strings respectively. When I first combined these three works into one, I considered using all triggering devices to influence the sonic layer. In the end, I elected to use three of the four birds in flight footage as the triggering device (Figure 70). I made this choice while listening to a selection of the audio recorded at Bombay Beach. There is an element of improvisation in the way I plucked and played many of the objects found in this environment, particularly the burnt piano (Figure 71). Consequently, these audio samples contain musical phrases based on this human-object-environment interaction.⁴³³ It was these musical phrases, coupled with the phrasing of the birds in flight, which motivated me to select this patch as the solo-triggering device for the sonic component.

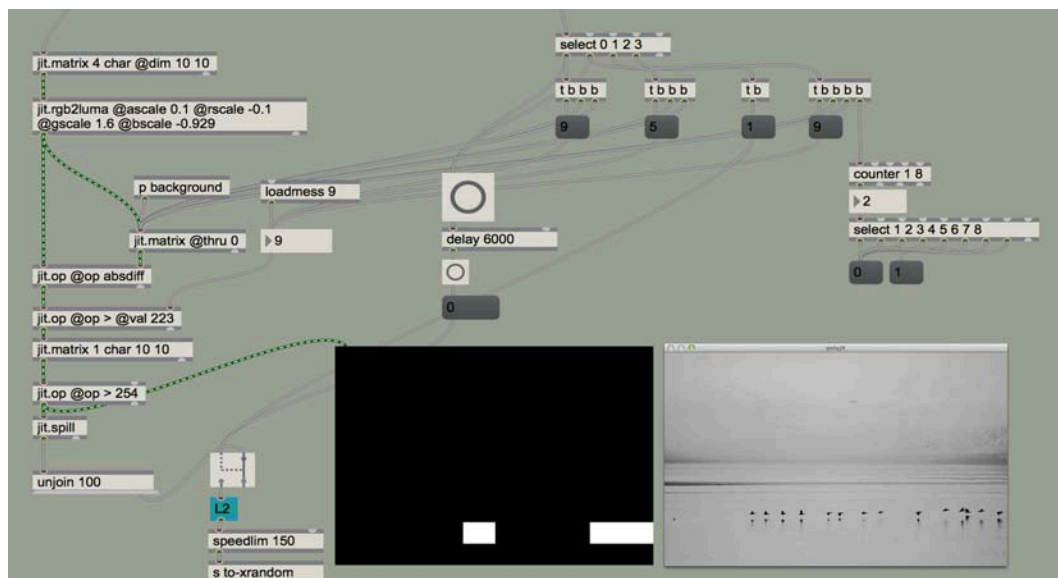


Figure 70. Bird Max patch computer vision.

⁴³¹ Andrew Denton, "Personal Communication," (2015).

⁴³² Ibid.

⁴³³ From a sonic arts perspective, Matthew Burtner defines this sort of human-environment interaction as EcoSon.



Figure 71. Playing the burnt piano. Photo. A. Denton.

I recorded a significant number of field recordings and human-object improvisations at Bombay Beach. Given the various methods of recording sound—using contact microphones, hydrophone, AMT M40 piano microphone system and two-channel panned shotgun microphones—an alternate field of sonic material was captured that, for me, shifts the temporal perspective of this environment. The final installation thus includes elements from all sonic fields, all triggered by the birds in flight footage. Additionally, in my attempt to find agential and co-creative devices from this situated encounter, I sonified historical graphs⁴³⁴ of the salinity in the Salton Sea and the changes of fish biomass (Figures 72 and 73). Using the 'Image Synth' functionality in the program MetaSynth, these images were translated into sonic motifs in conjunction with a sampler instrument containing sounds recorded from the burnt piano; the result being a pitch shift phrasing based on the graphs.

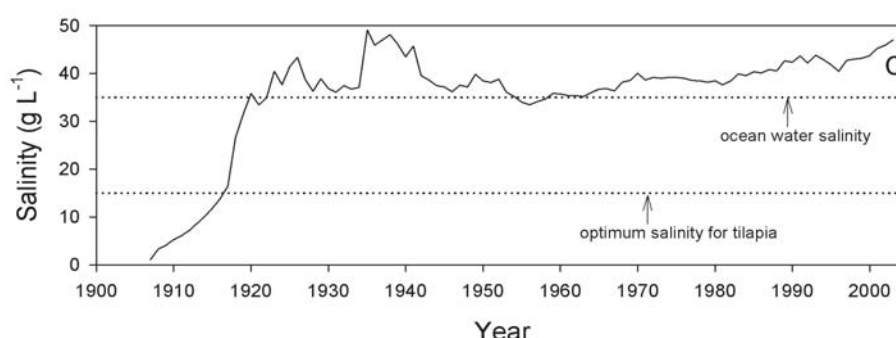


Figure 72. Salton Sea salinity graph.

⁴³⁴ Allen H Hurlbert et al., "Fish and Fish-Eating Birds at the Salton Sea: A Century of Boom and Bust," *Lake and Reservoir Management* 23, no. 5 (2007).

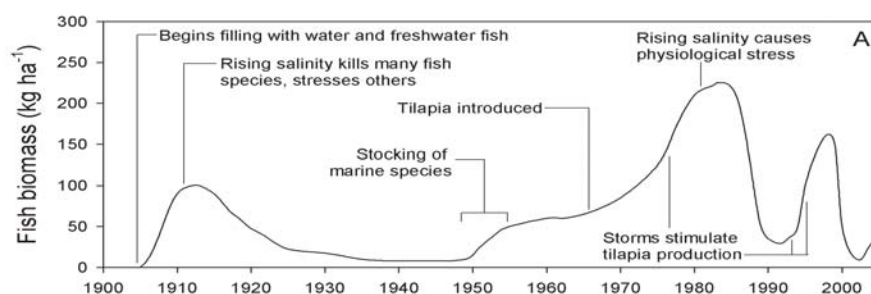


Figure 73. Salton Sea fish biomass graph.

The last sonic aspect of *Piano at the End of a Poisoned Stream* included convolution using the program SoundHack. For this process, I selected a water impulse that was recorded at the Salton Sea to convolve with a number of the burnt piano improvisations. In the end, the number of audio samples available for triggering by the birds in flight footage was 80. The lengths of these audio files vary considerably because of the different methods of interaction and recording. The result is an oscillation of environmental sounds and improvisations moving from foreground to background depending on the random triggering functionality. Because of this, and with the other components of the work, the final non-linear installation (Figures 74–76) moves through different temporal perspectives and, for me, evokes the weird weirdness (via Morton) of this environment: “a turn or twist or loop, a turn of event. [...] [the] *strange of appearance*, [...] [that] flickers a dark pathway between causality and the aesthetic dimension, between doing and appearing [...].”⁴³⁵

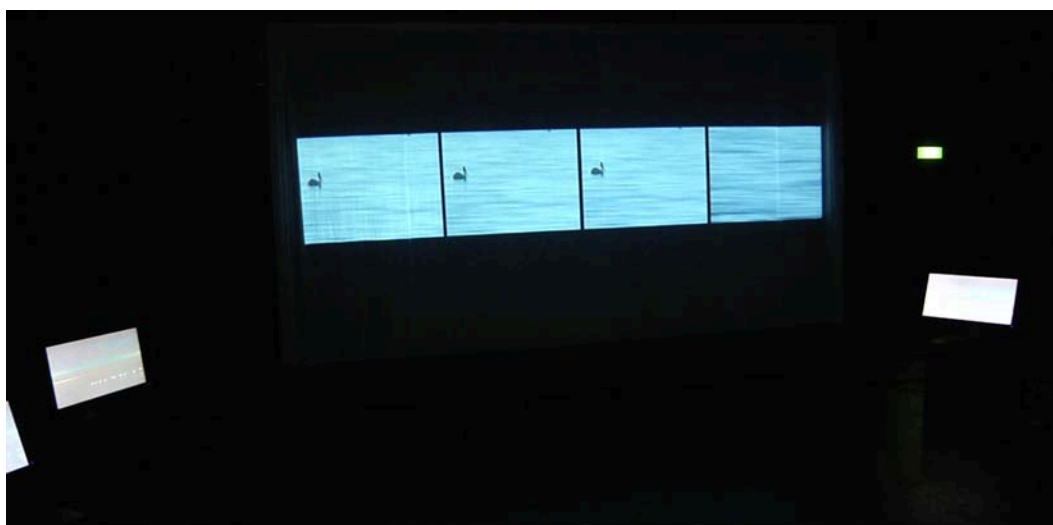


Figure 74. Waikato University gallery installation. April 21, 2017.

⁴³⁵ Morton, *Dark Ecology: For a Logic of Future Coexistence*.

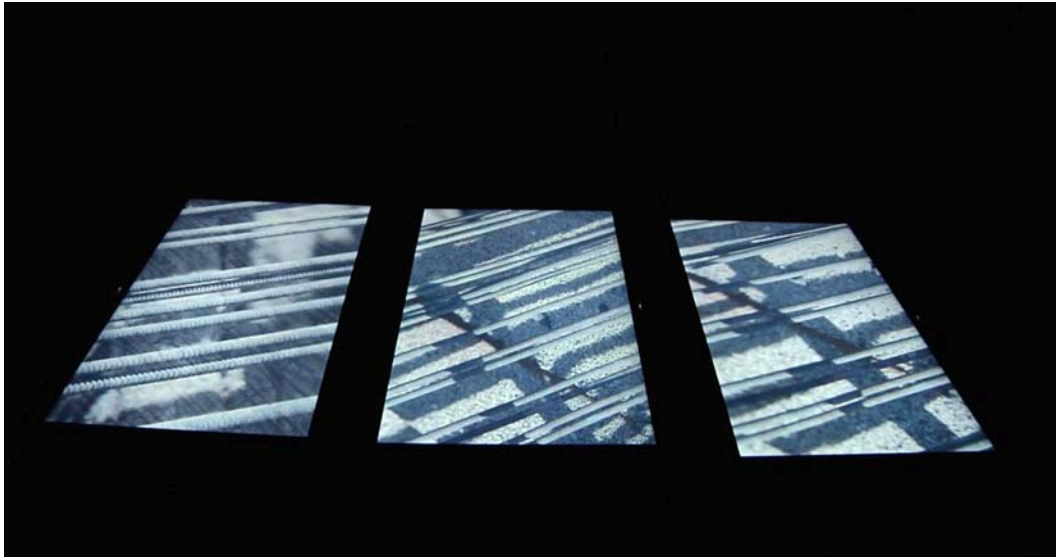


Figure 75. Waikato University gallery installation. April 21, 2017.

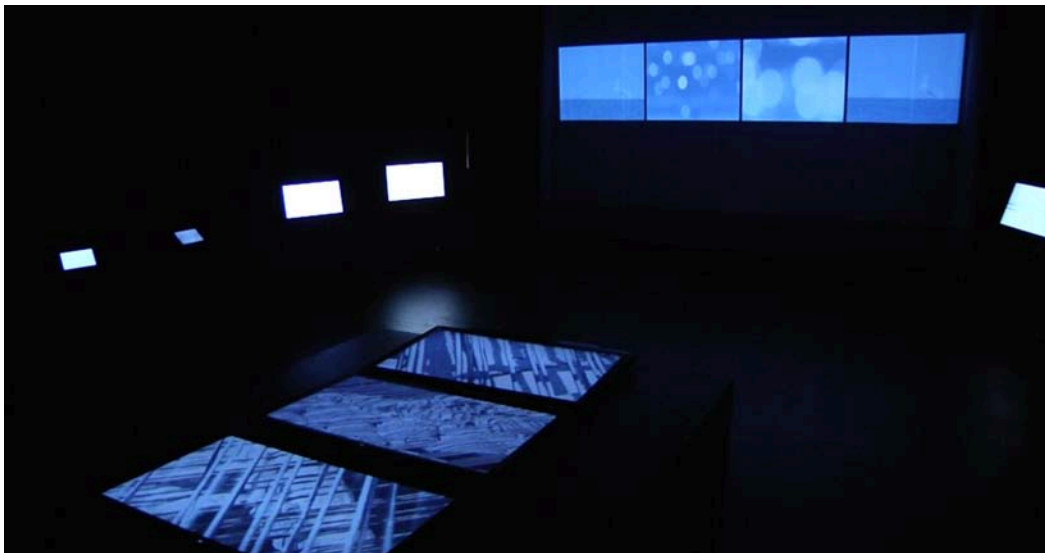


Figure 76. Waikato University gallery installation. April 21, 2017.⁴³⁶

⁴³⁶ For the documentation photos (Figure 74–76), it was necessary to use filters due to the changing lighting conditions, hence the image colours have altered from the original work.

6. *ALONGLY* INTEGRATED

*"[It] seems to be an implicit desire by individuals to integrate their sonic creativity within the broader social, cultural and ecological context of today's world."*⁴³⁷

Barry Truax

To be true to my research intentions, I have called this summation *alongly* integrated rather than a conclusion. Since my creative works and thinking in the making procedures progressed in moments of emergence—and out of the various conditions, influences and knowledges—this chapter is a part of the interwoven narrative and evolving meshwork.

I began writing this chapter when a recent edition of *Organised Sound* 22, no. 1 was published. Barry Truax, the issue coordinator, called for submissions that considered context-based composition as a method of practice. An aim of this issue was to survey contemporary and emerging practices in the field. As Truax notes, the response to the call was “overwhelmingly positive”⁴³⁸—so much so that a second edition was put in place.

In the editorial, Truax posed the question: “Do I dare hope that many of today’s practitioners, both emerging and professional, are not content to reside in a musical ‘ivory tower’, but would like to reach a wider audience and feel that their skills have some social value both within and outside the purely artistic world?”⁴³⁹ My answer is “yes.” My more complex and subjective answer is that the musical ‘ivory tower’ is one form of human exceptionalism which conceptualises creativity as an anthropocentric mental regurgitation—and usually one based on a male, European, and genius paradigm. The result, I believe, is a disembodied and romantic idea of creativity placing human activity above or outside the world. Also, it is made a problem by the theoretical and philosophical positions of the researchers I have explored during my research. As Haraway notes, human exceptionalism is “literally unthinkable in the best scientific

⁴³⁷ Barry Truax, "Editorial," *Organised Sound* 22, no. 1 (2017): 1.

⁴³⁸ Ibid.

⁴³⁹ Ibid.

practices of our day [and] unthinkable across the transdisciplinary natural and engineering sciences, the human sciences and arts.”⁴⁴⁰

In response to Truax’s call for submissions, Andrew Denton and I co-authored our paper “*In Environments: The convergence and divergence of practice*.”⁴⁴¹ We took this opportunity to reflect on our history of collaborative audiovisual practice that, since 1997, has been embedded in the context of different environments. For me, the process of co-authoring this paper was a prelude to my PhD research as Denton and I focused on the convergence and subsequent divergence of our collaborative practice, which occurred during the making of *Aspects of Trees*. As noted in the Early Pathways of Practice section of my dissertation (pages 33–39), while making *Aspects of Trees* my move towards non-linear creative systems began, which was the springboard into my PhD research.

What I envisioned when embarking on my dissertation was an inquiry into non-linear creative processes to find new pathways in artistic practice. This was motivated by my interest in engaging the agency of material gathered from the different environments and exploring the creative tendencies that might emerge when the linear trajectory of fixed-media formats was suspended. My research was guided by the belief that non-linear creative processes that explore co-creative devices from the agency of material could elicit different sensibilities and modes of communication, providing an alternative method to be in creative practice and experience the world.

To this effect, the audiovisual installations contained in my dissertation provided a way to contemplate in practice the different agential and performative possibilities that are at work in any given environment, be it an airport, a forest, or a polluted waste land. By combining the techniques of computer vision, sonification and convolution, “processes of emergence”⁴⁴² were foregrounded as a method of artistic practice. Moreover, folding in musical improvisations in response to these systems, and which the material then triggers, resulted in

⁴⁴⁰ Haraway, “Staying with the Trouble: Symptomatology, String Figures, Multispecies Muddles”.

⁴⁴¹ Connors and Denton, “*In Environments: The Convergence and Divergence of Practice*.”

⁴⁴² Pickering, “Art and Agency,” 18.

original non-linear audiovisual installations that oscillate sonically, visually, and texturally in a meshwork of situated emergence.

In this mode of artistic practice the performative aspect of people, places, and things moved in a “dance of agency” (via Pickering) that explored co-creative processes to tease out these emergent paradigms of expressions. What I encountered in my research was that with attentiveness to these “intra-actions” (via Barad), diverse temporalities are enfolded into the practice, which draws forward different patterns of relationships. These relationships are unpredictable and required that I adopt a more open-ended comportment to the effects and capacities available in the environments and with the materials (via Bennett). Consequently, I found that an aesthetic developed, one that does not operate in the mainstream anthropocentric notion of creativity⁴⁴³ but rather emerges by intersecting with forces other than those of human design. These forces also included the “dark-depressing” and “dark-uncanny” (via Morton) out of which an alternative form of ecological awareness emerged. This aligned with the position of my practice in that the move towards non-linear systems began to redeploy my relationships with the encounters in the field and in my creative research. The installations then emerged out of a process of entangled “intra-actions” in the different environments and with the different materials and, in turn, became a luring towards movement and pressure (Stengers via Haraway).

To support my research, I was drawn to critical, theoretical, and philosophical discourses that broadened my ideas on agency and the performative, which provided different vocabularies with which to be in creative practice. Accordingly, I began to contemplate my artistic process as an ecologically performative act. I was inspired by the way that these others were thinking and writing about human and nonhuman agency and making human exceptionalism problematic. These discourses aligned with my subjective belief in interconnectivity (pages 18–22) and my concerns about the purpose of an art form relationally situated in time and place. So, from the core of practice, I began the task of considering my creative research in line with these thinkers and, as such, the concept of Ecological Performativity emerged.

⁴⁴³ Keller and Lazzarini, “Ecologically Grounded Creative Practices in Ubiquitous Music,” 61.

My artistic focus shifted from a controlled (me) process to one of an ecology of practice, where the gesture of creativity and the artefacts that emerged were “produced by the relationship of relevance between the situation and the tool.”⁴⁴⁴ Restating van Dooren: “the specificity and proximity of connections matter—*who we are bound up with and in what ways*.”⁴⁴⁵ Through my shift to a non-linear praxis, the creative practice became more of an entangled co-creative process *in* the environments and *with* the materials. So, it has to do with the context of each work (echoing Truax) and being *in* differences (via Tsing), which in turn informed the pathways of practice and elements that were placed into the installation system.

Audiovisual Installation as Ecological Performativity thus contributes to research, an artistic *making-doing-thinking-feeling* creative practice that supports and broadens the emerging discourses on material agency, meshwork and “ecologically grounded creative practices.”⁴⁴⁶ Additionally, it evidences in practice and process an alternative vocabulary; what Truax denotes as an integration of creativity within the broader issues of today’s world. Ecological Performativity inhabits a multimodal method that does not attempt to fit neatly into a singular understanding or template; but rather, consciously takes account of the complexities, possibilities and interwoven threads of the entangled mesh.

Thus, my original contribution to the field of research is a practice-based methodology that sets up a new figuring to consider creativity as a co-creative activity. By using a specific range of processes to tease out these co-creative devices from the situated encounters in different environments—computer vision, sonification, convolution and improvisation—the creative act and resulting artefacts become multilayered “intra-actions” between people, places, and things. Therefore, the overt non-linearity of my ecology of practice contributes a thinking-in-the-making procedure that values a non-reductive process, and opens alternative possibilities and challenges. Consequently, an aesthetic based on processes of emergence has evolved. My practice-based research could be used for further inquiries into non-linear processes for creative research as it invites a

⁴⁴⁴ Stengers, “An Ecology of Practices,” 185.

⁴⁴⁵ van Dooren, *Flight Ways*, 108.

⁴⁴⁶ Keller and Lazzarini, “Ecologically Grounded Creative Practices in Ubiquitous Music,” 64.

broad perspective in the thinking and making procedures, from which other lines of wayfaring could emerge: as a “movement of self-renewal or becoming.”⁴⁴⁷

From an artistic viewpoint, being *in* and *with* these processes of emergence is my original contribution to research, out of which came the non-linear audiovisual installations *Flight Variant*, *Undercurrent*, *Cathedral*, and *Piano at the End of a Poisoned Stream*. These works represent an original contribution in the particular pathways of practice *alongly* travelled, as demonstrated in the portfolio section of my dissertation. Each installation evidences the different sensibilities, performative patterns of relationships and interwoven qualities of our material world with us in it and within it, which gives rise to different configurations in practice. My artistic practice has altered conclusively because of my PhD research. My relationship to a non-linear praxis was strengthened with regard to the worth of loosening-up (my) human-centric control over the final artefact, and the worth of suspending the linear trajectory of fixed media formats. I am surprised by what occurs when experiencing these installations.

Looking Forward

Towards the end of my PhD research, I was hired as the creative Max 7 coder for the audiovisual installation *The Organ Music*. This large-scale project was a collaboration with New Zealand composer Martin Lodge and Medtech Core for their Silo 6 exhibition (Figure 77) from October 28 – November 6, 2016.⁴⁴⁸ This interactive exhibition was New Zealand’s first ever medical technology showcase opened to the public and included pre-scheduled daily participation by many primary schools in the Auckland area (Figures 78 and 79). Working as a creative coder with Lodge and Paul Roberts from Medtech Core, we created a four-station music and visual installation, where the heart, lungs and muscles of the gallery visitors influenced the work (Figures 80–82). This occurred by hooking the participant up to medical sensors, where the readings determined what happened. The sensors sent data to four linked computers, which made changes to the audiovisual components.

⁴⁴⁷ Ingold, *Lines: A Brief History*, 116.

⁴⁴⁸ MedTech Core, “MedTech Outreach Project @ Silo6,” accessed January 20, 2017, <https://www.cmdt.org.nz/event/medtech-outreach-project-silo6>; Auckland Biotech Institute, “In photos: MedTech Changing the Face of Medicine,” accessed January 20, 2017, <http://www.abi.auckland.ac.nz/en/about/news/articles/2016/silo6-launch-school-events-photos.html>

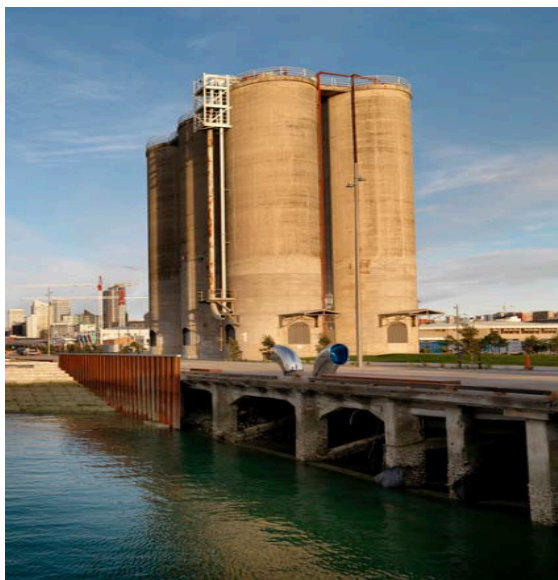


Figure 77. Silo 6, Auckland, NZ.



Figure 78. Primary school kids.

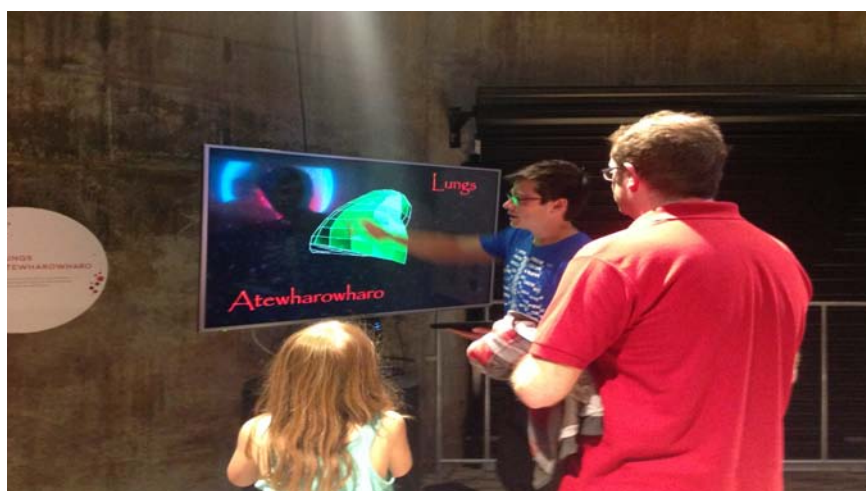


Figure 79. Visitors to *The Organ Music* lung station.

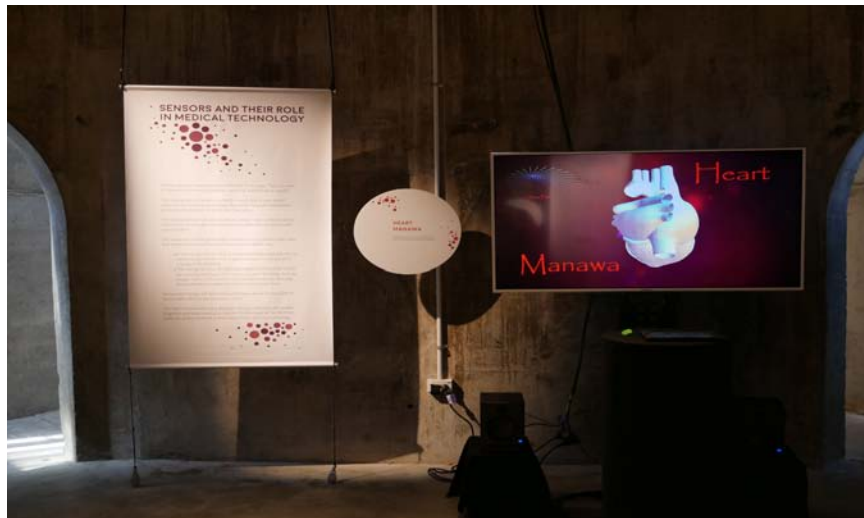


Figure 80. *The Organ Music* heart station. (Photo M. Lodge)

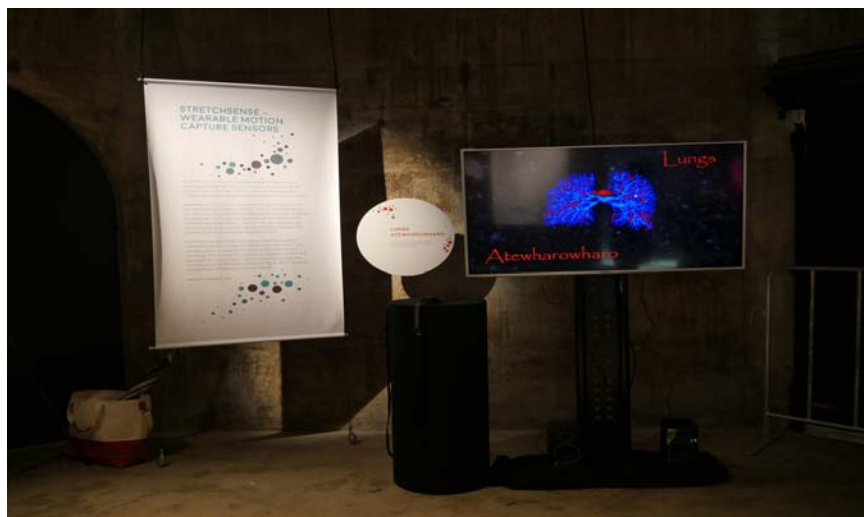


Figure 81. *The Organ Music* lung station. (Photo M. Lodge).



Figure 82. *The Organ Music* muscle station with Dr Lodge. (Photo G. Pittaway).

From this experience, I began to consider how to layer an additional “intra-action” into my non-linear audiovisual installations. I had in fact begun this research while making *Piano at the End of a Poisoned Stream*. During the second field recording trip to Bombay Beach, I collected two bass note piano strings from the burnt piano and began constructing an Arduino device whereby the plucking of the strings by a gallery visitor would alter aspects of the installation. In this case, I decided not to implement this device into the final installation; however, the idea was filed away for future research.

While research in interactive systems is not overly new, more creative inquiry—rather than technological—can be done with regards to the affective qualities that interaction can have in a non-linear system. To this effect, I would consider the development of the interactive non-linear audiovisual installations as improvisational systems. With improvisation already a component of Ecological Performative, expanding the tools of improvisation to gallery visitors would provide an additional layer of co-creative forces and alter how the non-linear audiovisual installations might be experienced. Additionally, I would explore different materials to install the audiovisual works. For example, I would experiment with custom made and flexible display materials, such as NanoLumens⁴⁴⁹, to create three-dimensional installations. The work can then function as a sculpture rather than confined to flat screens and square framed projections, which would encourage a different engagement with the artefact. For the sonic component, I am interested in building multi-speaker arrays that are influenced by the material engagement in the different environments.

Moreover, I would situate my research in specific environments for longer periods of time, rather than the ‘non-programmed’ approach used for my PhD research. While this process of ‘non-programmed’ was useful for being in the process of *organising for emergence*; situating my future research in specific environments for extended time periods would allow for a more thorough engagement with that encounter. Accordingly, I would consider ecologies where streamed Internet data could be enlisted more thoroughly as a co-creative device in the non-linear audiovisual improvisational system. These choices would be made prior to any field recording procedure.

⁴⁴⁹ <http://www.nanolumens.com>

To support this line of inquiry, I would consider the theoretical position of Natasha Myers and Carla Hustak's *Involuntary Momentum: Affective Ecologies*⁴⁵⁰ in relation to interactive non-linear audiovisual improvisational systems. This would require in-depth research on my part into evolutionary theories and the biological phenomenon of symbiosis from a practice-based creative methodology.

A Final Note

It would be impossible to ignore the escalation of the crisis that has occurred in the world since I started my research in November 2013. The United States now has Donald Trump as President; the number of people being displaced and forced into refugee status has escalated; more people die from suicide each year (800,000) than from conflicts, wars and natural disasters and suicide is “the second leading cause of death among 15–29 year-olds globally;”⁴⁵¹ and the number of animals that are listed to go extinct in 2017 has increased.⁴⁵² The philosopher Jason Silva describes the current human condition as a state of “soul sickness;”⁴⁵³ Fritov Capra calls it a “crisis of perspective;”⁴⁵⁴ while Rob Nixon claims it to be a kind of “slow violence.”⁴⁵⁵

For me then, it is only through creative practice I have the ability to be *in* the world on a level that feels connected and truthful to the things I care about—a sentiment shared by other creative practitioners.⁴⁵⁶ The alternative, as Haraway describes, is “the temptations to cynicism or defeatism, to despair, to various forms of avoidance and denial.”⁴⁵⁷ Operating in such entangled configurations from the core of creative practice:

⁴⁵⁰ Hustak and Myers, "Involuntary Momentum: Affective Ecologies and the Sciences of Plant/Insect Encounters."

⁴⁵¹ World Health Organization, "Suicide Data." Accessed April 30 2017, http://www.who.int/mental_health/prevention/suicide/suicideprevent/en/

⁴⁵² Joe Shute, "Extinct: Which Animals Could We Lose Forever in 2017?," *The Telegraph*, January 1, 2017.

⁴⁵³ Jason Silva, "Why Are We So Sad?" Accessed April 30 2017, www.facebook.com/jasonsilva/videos/1842849992645944/

⁴⁵⁴ Capra and Luisi, *The Systems View of Life: A Unifying Vision*, xi.

⁴⁵⁵ Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge, Mass: Harvard University Press, 2011). I am indebted to Thom van Dooren's *Flight Ways* for this quote.

⁴⁵⁶ Crystal Pite, "My Way of Coping with the World at the Moment – Crystal Pite on Flight Pattern." Accessed March 23 2017, www.youtube.com/watch?v=9tSBkT9AFWA

⁴⁵⁷ Haraway, "Staying with the Trouble: Symptomatology, String Figures, Multispecies Muddles".

the nature/culture dualism implodes and we're all repositioned as participants in lively ecologies of meaning and value, entangled within rich patterns of cultural and historical diversity that shape who we are and the ways in which we are able to 'become with' others.⁴⁵⁸

The non-linear audiovisual installations developed during my research and the pathways of practice travelled in the *making-doing-thinking-feeling*, are my creative response (and response-ability) to the concerns and questions that have emerged along the way—by perceiving “*in the everyday: a thinking of the world's varied ways of affording itself*.”⁴⁵⁹

⁴⁵⁸ Thom van Dooren, "Life at the Edge of Extinction: Spectral Crows, Haunted Landscapes and the Environmental Humanities," *Humanities Australia* 5, (2014).

⁴⁵⁹ Manning and Massumi, *Thought in the Act: Passages in the Ecology of Experience*, Loc 1241.

BIBLIOGRAPHY

- Airport Council International. "Airport Council International: The Voice of the World's Airports." Accessed October 10, 2016. <http://www.aci.aero/Data-Centre/Monthly-Traffic-Data/Aircraft-Movements/12-months>
- Alary, Bryan, "Fort McMurray Blaze among Most 'Extreme' of Wildfires: Researcher." Accessed July 12, 2016, <http://www.rr.ualberta.ca/en/RenewableResourcesNews/2016/May/FortMcMurrayblazeamongmostextreme.aspx>
- Ascott, Roy. "Cybernetics - Letter to the Editor." *Studio International* 176, no. 904 (1968): 8.
- "Balance-Unbalance." Accessed January 5, 2015, <http://www.balance-unbalance2015.org>
- Barad, Karen. "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter." *Signs: Journal of Women in Culture and Society* 28, no. 3 (2003): 801–831.
- Barad, Karen. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham, NC: Duke University Press., 2007. Kindle.
- Barad, Karen. "Quantum Entanglements and Hauntological Relations of Inheritance: Dis/Continuities, Spacetime Enfoldings and Justice-to-Come." *Derrida Today* 3, no. 2 (2010): 240–268.
- Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham & London: Duke University Press., 2010. Kindle.
- Bennett, Jane. 2011. "Powers of the Hoard: Artistry and Agency in a World of Vibrant Matter," The Vera List Center for Art and Politics, accessed June 06, 2016, <https://vimeo.com/29535247>
- Bennett, Jane. "Systems and Things. On Vital Materialism and Object-Oriented Philosophy." In *The Nonhuman Turn*, edited by Richard Grusin, 223–240. Minneapolis: University of Minnesota Press, 2015.
- Bennett, Jane. "The Force of Things: Steps toward an Ecology of Matter." *Political Theory* 32, no. 3 (June, 2004): 347-372.
- Billing, Jim, "Boeing Current Market Outlook 2014–2033." Accessed December 1, 2014, http://www.boeing.com/assets/pdf/commercial/cmo/pdf/Boeing_Current_Market_Outlook_2014.pdf
- Billing, Jim, "Boeing Current Market Outlook 2016–2035." Accessed January 28, 2017, http://www.boeing.com/resources/boeingdotcom/commercial/about-our-market/assets/downloads/cmo_print_2016_final_updated.pdf

"A Brief Description of Its Current Conditions, and Potential Remediation Projects."
Accessed August 10, 2015, [http://www.sci.sdsu.edu/salton/Salton Sea
Description.html](http://www.sci.sdsu.edu/salton/Salton%20Sea%20Description.html)

Brinkman, Dirk. "Editorial." *Silverculture Magazine* Spring, (2012).

Broad, C.D. *The Mind and It Place in Nature*. New York: Harcourt, Brace & Company, INC., 1925.

Bryant, Levi R. "Phenomenon and Things: Barad's Performative Ontology." *RHIZOMES* 30, (2016).

Butler, Judith. 2014. "When Gesture Becomes Event," Theater Performance Philosophy – International Conference, accessed May 19, 2016, <http://www.youtube.com/watch?v=iuAMRxSH--s>

Campbell, Richard, "Finding Patterns in the Redwoods: It's Easy as 1, 1, 2, 3..." Accessed September 5, 2016, <http://www.savetheredwoods.org/blog/wonders/finding-patterns-in-the-redwoods-its-easy-as-1-1-2-3/>

Candy, Linda, "Practice Based Research: A Guide." University of Technology Accessed June 1, 2013, [https://www.creativityandcognition.com/resources/PBR Guide-1.1-2006.pdf](https://www.creativityandcognition.com/resources/PBR%20Guide-1.1-2006.pdf)

Capra, Fritjof. *The Web of Life*. New York: Doubleday, 1996.

Capra, Fritjof and Pier Luigi Luisi. *The Systems View of Life: A Unifying Vision*. Cambridge, MA: Cambridge University Press, 2014.

Connors, Teresa. "Multimedia Collaboration as Art Practice." Master's thesis, The University of Waikato, 2013.

Connors, Teresa and Andrew Denton. "In Environments: The Convergence and Divergence of Practice." *Organised Sound* 23, no. 1 (forthcoming).

Cox, Christoph. "Beyond Representation and Signification: Toward a Sonic Materialism." *Journal of Visual Culture* 10, no. 2 (2011): 145-161.

Denton, Andrew. "Personal Communication." 2015.

Denton, Andrew. "Cinematic Affect in a Time of Ecological Emergency." Monash University, 2016.

Denton, Andrew. *Crude*. High Definition Video. Monash University Art Gallery, 2016, 2016.

Denton, Andrew. "Personal Communication." 2016.

Di Scipio, Agostino. "The Politics of Sound and the Biopolitics of Music: Weaving Together Sound-Making Irreducible Listening, and the Physical and Cultural Environment." *Organised Sound* 20, no. 3 (2015): 278–289.

- Domnitch, Evelina and Dmitry Gelfand. "Mesoscopic Phenomenology." In *The Vibrancy Effect*, edited by Chris Salter, Harry Smoak and Michel van Dartel, 22–26. Rotterdam: NAI Publishing, 2012.
- DuBois, Luke, "Hard Data." Accessed December 10, 2016, <http://lukedubois.com>
- DuBois, Luke, "Hard Data and Hindsight: Interview with R. Luke Dubois." Accessed December 10, 2016, <http://idiommag.com/2010/08/hard-data-and-hindsight-interview-with-r-luke-dubois/>
- DuBois, Luke, "In the News: R. Luke Dubois at the Ringling." Accessed December 5, 2016, <http://www.ringling.org/events/r-luke-dubois-now>
- DuBois, Luke. 2016. "Insightful Human Portraits Made from Data," accessed January 12, 2017, http://www.ted.com/talks/r_luke_dubois_insightful_human_portraits_made_from_data
- Dudas, Richard. "'Comprovisation': The Various Facets of Composed Improvisation within Interactive Performance Systems." *Leonardo Music Journal* 20, no. 1 (Winter, 2010): 29–31.
- Dunn, David. *Why Do Whales and Children Sing?* Sante Fe, NM: Earth Ear, 1999.
- Dunn, David. "Nature, Sound Art and the Sacred." In *The Book of Music and Nature: An Anthology of Sounds, Words and Thoughts*, edited by David Rothenberg and Martha Ulvaeus, 95-107. Middletown, CT: Wesleyan University Press, 2009.
- Emmerson, Simon. "From Dance! To 'Dance': Distance and Digits." *Computer Music Journal* 25, no. 1 (2001): 13–20.
- Erbe, Tom, "Soundhack." Accessed December 28, 2016, <http://www.soundhack.com/freeware/>
- Farra, Ricardo Dal, "Breaking Paradigms: Electronic Arts & Humanitarian Actions." Paper presented at International Symposium on Electronic Art, Vancouver, Canada, August 14–19, 2015.
- "The Giant Sequoia of the Sierra Nevada: Introduction." Accessed January 27, 2017, http://www.nps.gov/parkhistory/online_books/science/hartesveldt/chap1.htm
- Green, Charles. *The Third Hand: Collaboration in Art from Conceptualism to Postmodernism*. Minneapolis: University of Minnesota Press, 2001.
- Greene, Brian, "What One Artist Learned About America from 19 Million Dating Profiles." Accessed January 15, 2017, <http://ideas.ted.com/what-one-artist-learned-about-america-from-19-million-dating-profiles/>
- Grusin, Richard, ed. *The Nonhuman Turn*. Minneapolis: University of Minnesota Press, 2015.

- Hamilton, Jilian. "The Voices of the Exegesis." In *Practice, Knowledge, Vision: Doctoral Education in Design*, edited by Ken Friedman and Lorain Justice. Hong Kong Polytechnic University, School of Design: Hong Kong, 2011.
- Haraway, Donna. 2014. "Staying with the Trouble: Symptoiesis, String Figures, Multispecies Muddles," Public lecture, University of Alberta, Edmonton, accessed March 24, 2016, <http://www.youtube.com/watch?v=Z1uTVnhIHS8>
- Haraway, Donna. "Anthropocene, Capitalocene, Chthulocene: Donna Haraway in Conversation with Martha Kenney." In *Art in the Anthropocene: Encounters among Aesthetics, Politics, Environments and Epistemologies*, edited by Heather Davis and Etienne Turpin, 255–270. London: Open Humanities Press, 2015.
- Haraway, Donna. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham: Duke Univeristy Press, 2016.
- Haraway, Donna and Anna Tsing. 2015. "Tunneling in the Chthulucene," *ASLE Conference*, University of Idaho, Moscow, accessed June 25, 2016, <http://www.youtube.com/watch?v=FkZSh8Wb-t8>
- Harker, Alexander and Pierre Alexandre Tremblay. "The Hisstools Impulse Response Toolbox: Convolution for the Masses." In *The International Computer Music Conference* 148–155. Ljubljana, Slovenia, 2012.
- Harris, Shannon. "To Taste the Ground." Montreal, Canada, 2014.
- Harris, Shannon "Personal Communication." 2015.
- Heidegger, Martin. "The Question Concerning Technology." In *Martin Heidegger: Basic Writings*, edited by D. Krell. New York: Harper & Row, 1977.
- Hermann, Thomas. "Taxonomy and Definitions for Sonification and Auditory Display." In *14th International Conference on Auditory Display (ICAD)*. Paris, France, 2008.
- Hermann, Thomas, Andy Hunt and John G. Neuhoff. "Introduction." In *The Sonification Handbook*, 1–6. Berlin, Germany: Logos Verlag, 2011.
- Hermann, Thomas, Andy Hunt and John G. Neuhoff, eds. *The Sonification Handbook*. Berlin, Germany: Logos Verlag, 2011.
- Højlund, Marie and Morten Riis. "Wavefront Aesthetics: Attuning to a Dark Ecology." *Organised Sound* 20, no. Special Issue 02 (2015): 249–262.
- Homan, Shane. "Collaboration: Creativity, Industry and Politics." *Musicology Australia* 33, no. 2 (2011): 153–163.
- "How Many Airplanes Fly Each Day." <http://www.quora.com/How-many-airplanes-fly-each-day-in-the-world>
- Hurlbert, Allen H, Thomas W. Anderson, Kenneth K. Sturm and Stuart H. Hurlbert. "Fish and Fish-Eating Birds at the Salton Sea: A Century of Boom and Bust." *Lake and Reservoir Management* 23, no. 5 (2007): 469–499.

- Hustak, Carla and Natasha Myers. "Involutionary Momentum: Affective Ecologies and the Sciences of Plant/Insect Encounters." *differences* 23, no. 3 (2012): 74–118.
- Ingold, Timothy. *Lines: A Brief History*. Abingdon, UK: Routledge, 2007.
- Ingold, Timothy. *Being Alive: Essays on Movement, Knowledge and Description*. London and New York: Routledge, 2011.
- International, Airport Council, "Airport Council International: The Voice of the World's Airports." <http://www.aci.aero/Data-Centre/Monthly-Traffic-Data/Aircraft-Movements/12-months>
- Johnson, Steven. *Emergence: The Connected Lives of Ants, Brains, Cities and Software*. London: Penguin Books, 2001.
- Johnson, Steven. *Where Good Ideas Come From: The Natural History of Innovation*. London: Allen Lane, 2010.
- Jordan, Chris, "Midway: Message from the Gyre." Accessed August 5, 2016, <http://www.chrisjordan.com/gallery/midway/#CF000668%2016x21>
- Jordan, Chris, "Midway: Message from the Gyre—About." Accessed August 5, 2016, <http://www.chrisjordan.com/gallery/midway/#about>
- Keller, Damián, "An Ecological Approach to Composition." Accessed March 12, 2016, <http://www.sfu.ca/sonic-studio/srs/EcoModelsComposition/EcoComp.html>
- Keller, Damián. "Compositional Processes from an Ecological Perspective." *Leonardo Music Journal* 10, (2000): 55–60.
- Keller, Damián, "Behavioural Ecologies in Ubimus." Paper presented at VI Ubimus, Växjö, Sweden, June 30–July 2, 2015.
- Keller, Damián and Jonathan Berger. "Everyday Sounds: Synthesis Parameters and Perceptual Correlates." In *VIII Brazilian Symposium of Computer Music*. Fortaleza, CE, 2001.
- Keller, Damián and Ariadna Capasso. "New Concepts and Techniques in Eco-Composition." *Organised Sound* 11, no. 01 (2006): 55–62.
- Keller, Damián and Victor Lazzarini. "Ecologically Grounded Creative Practices in Ubiquitous Music." *Organised Sound* 22, no. 1 (2017): 61–72.
- Kim-Cohen, Seth. *Against Ambience and Other Essays*. New York: Bloomsbury Academic, 2016.
- Kingsford, R. T., J. E. Watson, C. Lundquist, O. Venter, L. Hughes, E. L. Johnston, J. Atherton, M. Gawel, D. A. Keith, B. G. Mackey, C. Morley, H. P. Possingham, B. Raynor, H. F. Recher and K. A. Wilson. "Major Conservation Policy Issues for Biodiversity in Oceania." *Conservation Biology* 23, no. 4 (2009): 834–840.

- Kirby, Vicki. *Judith Butler: Live Theory*. New York: Continuum, 2006.
- Kramer, G, B. N. Walker, T. Bonebright, P. Cook, J. Flowers and N. Miner. *The Sonification Report: Status of the Field and Research Agenda. Report Prepared for the National Science Foundation by Members of the International Community for Auditory Display*. Santa Fe, NM: International Community for Auditory Display (ICAD), 1999.
- Krause, Bernie. *Wild Soundscape: Discovering the Voice of the Natural World*. Birmingham, AL: Wilderness Press, 2002.
- Loveless, Natalie. "Practice in the Flesh of Theory: Art, Research, and the Fine Arts Phd." *Canadian Journal of Communication* 37, (2012): 93–108.
- Malafouris, Lambros. *How Things Shape the Mind*. Cambridge, MA: MIT Press, 2013.
- Manning, Erin. "Artfulness." In *The Nonhuman Turn*, edited by Richard Grusin. Minneapolis: University of Minnesota Press, 2015.
- Manning, Erin and Brian Massumi. *Thought in the Act: Passages in the Ecology of Experience*. Minneapolis: University of Minnesota Press, 2014. Kindle.
- Massumi, Brian. *Semblance and Event: Activist Philosophy and the Occurrent Arts*. Cambridge, MA: MIT Press, 2011. Kindle.
- Maturana, Humberto, "Metadesign." Accessed April 2, 2014, <http://v2.nl/archive/articles/metadesign>
- Maturana, Humberto and Francisco Varela. *Autopoiesis and Cognition: The Realization of the Living*. Dordrecht, Holland: D. Reidel Publishing Company, 1980.
- Maturana, Humberto and Francisco Varela. *The Tree of Knowledge: The Biological Roots of Human Understanding*. Boston: Shambhala Publications Inc., 1987.
- McCabe, Cynthia Jaffee. *Artistic Collaboration in the Twentieth Century*. Washington, D.C: Smithsonian Institution Press, 1984.
- Morton, Timothy. *Ecology without Nature: Rethinking Environmental Aesthetics*. Cambridge, MA: Harvard University Press, 2007.
- Morton, Timothy. *The Ecological Thought*. Cambridge, MA: Harvard University Press, 2010.
- Morton, Timothy. "Thinking Ecology: The Mesh, the Stranger Stranger, and the Beautiful Soul." *Collapse* 6, (2010): 265–293.
- Morton, Timothy. 2011. "Dawn of the Hyperobjects 2," accessed July 21, 2015, <http://www.youtube.com/watch?v=zxpPJ16D1cY>
- Morton, Timothy. *Hyperobjects: Philosophy and Ecology after the End of the World*. Minneapolis: University of Minnesota Press, 2013. Kindle.

- Morton, Timothy. *Realist Magic: Objects, Ontology, Causality* New Metaphysics, Edited by Graham Harman and Bruno Latour. University of Michigan Library: Open Humanities Press, 2013.
- Morton, Timothy. *Dark Ecology: For a Logic of Future Coexistence*. New York: Columbia University Press, 2016. Kindle.
- Murphy, Jim, Dugal McKinnon and Mo H. Zareei, "Lost Oscillations: Exploring a City's Space and Time with an Interactive Auditory Art Installation." Paper presented at International Community on Auditory Display, Canberra, Australia.
- Murphy, Peter. "'I and I': Collaboration and the Double Act of Musical Creation." *Musicology Australia* 33, no. 2 (2011): 175–184.
- Myers, Natasha and Joe Dumit. "Haptic Creativity and the Mid-Embodiments of Experimental Life." In *A Companion to the Anthropology of the Body and Embodiment*, edited by Frances E. Mascia-Less, 239–261. Oxford: Blackwell, 2011.
- Nelson, Robin. *Practice as Research in the Arts*. Basingstoke, UK: Palgrave MacMillan, 2013.
- Nicolescu, Basarab. "Methodology of Transdisciplinarity – Levels of Reality, Logic of the Included Middle and Complexity." *Transdisciplinary Journal of Engineering & Science* 1, no. 1 (2010): 19–38.
- Nixon, Rob. *Slow Violence and the Environmentalism of the Poor*. Cambridge, Mass: Harvard University Press, 2011.
- "Nps Stats: Annual Park Recreation Visitation."
[https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Annual%20Park%20Recreation%20Visitation%20\(1904%20-%20Last%20Calendar%20Year\)?Park=SEQU](https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Annual%20Park%20Recreation%20Visitation%20(1904%20-%20Last%20Calendar%20Year)?Park=SEQU)
- "Ocean Conservation Research." <http://ocr.org/sound-library/>
- Organization, World Health, "Suicide Data." Accessed April 30, 2017,
http://www.who.int/mental_health/prevention/suicide/suicideprevent/en/
- Paiva, Troy, "Lost America: The Salton Sea." Accessed September, 2015,
<http://lostamerica.com/photo-items/the-salton-sea/>
- Pelletier, Jean-Marc. "Sound and Sight: Composition for Image Analysis Systems." Master's Thesis, Institute of Advanced Media Arts & Sciences, 2004.
- Pelletier, Jean-Marc, "Perceptually Motivated Sonification of Moving Images." Paper presented at International Computer Music Conference, Montreal, Canada, August 16–21, 2009.
- Pickering, Andrew. *The Mangle of Practice: Time, Agency, and Science*. Chicago: University of Chicago Press, 1995.

- Pickering, Andrew. "New Ontologies." In *The Mangle of Practice: Science, Society and Becoming*, edited by A. Pickering and K. Guzik, 1–14. Durham, NC: Duke University Press, 2008.
- Pickering, Andrew. "Producing Another World: The Politics of Theory with Some Thoughts on Latour." In *Assembling Culture, Special Issue of Journal of Cultural Economy*, edited by T. Bennett and C. Healy, 197–212. Taylor and Francis Online, 2008.
- Pickering, Andrew. *The Cybernetic Brain*. Chicago: University of Chicago Press, 2010.
- Pickering, Andrew. "Art and Agency." In *The Vibrancy Effect*, edited by Chris Salter, Harry Smoak and Michel Van Dartel, 28–32. Rotterdam: NAI Publishing, 2012.
- Pickering, Andrew. "Being in an Environment: A Performative Perspective." *Natures Sciences Sociétés* 21, (2013): 77–83.
- Pickering, Andrew. "Ontology and Antidisciplinarity." In *Interdisciplinarity: Reconfigurations of the Social and Natural Sciences*, edited by A. Barry and G. Born, 209–225. London and New York: Routledge, 2013.
- Pickering, Andrew. "The Ontological Turn: Taking Different Worlds Seriously." *Social Analysis* 61, no. 2 (Summer 2017): 134–150.
- Pite, Crystal, "My Way of Coping with the World at the Moment – Crystal Pite on Flight Pattern." Accessed March 23, 2017, <http://www.youtube.com/watch?v=9tSBkT9AFWA>
- Plumwood, Val. "Nature in the Active Voice." *Australian Humanities Review* 46, (2009): 113–129.
- Polli, Andrea. "Soundscape, Sonification, and Sound Activism." *AI & Society* 27, (2012): 257–268.
- Polli, Andrea, "Particle Falls." Accessed December 5, 2016, <http://forecastpublicart.org/public-art-review/current-projects/2015/03/particle-falls/>
- Raines, Robert. *Composition in the Digital World: Conversations with 21st-Century American Composers*. New York: Oxford University Press, 2015.
- Reeves, Gregory, "Aero." Accessed June 1, 2015, <https://gregoryreeves.bandcamp.com/album/aero>
- Riggs, Ransom, "Strange Geographies: Bombay Beach." Accessed July 20, 2014, <http://mentalfloss.com/article/24260/strange-geographies-bombay-beach>
- Roads, Curtis. *The Computer Music Tutorial*. Cambridge, MA: MIT Press, 1996.
- Roads, Curtis. *Microsound*. Cambridge, MA: MIT Press, 2001.

- Salter, Chris. *Entangled: Technology and the Transformation of Performance*. Cambridge, MA: MIT Press, 2010.
- Salter, Chris. "The Vibrancy Effect: An Anti-Disciplinary Expert Meeting." In *The Vibrancy Effect*, edited by Chris Salter, Harry Smoak and Michel Van Dartel, 17–23. Rotterdam: NAI Publishing, 2012.
- Salter, Chris. "Exploring the Performative: Interview with Chris Salter." In *VIDA: Art and Artificial Life International Awards*, edited by Pau Waelder, 2014.
- Salter, Chris. *Alien Agency: Experimental Encounters with Art in the Making*. Cambridge, MA: MIT Press, 2015.
- Salter, Chris, Harry Smoak and Michel Van Dartel, eds. *The Vibrancy Effect*. Rotterdam: NAI Publishing, 2012.
- Scarponi, Antonio, "The Seventh Continent—Musings on the Plastic Garbage Project." Accessed October, 2014, <http://www.domusweb.it/en/design/the-seventh-continent-musings-on-the-plastic-garbage-project>
- Sellberg, Karin and Peta Hinton. "Introduction: The Possibilities of Feminist Quantum Thinking." *Rhizomes*, no. 30 (2016).
- Shute, Joe. "Extinct: Which Animals Could We Lose Forever in 2017?" *The Telegraph*, January 1, 2017 2017.
- Silva, Jason, "Why Are We So Sad?" Accessed April 30, 2017, <http://www.facebook.com/jasonlsilva/videos/1842849992645944/>
- Stengers, Isabelle. "An Ecology of Practices." *Cultural Studies Review* 11, no. 01 (2005): 183–196.
- Stengers, Isabelle "An Ecology of Practices." *Cultural Studies Review* 11, no. 01 (March, 2005): 183–196.
- Tharp, Twyla. *The Collaborative Habit*. New York: Simon & Schuster, 2009.
- Truax, Barry. "Sound, Listening and Place: The Aesthetic Dilemma." *Organised Sound* 17, no. 3 (2012): 193–201.
- Truax, Barry. 2014. "Soundscape: Interview with Barry Truax," accessed November 21, 2016, <http://www.youtube.com/watch?v=JFuRgnqyAJA&feature=youtu.be&t=292>
- Truax, Barry. "Paradigm Shifts and Electroacoustic Music: Some Personal Reflections." *Organised Sound* 20, no. 1 (2015): 105–110.
- Truax, Barry. "Editorial." *Organised Sound* 22, no. 1 (2017): 1–3.
- Truax, Barry, "Convolution." Accessed October 6, 2016, <http://www.sfu.ca/~truax/conv.html>

- Truax, Barry, "Convolution Techniques." Accessed August 10, 2016, [http://www.sfu.ca/~truax/Convolution Techniques.pdf](http://www.sfu.ca/~truax/Convolution%20Techniques.pdf)
- Tsing, Anna. *Friction: An Ethnography of Global Connection*. Princeton NJ: Princeton University Press, 2005.
- van Dooren, Thom. *Flight Ways*. New York: Columbia University Press, 2014.
- van Dooren, Thom. "Life at the Edge of Extinction: Spectral Crows, Haunted Landscapes and the Environmental Humanities." *Humanities Australia* 5, (2014): 8–22.
- Varela, Francisco, Evan Thompson and Eleanor Rosch. *The Embodied Mind: Cognitive Science and Human Experience*. Cambridge, MA: MIT Press, 1991.
- Welsby, Chris. "Films and Installations—a Systems View of Nature." In *Experimental Film and Video*, edited by Jackie Hatfield, 26–35. Eastleigh, UK: John Libbey Publishing, 2006.
- Welsby, Chris. "Cybernetics, Expanded Cinema and New Media: From Representation to Performative Practice." In *Expanded Cinema: Art, Performance, Film*, edited by A. Rees, D. White, S. Ball and D. Curtis, 276–287. London: Tate Publishing, 2011.
- Welsby, Chris. "Technology, Nature, Software and Networks: Materializing the Post-Romantic Landscape." *Leonardo* 44, no. 2 (2011): 101–106.

APPENDIX

Documentation (External USB drive)

Before opening the Max patches please read and follow the instructions in the README.pdf located on the external flash drive. Contained in each folder are the video and audio folders linked to the specific Max project. Setup instructions are provided on the documentation videos.

Flight Variant

- Documentation film of Max patch and installation (21'55"): *1.Flight_Variant_doc.mov*
- Max 7 Project Folders: *Flight_Concert_Max_Project*, *Flight_Gallery_Max_Project*
- Audio files folder: *Flight_Audio*
- Video folder: *Flight_Videos*

Undercurrent

- Documentation film of Max patch and installation (20'49"): *1.Undercurrent_doc.mov*
- Max 7 Project Folder: *Undercurrent_Max_Project*
- Audio files folder: *Undercurrent_Audio*

Cathedral

- Documentation film of Max patch and installation (39'49"): *1.Cathedral_doc.mov*
- Max 7 Patches: *Cathedral_Video_Fabric_Max_Project*, *Cathedral_Music_Max_Project*, *Alter_xfade_Max_Folder*, and *Cathedral_Vocal_Improvisation_Max_Patch*
- Audio files folder: *Cathedral_Audio*

Piano at the End of a Poisoned Stream

- Documentation film of Max patch and installation (18'34"): *1.Piano_at_the_End_of_a_Poisoned_Stream_doc.mov*
2.Bird_iPad1.mov
- Max 7 Project Folders: *Piano_Music_Max_Project*, *Four_Panel_Water_Max_Project*, and *Piano_Video_Max_Project*.

Note:

The installations described in my dissertation were created in Max 7 on a Mac Book Pro 2.7 GHz Intel Core i7 with 16 GB of Ram running the program in 64 bit mode. These patches will not operate properly in 32 bit mode. Also, they have been configured using the new project folder method available in Max 7. Each project folder should be placed in the Max 7 project folder located in the Users>> Documents>>Max 7>>Project folder. Other instructions regarding the Max patches are provided at the beginning of each documentation film.