Performing Geochronology in the Anthropocene: Multiple Temporalities of North Atlantic Foreshores

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Abstract

As a branch of geomorphology, geochronology determines the ages of sediment, fossils, and rocks, thereby assembling a geologic planetary history. As a geochronological dénouement, the proposed geological epoch of the Anthropocene may indicate the figural moment in geologic time when human activity inscribed itself into sediment across the planet. This dissertation offers an artist's account of practice-as-research investigating how to perform geochronology in the Anthropocene along North Atlantic foreshores. As sites prone to the geologic acts of deposition, erosion, and intrusion, foreshores provide an impermanent surface on which to interrogate the deep time, hidden knowledges, and climate crisis affiliated with the Anthropocene's inaugural narrative.

Geochronologists partly comprising a working group to give the Anthropocene its formal designation note that "[t]he expression of the Anthropocene in the environmentally sensitive coastal systems [including beaches, tidal flats, and deltas]… represents a diverse patchwork of deposits and lacunae that reflect local interplays of natural and anthropogenic forces" (Zalasiewicz, Williams, and Waters 2014). Climate change also places foreshores as central players impacted by storminess, glacial melt, rising sea levels, and ocean acidification. Produced as the book *Sound of Mull*, the artist's performance scores were developed through artistic practice-as-research and offer strategies for experiential knowledge acquisition through direct or imagined engagement with the multiple temporalities and more-than-human co-constituents of North Atlantic foreshores. Participatory, experiential engagement may sensitize people to the hidden geochronologies of everyday life.

This dissertation is situated within an interdisciplinary practice-as-research methodology integral to geopoetics praxis, interweaving research from performance studies, geology, human geography, and archaeology. Detailing foreshore performances enacted in Denmark, Iceland, Norway, Scotland, and Sweden between 2015 and 2019, the dissertation argues for interdependence and circulation as necessary components defining geopoetics. The account expounds the importance of both interdisciplinary scholarship and artistic practice-as-research methodology in the exploration of geopoetics as transformative action.

Research was undertaken through PhD study at the University of Glasgow from 2015 to 2019, supported by the Lord Kelvin / Adam Smith Scholarship.

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The dissertation includes documentation of the creative output that resulted from artistic practice-as-research:

- *Sound of Mull*. 128-page book, published by Laboratory for Aesthetics and Ecology
- "Intime." Video documentation: https://vimeo.com/334642045
- Four postcards that each feature a different performance score and photograph of the related performance
- "How to Perform Geochronology in the Anthropocene." Audio recording: https://soundcloud.com/arawlings/how-to-perform-geochronology-in-the-anthropocene

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Introduction

> The rocks are beyond slow, beyond strong, and yet yielding to a soft, green breath as powerful as a glacier, the mosses wearing away their surfaces grain by grain bringing them slowly back to sand. There is an ancient conversation going on between mosses and rocks, poetry to be sure, about light and shadow and the drift of continents (Kimmerer 2003).

> I have used the findings of the two sciences of geology and archaeology for purposes altogether unscientific (Hawkes 2012).

Geochronology and the Anthropocene

As a branch of geomorphology, **geochronology** determines the ages of sediment, fossils, and rocks, thereby assembling a geologic planetary history. Where "[g]eology is the science which investigates the successive changes that have taken place in the organic and the inorganic kingdoms of nature" (Lyell 1830, 1) considering both cause and influence such changes have had on external planetary structure, geochronologists extract from the Earth's surface geologic narratives with the capacity to structure human action and reaction. Geochronological material is harvested by geomorphological field researchers, who then apply multiple measurement tools to determine the ages of the material.

Geochronologists unearth evidence of major storms that caused flood and tsunami. They unearth patterns of erosion and flora succession. They unearth linguistic and societal depositions via human settlement. They unearth tephra. They unearth evidence of mass extinction events. In this way, data extrapolated from geochronological units impacts geographic and temporal comprehension of the Earth's history, and also implies possible futures. Geochronologists can reconstruct the past from hidden detritus within sediment, and then apply this knowledge of the past to forecast events of future precaution or anticipation.

Suffice to say, the practice of geochronology has widespread implications for human history and future. **Collective human memory** may not retain or transmit bioregional information that supports human survivorship. The conclusion of one research paper indicated that "[s]uffering and loss of life resulted, in part at least, from the local people's general lack of collective 'memory' of tsunami, of tsunami precursors (such as the marked draw-down of sea level before the subsequent tsunami), and of appropriate responses to such precursors" (Bishop et al. 2005, 379). However, **collective ecological**

memory is retained in assorted tangible sites—including tree rings, fish otoliths, and riverbank sediment. Geochronology extracts collective memory stored within sediment, in order to infer how this information may impact greater sustainability of human life in the present and the future. Further to this, geochronology can help to track land-use practices that lead to soil erosion or gullying, land change, and land degradation. Determining causation for land transmogrification is "important on several fronts, including: understanding the nature of 'natural' landscapes; quantifying the disturbance impact of 'European' agricultural practices on landscapes; and re-assessing the nature and impact of traditional indigenous land practices" (Castillo, Muñoz-Salinas, and Ferrari 2014, 1577).

The results of geochronological dating are interpreted by geomorphologists and geologists to determine time spans. As such, the methodology, results, and conclusion of geochronology directly impact decisions taken by the International Commission on Stratigraphy when they determine and name time spans. To this end, the International Commission on Stratigraphy may soon name a new geological epoch. Eugene Stoermer and Paul Crutzen, the geologists who proposed in 2000 that a new epoch be delineated, have recommended 'the Anthropocene' as its title—a neologism denoting humanity's geosynchronous impact on geological depositions worldwide (Crutzen and Stoermer 2000). While there is general agreement that a new epoch be named, disagreement stems from both what it should be named and when the epoch should be slated to have begun. For the former, the suggestion of naming a new epoch coupled with a speciesist neologism has encouraged rampant brainstorming for alternative names and a spree of other neologisms. American poet-academics Joshua Clover and Juliana Spahr countered Stoermer and Crutzen's recommendation with 'Misanthropocene' (Clover and Spahr 2014), while economist Kate Raworth emphasized gender with 'Manthropocene' and climate-change onus with 'Northropocene' (Raworth 2014). Donna Haraway's 'Chthulucene' (D. Haraway 2013) invokes the tentacular[1] while Marisol de la Cadena's 'Anthropo-not-seen' (de la Cadena 2015) flags a missing attention to all that is more-than-human.[2]

Literary theorist Lynn Keller's term of the "so-called Anthropocene" signals "the broad appeal of the term Anthropocene… tied to reflexive, critical, and often anxious

[1] Haraway proposes the Chthulucene as the epoch where human and more-than-human co-habitants in world impacted by climate change come together, entangling their tentacles (or feelers) to communicate alternative narratives to the Anthropocene.

[2] Along similar lines to Haraway, de la Cadena's Anthropo-not-seen calls attention to human's impact on more-than-human entities while also advocating for a reconsideration of more-than-human agency.

awareness of the scale and severity of human effects on the planet" (Keller 2017). There is much debate about where the so-called Anthropocene may begin, as pertains to humans acting as geologic forces. Suggestions include at the outset of Neolithic dwelling (some 12,000 years ago), at the inception of the Industrial Revolution in the 18th century, or at the detonation of the first nuclear bomb in 1945 by the United States Army. Wherever it is situated, a way to geologically situate humans in relation to our ecosystems will shift historically.

What happens if our understanding of time is reframed—through naming a new epoch—to emphasize human impact on planetary health? How does this reify the communiqués around climate change? Dipesh Chakrabarty argues that

> [s]cholars writing on the current climate-change crisis are indeed saying something significantly different from what environmental historians have said so far. In unwittingly destroying the artificial but time-honored distinction between natural and human histories, climate scientists posit that the human being has become something much larger than the simple biological agent that he or she always has been. Humans now wield a geological force (Chakrabarty 2009, 206).

The adoption of a new geological epoch (especially one with a speciesist name) will ripple reformed thinking throughout disciplines—especially impacting on climate-change discourses.

Drifting across Disciplines

To blend arts and science disciplines is to perform an alchemy seeking to create alternative academic narratives. Rather than pitting two ideas in opposition, or creating a narrative of evolution of ideas, I have greater interest in looking at cyclic knowledge formulations that change in impact and relevance depending on what other information is present—an ecology of thought. How do different disciplines co-opt each other's functioning terminology for metaphoric purposes? When, as an example, did it become fashionable in geography to use words such as 'actors'? With my selected disciplines of theatre and performance studies, human geography, geochronology, and archaeology, we witness exchanges and challenges of terms and their definitions, including 'performance,' 'actors,' 'physical,' 'depth,' 'site,' and 'temporality.' So, too, are the properties of space, time, pattern, and movement shared between the disciplines. A component of my PhD research will study the properties and lexicons between my selected disciplines that appear to collude and collide, particularly in **Chapter 3: Sites** and

Chapter 4: Temporalities.

Whatever the International Commission on Stratigraphy determines regarding whether and what a new epoch should be named, the result will no doubt impact the humanities reshuffling and creative processing for the coming quarter-century. Rob Nixon effectively couches the urgency for cross-disciplinary exploration when he asks, "what connective corridors toward other disciplines can scholars creatively navigate in an intellectual milieu when habitat fracture is becoming increasingly pervasive" (Nixon 2011, 30)? The aim of my research will consider how temporalities and sites are perceived and processed in light of the proposed Anthropocene and climate change, through the lenses of artistic practice-as-research and alternative narratives.

This PhD is written in a non-conventional style that entangles the narrative of creative non-fiction with an academic essay. The rationale for entangling these styles is an attempt to provide space to *perform* artistic practice-as-research not only within the creative output, but also within the complementary academic writing itself. As this PhD functions in the interstitial zone within, outwith, and between disciplines (performance studies, human geography, geology, and archaeology), and as this PhD relies on a research methodology in its youth (artistic practice-as-research is twenty years old as a burgeoning methodology), I take allowance to expand what academic writing may be(come) as it becomes-with interdisciplinarity and explores emerging methodology.

For the site-respondent artistic creation, the methods used to perform geochronology extend from a practice-as-research methodology, foregrounding linguistic estrangement as counterpoint to scholastic textuality; interconnection and circularity as phenomenological *showing-doing* (Schechner 2013, 22); and heuristic encodement via durational, site-invested artistic attunement through listening and intimacy. Experiential learning through practices of attunement and intimacy give way to embodiment, essential for think-doing, showing-doing, and becoming-with. I have read scientific papers, visited the Scottish Universities Environmental Research Centre and its Accelerator Mass Spectrometer, and spoken with scientists who use geochronologic dating to understand the material processes that inform their research inquiries, data output, and application of geologic research. This process embraces passive knowledge acquisition[3], the results of

[3] Passive knowledge acquisition is teacher-centered, where the student receives direct instruction or lecture from a teacher. Experiential knowledge acquisition is student-centered, as students take an active and/or participatory role in order to learn. Experiential knowledge acquisition is a tenet of sustainability pedagogy.

which I use as structural and materialist formulations that shape who, where, what, when, and how to perform geochronology through artistic practice-as-research. This practice-as-research considers the potential of a further embodied understanding of geochronology—with its emphasis on deep time and multiple temporalities—through an attempt to augment passive knowledge acquisition with experiential, participatory performance scores. Such practice-as-research explores the possibility for artistic practice to act as an experiential knowledge generator and driver to further emplace, embody, and interrelate humans within temporal and situated contexts.

Researcher Background

I come to this project with a fifteen-year career as an interdisciplinary artist using languages as primary materials for the performative, publishable, and exhibitable work I produce. Combining auditory attunement with intimacy through sensorial and linguistic observation as well as processual performance work evidenced through several artist practitioners described in **Chapter 1: Literature and Practice Review**, I chose to focus my artistic practice-as-research on creating and testing a series of performance scores for sound and movement. This has provided me with a deepening of experience in writing for and enacting performance, extending from my professional artistic practice.

My first poetry book *Wide slumber for lepidopterists* (Angela Rawlings 2006) was used as a script for polyvocal theatre performances (Commutiny 2006; VaVaVoom Theatre and Bedroom Community 2014). Subsequently, I have contributed to or written libretti for composers keen to explore eco-ethical concerns through constrained, deconstructed language, including *Longitude* (Franzson, Rawlings, and Úlfarsson 2014), *Bodiless* (Herbst and Rawlings 2014), and *H e (a) r* (Stefánsdóttir 2016). To explore the latter improvisational schema, I committed to practices of both vocal and contact improvisation as early as 1998, with focused workshop development in Toronto from 2007 through 2010. My work with Canadian composer and vocalist Christine Duncan's Element Choir explored alternative conduction techniques as prompts for choral vocalizing within groups of 6 to 75 people. With opera singer Fides Krucker, I studied bel canto and extended vocal technique. I also participated in Misha Glouberman's *Terrible Noises for Beautiful People* as a way to learn a renegade version of John Zorn's *Cobra*. These opportunities led to multiple public performances, and I extended my creation and development practice to produce performance poetry and new music composition for solo, duo, and trios performers, using combinatory scripted and improvised techniques.

It is from these foundations that I have entered my PhD research, with the intention to develop approaches of how to perform geochronology in the Anthropocene through the methodology of artistic practice-as-research as elucidated in **Chapter 2: Methodologies**.

Research Questions

Geochronology is a practice to discern overlap and continuum of time as evidenced in sediment samples. If we extrapolate the methodology of a science-driven geochronologist, how can we use this as a methodological framework that parallels and informs practice-led research in the arts? "Humans leave their mark, and the earth carries it forward as an archive" (Parikka 2015, x), Jussi Parikka asserts in his introduction to *A Geology of Media*. Since geochronology studies the past to provide insight into managing human and more-than-human futures, what role does it have in identifying the planet-wide sediment indicators, which the International Commission on Stratigraphy uses to recommend naming a new epoch? What could geochronologists then suggest about a sustainable future that mitigates nuclear presence and/or prevents it happening again and/or signals to future beings that the sediment houses a layer of toxicity?

In preparation for devising my research questions, I consider what it means to perform geochronology, and what of geochronology is performed. I also consider how performing geochronology could be analogous for a deep investigation into an unfamiliar terrain to understand one's position differently. Of significance in preparing my research questions is attention to what could be metaphoric in geochronology when applied to climate crisis considerations. The result of these considerations formed the following research questions.

- How does research into less familiar scientific concepts and knowledge production impact the drivers of developing new artistic practice, thereby altering or shifting my understanding of what artistic practice can do?
- How does participatory, experiential engagement sensitize people to the hidden geochronologies of everyday life?
- What does it mean to make performance at the crux of climate change and the proposed introduction of the Anthropocene as a geochronological delineation of time?

The creative output documented in the book *Sound of Mull* and its exhibitable material performs responses to these considerations. Such documentation plays an

important role in this thesis, as a record of phenomenological *showing-doing* (Schechner 2013, 22). This record behaves as both archive or trace work of the performability of the scores as well as documentation to guide or instruct how others might attempt to actualize the performance scores. In some instances, the documentation functions as its own creative entity—not solely documentation, but an artwork itself. This becomes an entangled tentacularity[4] of rationales for performance documentation. Beyond the book, I rely on photographs, videos, and video stills throughout this dissertation to illustrate what I describe in the text[5]. Providing evidence of the experiential through supplementary documentation is crucial to my practice-based research, which hinges on tacit, haptic, and sensorial knowledges accrued, in part, through *in-situ* performances.

Complementary scholarly writing for the artistic practice-as-research demonstrated in *Sound of Mull* is divided into the following chapters: **Literature and Practice Review**, **Methodologies**, **Sites**, and **Temporalities**. In the Literature and Practice Review, I introduce geopoetics by emphasizing processual and site-respondent artworks that demonstrate affective and ethical urgencies, estrangement to geography through durational practices, and embodiment activated through interdisciplinarity and language acts. In **1.3 Affective and Ethical Urgencies**, I focus on parallel practices of relevance to my artistic practice-as-research that engage water, ice, and fog as co-constituents of the artwork case studies. In **1.5 Estrangement: Geography and Duration**, the case studies survey processual art practices concerned with tide, sound, and lines. Finally in **1.7 Embodiment: Interdisciplinarity and Multiple Languages**, I review artworks that attune the body to time, sand, and signs.

Conventionally within artistic practice-as-research dissertations, the Literature and Practice Review, Conceptual Framework, and Account of Process are presented as chronologic, independent chapters. However, as my dissertation foregrounds methods of entanglement and interdependence, I have opted to intertwine the latter two—Conceptual Framework and Account of Process. **Chapter 2: Methodologies**, **Chapter 3: Sites**, and **Chapter 4: Temporalities** present alternating conceptual frameworks and accounts of process within their structures. Though I have separated methodologies, sites, and temporalities to provide the dissertation's structure, the concepts frequently interlink; I

[4] Acknowledging Donna Haraway's enthusiasm for multispecies becoming-with through engagements with "the tentacular ones" (D. J. Haraway 2016, 31). See her book *Staying with the Trouble: Making Kin in the Chthulucene* for more on tentacularity.

[5] Unless otherwise specified, the diagrams, photographs, and video stills included in this dissertation have been created by me.

indicate such interconnections by cross-referencing the subchapter where additional discussion occurs.

In Chapter 2: Methodologies, I introduce artistic practice-as-research as my methodology and expand on geopoetics as a driver of this dissertation. Next, I outline the role that the methods of attunement, interconnectedness, intimacy, languaging, and response-ability play in my research. Between each method's subchapter, I insert a performance score sourced from *Sound of Mull* as demonstrative of the method's actualization through the creative process. Chapter 3: Sites introduces the multidisciplinary approaches to defining 'site,' while subsequently introducing North Atlantic foreshores as my site of focus for the artistic practice-as-research. The performance scores "Intime" and "(SUND)" are explored in depth at each tangible site they occurred, including foreshores of **3.7.1 Loch Long, Scotland**; **3.7.2 Kinghorn, Scotland**; **3.7.3 Lomma Beach, Öresund, Sweden**; **3.7.4 Herøya Industripark, Grenland, Norway**; **3.7.5 Nidelva, Trondheim, Trøndelag, Norway**; and **3.7.6 Kelda and Hjörseyjarsandur, Snæfellsnes, Iceland** as well as the galleries Inter Arts Centre in Malmö, Kunsthall Trondheim, and Sea Loft in Kinghorn. Chapter 4: Temporalities returns to a structure comparable to Chapter 2: Methodologies. I alternate conceptual subchapters on geochronology, the Anthropocene, multiple temporalities of foreshores, temporal attunement via listening, and tempoception with performance scores that demonstrate how the conceptual considerations led to and/or grew out of their creation. The dissertation concludes with performance insights, an assessment of the research's contribution to geopoetics, and implications for further interdisciplinary research.

But first, I present **Chapter 1: Literature and Practice Review**, surveying geopoetic, processual, and interdisciplinary contemporary arts practices.

Chapter 1: Literature and Practice Review

1.1 Parallel Practices

> And with them, or after them, may there not come that even bolder adventurer—the first geolinguist, who, ignoring the delicate, transient lyrics of the lichen, will read beneath it the still less communicative, still more passive, wholly atemporal, cold, volcanic poetry of the rocks: each one a word spoken, how long ago, by the earth itself, in the immense solitude, the immenser community, of space (Le Guin 1988).

The following chapter introduces **geopoetics** and related artistic practices, providing an account of practices and practitioners whose works parallel the practice, research, and creative output central to my dissertation. My Literature and Practice Review focuses on contemporary performing, time-based arts and interdisciplinary art projects as a way to gauge how thinkers and practitioners consider the ethical moment of now, rather than attempting to look at ancestral practitioners whose worldviews and geographical experiences may have differed dramatically from a current lived experience. All work selected has at its root a practice methodology which I have adapted for scholastic experimentation in my dissertation's practice-as-research performance creation and development.

I have selected North Atlantic foreshores (fig. 1) as the geographic focus for my dissertation because of their geopolitical planetary and bioregional embroilments. North Atlantic foreshores are impacted by a confluence of wind-current systems that move in a counter-clockwise motion over the Atlantic Ocean, influencing and creating weather systems that impact coastlines throughout the United Kingdom, west-coast Scandinavian countries of Denmark and Norway, Faroe Islands, Iceland, Greenland, and the east coast of North America. Weather systems, wind, and water currents have long-term impact and formation of land masses, and the microcosmic focus of geochronology on sediment and rock samples extrapolates this larger interconnection between abiotic entities, temporalities, and sites.

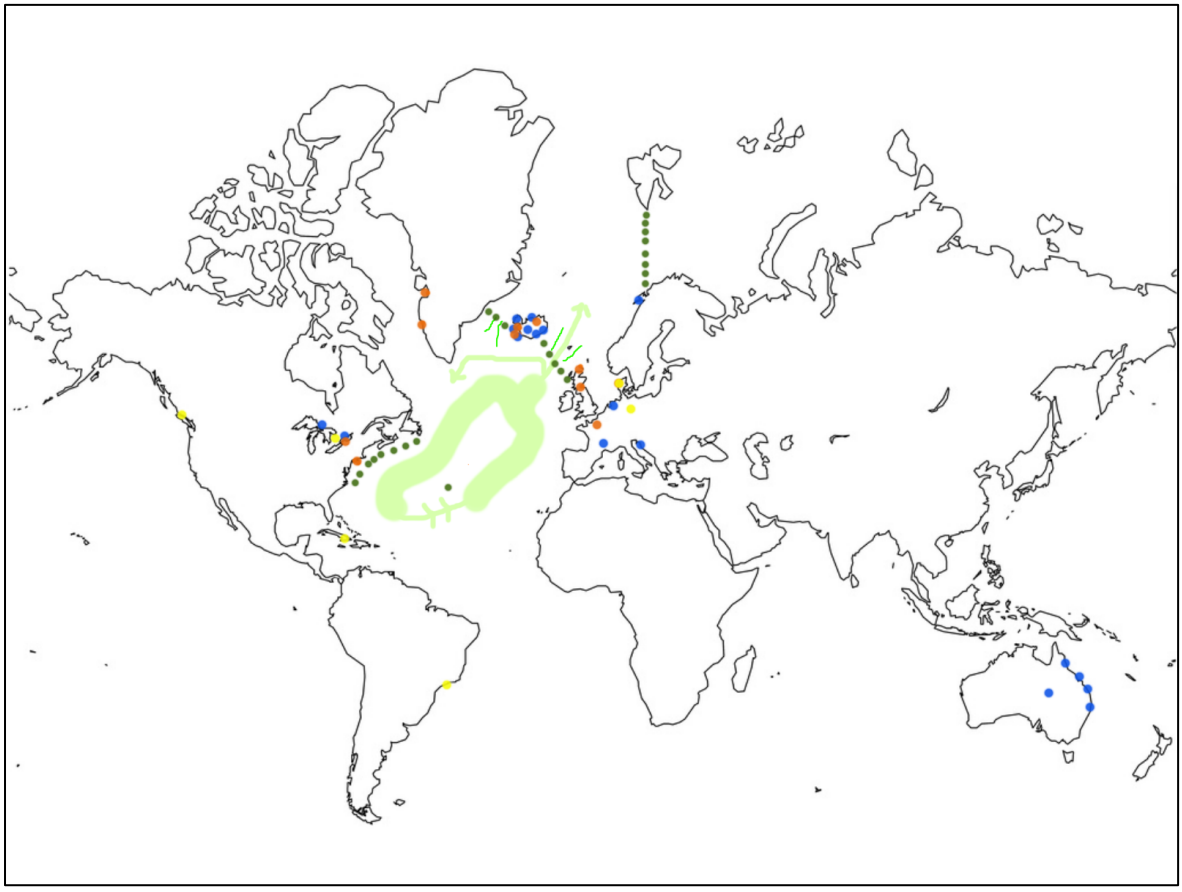

Figure 1. North Atlantic foreshores impacted by a confluence of wind-current systems (thick green line). Green dots indicate Sound Surveillance System (SOSUS) operated by co-operative international military. Neon green lines indicate GIUK Gap, site of the North Patrol. Orange dots indicate locations of artwork focused for this practice review. Yellow dots indicate future practice-review artwork locations. Blue dots indicate locations where I have previously created work.

Selecting North Atlantic foreshores as sites of consideration for my dissertation allows me to survey northern coastlines impacted in the immediate sense by climate change, in addition to intercontinental relationships that span deep time and that have fallen already under the research purview of geochronological studies. I will expand on my rationale for North Atlantic foreshores in **Chapter 3: Sites**, but mention it here as context for the artists and art practices I have chosen to include in my Literature and Practice Review—who all produce work in proximity to North Atlantic coastlines, engaging either abiotic material or site-respondent methods.

1.2 What Is Geopoetics?

By proposing praxis to come, geopoetics interrogates (in)comprehension of planetary crisis through a refiguring of human and non-human relations. My dissertation introduces geopoetics as an important component of the foreseeable future of interdisciplinary artistic practice. But first, how does geopoetics differ from ecopoetics?

Derived from the Greek, ‘eco’ (οἶκος) translates directly as ‘home’ but implies consumption through its application to cyclic-system jargon such as ‘economy’ and ‘ecosystem.’ Also from the Greek, ‘geo’ (γαια) implies ‘earth, ground, land.’ The result of work with a geopoetics emphasis may breed awareness of abiotic entities (physical and chemical components of ecosystems) as expressive, affective entities capable of communication via a geosemiosis. According to Victor R. Baker,

> [g]eology is a science of connection to our real environment, informed by the action of signs, a geosemiosis, that leads investigators on a fruitful course of hypothesis generation. This mode of inquiry has profound implications for public understanding of science, for achieving a habitable planet, and for advancing creative thought about Earth as a planet (Baker 1999, 633).

Geosemiosis becomes an offshoot of the 20th-century research field of biosemiotics. Where biosemiotics has emerged as a significant field of inquiry investigating the signaling capacity of biotic entities, geosemiosis extrapolates comparable query to abiotic entities including weather systems and geology. How do weather, geology, and geography inscribe notional life? How do these abiotic entities communicate with each other and with biota? How could the speciesist, anthropocentric concept of ‘life writing’ shift through such questions?

For Scottish poet Kenneth White who originated the concept, geopoetics delineates alternatively a “place” or a “climate of reciprocal inspiration” where “all kinds of specific disciplines can converge, once they are ready to leave over-restricted frameworks and enter into global… space” (White, n.d.). For American literary critic Rebecca Walsh, geopoetics necessarily “stresses the global geographic content” of poetics experiments that “create incommensurate and sometimes self-contradictory political positions regarding ideas of cultural, racial, and national otherness” (Walsh 2015, 5). American poet and geographer Eric Magrane called for “an enchanted, earthy, and transaesthetic approach that moves to juxtapose contemporary poetics, particularly in the realm of ecopoetics, with critical human geography” (Magrane 2015, 1). Magrane further offers a definition of geopoetics as “creative geography, including discussions of geographer-poets and of poetry as a research method; second, as literary geographies of poetry; and third, as geophilosophy” (Magrane 2015). For Paris-based art critic, activist, and philosopher Brian Holmes, geopoetics is constructed “[t]hrough analytical work on the dynamics of form and the efficacy of symbolic ruptures,” where “one can try to approach the diagrammatic level where the cartography of sensation is reconfigured through experimentation” (Holmes 2005, 742).

Geopoetics also provides space to reconsider both the noun and verb of 'place'—to acknowledge humans as place-makers, and for places as human-makers (Madden 2010), but also to consider the action 'to place' with its locative instruction pertaining to humans being placed and also humans placing things. How do slow and rapid migrations (of glaciers, weather systems, birds, human resettlement) refigure place? How do our constantly evolving knowledge systems (from archaeology to human geography) rewrite place? And how do we broaden our bioregional tendencies to embrace the planetary when we invoke the term 'place'? As Ursula Heise urges, "What is crucial… is not so much a sense of place as a sense of planet" (Heise 2008, 55).

Adapting experiential methods that invite immersion with, awareness of, and interaction with abiotic entities such as weather systems and tidal deposition may provide a key that supports the transformative actions necessary to process human impact on geologic realities in the face of climate change. Creative markers of geopoetics methods may include affect, atmosphere, ethical urgencies, estrangement, noticing, listening, intimacy, multilingualism, and polyphony—with the latter embracing bio- and geosemioses within its aural considerations. This differs from ecopoetics by emphasizing an estrangement from a conceptual οἶκος or home, instead acknowledging the agency of more-than-human entities with their material assemblages as indicators of response-ability.

This Literature and Practice Review considers the linguistic estrangement of Papa Westray's *Sjuen ir ens og glerlek*, Halla Steinunn Stefánsdóttir's *Unn*, and Cecilia Hultman's *Hold*; the affective rooms that perform as immersive installations by Ólafur Elíasson, Roni Horn, Fujiko Nakaya, Elizabeth Ogilvie, and Rúri; and the abiotic curiosity and inter-entity collaborations enacted by Stefan Östersjö of the Landscape Quartet, Michael Craik, and Minna Kurjenluoma. All have been selected as kindred projects for my own work, as they cross disciplines and have offered me insight into the potential for creative processes to offer transformative action through experiential knowledge acquisition. For each performance, I considered the following questions. Who or what are the performers? Where does the performance take place? Over what period of time does the performance occur? Who or what is the audience? How is the performance disseminated (through what media)?

1.3 Affective and Ethical Urgencies

Work of interest for this Literature and Practice Review invests simultaneously in the notions that theatre is a sensorium and that theatre curates affect. In Fiona Templeton's

afterword to her play *You, the City*, she wrote that "[t]he experience of art is in relationship, meaning being born where intention and interpretation meet. Theatre is the art of relationship" (Templeton 1990, 139). Affect and ethical urgencies manifest within relationship. How do we forge and sustain ethical relationships with and in ecosystems? Nixon echoes this sentiment via his query on praxis and ethics: "How, indeed, are we to act ethically toward human and biotic communities that live beyond our own sensory ken" (Nixon 2011, 15)? The potential for such relationships may form, first, through the acknowledgement of our own sensorial differences, our estrangement, and our ostranenie[6] when faced with what still persists as the sublime imponderabilia of more-than-human entities.

The audience—whether singular or multiple, human or more-than—is focal for works considered within the context of geopoetics: audience as performer, audience as meaning-maker, audience as narrative-maker, audience as place-maker. Perhaps, too, the inverse: place as performer, place as meaning-maker, place as narrative-maker, place as audience-maker. These works also rely upon an extended interaction with abiotic elements (tides, seasons, daylight) to generate performative output. Most examples I cite work with water in some capacity—through weather, tide, or geographic bodies (ocean, loch, glacier, fog, waterfall). Since I will also be working with water via its geomorphic force on foreshores, these examples are selected as a way for me to research how artistic practitioners approach water—and its position or relation to land—as material, as collaborator, or as player.

We interface with ecosystem fluctuations via weather changes through a theatrical lens, relying on the weather to provide daily theatricality when weather is imagined as setting, narrative ("How's the weather?"), and/or actor/agent—where weather impacts other actors such as sediment, rock, or water. In some butoh and body weather exercises, dancers' movements are prompted by the external influence of abiotic entities as a strategy for their creative processes. As well, Jacques Lecoq's idea—

> [P]ull, push, climb, walk, run, jump, lift, carry, attack, defend, swim. These actions trace a physical circuitry in sensitive bodies in which emotions are imprinted (Lecoq 1997, 82)

—to work through corporeal movement in order to arrive at emotionality could be extended to affect production in, via, with, and/or through more-than-human entities. All actions Lecoq lists could be *inter*actions with abiotic entities. Could the movement of

[6] Made popular in the 20th century by Russian formalists, ostranenie (остранение in Russian) is the introduction of defamiliarization enacted through art as a way to attune perception.

abiotic entities, in a geosemiotic sense, produce an **abiotic affect** or **atmosphere** to which interconnected humans and more-than-humans are susceptible? By paying attention to geomorphology, we can get a sense of the movement inherent in abiotic systems. This is less about an indication of *time* than it is about uprooting perceptions of speed and stasis.

Geography and geology are always in relation to ecosystem components, to the atmospheres that impact them and the poetic atmospheres they conjure. The material and the poetic commingle, interplay, respond, co-create, and co-curate their monologic or dialogic narratives. Donna Haraway insists "[i]t matters what matters we use to think other matters with" (D. Haraway 2013). In geography and geology, Haraway's logic plays in a never-beginning, never-ending, always unspooling drama as rocks and landscapes are constantly evolving through their contact with weather and water.

Theatre and performance function in combinatory sensorial capacities (sound, visual, movement, spatial, temporal). In Icelandic, it is possible to signify seasons through their becoming—*að vetra* is not a noun, but a verb—*to become winter*. It winters. It becomes winter. Here is a cyclic state that simultaneously progresses as it cycles. Cycles feed and inform, never at rest in static eternity but instead responding to what was and **becoming-with** (to use a popular concept from biosemiotics forefather Jakob von Uexküll) what will be. The season becomes the winter that had, in a previous state, been becoming winter. It matters what stories tell stories, and it matters what semioses are perceived as the material for how those stories are communicated.

The site is a room.

A room

is any space in which a body may move.

A room performs.

Of interest to geopoetics are what I propose to call **rooms that perform**, spaces that exaggerate the potential for human contact with abiotic entities. This may include pre-recorded (video or audio) archival footage writ large in a gallery space, or outdoor locales where attendees are invited to engage particular abiotic entities that otherwise might not be typically present at that moment of engagement. These rooms that perform largely uphold a temporary access as ascribed by time-based arts, though the amount of time one spends in the room is determined by the attendee (rather than by fixed, constrained action-time).

1.4 Case Studies: Water, Ice, Fog

Attendees of large-scale immersive installations gain access to ecosystem components otherwise inaccessible to the living human, based on scale or location. Consider the capacity to stand "inside" an Icelandic waterfall in Rúri's *Fount: Vocal VII*[7] (fig. 2) or to witness up-close glacial melt in Elizabeth Ogilvie's *Out of Ice*[8] (fig. 3). In these works, humans stand in simulated proximity to flowing water. Dettifoss is Iceland's most powerful waterfall, with an average volume discharge of 193 m^3/s. It is located in Jökulsá á Fjöllum, the country's largest glacial river flowing north from the ice cap Vatnajökull. It would be impossible to place one's body within close proximity to the waterfall's base, but Rúri's video and sound installation renders it possible to experience the roar and vision of this impossibility. The major missing component is water mist and spray, but somehow the terror in one's body layers such sensation into the installation given the waterfall's thundering sound. For Ogilvie's *Out of Ice*, an immersive space is set up where water videos are projected onto theatre scrims situated near four walls. The exhibition space fills with the sound of ice melting. The scale and proximity of this microcosmic act renders accessible what otherwise is too distant and small to witness.

Figure 2. *Fount: Vocal VII* by Rúri (Rúri 2015).

[7] I attended this in person in 2015.

[8] I engaged with the work in the artist's studio and via video and book documentation.

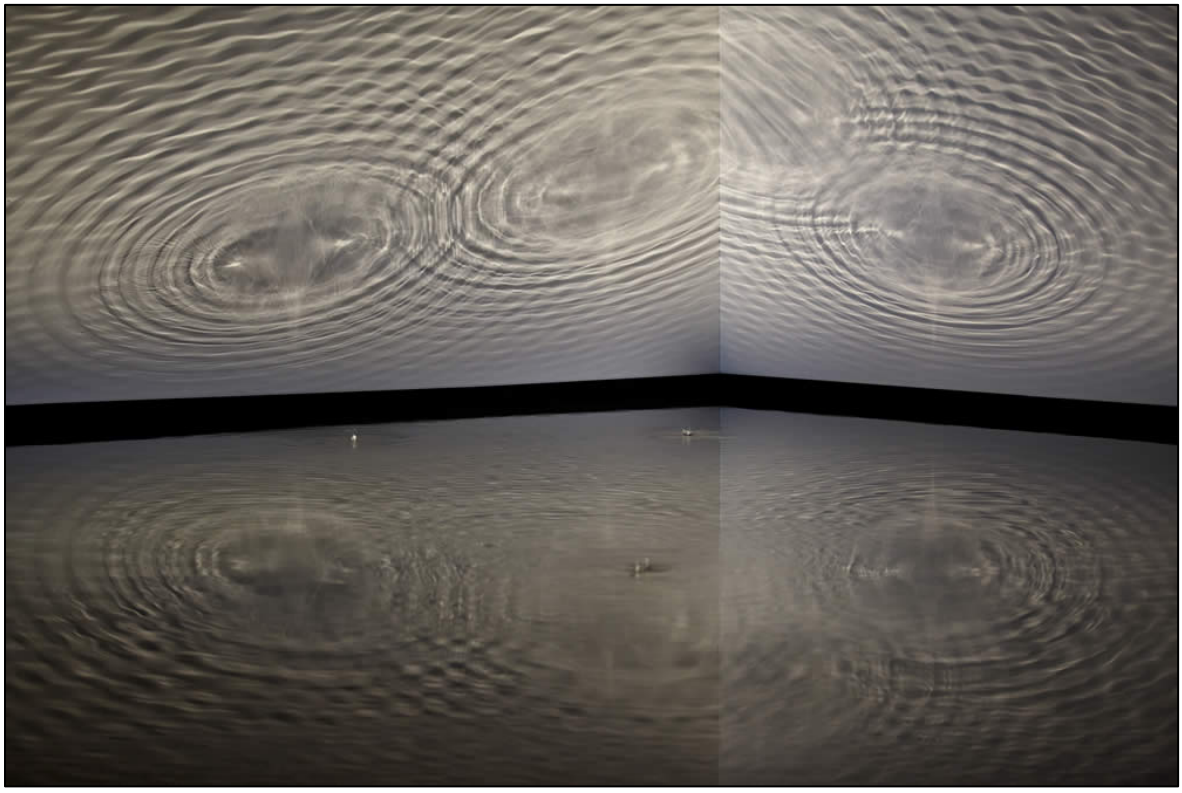

Figure 3. *Out of Ice* by Elizabeth Ogilvie (Ogilvie 2014).

Significant, here, is the exhibition space for *Fount: Vocal VII* and *Out of Ice*, all situated within the safety of black-box theatres or blackened gallery rooms. The fall-out of climate change is archived in these works and given temporary theatre for those willing to give their bodies to the experience. Like Ogilvie, Roni Horn's work focuses on glacial and weather interplay—though Horn's prominent glacial work, *Library of Water*[9], is situated as a permanent exhibition that has taken over the entire building of a small Icelandic town's former library.

Library of Water archives melted ice cores from twenty Icelandic glaciers. Each ice core has been placed in a transparent column, arranged in Stykkishólmur's former library. On the floor, Horn has embedded English and Icelandic terms used to describe both humans and weather such as unpredictable, *dyntótt*, oppressive, *heiður*, and bright. *Library of Water* has been architecturally designed to embrace the building's position at the highest point of the fishing town, where north and west-facing windows invite daylight into the space. While daylight acts as the primary illumination of the glacial water, translucent yet murky at its base with ash and organic sediment, each column also has a spotlight at its foundation. The melted glaciers stand in sight of Breiðafjörður Bay, so any viewer reckons with the elevated view of a here-and-now in the face of spectral time and imminent loss.

[9] I have visited this installation multiple times in the past decade.

Where Horn's *Library of Water* excerpts glaciers for an interior that reflects the local exterior, works by Ólafur Elíasson and Fujiko Nakaya invite abiotic entities into unexpected spaces. Elíasson's *The Weather Project* (2002) was installed in the Tate Modern's expansive Turbine Hall. With replicative sun dominating part of the room's ceiling, the atmosphere is otherwise built from a

> fine mist [that] permeates the space, as if creeping in from the environment outside. Throughout the day, the mist accumulates into faint, cloud-like formations, before dissipating across the space (Modern 2016).

Elíasson extended his work with mist in his immersive installation *Your Blind Movement* (2010)[10], staged in Berlin at the Martin-Gropius-Bau Gallery. There were comparable installations by Elíasson that occurred elsewhere in the world in 2009 and 2010: *Your Atmospheric Colour Atlas* (2009) and 21st Century Museum of Contemporary Art, Kanazawa, Japan; *Din Blinde Passager* (2010), ARKEN Museum of Modern Art, Copenhagen; and *Feelings Are Facts* (2010) (fig. 4), Ullens Center for Contemporary Art, Beijing. The shift in titles is notable, as otherwise the installations are similar—multiple rooms filled with a fog that has been illuminated with one or more dominant colours.

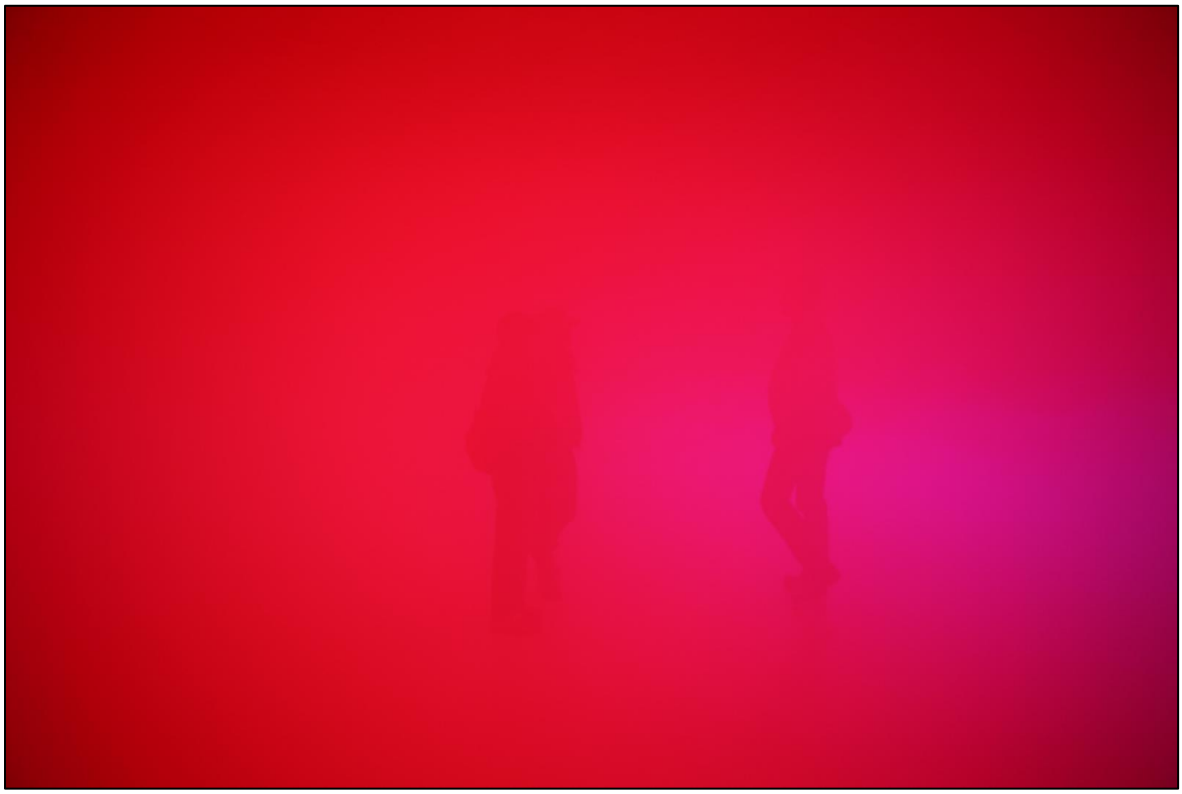

Figure 4. *Feelings Are Facts* by Ólafur Elíasson (Elíasson 2010).

[10] I attended the Berlin exhibition in 2010.

How does the experience of any performative room shift if it is linguistically contextualized with words like ‘blind,’ ‘movement,’ ‘atmospheric,’ or ‘feelings’? For Doreen Massey, work such as Elíasson’s *The Weather Project* “challenges the static, given, implacable ‘objecthood’ of art” (D. Massey 2003). Inviting or invoking affect via English-language markers in his titles formulates how any body may enter and experience a space. Even one word will act as context, setting up anticipation and expectations in attendees for what they may experience. Titles, as well as images, become the first points of entry—pre-performance, in this sense. If the title is encounters during or after the work, it may also prompt the person who experiences it to renarrativize her engagement with the work. Elíasson offers a strong example of this in his use of different titles for similar works. By emphasizing lack of sensorial access (blind), the transitory (movement), the invisible (atmospheric), or the affective (feelings), Elíasson reframes a visitor’s aesthetic experience through diction choice.

Elíasson’s work extends beyond the confines of gallery walls to explore the public or commons as a site where ecosystem components perform for human audiences. As a public installation, *Ice Watch* (2015)[11] (fig. 5) raises questions around the eco-ethics of transporting calved Greenlandic icebergs to deposit in a Parisian square, coinciding with the 2015 climate conference. This overt gesture of climate-change awareness places within an urban capital (Paris) an abiotic entity (calved glacier), where passers-by can interact with the displaced ice they hear so much about in the news, but otherwise to which they would not necessarily have tangible yet ephemeral access. In this context, the glacier is asked by Elíasson to *perform* climate change within urban commons. The commons, itself, transforms into a stage for climate change, conjuring rural Greenland and landscapes soon to become extinct.

[11] I engaged with this work via online documentation.

Figure 5. *Ice Watch* by Ólafur Elíasson (Elíasson 2014).

While Elíasson explores multiple ecosystem components in and out of gallery spaces, Nakaya is noted as the first artist to use fog as sculptural material, and these have occurred predominantly outside. As a series of commissioned sculptures including for theatre-maker Gisèle Vienne's *This Is How You Will Disappear*, Nakaya transforms spaces around the world through structured, fabricated fog. I navigated Nakaya's *Fog in Toronto #71624* (2006)[12] (fig. 6), a commission for the city's late-night September festival Nuit Blanche. In her fog works, the *literal* atmosphere curates affect. Any audience member must immerse herself to experience the work. She becomes a performer for herself, a performer whose body moves with difference through the density of fog and the mud formed from many feet tramping through grass and dirt in a fog-machine environment. With sight-as-sense partly obscured, hands stretch in front or around to navigate. Feet step with care to not slip. She follows in the mud-prints of whoever came immediately before her, and she hears another following behind her. Predecessors and successors, though, remain half-sensed as idea or occasionally a startling figure momentarily discernible through the fog. For how long has she walked this fog, and will it ever end? Would she

[12] I attended this installation in 2006.

even desire an end? To walk Nakaya's fog sculptures disorients the unthinking confidence of the walker, providing her semi-solitude to consider her body in relation to the bodies of water-as-mud, water-as-fog, and water-as-another-human.

Figure 6. *Fog in Toronto #71624* by Fujiko Nakaya (Stathacos 2006).

1.5 Estrangement: Geography and Duration

Dipesh Chakrabarty asserts that "[c]limate change is an unintended consequence of human actions and shows, only through scientific analysis, the effects of our actions as a species (Chakrabarty 2009, 221)." The idea of 'unintended consequence' here suggests the question of how to respond. The reaction to climate change has been couched in discourses of crises and Armageddon, which blankets reaction in fearmongering that eventually gives way to an indifference when the shock-adrenaline wears off. But consider the capacity for us to estrange the status quo. There are things we think we know—our mother tongues, the functionality of our bodies, a dim understanding of how to navigate any waking day, and of how our immediate ecosystems cycle around and with/in us. Could there be value in estranging what we assume is familiar, in order to re-evaluate our relationship to knowing? How can this enliven our curiosities? How, then, could we become emboldened by our curiosities as we consider what has happened through our unintended actions?

1.6 Case Studies: Tide, Sound, Line

What is exciting from a geopoetics perspective about artists' practices are the procedures they undertake. The output, as trace-work, holds perhaps more interest for the exhibiting visual-arts world. But for the theatre practitioner, the artists' dedicated practice of collaboration, repetition, and revelation (as in, what is revealed but also what is sublime) offers alternative modes of interaction or intervention with familiar materials—a way to teach a person about relationships through longer-term engagement with source and site. The artist, musician, or composer emphasizes the process and its physiological result as fundamental to the experience of the work. The process is the result. The result evidences the process. This is true for artists such as Finnish photographer Minna Kurjenluoma, Scottish painter Michael Craik, and the sound artists of the Landscape Quartet.

Kurjenluoma's *Moving Mountains* (2012)[13] (fig. 7) was created in Iceland and first exhibited in Helsinki's Hanasaari Culture Center. For this photography series, Kurjenluoma studies tidal deposition along the north shore of the Reykjanes peninsula in southwest Iceland. A region renowned for its volcanic black-sand beaches occasionally brushed with blonde sand carried through the North Atlantic on the Gulf Stream, Kurjenluoma photographs the moment when water ebbs from sand mix, displaying what she refers to as new landscapes in the shapes demarked by the tide (Kurjenluoma 2015). Capturing the moment becomes an undocumented performance itself, as Kurjenluoma stands along the shoreline for eight hours, snapping photo after photo of tidal deposition. What transpires for the person who studies sand, sediment, deposition for an extended period of any day? What relationships are formed and unformed through this rural theatre?

[13] I engaged with this work via the artist's portfolio and in-person conversations with her.

Figure 7. *Moving Mountains* by Minna Kurjenluoma (Kurjenluoma 2015).

Kurjenluoma, too, studies humans within landscapes. For her *Scars on Landscape* photograph series[14], she visits numerous tourist sites in the Icelandic wilderness, capturing lines of hikers at a distance in striking multicoloured Gore-Tex outerwear. The human lines navigate impossible glacial and waterfall landscapes, with Kurjenluoma unseen as the witness and documenter to mass tourism. How might shifting one's view from ecosystem component to human-ecosystem interaction compel an altered understanding of human time? The hiker's adage that leaving nothing but footprints is a non-injurious engagement with an ecosystem is spurious at best, deluded at worst. Paths mark any land with history of human presence.

In Scotland's Sea Loft Artist Studio at Kinghorn on a sunny February afternoon, I watch freight and oil ships traverse the Firth of Forth, an estuary of the North Sea. To the east, I see two offshore oil rigs, stout and towering from their ocean perches. To the south, I see the Lothian coastline stretching like a mirrored inversion of Iceland's Reykjanes peninsula. Mid-peninsula, a volcanic point and then at the end, choppy cresting hills. Flat between. Lava field or farmland?

[14] I assisted Kurjenluoma in shooting this series.

The practice of an artist, at times, engages a slower speed and repetition. Craik's studio sits beside Ogilvie's in the Sea Loft at Kinghorn, where he works with endurance painting techniques that experiment with how hues stretch and distort over time. For serial work with titles such as *Vestige* and *Trace*, Craik paints aluminum with acrylic; once it dries, he layers the paint repeatedly up to fifty times. Then he sands down the edges of his canvas, revealing paint sedimentation through the process. His canvases drip-dry around their edges, the thick paint forming stalactites.

In his series *Intime*[15] (fig. 8), Craik paints paper with monochromatic watercolour, then dips half the paper into a bucket of water. The paint streaks, revealing striated and occasionally winging dispersion of colour as it soaks down the canvas. Craik repeats his processes on his different canvases, using a variety of monochromes and variously sanding or water-dipping. Aluminum, sand, sedimentation, stalactites, water, water, water. The geomorphology of his practice reveals an interplay of human mark with material logic, via layered endurance procedure performed by the artist.

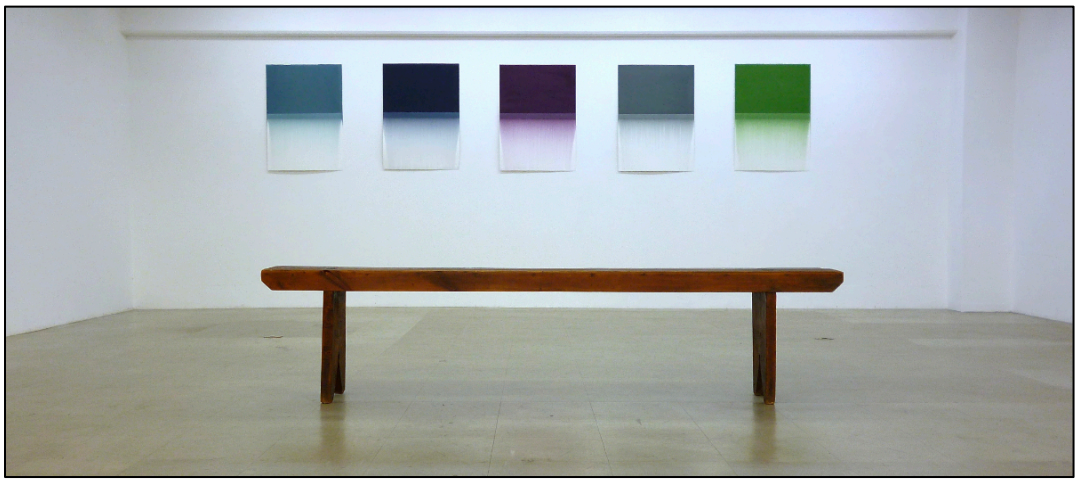

Figure 8. *Intime* by Michael Craik (Craik 2016).

Where Kurjenluoma and Craik rely on abiotic entities to co-devise their processual artworks, the Landscape Quartet invites geophysical forces to act as players in their works. The Landscape Quartet integrates ecosystem components as players of human-produced instruments. Quartet members Bennett Hogg, Matthew Sansom, Sabine Vögel, and Stefan Östersjö involve guitar, violin, and flute in dialogues with air and water.

[15] I engaged with this work in the artist's studio, watching his process and conversing with him about it. Craik adopted the title *Intime* in 2016, after I recommended it. I later realized the same title would work well for an unrelated performance score in *Sound of Mull*.

On the sand dunes of Lomma Bay, Sweden, Östersjö winds a long extension of nylon string around the trunk of a stunted tree[16]. He attaches the string to his guitar. A fellow musician audio-records the subsequent buzz elicited from the string as a western wind sings over it (fig. 9). Östersjö's Aeolian guitar offers environmental engagement that is "not inscription but rather incorporation" (Craik 2016), as he works with the wind as a co-player of the instrument instead of producing work *about* the wind. This gesture offers the guitar to the wind for its responsive capability, rendering Östersjö positioned as both co-player and audience to the more-than-human engagement. The wind's audible touch offers Östersjö and fellow human listeners the opportunity to estrange themselves from the known ways in which guitar is performed by instead inviting the more-than-human to animate the instrument. In this way, an Aeolian guitar may function as a tool for a human to become-with wind.

Figure 9. Aeolian guitar performed by Stefan Östersjö of the Landscape Quartet.

Imagine standing for eight hours at a seashore, photographing the patterns of black sand striated on blond sand. Picture dipping watercoloured paper into vats of water for three months straight, to witness the impact of water on hue. Envision stringing a guitar to the trunk of a young tree emerging from a sand dune, inviting wind to play the instrument. Through these imaginings, how do you commence the process of doing these actions?

[16] I photo-documented this performance.

How do you move beyond your imagining to actually try the methods developed by these artists? These practices hold the capacity to transform individuals' relationships with water or sand as material—to create an intimate, embodied understanding of flow through long-term witnessing and interaction.

1.7 Embodiment: Interdisciplinarity and Multiple Languages

In English-language dominant research fields, geopoetics emphasizes a viewpoint where human and more-than-human languages interdepend. How can words and ideas translate between languages? How does sense change depending on how a language approaches an idea? Languages undergo comparable shift to sedimentation as they are subsumed, included in, or become other languages entirely.

The works of *Sjuen ir ens og glerlek*, Halla Steinunn Stefánsdóttir, and Cecilia Hultman are examples of engagement with the poetic, posited in non-conventional performance and publishing formats. The act of publishing—whether in book format, as audio recording, or printed on non-standard surfaces, is an act of making tangible a text for a public. Through publication, the publishing medium becomes the body for the text. Within the object, the text performs.

1.8 Case Studies: Time, Sand, Sign

In 21st-century north Scotland, Scots Gaelic and English intermingle. Proximal countries with coastlines ringing the North Atlantic—including Faroe Islands, Denmark, Norway, and Iceland—evidence variations of Old Norse through their mother tongues, and this linguistic drift is present on historic Scottish settlements as well via a near-extinct language called Nynorn. The Inner Hebrides' Isle of Skye is populous with Old Norse toponymy. Towns include Uig (meaning *Bay*, from Old Norse: *Vík*), Stein (meaning *Stone*, from Old Norse: *Stein*), and Waternish (meaning *Water*, from Old Norse: *Vadn*). Skye itself is a hybrid of Old Norse *sky* (*cloud*) and *ey* (*island*). Farther northeast, Orkney Islands' Nynorn language and sedimentary coastline are under severe threat of erosion. Orkney's *Westray* is Old Norse for *Vestrey* (*West Island*).

Orkney Islands' elegiac project *Sjuen ir ens og glerlek* (2010)[17] (fig. 10) takes nearly extinct Nynorn diction about wind and tide charts as the foundation for a geographic

[17] I engaged with this work via online documentation.

collaboration. English-language lyrics for a song called “The Sea is like a Mirror” by James Hesford, inspired by the Beaufort Wind-Force Scale, detail many ways in which wind and tide are measured: “At one to three / light air / smoke drifts… Seventy three upward / hurricane / Widespread damage occurs” (Hnolt 2011). The lyrics were used as a base for the project, translated into Nynorn and then inscribed using marble dust and rabbit glue onto basalt shore of Minister’s Flag at low tide. Nynorn is left to disintegrate over the coming days through interaction with the elements. *Sjuen ir ens og glerlek* provides a solid example of what Angela Last refers to as a prompt “for greater, long-term care [that] shares a representational space with depictions of humanity as a perished remnant that seem to alter between the nostalgic and the melancholic” (Last 2015, 2). Protection of ecosystems could, then, imply protection of rural ways of life and rural dialects and knowledges.

Figure 10. *Sjuen ir ens og glerlek* (‘Sjuen Ir Ens Og Glerlek’ 2010).

Where *Sjuen ir ens og glerlek* invites the tide to alter its published text, Stefánsdóttir captures the sounds of tides as material for some of her compositions. She speaks frequently of activating a space, a primary concept and artistic method she is developing within her PhD through the University of Lund in Artistic Research in Music (Stefánsdóttir 2016) through a series called *I Play* which activates the response-ability[18] of

[18] Drawing from the research of Donna Haraway and Karen Barad, *response-ability* renders a site’s co-constituents as equally agential as humans can be. I explore response-ability in greater depth in the subchapter **2.8 Response-ability as a Method**.

a site's materials. Activation of space "represents a performer's active engagement with space: a method to break away from tradition and in so doing, exploring whether new aspects of the environment's structure can be revealed" (Stefánsdóttir and Östersjö, n.d.).

Stefánsdóttir situates her research into artistic agency through her praxis with "soundscape[s] connected to ecology, acoustics and embodiment; drawing on encounters and what happens in the connection" (Stefánsdóttir 2017). To activate Lomma Bay, Hjörseyjarsandur, and Kelda, Stefánsdóttir recorded the tide as it rose as well as ecosystem components of the foreshore (fig. 11). Her material attention to the audible came via Zoom audio recorder, hydrophone, DPA microphones, and headphones. Listening through an audio recorder allows for a selective and directional focus. She uses the recorded sounds within the tide to heighten awareness of listening. My experience of her work surfaced encounters and interconnections between humans and more-than-human entities, as for me her recordings rewrite the soundscape as an asemic sound poem. While we may not understand the communicative components we hear, we might determine that there is communication occurring—hence asemia, where the rearrangement of communicative components by Stefánsdóttir renders them into a sonic construct indicating semiotics are present. Through this process, tidal materials form communicative components in Stefánsdóttir's two-hour sound installation *Unn*[19], affording both composer and listener the opportunity to estrange sonic comprehension from familiar signifiers.

[19] I photo-documented this work and later co-exhibited "Intime" with *Unn* at Malmö's Inter Arts Centre in 2017. See **3.7.7.1 Exhibition and Performance: "(SUND)"** for an analysis of this.

Figure 11. Halla Steinunn Stefánsdóttir audio-records components of Lomma Bay's soundscape for her audio installation *Unn*.

Akin to Stefánsdóttir's rendering the components of a soundscape into asemic sound poems, Hultman arranges stones as syntactic components of visual poems she devises. Hultman's visual arts practice incorporates drawing, sculpture, and written languages to present geology-focused visual poetry both materialist and becoming-with in its ethos. In her artist statement for Konstfack's 2011 Degree exhibition, Hultman describes the time spent on her practice as requiring "total presence and physical intimacy, which my way of drawing and installing amplifies" (Hultman 2011)." Professor and artist Magnus Bärtås describes Hultman's work as "poetry… extracted from images of geological examinations, rocks, mountains, maps, satellite images, electro-microscope images—instrumental models of representation of micro- to macrocosm in, mostly, natural science" ('Cecilia Hultman' 2016).

Her book *Hold*[20] documents an artist residency in Skien, Norway, and includes poetic ruminations on and manifestations of geologic encounters in Grenland, Norway (Hultman 2017). For one work, she places stones in a line, preceded by the punctuation em-dash and proceeded by an ellipsis (fig. 12). In another work installed on graph paper,

[20] I visited the artist's studio and conversed with her while the exhibition and book were in progress.

Hultman juxtaoposes quartz with her true-to-life graphite drawing of the stone placed precisely overtop of the section drawn (fig. 13). Yet another conglomerate work embeds a rock within the space of lined paper, excising the paper around the placement of the rock. One of the excised lines improbably conjoins itself to the rock, playing with lineation and foreground (fig. 14). Her work challenges what materials can form a line, a sentence, and the semantic.

Figure 12. Visual poem from Cecilia Hultman's *Hold* (Hultman 2017).

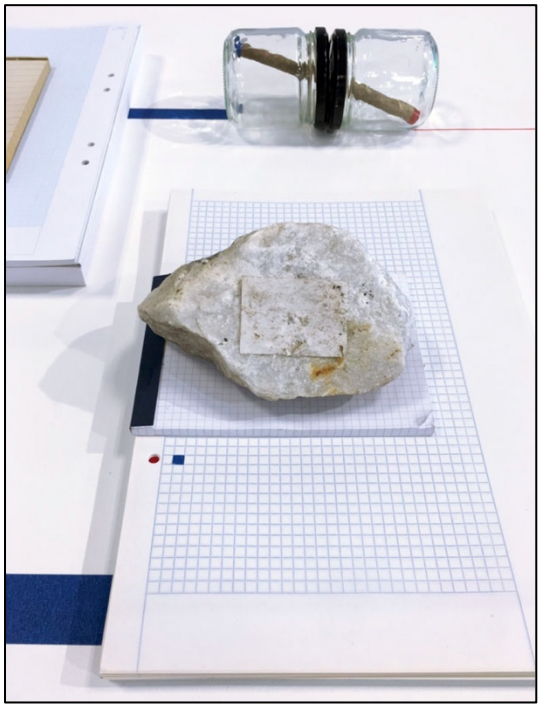

Figure 13. Visual poem from Cecilia Hultman's *Hold* (Hultman 2017).

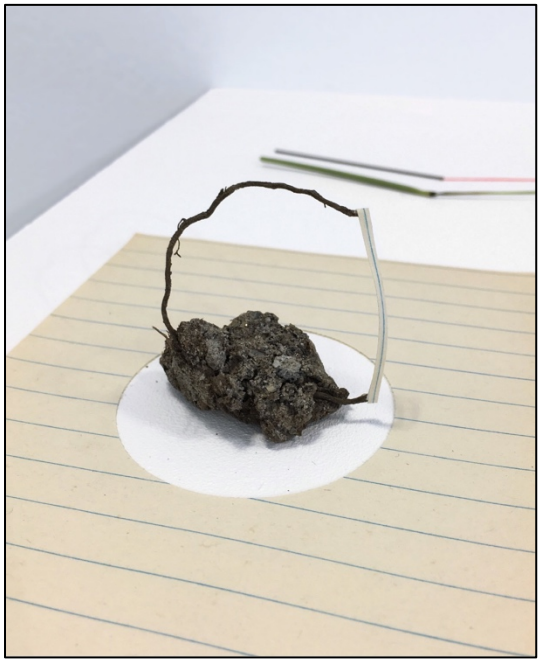

Figure 14. Visual poem from Cecilia Hultman's *Hold* (Hultman 2017).

1.9 Trajectories, Intersections, and Parallelisms

The 21st century's interdisciplinary scholastics struggle to rearrange perceptions of collectivity and memory when faced with the so-called Anthropocene as the climate-change epoch. Integral to this, geopoetics is poised to refigure human and other-than-human relationships via arts-and-sciences blended practice, stressing sites simultaneously within bioregional and planetary scopes. This occurs when places are considered human-makers, humans are place-makers, and abiotic entities are ascribed the capacity to communicate via geosemiosis. Creative trajectories of geopoetics feature emphases on affect, environmental ethics, estrangement from familiar languages and everyday habits and locations, and polyphony embracing more-than-human performers. Nixon makes a strong argument that could be held as a *raison d'être* for events with potential for transformative action: "A major challenge is representational: how to devise arresting stories, images, and symbols adequate to the pervasive but elusive violence of delayed effects" of "environmental calamities" (Nixon 2011, 3).

Theatre and performance, as affective sensoria, frame relationships through immersive and interactive multimedia events. Within such contexts, abiotic entities may invoke affective atmospheres for attendees. Such interactions may occur in rooms that perform—which may be within human-architected structures, or within public commons. Rúri, Ogilvie, Horn, and Elíasson frame immersive rooms that perform within human-architected structures. Elíasson and Nakaya extend abiotic atmosphere in their commons-situated rooms that perform. Theatres of the rural may be staged by process-oriented artists

who devise endurance or *in-situ* techniques to create work, as exemplified in the eco-respondent efforts of Kurjenluoma, Craik, and the Landscape Quartet. The performative actions of visual artists like Craik, Kurjenluoma, and Östersjö offer alternative experiential learning processes. Imagine taking a group of people into a workshop capacity where they experiment with the artists' processes. What would each person learn by trying these processes of photographing sandscapes or dipping watercolours into buckets of water?

Languages, too, become points of fascinating intersection for the plurilinguistic, neologism-hungry drives of the 21st century. The Scottish language Nynorn, as an example, plays monologist in a drama set on an Orcadian coastline in *Sjuen ir ens og glerlek.* Finally, Stefánsdóttir and Hultman expand the concept of what linguistic materials may be comprised as they engage more-than-human entities in their compositions. Such works align well with Last's notion that geopoetic output "often promote(s) a closer identification with a greater planetary history that might translate into new political demands and new forms of identity and participation" (Last 2015, 2).

The link between several of these works is their flexible time engagement, given to arts methods, practices, and performance strategies that slow down or pervert a sense of time. Rather than the scheduled, committed time of conventional theatre (where a performance holds an audience captive in a space, unable to move), many of the immersive installations invite attendees to come, explore, and depart at their own pace. What's more, the navigational design and content of rooms that perform are architected in ways that people stay longer on their own volition, co-creating the experiences they wish to have. Such accrued co-creation positions participants for transformative actions that can shape awareness of interdependence and relationships with more-than-human entities. Accrued. Sedimentation. Practice-led research and site-respondent performances contribute to making sense of what settles in the present or the future as a trace of what has passed.

Chapter 2: Methodologies

2.1 Artistic Practice-as-Research

> The challenge for practitioner-researchers… is to restore the link between practical or lived experience and the aesthetic, and to demonstrate how, in artistic practice, this realizes a mode of generating knowledge that has application beyond immediate points of production and consumption of the artistic product (Barrett 2007).

> If a rush of troubled stories is the best way to tell about contaminated diversity, then it's time to make that rush part of our knowledge practices. … It is in listening to that cacophony of troubled stories that we might encounter our best hopes for precarious survival (Tsing 2015).

> Entire populations, oh, we don't see… (Moss 2017)

In my dissertation Performing Geochronology in the Anthropocene, I explore performance creation and notation as a method of research inquiry through the disciplines of performance studies, geology, human geography, and archaeology, with evidence of this research offered through performance via scores and exhibitable documentation. The artistic practice-as-research methodology I embrace has developed with the understanding that "performance ways of knowing propose different ways of knowing from those of traditional textual scholarship" (Fleishman 2012). Artistic practice-as-research aligns with my intention to explore how participatory and embodied performance activates experiential knowledge acquisition through attunement, thinking-doing, becoming-with, and sustain-ability. By applying artistic practice-as-research methodology to performing geochronology, I further analyse how performance-derived experiential knowledge acquisition holds relevance to contemporary ongoing discussion of humans as geologic forces—arising alongside the proposal within geochronology that the Earth has entered a new epoch in the last 70 years suggested as the Anthropocene (Crutzen and Stoermer 2000).

The interdisciplinary partnership of the arts and the physical sciences is a challenging but necessary development within academia. Feminist philosopher Nancy Tuana describes the gaps of knowledge acquisition between humanities and sciences as "the knowledge that is too often missing and is often desperately needed is at the intersection between things and people, between feats of engineering and social structures,

between experiences and bodies" (Tuana 2008). From the human geography perspective, Nigel Clark urges that "[a]s well as being interested in what scientists actually do, we need to be interested in what scientists are interested in: our critical rituals must lead on to decisions, allegiances, and, especially, to commitments" (Clark 2011). Following her own interdisciplinary research into the links between post-industrial forests, matsutake mushrooms, and cultural commodity, Anna Lowenhaupt Tsing proposes to reimagine "intellectual life as a peasant woodland, a source of many useful products emerging in unintentional design… [where a] forager can choose what to gather and can make use of the woodland's patches of unexpected bounty" (Tsing 2015). It is at these intersections—between textual and practice-based scholarships, between disciplinary divisions of the creative arts, physical sciences, and social sciences—that my research into performing geochronology unfolds. I follow the lead of Clark's urging for *critical rituals* that make a difference, Tuana's expressions of need *between* and Tsing's model of researcher-as-forager to reconsider the emphasis on discipline-driven categorical boundaries by queering acquisition and assemblage within academic research.

Through practice-based research in a visual arts context, Graeme Sullivan has proposed a create-to/and-critique mode of inquiry where "reflexive approaches… enact and embody responses that often take place within postdiscipline contexts" (Sullivan 2010). Sullivan goes on to describe create-and-critique "as a way to open up new ways of responding to pressing issues and to see the impact on existing information structures" (Sullivan 2010). Within my postdiscipline (to use Sullivan's term) or interdisciplinary (arts/humanities and physical/social sciences) dissertation, the create-and-critique method facilitates an entangled approach to knowledge acquisition and production by allowing discovery processes to unfurl and encode within both creative production and analytical exposition (fig. 15). Theory-driven critique prompts development and revision of the creative output. Discipline-specific discourse and experience broadens *and* deepens theory while founding the content and structure of artistic output. Reflexive analysis interrogates and entangles disciplinary borders. Artistic creation knits unexpected theoretical analysis while unravelling and binding disciplinary strands.

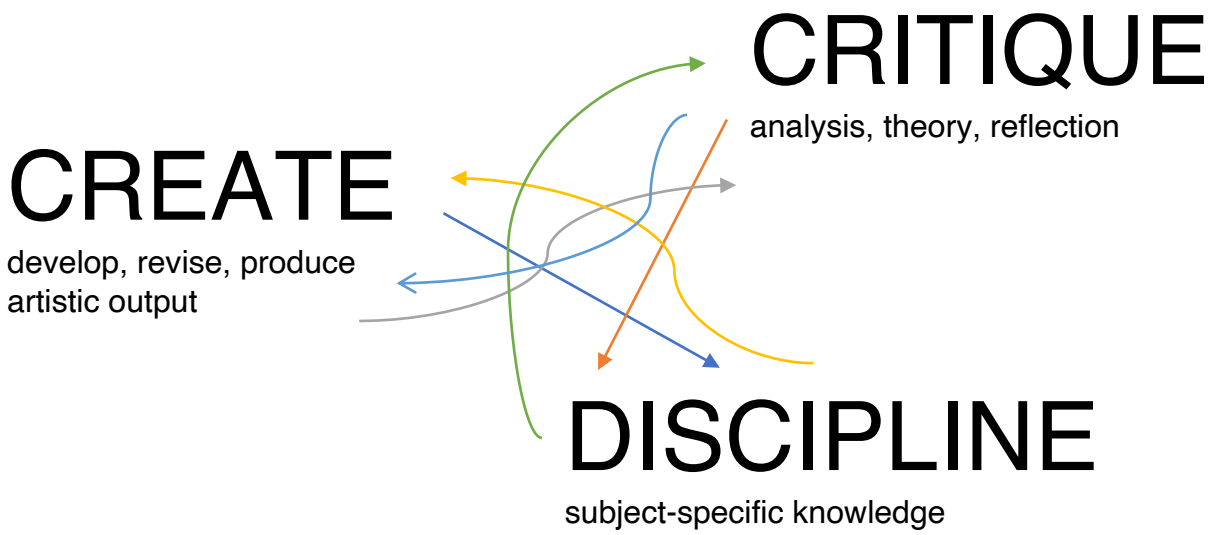

Figure 15. An entangled approach to knowledge acquisition based on Sullivan's create-and-critique mode of inquiry.

My methodological intention to partner artistic creation with experiential knowledge acquisition as both auto-ethnographic research and a way to elucidate and entangle arts and sciences' discipline-specific understandings resonates further with Sullivan's notion of practice-as-research where "artists who 'think in a context' are interested in creating critical artistic encounters that change the way we think about things around us" (Sullivan 2004; 2006). At stake within performing geochronology and the insistence of stratigraphic naming in this contemporary moment is the degree of cross-disciplinary discussion of the Anthropocene proposal beyond geology's academic community. Of relevance to 'Anthropocene' as the name for this epoch, Tsing has theorized that "[t]his 'anthropo-' blocks attention to patchy landscapes, multiple temporalities, and shifting assemblages of humans and non-humans: the very stuff of collaborative survival" (Tsing 2015). The implications of naming a new epoch that foregrounds human impact on planetary chronology challenges the actual entanglement of temporalities in a more-than-human, beyond-human, becoming-human, and including-human context.

This dissertation is comprised of two components: site-respondent creative output and complementary scholarly writing. The complementary writing takes as its model Robin Nelson's rubric for textual documentation of practice-as-research methodology (Nelson 2013). This includes a practice review of sibling performances and an entanglement of the conceptual framework and account of process. For the creative output, I have followed an intuitive and reflective process throughout the PhD research that has

resulted in interconnected and entangled participatory performances, derivative collaborations, performance scores, and exhibition material. This intuitive process has been developed over the course of my previous fifteen years of work as a writer and artist. In the following subchapters, I will expand on my methodology through extended discussion of the interdisciplinary field of geopoetics; experiential knowledge acquisition through listening, attunement, intimacy, and languaging; and interconnection, circularity, and entanglement through critique.

2.2 Interconnectedness

> How do gatherings sometimes become 'happenings,' that is, greater than the sum of their parts (Tsing 2015) ?
>
> The question of whom to think-with is immensely material (D. J. Haraway 2016).
>
> Few things are more planetary and more intimate than our bodies of water (Neimanis 2012).

Light breeze, partly cloudy. Laureen Burlat and I scour the foreshore for plastic bags and the horizon for submarines. Breeze, before the snowstorm. Stefan Östersjö wraps nylon string around a short tree on a sand dune, attaching both ends to his guitar; he then holds the guitar horizontal for the wind to strum this string. Windchill, rain. Cecilia Hultman and I embrace; the circular forms of our arms wrapped around the other's torso ground us. Intermittent wind gusts, sun. Halla Steinunn Stefánsdóttir rigs a hydrophone to record eelgrass in a tidal pool. Still, after the rain. Seabirds wheel above as Laboratory for Aesthetics and Ecology curators walk counter-clockwise in mud. Gentle breeze, crisp sunrise. Rebecca Bruton and I build melodies as memory waves within a foreshore's soundscape.

Relying upon a methodology of interconnectedness, attunement, and collaboration, my accounts of process expound on the creative experiments and outputs of my artistic practice-as-research for Performing Geochronology in the Anthropocene. **2.11 Performance Score: "Intime"** introduces the score for an *in-situ* performance practice accounted for later in several subchapters of **Chapter 3: Sites**, describing the foreshores, collaborators, movements, and experiential knowledge acquisition arising from the score. The performance and sound scores of *Sound of Mull* (introduced in **2.13 Performance Score Collection: *Sound of Mull***) catalogue experiential knowledge acquisition and potential pedagogical applications exploring how to perform geochronology. The

development of "Intime" and *Sound of Mull* creates a feedback loop, where the repeated practice of "Intime" provides foreshore encounters that generate *Sound of Mull* scores. "Intime" is itself a score within *Sound of Mull*, changing as an experience with the creation of each new score. The two components are separate, yet interdependent. I write description of *in-situ* research in the present tense, as a temporal counterpoint within each section. I also indicate collaborators *in-situ* by their first names, to honour the intimacy afforded through collaboration.

In the documentary *Donna Haraway: Storytelling for Earthly Survival*, Haraway says, "Thinking is a materialist practice with other thinkers—and thinking happens in storytelling" (Terranova 2016). To explore interconnectedness within my practice, I include multidisciplinary practitioners and non-human actors whose participation is vital to researching how to think-with more-than-humans and our interdependences. Collective research builds through attunement to and within various sites and shared embodied knowledges, which I discuss further in **2.4 Geopoetics and Attunement**. By bringing different practitioners into my research, I open up discussion of my research questions through exploring practice-based experiments solutions developed by related thinkers and makers while simultaneously investigating attitudes towards different languages within our English-language dominant research. I collaborate with people who have a background in multiple languages and who have resided in many different locations, proximal to the North Atlantic and/or fluent in one or more of the languages from the area. Interrelated multilingual and non-verbal performances, exhibitions, and scores feature the international collaborators with whom I developed the work.

While participants double in their roles as audience members, the potential for audience expands beyond direct participation in a score. Where Allan Kaprow's happenings were designated for performers only (Kaye 2000, 109), the documentation of *Sound of Mull*'s site-respondent performances is intended to reach an audience beyond solely the performers (a.k.a. the participants). This intended audience includes researchers in the humanities and physical sciences[21], literary and arts-engaged readers[22], fellow arts

[21] An example of this in practice: While the editors of *Geopoetics in Practice* have not directly participated in these performance scores, they have published material on "Intime" in their collection, including the use of a video still from a Kinghorn performance of "Intime" for the front cover of their book.

[22] An example of this coming to fruition: UK poet Elizabeth-Jane Burnett selected *Sound of Mull* as a 2019 summer must-read for a *Sunday Times* article, describing the book as "touching and timely, providing intimate responses to global environmental problems" (Lovegrove 2019).

practitioners and cultural workers[23], and students whose teachers and professors incorporate scores in their curriculum[24]. Such an audience may have a strong regional demographic based on my own outreach capacity to disseminate work within European, North American, and Australian contexts—particularly within the Nordic and Canadian regions. To move beyond the ephemerality of a site-respondent participant-driven performance, I also offer a non-performing audience access to past performances through video documentation as well as the instructional means to enact their own performances beyond my facilitation. In so doing, such audiences may self-select to become performers themselves.

Beyond the human audience, I would like to note the attendant spectators from the more-than-human world. Any *in-situ* performance may be witnessed by species who inhabit the location. Obvious audience at "Intime" performances has included birds, dogs, and bristleworms. More-than-human audience may extend beyond the moment of the performance, however, through olfactoric and kinetic traces left by human participants.

Haraway describes her string figures as "*thinking* as well as *making* practices, pedagogical practices and cosmological performances" (D. J. Haraway 2016). "Intime" and *Sound of Mull* are designed to function as string figures in these ways. As pedagogical practices and performances, "Intime" and *Sound of Mull* originate as actions that can be adapted to many sites depending on resources such as available people, tools, access, funding, and duration. By putting the compositional tools of sites, temporalities, and hidden knowledges together, I create opportunities for experiential knowledge acquisition that could be adapted as a long-term interdependent practice. The scores are designed as practices of thinking-doing and becoming-with through an assemblage of haptic, tacit, and embodied knowledges. Taking up Tuana's urge for ontological practice that "rematerializes the social and takes seriously the agency of the natural" (Tuana 2008), the thinking-doing practices proposed in "Intime" and *Sound of Mull* extend to explore human impacts on sites and inhabitants, as well as sites and inhabitants' impacts on humans. The term 'impact on' could be interchangeable with 'relationship to,' 'world-making with (Ahmed 2017),' or 'becoming-with.'

[23] Based on the strength of performance-score documentation, Canada's National Arts Centre has hired me as co-curator for the 2021 Ideas of North Festival with the invitation to include arts practitioners of relevance to *Sound of Mull* within the programming.

[24] Wesleyan University professor Danielle Vogel included *Sound of Mull* on her ecopoetics syllabus, inviting me to engage her students virtually in a discussion of artistic practice-as-research.

2.3 Performance Score: “Knots”

The circulation of plastic bags became a point of consideration for developing performance that placed participants in counter-clockwise movement—movement integral to “Intime”’s *raison d’être* and discussed in **3.6 The Foreshore**. Plastic originates as crude oil—crude oil comprised of decomposed microscopic organisms and plants, with these decomposed components acting as geophysical indicators of deep time. Crude oil is sourced from the land and from the ocean’s floor, extracted via oil rigs and processed by industries only to be used, discarded, and, in the case of Loch Long’s bags, to find its way back into the ocean. Based on a conversation we had while walking along Loch Long, Laureen Burlat began a practice of collecting plastic bags, first from the shoreline (fig. 16 and fig. 17) and later from other sources, cutting them into long pieces, and then knitting the plastic as yarn (fig. 18). She reknitted, telling a different story. This activity led to the co-creation of the performance score “Knots.” Burlat’s interaction with repurposed crude oil enacts a different kind of intimate circulation, raising awareness of corporeal relationship with more-than-human entities that exist in multiple temporalities.

Figure 16. Laureen Burlat pulls a plastic bag from Loch Long.

Figure 17. Laureen Burlat tugs plastic from Loch Long's foreshore.

Figure 18. *Trash Strata*, plastic bags knitted by Laureen Burlat.

Though Burlat and I perform "Intime" on Loch Long's foreshore as discussed in **3.7.1.1 Intimate with Loch Long, Scotland**, we do not perform "Intime" in sight of a

submarine, since the unexpected passing of the submarines allowed us no time to prepare a foreshore engagement. Each time we saw submarines during our several-months dwelling by the loch, we watched them from a distance (fig. 19). I shot videos of submarines from multiple locations over a three-month period. These are partnered with video of Burlat knitting plastic, in which we see the landscape, waves, rocks, and plastic with Burlat in the distance or in close focus. We witness Burlat winding a long string of plastic into a ball (fig. 20) as the plastic string stretches down the coastline (fig. 21). Once wound, Burlat sits by the ocean and knits the plastic yarn into a long train (fig. 22). The knit train is then affixed to her wrists, and she enters the loch fully clothed to wade up to her neck, the plastic train floating atop the water behind her (fig. 23).

Figure 19. Submarines departing from Loch Long.

Figure 20. Laureen Burlat rolls the plastic into a ball for knitting.

Figure 21. The unspooled plastic yarn stretches down Loch Long’s coast.

Figure 22. Laureen Burlat knits on Loch Long's foreshore.

Figure 23. Laureen Burlat prepares to enter Loch Long with her knitwork.

The roll of knit plastic is the creative output of "Knots," performed by Burlat between February and May 2016 on Loch Long. For 44 minutes of the "Intime" performance documentation video, one of the four split screens displays Burlat's process of knitting on Loch Long, and eventually entering the loch herself with the plastic train floating behind her, shortly before a nuclear submarine passes through the same shot. This

final act signals a moment of becoming-with crude oil (in the form of plastic bags), ocean currents, and submarine circulation. The submarine was also video-documented and is included in this video.

"Knots," as actualized score, also reflects the collaborative nature and derivative potential of artistic practice-as-research encounters. While the performance score was co-developed by Burlat and me, the creative output (of knit plastic) has become her own artwork, which she entitled *Trash Strata*. She has shown this work as part of her solo practice in Valence, France, and we exhibited it at the launch of *Sound of Mull* (see **3.7.9 Rooms that Perform: Sea** Loft, Kinghorn, Scotland).

2.4 Geopoetics and Attunement

> What settler colonialism, and its extensions into contemporary petrocapitalism, does is a severing of relations. It is a severing of relations between humans and the soil, between plants and animals, between minerals and our bones (Davis and Todd 2017).

> In traditional indigenous communities, learning takes a form very different from that in the American public education system. Children learn by watching, by listening, and by experience. They are expected to learn from all members of the community, human and non (Kimmerer 2003).

> [S]taying with the trouble requires learning to truly be present (D. J. Haraway 2016).

As an interdisciplinary research field, Eric Magrane emphasizes geopoetics "as creative geography, including discussions of geographer-poets and of poetry as a research method; second, as literary geographies of poetry; and third, as geophilosophy" (Magrane 2015). His definition offers a flexibility to include other artistic disciplines but not explicitly so as Magrane foregrounds both the literary and the poet within the over-arching definition. My own working definition of geopoetics embraces what philosopher Isabelle Stengers calls an ecology of practices (D. J. Haraway 2016) by emphasizing interdependence of knowledge acquisition and production within categorically bound disciplines couched as arts or sciences. I extend the notion of poetics to apply this theory of arts mechanics to other arts media such as performance and music. Magrane's use of the term 'creative geography' here, too, is key to formulating the cross-disciplinary reaches of geopoetics; I would add to this creative archaeology and creative geology as well, both of which extend the temporal (from deep time to unknowable futures, from mayfly to glacial lifespans) and spatial (surface, depth) aspects of geopoetics considerations. Geopoetics,

then, explores the mechanics of interdependent systems inclusive of and (fore)grounding global, planetary, earth-directive creative workings and worldings.

To derive a research method adherent to my geopoetics working definition, I draw on feminist new materialist approaches through the "art of noticing" (Tsing 2015) as attunement. **Attunement** is the practice of coming into material awareness of one's environment through intentional activation of and focus on/through the senses including audition, vision, tactition, gustation, olfaction, thermoception, and proprioception. Estelle Barrett describes some artistic practice-as-research approaches as "[a]n intensification of everyday experiences from which new knowledge or knowing emerges" (Barrett 2007). Attunement estranges the everyday experience of senses through an enhancement of noticing the intra-action of senses within and outwith one's body; such noticing shifts one's relationship with worlding, which invites the formulation of new knowledge through different and deferential experience. Via attunement, the theoretical mechanics of geopoetics manifests through the actions of observation, tuning in, noticing, dwelling, and becoming-with.

In the latter half of the 20th century, composers such as R. Murray Schafer and Pauline Oliveros focused on attunement via audition (a.k.a. hearing). A Canadian composer, Schafer founded the field of acoustic ecology through his research into how soundscapes impact humans and the impact of humans on soundscapes and their inhabitants (Schafer 1997). Via his work in music composition and acoustic ecology, Schafer developed awareness-building exercises to "sensitize the ear to the miraculous world of sound around us" (Schafer 1992). Published in 1992, Schafer's *A Sound Education* compiles a selection of these ear-cleaning exercises, intended to estrange and enhance one's awareness through the act of listening. From the 24th and 25th exercises in this book, Schafer proposes,

> 24. Hearing gets to places where sight cannot. Ears see through walls and around corners. When something is hidden, sound will reveal its location and meaning. Make a list of all the sounds you can think of that come from hidden places, sounds that are made by objects you have never seen.
>
> 25. Some of the sounds that occurred to you in the last exercise may have come from your own body. Remain still for a moment with your eyes closed and listen to the sounds beneath your skin. How many of the following do you hear?
>
> breathing
>
> heart beating
>
> stomach sounds
>
> swallowing

cracking of bones, knuckles, etc.

ringing in the ears

Do you hear others? (Schafer 1992)

Such ear-cleaning exercises direct the reader to reposition herself sonically in relation to the world inside and outwith her body. These tuning-in methods juxtapose senses (sight and sound) and provide experiential knowledge acquisition that can lead to a transformation of the listener's relationship with the world in which she is interconnected.

Schafer's work on sound and soundscape education correlates with American composer Oliveros' praxis of Deep Listening. Oliveros describes Deep Listening as

> learning to expand the perception of sounds to include the whole space/time continuum of sound—encountering the vastness and complexities as much as possible. Simultaneously one ought to be able to target a sound or sequence of sounds as a focus within the space/time continuum and to perceive the detail or trajectory of the sound or sequence of sounds. Such focus should always return to, or be within the whole of the space/time continuum (context) (Oliveros 2005).

It is Oliveros' emphasis on Deep Listening as relevant to performance and composition practices (Oliveros 2005) that strikes me as instructive in the co-development of my own artistic praxis and creative output. Through exercises exploring "energy work, bodywork, breath exercises, vocalizing, listening, and dreamwork" (Oliveros 2005), Deep Listening facilitators often emphasize participation within a circle as "an equalizing symbol" and through slow walking (Oliveros 2005).[25]

Within my creative practice, I've straddled the spectrum between scripted then embodied text on one end (prose, poetry, plays, scores) and improvisation on the other end (extended vocal technique, sound poetry, new music composition, and contact improvisation). The former requests heightened attention to faithful reproduction with investment in rehearsal, repetition, and representation, including at times memorization. The latter strips blueprint from performance while foregrounding spontaneity and intuition—generative for both improvised composition as well as experiential knowledge acquisition leading to the development of performance strategies and scripts. Schafer and Oliveros' exercises instruct the listening of benefit to improvisation and the syntaxes for communicating performance scores. The partnership of scripted rehearsal and structured

[25] "Gathering of the class into a **circle**…. A circle formation is preferred as it is an equalizing symbol and may strengthen the understanding that learning comes through shared experiences…. The **extreme slow walk** is next. Variants of the extreme slow walk are done as experience accumulates. The walk is done with and without music selected by the instructor. The instructor gives the theme for the walk. For example, walking in the desert or walking in a forest" (Oliveros 2005).

spontaneity has evolved a practice-as-research method for me that co-evolves both practices.

Sound of Mull's emphasis on performance scores is indebted to a lineage of artists who introduced participatory scores. In the 1960s and 1970s, the Fluxus movement supported dissemination of interdisciplinary scores by numerous artists including Nam June Paik, Dick Higgins, John Cage, and Yoko Ono (Hendricks, Bech, and Farzin 2009). In the late 1960s through early 1980s, Annea Lockwood staged her *Piano Transplants* scores, which feature succinct instructions for elemental interaction with ruined pianos.

> **Piano Burning** (1972—Amarillo, Texas)
> Find a shallow pond with a clay/other hard bed in an isolated place.
> Slide upright piano into position vertically, just off-shore.
> Anchor the piano against storms, e.g. by rope to strong stakes.
> Take photographs and play it monthly, as it slowly sinks (Lockwood 2012).

In *Sound of Mull*, "Violinouflage" pays direct homage to Lockwood's trailblazing work with non-traditional instrument interaction.

The partnership of scripted rehearsal, structured spontaneity, and devising performance scores as evidenced in this lineage of artists has led to a practice-as-research method for me that co-evolves all three practices in the context of response-ability to ecological crises. If scores, scripts, and choreographic annotations are situated on one end of a performance spectrum, then structured improvisation sits at the other end. Any performance could be registered on such a scale as more aligned with one end or another.

Performance studies scholar Minty Donald posits performance-score instructions and the physical enactment of scores as "a model where forward planning must be subject to continual revision and responsive to ever-changing circumstances" (Donald 2016). In the context of addressing ecological crises, the capacity to continually revise forward planning becomes a necessity. Both ecology and geochronology track planetary, biotic, geomorphologic, and ecosystem structures as predictive models for future planetary behaviours. An ecological or geochronological structure could be analogous with a script or score, with rehearsal as analogous to predictive modelling and consequent government policy developed as precautionary action to catastrophes. While policy is an important tool for reacting to events, there is also a requisite to adapt to the specific parameters of events with urgency—with spontaneity. This, to me, mirrors the devising spectrum for scripted, rehearsed to improvised performance. The capacity to devise proactive structures as well as attune oneself in improvised practice builds resilience, responsiveness, adaptability, and

an acceptance of the multiplicity of directions any choice could lead one in a given moment. The development of such attunement strengthens the overall response-ability of the human species in the face of ecological crises.

The work I explore deals with what is *not* seen (ocean drift, international surveillance, larger-scale time practices). I consider the continued longer-term lifespan of weather and tectonic movements, and correlate unfamiliar temporalities to sentence lengths, music tempos, breath expulsion. Sound is unseen. Sustained, intoned vowels trigger affective response. Affect becomes effective in encoding or envesseling sentiment between entities. Spontaneity—a storm—enlivens. Script or score—sedimentary—embeds.

2.5 Performance Score: "Deep Time Listening"

My introduction of auditory attunement as a method of geopoetics elucidates part of my research connected to my creative output—the practice of auditory attunement and the surfacing of performance scores where performers work with sound as their medium. An initial score that readers encounter in my book *Sound of Mull* is titled "( )," and contains the sole instruction: "Go outside and listen for what cannot be heard." The next performance score, "Deep Time Listening," repeats this salvo before launching into a list of ways to listen for what cannot be heard in the context of deep time (fig. 24).

Deep Time Listening[1]

Go outside and listen for what cannot be heard.

Go to a foreshore and listen for the benthic community beneath the sand, rock, or mud.

Listen for the ocean's youth, whose story may echo in a moon-snail shell.

Go to a mountain and listen for orogeny[2].

Listen for the thoughts[3] of a once-thriving ecosystem, of current ecosystem struggle, of future ecosystem resilience.

Go to a young forest and listen for the unfurling of Devonian[4] ferns in early morning sun.

Go to a coniferous forest and listen for the first Permian[5] pine cones to drop from tree to floor.

Go to the winter and listen for Ice Ages past, melting glaciers' present, and the ghosts of glaciers future.

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[1] In geologic time, the term *deep time* refers to a planetary timeline that spans the Earth's existence over c. 4.5 billion years (McPhee 1981, 20). In sound education, Pauline Oliveros coined *deep listening* as multi-faceted transformative action (Oliveros 2005, xxiii). This title combines *deep time* and *deep listening* to propose a method for performing geochronology.

2 Orogeny is the formation of mountains. It may be of use to reference geologic time guides to determine the orogeny's onset, duration, and phases or the physical manifestations of height, area coverage, and geologic materials associated with the mountain range you visit, to focus your listening across millennia.

[3] Aldo Leopold's *Thinking like a Mountain* argues for ecosystem sentience (Leopold 1987, 129-32).

[4] The Devonian period of geologic time ranged from 419 to 372 million years ago. During this period, the first young forests appeared, populated by clubmosses, horsetails, and ferns.

[5] The Permian period of geologic time lasted from 299 to 254 million years ago. During this period, the first coniferous forests appeared.

Figure 24. Performance Score: "Deep Time Listening," excerpted from *Sound of Mull.*

While these scores provide examples of attunement through auditory practices (ear-cleaning exercises and Deep Listening), attunement is not solely the purview of audition. Instead, these scores require the performer to attune their inner ear through envisioning the deep time situatedness of the immediate site in which they are located. In a sense, they are invited to tune out of what soundscape is present, and instead imagine soundscapes past and soundscapes future, which has the potential to offer an intense remediation of the

soundscape in which they currently exist. In both instances, the performance is an internal exercise that may prompt experiential knowledge acquisition through its unfolding.

2.6 Intimacy and Languaging

> It is a sign of respect to call a being by its name, and a sign of disrespect to ignore it. Words and names are the ways we humans build relationship, not only with each other, but also with plants (Kimmerer 2003).

> Having the words also creates an intimacy with the plant that speaks of careful observation (Kimmerer 2003).

Through her professional touch of mosses, bryologist Robin Wall Kimmerer adds duration and familiarity to the potential **sense-abilities** at stake within an experiential, traditional ecological knowledge. The taught and tacit knowledge gleaned through her experiences as a member of the Potawatomi tribe has also led to Kimmerer's research contributions in Traditional Ecological Knowledge, which values the professional touch and observation of indigenous populations and the ecosystems with which they are interconnected as complementary to scientific knowledge and instructive of sustainability approaches (Kimmerer 2002). In her book *Gathering Moss: A Natural and Cultural History of Mosses*, Kimmerer describes traditional knowledge as "rooted in intimacy with a local landscape where the land itself is the teacher" (Kimmerer 2003). Intimacy could then be positioned as a form of experiential knowledge acquisition—where "[i]ntimacy gives us a new way of seeing, when visual acuity is not enough" (Kimmerer 2003). Of mosses, she suggests that "[l]earning to see mosses is more like listening than looking" (Kimmerer 2003). Such a relationship of intimacy—cultivated through professional touch and traditional ecological knowledge—affords agency to the more-than-human as teacher, with human in the long-term role as a student of becoming-with.

Languages become lenses through which a person can explore and anchor sense-ability within intimacy. Kimmerer, too, extends the notion of intimacy to the act of naming (Kimmerer 2003) and storytelling. She entangles language with sensorial observation:

> [o]ur stories from the oldest days tell about the time when all beings shared a common language—thrushes, trees, mosses, and humans. But that language has been long forgotten. So we learn each other's stories by looking, by watching each other's way of living (Kimmerer 2003).

With my background in experimental poetries, the link between language acts (such as naming or narrative construction) and the intimacy afforded through sensorial observation

conjures sound and visual poetries as artistic practice of relevance for exposing such entanglement. Sound and visual poetries foreground the materialities of languages, concurrent with or ahead of the semantic. The methods on which I rely to perform geochronology engage fundamentals of sound and visual poetries through their attachments to listening and **geo-graphy**—what Heather Davis and Zoe Todd note as "the literal writing of the earth" (Davis and Todd 2017)—built through "careful observation" (Kimmerer 2003) of sites and their co-constituents. My creative praxis intersects the materiality of *geo-* and *-graphy* through methods of linguistic sensoriality and attunement in sound, movement, and vision.

2.7 Performance Score: "Sound Sund"

> Each being with whom our lives are intertwined is named and thanked. When I say my morning thanks, I listen a moment for a reply. I've often wondered if the land any longer has reason to return gratitude towards humans (Kimmerer 2003).

In Norway and Iceland, it is common for compound names to identify the geographic feature after which the place (usually a town or city) is named: vik/vík (bay), dal/dalur (valley), foss/foss (waterfall), sand/strand (beach), nes/ness (peninsula). Identifying a geographic term of resonance with North Atlantic foreshores and present within many languages bordering the ocean (Icelandic, English, Norwegian, Danish, Swedish), I search toponymy repositories for the original language terms: sound, sund. In English, the word 'sound' doubles its meaning as audible material and as body of water. Reading through lists of cities, towns, and villages in foreign languages, while manually sifting for my sund-word, allowed me to gain cursory understanding for regions, nations, and how places are named.

My approach to collect toponymy with a repeated geographic motif draws from a previous creation/development strategy for *Gibber*, where I collected 1,400 place names containing the word 'land' while Poet-in-Residence in Queensland, Australia (Angela Rawlings 2012). I repeated this technique in *Áfall/Trauma*, gathering general vocabulary in Icelandic, English, and Danish to contain the word 'land' (Angela Rawlings and Bencke 2016). For *In Memory: Jökull*, I collected all compound words that feature the Icelandic word for 'glacier' (jökull, jökla), creating a linguistic archive of future loss (A. Rawlings 2015). The resulting toponymy lists have an in-built rhythm sprung from the repetition of 'land', 'jökull/jökla', or 'sund'.

Names containing ‘sound’ or ‘sund’ form the primary linguistic material for the performance score “Sound Sund.” In *Sound of Mull*, the performance score proposes that the performer should pronounce the place names “as incantation, as litany” as a way to respect “foreshores that were, reinscribed by foreshores that will be.” “Sound Sund” has been adapted as a visual poem published via the 3D Poetry Editor (A. Rawlings 2017).

2.8 Response-ability as a Method

> Weather is not ahistorical, but nor is it facilely ‘made’; it is rather wrought from a specific set of conditions. This makes weather both predictable and changeable: bodies that weather also respond (Neimanis and Hamilton 2018).

> In passion and action, detachment and attachment, this is what I call cultivating response-ability; that is also collective knowing and doing, an ecology of practices (D. J. Haraway 2016).

> Telling stories of landscape requires getting to know the inhabitants of the landscape, human and not human. This is not easy, and it makes sense to me to use all the learning practices I can think of, including our combined forms of mindfulness, myths and tales, livelihood practices, archives, scientific reports, and experiments (Tsing 2015).

Fundamental to my practice-as-research is investigating the potential for response-ability to be a method driving artistic praxis, where the research I conduct investigates how to set up frameworks of facilitation through which I and other human participants can reflect through the idea of response-ability via an experiential learning process. Response-ability renders the materiality of a site—the site’s co-constituents— equally agential in co-constructing experience, as “we require each other in unexpected collaborations and combinations, in hot compost piles. We become-with each other or not at all” (D. J. Haraway 2016). Attunement through experiential learning provides a platform to demonstrate the thinking-doing and becoming-with at the heart of activating response-ability. To become response-able is to cultivate a relationship where listening is activated; as Oliveros wrote, “Listening is survival” (Oliveros 2005). Designs for performance and score incorporate possibilities for transformative action in how performers, participants, and/or audience relate to their lived experiences with their own narratives, multiple temporalities, sites, ecosystems, fellow humans, and more-than-human entities including geomorphological agents.

How can tuning into and through relationship to place, human, and more-than-humans cultivate greater awareness of interconnection as part of an ongoing reframing of narrative intended to drive "best practices" for how humans interact within planetary boundaries? Sprouting from Tsing's explanation of the relationship-making and maintenance of powers of matsutake (Tsing 2015) and Kimmerer's intimacy with moss, I propose **relational empathy** as self-reflexive awareness for the interdependence at stake in relationships with human and more-than-human entities, understanding the cultivation of that empathy as an integral component for human exploration and extension of that relationship in the face of surviving precarity. I envision empathy as a human-driven and projected affective action. I do not expect empathy to be a reciprocal component of relationship-building by more-than-human entities engaged given the anthropomorphism in imagining more-than-humans practice empathy, but I also do not wish to exclude the possibility that more-than-human entities experience empathy. A component of my methodological response-ability is a self-reflexive consideration of relational empathy in the context of artistic entanglement.

Within my artistic practice, I *live* my research by taking on subjects in which I want or need to dwell metaphorically. I make space for others to dialogue with me whenever I disclose what I research or when I perform. Similarly, where I geographically dwell impacts what and how I research. The initial PhD project proposed notions of deep time and sustainable futures in the context of contemporary Scotland and its seaboard. This led me first to consider *where* the PhD research should unfold, and how physically site-interdependent and response-able I could situate myself so as to enact a phenomenological, autoethnographic practice within a research context.

By *dwelling* as a phenomenological *showing-doing* (Schechner 2013) in proximity to the sites I study, my research foregrounds observation of what is accrued bodily through slow, durational practice and how this is impacted/disrupted/changed through sudden material events. Practice-as-research is not only a work methodology; it becomes a lifestyle that impacts everyday movement through the researched world. To dwell proximally to shorelines, erosion and deposition sites, strong gales, turf-house ruins, Viking forts, Scottish castles, shipping routes, nuclear naval operations, oil rigs, and decommissioned Sound Surveillance System (SOSUS) infrastructure is to posit one's body as an observational system. The sites instruct—a different shade of instruction than proffered by textual scholarship, but no less abundant in the transference of knowledge between ecosystem and physiology. For a research project invested in understanding more-

than-human temporalities via geologic and archaeologic inputs, becoming-with any site is key.

There is power in going to the site itself, inviting people to take responsibility for direct engagement with a location instead of the theoretical, abstract, disembodied notion of what the place is. The idea of the place is not the place. As geography professor Rachel Slocum explains, "(e)ngaging the public on climate change is especially difficult because global climate change is perceived as spatially and temporally distant" (Slocum 2004). Emplacement (through site-specific, site-dependent, site-respondent *in-situ* field work) is a significant method of knowledge acquisition for this project, shifting the theoretical into the embodied. While researching how to perform geochronology, I co-devised tangible sites selected by intuition, invitation, and the sites' affordances to dwell with many sites imaginary; I expand on this method of site selection in **Chapter 3: Sites**.

By *performing* geochronology—that is, by *showing-doing*—we may reveal knowledge production that extends before human existence—knowledge production undertaken by other-than-human entities. We may narrate the hidden archives of sedimentation, alongside the revising gestures of deposition, erosion, and intrusion. We might obviate, too, our inescapably anthropocentric thought constructs, the languages that drive them, and our inherited wills-to-narrativize-and-metaphorize. We might demonstrate what is invested in this human moment of past-future collision, where we urge ourselves to contend with an anthropocentrism in contemporary earth-life formulations. By performing geochronology through intimacy and attunement, we might dream for becoming-with and sustain-ability (García Zarranz 2018) within fluctuating systems difficult to predict.

For a practice-led researcher in performance studies and human geography, an in-depth consideration of geochronology offers an opportunity to think through an eco-ethical knowledging in temporal and spatial fluctuation. Geochronology posits temporal relationality of human and more-than-human entities in narrativized chronologies. The data-driven output of geochronological research lends itself to recharacterization in order to tell the stories archived in the earth's sediment. Relational development provides humans an opportunity to resituate ourselves near what is deemed more-than-humanity, with the intention to interrogate and refigure the doomsday rhetoric at stake in contemporary climate-change discussions. Stratification, layering, interconnection, and interdependence—all components of geologic and stratigraphic vision—gift continued discourse and action with incensed notions of communality and commonality amongst the estranged familiar.

2.9 Performance Score: “Violinouflage”

As an integral sense, intimacy enlivens the experiential potential of artistic practice-as-research to sustain the practitioner’s attunement via haptic and tacit knowledge acquisition. In *Sound of Mull*, the performance score “Violinouflage” proposes a way to engage with a foreshore to acquire haptic and tacit knowledge. The score instructs the performer to place violins at the lowest, midpoint, and highest points of a foreshore. The intention is to take a familiar object associated with sound and immerse it within a foreshore environment for long-term dwelling. The performer must strategize the optimal foreshore for this experiment, partnered with what weights or buoys may be necessary to keep the violin emplaced during tidal fluctuations. The haptic, or hands-on, necessity of the score requires the performer to handle the violin in non-conventional ways (affixing weight or buoy with rope) and to approach the foreshore for its dwelling potential (considering what rock, sand, mud, and more-than-human co-constituents will provide the optimal habitat for the violin’s survival). Such considerations encourage the cultivation of intimacy with both instrument and foreshore, an intimacy beyond normative engagements.

The violin neck, encrusted with sand and with its splayed strings, is the remaining physical archive from “Violinouflage” (fig. 25) which was performed at Skarðsvík, Iceland in February 2019, proximal to the Hellissandur SOSUS Listening Centre. At the time this score was performed, there was a strong wind from the southeast gusting 25 meters per second. The foreshore is wide-sweeping blonde sand (fig. 26), distinct in Iceland at this peninsular location under Snæfellsjökull glacier. Low tide was at 13:30 but rose quickly. With the violin body dug partly into the sand, I tied the neck and body with a double bowline knot to affix it to the smallest A0 buoy and the 2kg weight (fig. 27 and fig. 28). I chose this knot for the double entendre on bow (violin bow, and the bow of a ship). I positioned the violin behind a seaweed- and barnacle-encrusted boulder which leaned against the sea cliff where it would be submerged for hours during each tide flood (fig. 29).

Figure 25. The violin neck comes unglued during an attempted retrieval after it has dwelled on the foreshore for twenty-four hours.

Figure 26. I carry violin, weight, and buoy along the foreshore of Skarðsvík, Iceland. Photo credit: John Rogers.

Figure 27. Violin awaits drowning.

Figure 28. I tighten the knots which will affix weight and buoy to the violin. Photo credit: John Rogers.

Figure 29. The violin lays half-buried in the sand, awaiting the arrival of the next high tide. I include the score in case someone finds the violin.

The violin went through two tide floods and ebbs, and I returned the next day to check on it. There was a strong windstorm off the west coast (Fontaine 2019), unusual in its strength. Ships were called home. Seabirds gathered along the coastline seeking shelter. Local theatre owner Kári Viðarsson remarked the subsequent day that the waves had been so high and violent overnight at high tide that the coastline around Hellissandur was transfigured in a way unfamiliar to residents in decades. When I tried to find the spot, boulders the sizes of cars and woodsheds had piled in front of the sea cliff where I'd hidden the violin. I could no longer access it with the ease of the day prior, instead climbing over slippery boulders, sliding my whole body over and amongst them, to eventually spy the violin. It was still there, and still intact, though buried in a bit more sand and wedged thoroughly by a new boulder pushed against it. Reaching hands into the small crevice, my performance partner John Rogers managed to remove the violin neck; the wood glue had given out overnight, so it wasn't actually attached (just in vision). The violin body wouldn't move, though, and remains co-dependent with this site to this day.

Normally, I feel perfunctory creating work. It is not an emotional space when *in-situ* performance is in progress. Rather, it is a practice of holding the space to see how to interdepend with humans and more-than-human entities to ensure the work can unfold. There is focus on the technical aspects of body movement and documentation (mental

notes for later writing, photographs, video work). Later, I may have an emotional response while viewing the output—including enthusiasm or joy for documentation gone well.

For the days that proceeded the violin body left behind, I felt pangs of longing and loss. My heart reached its tendrils northwest from Reykjavík, where I lived, towards the tip of Snæfellsnes peninsula. I kept mental track of where the tide was, imagining the violin below the ocean or exposed to wind. The strong urgency to return and retrieve the violin body stayed with me. I watched live recordings of Owen Pallett's concerts online, listened to him intone, "I leave my violin unattended" (Pallett 2014). Close-ups of his violin pulled me fully to this violin under the ocean which I did not even myself know how to play.

2.10 Accretion and Circularity

> [W]eathering as a concept learns from a feminist politics of difference and intersectionality: not all bodies weather the same; weathering is a situated phenomenon embedded in social and political worlds (Neimanis and Hamilton 2018).

In the context of this interdisciplinary PhD, I pay close attention to the form and content with which I work as I consider how to perform geochronology in the Anthropocene. The content includes what human and more-than-human assemblages are inclusive within *in-situ* performance, extending to consideration of the multiple temporalities fluctuating within the shared site. In a materialist sense, the personal-as-political unfolds in what I see or sense as I engage a site through the lens of 'geochronology,' the 'Anthropocene', and 'climate change.' Sighting half-submerged nuclear submarines with their classified circulation matters as material. Awareness of the benthic community members I may disturb as I walk along a foreshore matters as material. As a designer and facilitator of performance scores, I cradle the ethical implications of weaving experiential stories that contain and entangle the already entangled "terraforming assemblages" (Keller 2017).

So, too, within my complementary academic analysis do I attend to the ethical implications of entangling the already entangled thinkers with whom I think. Haraway notes that the anthropologist Marilyn Strathern taught her: "it matters what ideas we use to think other ideas (with)" (D. J. Haraway 2016). My commitment to academic research provides a deepening of institutional support for the subjects I pursue within my creative practice. I engage with previous works I have produced coming through scholarly research, such as Lynn Keller's essay on my poetry book *Wide slumber for lepidopterists* in her essay collection *Recomposing Ecopoetics: North American Poetry of the Self-Conscious*

Anthropocene (Keller 2017). By partnering my creative output with scholastic intent, I learn from and with research contexts that engage this same work. I think of Haraway—"Thinking is a materialist practice with other thinkers" (Terranova 2016) and how reading through source texts of people who engage my work—such as Keller and Libe García Zarranz—informs, shifts, and resituates the work I produce. The creative output asserts itself as a form of dialogue with the thinkers who influence my work, including fellow artistic practice-as-research scholars such as Stefan Östersjö and Halla Steinunn Stefánsdóttir (whose works are discussed in **Chapter 1: Literature and Practice Review**) whom I invite into my research praxis. I mention this within intimacy and languaging as the cyclic and generative nature of producing creative work that then feeds academic research and influences creative work that has been an influential component of my research methodology. Experiential learning is a tenet of sustainability pedagogy (Jensen and Schnack 1997; Hamilton and Wills-Toker 2006) and this, alongside García Zarranz's recent proposal of the hyphenated term **sustain-ability** (following from the hyphenation of Karen Barad's **response-ability**) (García Zarranz 2018), informs my consideration of how an experiential artistic practice impacts lifestyle choices that "stay with the trouble" (D. J. Haraway 2016) of cultivating an ability to sustain worldly emplacement.

In creating the dissertation, I also find that it does not have a deterministic or teleological methodical flow (as in: I do this, and then the next step is to do that…); rather, there is a circularity produced through returning to and reliving approaches and practices that emerges, accrues, and gives the sensation that I cannot remember or hold in mind everything that I learn through the process. As the researcher's body is partly the carrier bag (Le Guin 1996) for these experiences, I have a tacit understanding of the many subjects and concepts that link into the practice. I can't see the forest for the trees, because I am so focused on attempting to recall my experiences with each tree.

With embodied work grounded in geochronology and geomorphology, I follow the 'weather' and wellness of the body, how a phenomenological approach to comprehending circulation can ground, uproot, or erode propositional stratification (of sediment, of experience). As practice, this is complicated by my personal wellness, which I hesitate to thread into academic research due to worry about the veracity of autoethnographic disclosure in this capacity, about the reception that such disclosure tends to receive in academic contexts (with a distanced affective response), and about not wanting to distract from the overall research field which I intend to sculpt as multiply accessible and repeatable a practice (not a practice about my health, in other words). Still, the feeling of

being overwhelmed by and unable to keep in mind the many links called up through the actions becomes entangled with my personal wellness during the research—wellness informed through post-chemotherapy "brain fog" (Parker-Pope 2011) and hormonal fluctuation from the onset of perimenopause. I experience the research and react and respond to it as a body with these specific attunements. It matters what stories tell stories, and it matters what bodies embody embodiment (or bodies embody bodies). The symptom-rife body, the body of hormonal fluctuation, the recuperating body, the ill body, the body that cancered—the chemical, physiological make-up of this body colours how it performs and assesses its attunement, its entanglement, its defamiliarization, and its desire for transformative action.

2.11 Performance Score: "Intime"

In time

Pronunciation: /ɪn/ /taɪm/, ĭn tīm

Etymology: in tīma (Old English), in tīmô (Proto-Germanic), i time (Danish), í tíma (Icelandic). See also *tide.*

Prepositional phrase

1. When or before due
2. Immediately
3. Eventually
4. Successive continuum of past, present, future
5. Rhythmically synchronous

Intime

Pronunciation: /ɛ̃.tim/

Etymology: intimus (Latin)

Adjective

1. Intimate
2. Inner

The term 'intime' implies both the French word for 'intimate' as well as a conjunction of the English-language 'in time.' As a series of coastal/tidal actions, "Intime" is geopoetics writ large—a visual and proprioceptive performance poem inscribing 'O' onto foreshores at low tide. As sites prone to the geomorphic acts of deposition, erosion, and intrusion, foreshores provide an impermanent surface through which to interrogate the deep time and climate change affiliated with the Anthropocene's inaugural narrative. What is foreshore is not what was foreshore, or what will be foreshore. By extrapolating the results of geochronological dating, one might reveal a narrative of *be*foreshores, and

predict fore*thcoming*shores. The foreshore acts as a powerhouse of betweenings, a wobbly or warbling signature of time changes. Foreshores, in this sense, may be keystone geographical features. Foreshores are formed through deposition, erosion, intrusion, extrusion—examples being submarine eruption as extrusive event, marine flora and benthic infauna communities as intrusive contributors. The multiple narratives of geochronology play out in the deep pre-human time and speculative futures of the foreshore.

"Intime"—along with the derivative works "(SUND)" (discussed in **3.7.9.1 Mapping "Intime" as "(SUND)"**) and "Knots" (discussed in **2.3 Performance Score: "Knots"**)—proposes embodied, site-respondent possibilities via foreshores of how to perform the geochronology of large-scale, temporally distinct events otherwise difficult to process in human-conceived notions of time and space. The point of departure is the North Atlantic Drift in collusion with the Irminger Current and Labrador Current; counter-clockwise circulation of air and ocean currents rove from the British Isles to west-coast Scandinavia and southern Iceland. "Intime" is performed in foreshores impacted by such air and ocean currents. Each performance lasts the length of the participants' available time and energy, averaging an hour.

To prepare for an "Intime" performance, I check the tide chart that corresponds with the foreshore where the performance will take place. The variable distances between ebb (low tide) and flood (high tide), influenced by spring (corresponding with full or new moon, when tide pulls are at their strongest) and neap (quarter moons, weak tide pulls) tides, mean that the littoral zone is exposed for different periods of time any given day. With each site, I commence performance when the low tide begins its flood, so that the full foreshore is exposed and, if sandy, will provide a surface for footprints to create a temporary tattoo of our path on the ground. As the tide floods the tattooed sand, it 'erases' the mark we have made. I also attempt to choose a date closest to the spring or neap tide, so as to maximize the depth of the littoral zone; this provides the largest stage on which "Intime" may be performed. Finally, I select a diurnal hour so as to perform the interaction in light conditions suitable for documenting with video.

I select a foreign-familiar activity in order to estrange myself from habitual engagement with my body, the sites, and my collaborators. The counter-clockwise procession offers a naïvely known embodiment in relation with innumerable more-than-human collaborators that guide and shape the performance. How does the quality of the ground guide one's movements? How do wind speeds, weather, and temperature inform

the movements we make? As with geochronology, one attends an activation process to see what opens up the materiality of the site. Therein is an interpretive science, hypothesis as to datings of stratigraphic unit (SI), but until the dating is performed, the outcome is uncertain.

"Intime" performances took place in:

- Loch Long, Scotland (2016), see **3.7.1.1 Intimate with Loch Long, Scotland**;
- Lomma Bay, Sweden (2017), see **3.7.3.3 Intimate with Lomma Bay, Sweden**;
- Herøya Industripark, Norway (2017), see **3.7.4.1 In Time with Herøya Industripark, Norway**;
- Kelda and Hjörseyjarsandur, Iceland (2016/7), see
- **3.7.6.1 In Time with Kelda and Hjörseyjarsandur,** Iceland;
- Nidarø, Norway (2017), see
- **3.7.6.1 In Time with Kelda and Hjörseyjarsandur,** Iceland;
- and Kinghorn, Scotland (2016/7), see **3.7.2.1 In Time with Kinghorn, Scotland**.

Additional "Intime" practices were undertaken in Denmark and Iceland (2016-8) and Faroe Islands (2019), though documentation of these encounters is excluded from my dissertation as these were undertaken less as performance and more as rehearsal and continuation of practice. Additionally, public performances and curated events have been co-supported by Laboratory for Aesthetics and Ecology (DK). In 2017, Lomma Bay's "Intime" was co-supported by Lund University (Malmö Academy of Music and the Inter Arts Centre); see **3.7.3.3 Intimate with Lomma Bay, Sweden**. Nidarø's "Intime" was performed near and exhibited at Kunsthall Trondheim; see **3.7.5.1 Intimate with Nidarø, Norway** and **3.7.8 Rooms that Perform: Kunsthall Trondheim, Trondheim, Sør-Trøndelag, Norway**. A final "Intime" circulation was staged on the foreshore below Sea Loft, Kinghorn, Scotland for the launch of *Sound of Mull*; see **3.7.9 Rooms that Perform: Sea Loft, Kinghorn, Scotland**.

Practice-as-research documented in "Intime" captures an *in-situ* approach to how performance unfolds in the flux of the Anthropocene's proposal. Video documentation of "Intime" is arranged in a split-screen four-panel work where the videos function as a cosmopolitan assemblage of sites and temporalities. My intention is to create an aesthetic presentation of the documented performances, incorporating distance and close shots of

endurance performance alongside non-human activities on or near foreshores as well as related performances that depict engagement with geochronology (including collaborations with Burlat on “Knots” and with Cecilia Hultman on Herøya slag and geologic formations). All videos are colour-corrected and audio is removed. Footage is shot intentionally without focus on soundscape, with the foresight to anticipate their silent screenings or their pairings with professionally captured soundscapes or live sound performances (such as in cooperation with Stefánsdóttir for the Inter Arts Center performance and exhibition).

Videos are also edited to display a range of speeds (slowed down, real-time, sped up) as a proposal of the multiple temporalities one might perceive through the recorded, archival process. For performances where I acquired footage from more than one angle (including Lomma Bay and Nidarø), care was taken to sync the videos in the composite four-screen work. I opted to exclude subtitles that situate each video within a place, as the diversity of places already provides a sense of difference as well as the likelihood they are in northern climes. The results of this assemblage produce concepts that other practitioners may use to process, reflect, and respond to “Intime” as performance and “Intime” as video installation.

Moon cycles pull tides. Days dip darker past the autumn equinox. Système préparatoire infrarouge pour l’alerte (SPIRALE) tracks ballistic missiles using infrared satellite imaging (Deriu 2010). The cyclic motion of tectonic plates. The sinistral whorls of cochlea, of periwinkle shells. In the new drowned Wonderland, Alice runs the Caucus-race with Mouse, Eaglet, Dodo, Lory, and Duck (Carroll 1865). Seabirds circle overhead. Wiccans close the sacred circle by walking widdershins (Grimassi 2000). Eelgrass washes ashore as entangled loops. The rising tide erases sand spirals. We hold our writing hands mid-air, trace the letter O with our index fingers.

2.12 Critical Reflection through Textual Scholarship

> For an arts researcher inspired by a call to critical action, any inquiry is undertaken for personal and public ends. A questioning attitude that is socially and culturally directed readily maps onto methods of inquiry and research acts that are responsive and exploratory. Yet the most crucial element within this inquiry process is the need to be able to create forms from which critical options can be more clearly assessed and addressed. This will require moving in and beyond the comfort of prescribed discipline knowledge, as issues and concerns demand approaches where new perspectives are opened up. Consequently it

> is the creation of new opportunities to see beyond what is known that has the potential to lead to the creation of new knowledge (Sullivan 2006).

Academic work founds itself in knowledge transference through predominantly text-driven scholarship, where written human languages have become an expected, familiar hierarchical system through which knowledges are transferred between cultures, fields, and generations. The *semantics* of the languages are afforded focus for understanding and information. But there is more to languages than their semantic content, and there is more to research-driven knowledge acquisition than scriptophilic encodement and dissemination.

Of practice-as-research as a complementary approach to traditional scriptophilic scholarship, South African performance studies scholar Mark Fleishman writes: "What is required is an honest acceptance that the principle of 'compossibility'—fleshes alongside texts alongside images, sight alongside hearing and touching and feeling and moving—is called for" (Fleishman 2012). I would add to his call for parallelism a need to sense the sensorial within languages as well, and to accentuate those lingui-senses in extended conversations with more-than-human entities and their temporalities. Foregrounding the visual, proprioceptive, and aural components of languages becomes a way to estrange the familiar and to attempt to understand a larger ecosystem of a language's functionality (what is subliminal in the gears of the language tool). It offers a strategy to obviate self-aware representational gestures—necessary as "[m]uch of the modern interest in phenomenology by continental philosophers derives from an effort to circumvent what is commonly accepted to be a first order philosophical problem. This is the problem of representation. How is it possible for our thoughts, ideas, or language to represent the world" (Baker 1999)?

Stripping prescribed, directive narrative from performance—or embedding it strategically—places greater sustained response-ability on audience and participants to devise their own narratives, and potentially notice narratives *as* narratives. The same is true for diction, where spotlighting selected vocabulary can underscore politicized and affective gestures layered into the work. Can the same extend to awareness-building of language's representational usage? "In an age when the media venerate the spectacular, when public policy is shaped primarily around perceived immediate need, a central question is strategic and representational: how can we convert into image and narrative the disasters that are slow-moving and long in the making…" (Nixon 3)? Nixon's supposition of slowness and immediacy suggest, to me, a repositioning of narrative and visual enaction to comprehend

climate change—both passive audience/listener positionalities—to embody tempo(ralities) in heard and felt (*embodied*) capacities. I would emphasize *moving* in his conjecture of slow-*moving*. As a stepping-stone (or a sedimentary layer) between narrative and visual as the top stratification of circulating contemporary thought and an *underlayer* of movement, my practice-as-research output explores an embodied approach to *metaphor*.

But let us consider for a moment the efficacy of geological metaphor in textual scholarship. Stratifying acquired knowledge does not surface *new* thought, but rather recirculates or unearths previous thought and action to fit current modes of comprehension. Conceptualizing knowledge acquisition in capacities that are not linear, surface, or chronological supports, perhaps, a way to shift spatial and perceptual circulation of knowledge experience to movements that could be considered spherical, network-noded, stratified, and/or mixed-flow.

As I attend to this moment within my complementary writing, I think of mosquitoes and Fleishman (Fleishman 2012), who intercut a scholarly paper on practice-as-research with anecdote of his phenomenological interaction with mosquitoes as he typed. I pause typing to think. My eyes glaze over, seeing nothing. I place my hands in front of my body in an orb shape, try to pull them apart to grow the circular shape. I pull strings with one hand between the imagined orb of the other to reconnect imagined thought-nodes. I attempt a physical approach to depth. My thoughts race to earth roundness, its molten core, the stratification of thought and rock that connects and disconnects and sifts the modalized thinking connections.

What if we consider these acts in a more spherical, embodied sense? Consider where and how the act of learning accrues in the body. What if knowledge acquisition takes its jumping point from the moment of embodied textual engagement and then applies it beyond the page to embodied daily life engagement? How do we confront or engage the speech acts around us at all times, and what is communicative beyond inherited languages? Our inherited, preconceived notions of what has depth, surface, movement, embodiment, duration, or chronology can help to reposition our understandings of how we are positioned in worldly, deep time thinkership.

Each chapter features (often as the first subchapter paragraph) non-sequitur statements that suture time, space, materials, and agents as seminal players informing the overall research process; an example of this is found in the second paragraph of the **Introduction** (“Geochronologists…”). These non-sequitur statements act as prose poems

in their own right, while introducing and continuing touchstones of research reference that reappear in each chapter. Each "Intimate / In Time with…" subchapter of **Chapter 3: Sites** recurs non-sequitur statements that previously appeared in the Introduction and other chapters, re-assembling the statements to combine time, space, materials, and agents relating them with greater specificity to the processual account that follows within the subchapter. My choice to incorporate this is an attempt to counterflow or counterpoint conventional forms of artistic practice-as-research complementary writing by inviting the writing format and content to *perform* itself as a demonstration of the reweaving, renarrativizing that happens when similar syntactic structures are assembled through repetition. As the creative output repeats ("Intime"), so does the writing style describing the creative output. I have also written this not in the form of case studies, but in a long interconnected format where I refer back to earlier works as I expand sections. This has a circularity which rhymes nicely with the counter-clockwise circulation explored heavily in "Intime."

As an artist, I have inherited a best-practice training from my undergraduate years (in a course on poetics) which foregrounded Roland Barthes' notion of reader's interpretation as important (not author's) (Barthes 1977). This has been a valuable practice within public and private reflection on the creative output I have produced the last twenty years, as it has afforded me the opportunity to foreground or facilitate analytical or theoretical discussions of work I've created, while limiting the need to articulate my own discursive reflection in publication spaces. The complementary writing component of my PhD challenges this limitation by inviting explication of my influences, conceptual frameworks, and process analyses.

I take the guidance of Nelson's *Practice as Research in the Arts: Principles, Protocols, Pedagogies, Resistances* for the overall structure of this PhD, where Nelson advocates that artistic practice-as-research dissertations work well when comprised of practice review, conceptual framework, and account of process (Nelson 2013). For practice review and conceptual framework, Nelson recommends a third-person perspective, whereas in accounts of process Nelson recommends first-person perspective. I take this one step further by referring to collaborators and participants by their first names (rather than last, as is academic writing protocol), to denote the familiarity and intimacy that was established during the creative process. I have opted to deviate from referring to "account of process," instead relying on the term "analysis of process" to foreground the integral role that analysis, context, and theory play in explication about practice-as-research in

complementary writing, which situates the PhD work as different from the trade tools of non-academic artistic statements and project descriptions.

I write the complementary academic writing of my PhD in these ways because, as Haraway urges, “It matters what stories tell stories” (D. Haraway 2013).

2.13 Performance Score Collection: *Sound of Mull*

Sound of Mull is a book that collects into one volume the performance scores developed through artistic practice-as-research into how to perform geochronology in the Anthropocene along North Atlantic foreshores (fig. 30). *Sound of Mull* acts as both an archive of scores created and practiced, as well as a handbook for speculative performances that may occur with or beyond my facilitation in the future. The idea to create a book of this kind arose during the practice-as-research as a strategy to share working methods that otherwise would have been inaccessible for audience or unable to fully document in video/audio. It is also my intention that the scores propose experiential knowledge acquisition, inviting readers to imagine or test them for themselves.

Figure 30. *Sound of Mull* and accompanying postcards that contain performance scores.

The title *Sound of Mull* refers to both a Scottish body of water as well as the potential audibility of contemplation. Each subsection (including Inner Sound, Sound of Sand, Water Sound) adapts the name of a Scottish body of water to refract through the geomorphic or metaphysical property it lists. The words ‘score’ and ‘composition’ are frequently and intentionally left without reference to artistic medium, so as to allow for their imaginings and applications within, between, and beyond arts practices. The scores emphasize sensorial engagement through listening, movement, response-ability (D. J. Haraway 2007, 89), and sustain-ability (García Zarranz 2018). All scores are intended for personal experiment, social experience, and/or compositional exploration.

The book itself offers a tentacular[26] performance method. Not only are scores documented and also offered for future engagement; the book design itself explores how to perform geochronology, as I was part of all creation and development aspects of the project. About the design specifically, I worked closely with a designer to envision a handbook-style publication that could be easily transported to foreshores. We opted to deboss stylized lines on the cover, which are outlines of the geographic area Sound of Mull in Scotland. The colour scheme in the book is a deconstruction of the colours within the "Violinouflage" photo-documentation, with the dominant colours of olivine, basaltic sand, violin, crest, volcanic rock used for the cover, section dividers, and photograph washes throughout the book (fig. 31). The buoy's electric orange was, in particular, a notable colour we employed throughout the book, as a man-made hue and climate-change danger indicator in contrast to the environment palate otherwise present.

Figure 31. Colour Study of "Violinouflage" photo-documentation, deconstructed to form the colour palate for *Sound of Mull.*

[26] For more on tentacularity, read Haraway's multispecies becoming-with through engagements with "the tentacular ones" (D. J. Haraway 2016) in her book *Staying with the Trouble: Making Kin in the Chthulucene.*

Chapter 3: Sites

3.1 To Define

A geologist consults a tide chart to determine ebb and flood times for the coastline where she'll perform fieldwork (1994). The human geographer entangles and blurs the boundaries between body and land as she walks the foreshore (Lund 2012). Lugworms (*Arenicola marina*) eject sand in loops and spirals on littoral zones at low tide (Tyler-Walters 2008). An archaeologist surveys the Stone-Age settlement Skara Brae, under threat from climate change consequences including increased storminess, rising sea levels, and coastal erosion (Markham 2017; Feser et al. 2015). Searockets (*Cakile arctica*) populate the barren sand of new island Surtsey, two years after a submarine volcanic eruption disgorged basalt and palagonite as a North Atlantic island (Fridriksson 1987). An oil rig is vacated due to the approaching storm (Zhang 2017). Eelgrass (*Zostera marina*) shields blue mussels (*Mytilus edulis*) from dislodgement during a storm (Reusch and Chapman 1995). The performer runs in counter-clockwise circles on foreshores to cultivate relational empathy with the North Atlantic and its past, present, and future constituents.

While the term 'site' is prevalent across the arts and sciences, its discipline-specific usage differs in quantitative and qualitative valuations determining the borders and relations implied within a geophysical assemblage. The sciences tend to emphasize past, present, and future processes enacted on and in a site through the materials that preside and compose it, with narrative output demonstrated through largely quantitative measurement and study of the materials therein. As the science determining ages of rocks, fossils, and sediment, geochronology reflects on materials and their causal realities to understand what happened in a region, which can lead to the formulation of response contingencies for similar future ecosystems and their co-constituents (Bishop et al. 2005). Field-work sites are selected for their complexities with research providing data on the geological history of a region, which may include a period of climate change, a mass extinction event, evaluating mineral or water resources, and/or understanding natural hazards (Coe 2010). On sites, samples (known as stratigraphic units, or SIs) are extracted, which then undergo one of several dating methods that use radioactive isotopes or stable isotope ratios to determine absolute or relative ages; I will talk more about geochronology and multiple temporalities in

Chapter 4: Temporalities.

Exploring human relationships with place and time, archaeology is also concerned with site materiality by delimiting an historicized sense of site through topographic and depth explorations. Reasons for selecting a site tend to foreground advancement in research of well-preserved (pre)historic, cultural remains or an archaeologically sensitive region threatened by destruction (Greene 2002). When surveying the material boundaries of a site, archaeologists may rely on shovel testing, auguring, resistivity, photography, or electronic distance measurement including a global positioning system (GPS) (Greene 2002). A site's fieldwork may range from non-intrusive examination (such as desk-based assessment, archaeological field evaluation, or an archaeological watching brief) to full-scale excavation (Greene 2002).

The geochronological site could also be hyperlocal or global, all determined by inference drawn from a site's materials. A stratigrapher's site could be considered to be confined to a location for field work conducted via extraction of stratigraphic units, even when the site considered for geochronology is intended to extend research applied to planet-wide, or even interplanetary, stratification encoding chrons, ages, epochs, periods, eras, eons, or supereons (Milton 2017). Archaeologists work with both depth and topography to delineate a site. Some geologists and archaeologists rely on radiocarbon dating to determine the ages of materials found within their sites, and the types of materials eligible to date give an indication of what is deemed valuable as site markers. According to an archaeological paper discussing procedures involved in radiocarbon dating, such matters include

> bone (collagen extraction, with and without ultrafiltration), cremated bone, tooth enamel, charcoal, grain, carbon residues, shell, wood (including alpha-cellulose isolation), peat, sediments, textiles, fuel/biofuel, and forensic samples (Dunbar et al. 2016).

These are sought-after materials during site excavation and fieldwork, since these materials are possible to radiocarbon date with Accelerator Mass Spectrometry (AMS). This technology is used to accelerate ions at high energy, and separate particles on the basis of their mass-to-charge ratio. The amount of carbon 14 isotopes versus that of carbon 12 isotopes may then be analysed to produce a radiocarbon date. A geochronology site may also include the facility where AMS is conducted.

We may also determine a site by considering size (or scale), sensorial engagement, and temporality. Size may refer to a quantifiable measurement in horizontal or vertical directions, indicating how wide, narrow, tall, or deep the site is. Climatic forces,

geophysical forces, and ecosystem components may also contribute to how a site's intersectionalities and intensities are established. A site's definition might be driven by human perceptual measurements, which could be quantifiable (decibel level) or qualifiable (kinaesthetic access or what can be observed by the naked eye). In his book introducing archaeology, Kevin Greene asserts that "[t]he human eye, informed by experience and training, remains the most sensitive instrument" (Greene 2002) in delineating the borders and materials of a site. As for temporality, we might configure a site's boundaries through its past, present, future, or other non-linear expressions of time.

Inclusive of yet beyond the material scope of geochronology and archaeology, human geographers consider the relationship of site materiality with human activity: "it makes no sense to privilege human agency in sites over the material force relations that draw them together. No individual is ever outside of the dense materialities that compose sites, but—equally—neither is one the transcendental author of those sites" (Woodward, Jones, and Marston 2010, 273). Reading feminist geographer Doreen Massey through feminist theorist Karen Barad's sense of agency enlivens the roles more-than-human entities play in activating sites. Barad's notion that "agency is about response-ability, about the possibilities of mutual response" (Dolphijn and Tuin 2012) underscores active place-making through interaction: "If places can be conceptualized in terms of the social interactions which they tie together, then it is also the case that these interactions themselves are not motionless things, frozen in time. They are processes" (D. B. Massey 1994). Within a site, such processes and movements *perform* enactive materialities. Better yet, the site itself might be cast as performing, performance, and/or performer.

A major contribution to the concept of site from performance studies has been the sense that a site may have unfixed coordinates due to its own transitive, constantly becoming nature. Performance studies scholar Nick Kaye explains that where "site-specific work foregrounds site's elusiveness and mobility, the concept and features of the site which it articulates are continually annulled, displaced, or surpassed" (Kaye 2000a, 188). This could be construed, in part, by humans as place-makers through their sensorial faculties and physiological engagements. Performance artist and professor Mike Pearson attests that "a place owes its character not only to the experiences it affords as sights, sounds, etc. but also to what is done there as looking, listening, moving. Both 'being' and environment are mutually emergent, continuously brought into existence together" (Pearson 2010, 16). A site becomes-with the human who becomes-with the site. They

interdepend, entangle, and co-devise existences as their bodies—which may also be the same multi-entity assemblage of one body—flux when in contact.

3.2 To Land

Pearson advocates for cross-disciplinarity within performance studies with his position that "the perceptions of cognate disciplines such as geography and anthropology are instructive for both the critical apprehension of any creative initiatives in performance" (Pearson 2010, 13). The confluence of theatre and performance studies with human geography and archaeology may emphasize the human in ecological co-construction, with notions of 'site' enhanced through the geochronological enactment of speculative human relationship with geophysical material. In general, performance studies researchers engage a sensorial determination of site, working primarily with surficial and local aspects of site-respondent performance. The concept of landscape figures prominently into such determination, as landscape suggests a two-dimensional projection into which a viewer inserts herself (Benediktsson and Lund 2010). The horizon line indicates the focus point for the surface we engage, and that surface is first and foremost whatever exists proximal to the visible horizon line. What exists beneath the surface of land or water, and what circulates above the horizon, are secondary or complementary foci to the primary emphasis within the concept of landscape: that concept positioning interest in the surface. An engagement with the surface is also chronological engagement with past and future evidence of geologic and climatic depths. What forms, informs, and reforms the surface is driven by the vertical—the depth where geologic and atmospheric drivers circulate.

The fixed locality of site-specific art emerged as a seminal definition through visual artist Richard Serra's assertion that "[t]o remove the work [from the site] is to destroy the work" (Serra 1994). This notion anchors site-specific art to a surficial space and current temporality. Anthropologist and Anthropocene researcher Anna Tsing notes within the sciences that descriptive analyses included within reports are "site-specific, that is, attuned to indeterminate encounters and thus nonscalable" (Tsing 2015). Site-specificity within the sciences, then, asserts a particularity within research that confines findings only to the location studied. In performing geochronology, I propose to expand on such site-specific definitions by considering the deep time or future possibilities that emerge through site ontologies of human geographers. By doing so, work produced through performing

geochronology would raise awareness of the land's geophysical make-up and chronology as players within an aesthetic, relational proposition.

Via alternative narratives incorporating deep time and distant futures, the site specificity of performing geochronology heaves through the material transmogrifications governed by geodynamic forces. The fleeting performer or audience interaction shimmers with the ghosts of former site materiality and future site upheaval. A site is simultaneously the moment when performer or audience engages it, but also houses stories of what the site was or wasn't while implying what the site may become through climatic, geophysical reconfiguration in millennia to come. A slowly transformed and transforming site carries the moment of artistic interaction as attentive fluctuation in a grand narrative of planetary becoming. With a need for planetary becoming-with and relationship building that reposition embodiment through narratives of climate change and the Anthropocene, performing geochronology acts as a moment of situated attunement through which participants or witnesses may relate differently experiential knowledge acquisition and transformative action.

Kaye interprets cross-disciplinary philosopher Michel de Certeau's notion of place as "*an ordering system*" (Kaye 2000), which bisects fixity by implying a place, as an ordering system, can be reordered or is in a constant state of reorganization. Kaye goes on to read de Certeau's supposition of human engagement with space "as *ordering activities*, whether that activity be walking, reading, listening or viewing. Thus, different and even incompatible spaces may realise the various possibilities of a single place" (Kaye 2000). The latter epiphany makes way for an ordering activity, repeated in multiple otherwise unconnected places, to delineate a site as a space where particular ordering activities occur. Within a visual arts and art historian context, Ida Soulard and Fabien Giraud propose a definition of site as a "formalization of continuity," through their interpretation of artist Donald Judd's call for new works that "do not allude or refer to a space outside of themselves but—through a series of material inferences—construct and unfold their specific and continuous spatiality" (Soulard and Giraud 2015). By combining Kaye, Soulard, and Giraud's reflection on sites, site-respondent performances could be redrawn as ordering activities enacted within spaces that formalize continuity through material inferences.

3.3 The Anthropocene and Climate Change

> We contend that the truly emancipatory aspect of the Anthropocene for art pertains to… a revised conception of sites and the type of rational practice to which it testifies. Art in this context cannot be reduced to representation. Art is not merely a conservation of *what we were* or a reaction to *what we are*, but a proper commitment to *what we could be*; it is the material formalization of the possible (Soulard and Giraud 2015).

To articulate a site, within the context of performing geochronology, requests attention to the current geophysical surface of site engagement as well as the site's deep time and forecasted future. In 2016, the International Commission on Stratigraphy was presented with the proposal to signal a shift in the synchronicity of global processes by naming the Anthropocene as the geologic time of now (Carrington 2016). To delineate a new time, the International Commission on Stratigraphy requires indication that global sediment samples will return shared indicators of that epoch. The Anthropocene suggests human forcing of physical process, though the primary driver remains open to debate—including potentially the Industrial Revolution, radiation from nuclear reaction, and wide-spread presence of plastics. Of relevance to performing geochronology, the surficial stratum of access to the performers' and audience's bodies would necessarily be the stratum providing material indicators of the Anthropocene (see

Chapter 4: Temporalities for further discussion).

Industrial, nuclear, or plastic markers of the Anthropocene would not touch only one site; they would have implications for (m)any sites. Such markers also suggest that topmost global sediment sample could, itself, be a meta-site—a site that is simultaneously local and global, affective and cosmopolitan through its material assemblage. Performing geochronology, therefore, requests a multi-modal approach to the idea of site; the global/planetary, the national/international, and the bioregional/local are all factors in co-devising the identity of the site and, in this way, to define a site is no longer to rely on cartographic boundaries. Further to this, the multi-modal site can situate the Anthropocene and climate change as urgent and proximal players in site-respondent performance that vulnerable hotspots—a primary consideration in how I select sites for performance later in this chapter. The confluence of such urgencies and agencies might then elucidate past and future geochronologically-driven narratives that dictate the content and form of a performance.

Geochronologists also consider how significant deposition, erosion, and intrusion of past strata formation may provide clues for how humanity might contend with future catastrophic events of similar unfolding. From climate change (Plass 1956) and inadvertent climate modification (Massachusetts Institute of Technology, Kungl. Svenska vetenskapsakademien, and Ingenjörsvetenskapsakademien (Sweden) 1971) to global warming (Broecker 1975), overwhelmed planetary systems are triggering catastrophic events like tsunami, earthquake, and volcanic eruptions. The future precaution at stake within the deep-time narratives unearthed by geochronologists have become one of the puzzle pieces for reacting to catastrophes. Of consideration within site-related narrative construction, professor of English literature and the environment Ursula K. Heise argues that "biodiversity, endangered species, and extinction are primarily cultural issues, questions of what we value and what stories we tell, and only secondarily issues of science" (Heise 2016). Current global focus on climate change provides immediate imaginative, cultural testing grounds to circulate with past eco-transmogrification and predicting futures, inviting both a site-specific focus as *global* in addition to a site imaginary (as any future or past site would be).

Site delineation through a performative approach to geochronology invites the performer to imagine a site defined through Anthropocenic markers (industry, nuclear, plastic), human time (such as memory, nostalgia, recollection, and archaeological evidence), and deep time (land-mass formation and fluctuation, crust tides, erosion,

intrusion, deposition). It may also be beneficial to select a site for performing geochronology where material modes of geologic agency (such as erosion, intrusion, and deposition) are performed with a temporal frequency accessible for humans through embodied interaction. To align with the idea of (m)any sites or the meta-site, a site-for-performance may need to be composed of cosmopolitan materialities that perform their movement. A performance-for-a-site may, instead or also, need to sustain relevance and resonance across (m)any sites or the meta-site. I endeavour to locate a site for performance, then, with a generalized global similitude but also the specificity of local emplacement.

3.4 The Site Imaginary

The Scottish Universities Environmental Research Centre sends isotopes counter-clockwise within its Accelerator Mass Spectrometer to deduce the date of unburnt bone samples taken from Links of Noltland archaeological digs (Dunbar et al. 2016; Marshall et al. 2016; Markham 2017). Between shores of Greenland, Iceland, Norway, and the UK, the Sound Surveillance System (SOSUS) monitors military, cetacean, and seismic movements via classified and declassified Department of Defence hydrophone networks laid on the ocean floor (Benson and Rehbock 2002; Duke and Stockholm International Peace Research Institute 1989). A Vanguard-class submarine carrying sixteen Trident nuclear missiles drifts from its loading dock down Loch Long to the North Atlantic, where it patrols the GIUK Gap for ninety days before returning to the RNAD Coulport armaments facility (Nicolson 2015).

To select a site for the performance of geochronology is to select a site simultaneously past and future, a site already drawn and erased and a site not yet envisioned. Stratigraphic and oceanic depths obscure access to many past, present, and future sites. Large-scale (covering many kilometres) or microscopic sites also hinder conventional approaches to sensorial interaction if the site is conceived as within a performer's or audience's field of experience or vision.

The notion of site multiplies. A geochronological site is an historic and prehistoric imaginary, with sediment samples reconstructing an educated narrative of what might have occurred at a place long ago, including and before human time, within the deep time of the Geologic Time Scale. That same site holds within it a future imaginary as well, what may become as the concept of deep time extends not only into a past, but into a future. The site

is unstable, inconstant, a place now and momentarily known by a human but otherwise imaginary.

So, too, are places like the open ocean, the interior of North Atlantic storm clouds, and the foreshore's sand where benthic communities are buried. *If a tree falls in a forest…* These are also sites imaginary, known only through a pieced-together narrative we construct of personal or the related fragmentary experience of a place. We construct and engage narratives of a site's material histories and futures through languages. We sift semantics via inherited languages through our listening, breaking the words to phoneme in attempts to understand the essence of an utterance, to pinpoint its essentiality. Languages are dense archives of human history, with their inceptions impossible to map. So, too, is the challenge in imagining linguistic evolution; in the documentary *Into Eternity*, nuclear waste facility designers struggle with how to construct signage that will communicate in five hundred or five thousand years the danger entombed within the storage site (Madsen and Bergmann 2010). The start and end of a river is also impossible to plot. Even the seashore redraws its border four times a day, fluctuating with a cyclic moon that pulls tides higher when it is full, exemplifying an always provisional site.

A site imaginary belies the urge to hear what we cannot: an ocean in a seashell, inherited languages whose dialects warp over centuries passed between bodies, or the hypothesis of a future archaeologist brushing dust from plastic unearthed beneath topsoil. The air and ocean currents comprising the confluence of the North Atlantic Drift, the Irminger Current, and the Labrador Current become a site imaginary for humans, as currents' movements house scales and temporalities outside the sensorial scope of human experiences. The nuclear submarine's hidden trajectory at oceanic depth becomes a site imaginary. The interior of a working Accelerator Mass Spectrometer becomes a site imaginary. To cultivate relational empathy with these disparate sites of non-access, I align my body and movement in circulation with more-than-human bodies within (m)any co-constructed site(s).

3.5 The Body

> [T]he dancers would be asked to imagine looking out to sea; at other times, they were to visualize the water flowing through them (Rae 2011).

When determining sites for performing geochronology, I consider how an audience or artist wishes to be physically placed within a site to produce site-specific performance. The site imaginary as a speculative site superimposes within a tangible site, producing a

meta-site where geochronology may be performed. The *anthropos* of Anthropocene requests the performance of geochronology to be situated through the sensorial and perceiving lenses of the human body, and so the body becomes the first tangible site where and through which a performance might unfold. Inclusive of considering past and future, small- and large-scale sites imaginary, a performing body desires to engage the immediate materials of a physical site. Geologists head into the field to sample rocks. Cartographers set up surveys to plot sites of interest over great distances. Archaeologists dig deep into the earth. The pleasure of field research involves the hands-on engagement of a site's materials to learn its secrets and devise its stories as materials change.

Situating preposition by a performance-based, interdisciplinary understanding of site furthers the definitional complexity in determining site. Any body could perform at a site. In a site. On a site. Near a site. Could any body perform a site? Any body could perform for a site. How might any body perform with a site? How might gender, sexuality, race, class, profession, or other identifiers perform any body within a site? Is it possible to perform outwith a site? These prepositional musings fuel how I place my body in relation to a site where I situate performance. To perform one's relationship with, to, for, and near a site, the performer engages what linguistic and non-verbal communication inherent and inherited within her. She images a future audience who might engage the site through documentation of her performance.

To further cast the role of a human body as agential in site determinism, human geographers Keith Woodward, John Paul Jones, and Sallie Marston theorize how a body participates in the making of a site. "[T]he comings-together of elements composing a site are always a matter of labour, of work: bodies do not merely *find* themselves in positions of relative or interlocking distribution, but *participate* in the production of the fields of force through which they aggregate" (Woodward, Jones, and Marston 2010, 273). Through this logic, a human body that co-creates a site does so *as* part of the site itself. The body not only participates in the making of the site but is interdependent with the site as a physical component of the site's materials.

If the human body is to involve itself in a performance, a site's scale may provide immediate constraints on the physical design of the performance. A body concerned with performing geochronology considers how to engage site materiality as a geochronologist would—through observing surface measurements and extracting stratigraphic units. Surface measurements may indicate a body's potential to engage a site, through evaluation of temperature, wind speed, precipitation, storminess, evidence of multiple species

inhabitants, and/or tide fluctuations. How far can this body sense through sight or sound? For how long can a human body dwell in the weather and temperature of the site? With whom or what might this body interact while *in situ*? The body in performance may consider these agencies in relation to devising a performance.

3.6 The Foreshore

> As transition areas between two adjacent but different ecosystems, ecotones appear as both gradual shifts and abrupt demarcations. But more than just a marker of separation or even a marker of connection (although importantly both of these things), an ecotone is also a zone of fecundity, creativity, transformation; of becoming, assembling, multiplying; of diverging, differentiating, relinquishing. Something happens. Estuaries, tidal zones, wetlands: these are all liminal spaces (Neimanis 2012).

The counter-clockwise collusion of the North Atlantic Drift, the Irminger Current, and the Labrador Current impacts subarctic, arctic, and temperate foreshores around the North Atlantic (fig. 32 and fig. 33). While planetary rotation is counter-clockwise (from east to west), the Coriolis Effect deflects air and water currents to the right in the northern hemisphere, causing a tendency for clockwise flow in the North Atlantic Ocean (Harper 2004). The North Atlantic Drift, through ocean and air currents, extends northeast from the Gulf Stream to continue its path across the many vulnerable shorelines of Scotland's western seaboard. The Drift presses its storms farther north-northeast, touching Denmark and Norway, its climate impact felt as far inland as Sweden. Arcing as an extension from the North Atlantic Drift, air and water currents of the Irminger Current deviate from the Coriolis Effect to circulate counter-clockwise near Iceland's south shore, connecting with the Labrador Current by the southern tip of Greenland. The Labrador Current cuts a path south to reconvene with the Gulf Stream and North Atlantic Current along North America's Eastern Seaboard (Robinson 2006). The up-thrust of warm air from the North Atlantic Drift keeps sea ice away from these North Atlantic shorelines while modulating the climate of impacted land (Petersen, Sack, and Gabler 2015).

Figure 32. Map of North Atlantic (‘ArcGIS Online’ n.d.).

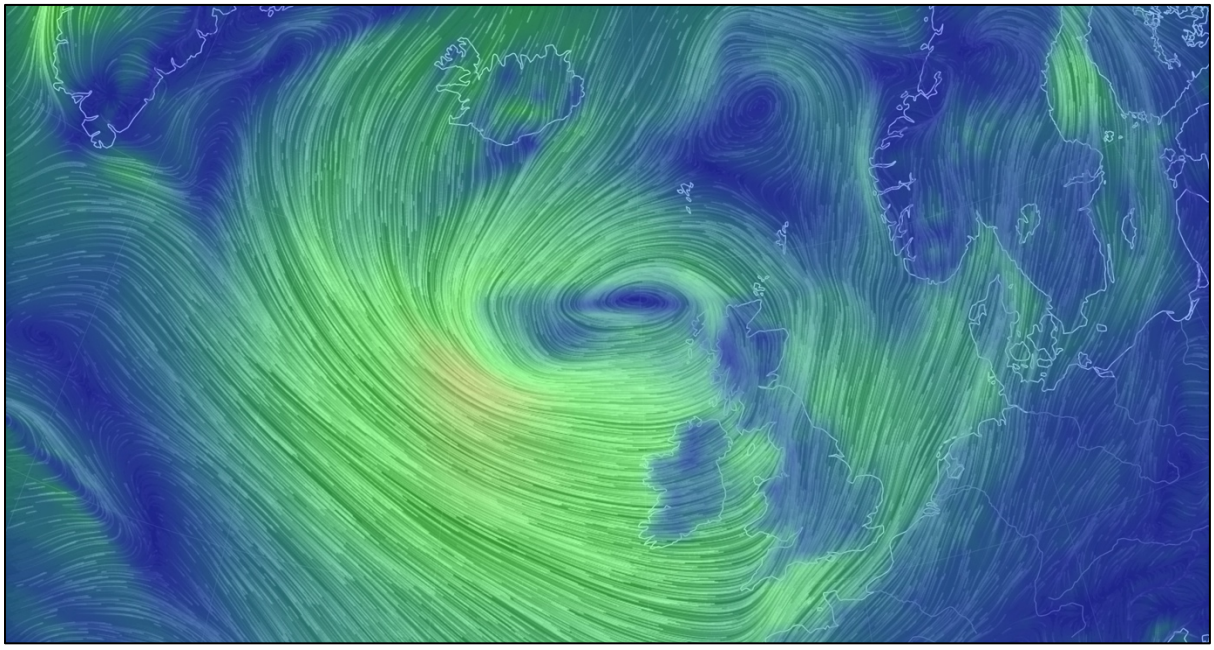

Figure 33. Map of surface winds over North Atlantic, 10 September 2017 (Beccario 2017).

The volume of English-language media reportage from North America and the United Kingdom promulgates a larger worldwide awareness of and emphasis on North Atlantic shorelines. Media focus during the 20th and 21st centuries has alternated between military actions in and on the Atlantic Ocean, news of trade routes, and the development of submarine natural resource extraction (oil, fishing, and energy harvesting). During the Cold War, extensive hydrophone networks were laid on the Atlantic seabed so that American and UK governments could monitor and anticipate the movement of Russian submarines (Benson and Rehbock 2002; Duke and Stockholm International Peace

Research Institute 1989). Ships and submarines from these countries continue regional patrol of the GIUK Gap, making landfall first in littoral zones (Nicolson 2015) (fig. 34). An antagonistic interdependence of Norway and the United Kingdom's governments and corporations plays out within North Sea oil extraction (Noreng 2016). These geopolitical subjects continue to preside in world news, as climate change and global heating place foreshores as central players impacted by storminess, glacial melt, rising sea levels, and ocean acidification, among other topics.

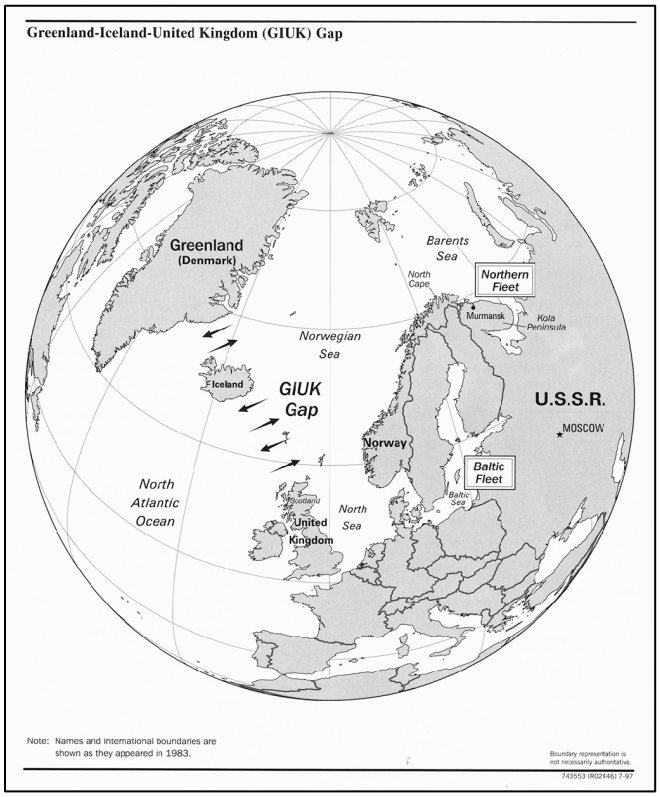

Figure 34. GIUK Gap. Public domain.

It is within the slow and rapid refiguring of North Atlantic foreshores that I research how to perform geochronology and co-construct sites: the meta-site, the site imaginary, the tangible site. Geochronologists partly comprising a working group to give the Anthropocene its formal designation note that "[t]he expression of the Anthropocene in the environmentally sensitive coastal systems [including beaches, tidal flats, and deltas]… represents a diverse patchwork of deposits and lacunae that reflect local interplays of natural and anthropogenic forces" (Zalasiewicz, Williams, and Waters 2014). As an intrinsic component of coastal systems, foreshores are delineated by how tides draw, erase, and redraw the relationship between land and water. The tide at full flood and emptied ebb marks the two surficial borders of the foreshore. As geographic phenomena, shores are in movement, becoming or going. They are vulnerable to shifts in temperature, inhabitation, climate, and storminess—and house within their sediment and any neighbouring sea cliffs

the collective stories of deep time. Contacted and redrawn by wind and air currents, foreshores obviate erosion and deposition—two primary markers of geomorphic narrative construction.

A future archaeologist might wind her way along North Atlantic foreshores to note the intermingling of *anthropos* detritus with sites' constituents. An Icelandic *kelda* drains ocean water twice daily, revealing a foreshore of quicksand littered with fishing buoys and the ejecta of lugworms. Broken plastic and bags colour the foreshore of Loch Long's striated rock and large stones. Kinghorn's smooth sand and large littoral zone make comfortable walking and homes for an active benthic community of razor clams. A Norwegian industrial zone surfaces ecosystem toxicity from polychlorinated biphenyls (PCBs) along a pebble foreshore spare in marine and benthic life diversity. The porous mud of Nidelva's sweetwater estuary teems with birdlife near a half-submerged car tire.

Climate change spotlights the precariousness of shorelines with the prospect of rising sea levels. Within this, shorelines are not only settings but actors in urgencies[27] coming to a future near you. No longer storied as tranquil or romantic, shorelines are a space from which bodies flee in a not-too-distant future. As a site for performing geochronology, the foreshore becomes both endangered and endangering within a temporal whorl. I will stay with the site's trouble with the calm of a geochronologist.

3.7 The Sites

While researching how to perform geochronology, I co-devised tangible sites selected by intuition, invitation, and the sites' affordances to dwell with the many previously mentioned sites imaginary (North Atlantic air and water currents, military actions in the ocean's depths, indicators of deep time, climate change, and speculative futures). Intuited site selection was guided by an inherent openness to roaming in locations of immediate access to where I dwell. Site selection via invitation arose through requests I received from academic and arts institutions to present work in person, where I took the opportunity while in less familiar terrain to co-create a local site for performing geochronology. Co-determinism of a site was figured, as well, through both my own physiological access to a site as well as the geophysical indicators of deep time, the Anthropocene, and climate change; I will go into further detail of these indicators in the

[27] "I name these things urgencies rather than emergencies because the latter word connotes something approaching apocalypse and its mythologies. Urgencies have other temporalities" (D. J. Haraway 2016).

description of each site. I found, as well, pre-selection of sites as potential stages for performing geochronology worked less well logistically, where the imagined site itself prohibited access through financial restraint or geophysical and/or physiological inaccessibility.

While processual artistic practice-as-research with predominantly rural foreshores occurs *in situ*, libraries, galleries, and performance venues in urban sites provide access to documentation after the processual work. The room, as a tangible site, is likewise a conduit to sites imaginary as discussed previously, while also reframing the rural, geographically disparate tangible sites as sites imaginary within the room. Considering the visual artist Robert Smithson's idea of a non-site as a site that represents another site (Smithson 1996), I explore how to perform not only in the foreshore, but how to reframe foreshore and sites imaginary within the non-site of the white-cube gallery and the black-box theatre. In subsequent subchapters where I account for my process, I explore my site-respondent works and their existence as processual, reframed, or built-for-gallery or theatre. The following list of tangible sites outlines the primary geological, archaeological, collaborative and/or geographic features of resonance in the co-creation and dissemination of geochronology performances enacted during the research.

3.7.1 Loch Long, Scotland

Latitude: 56.01086647806622
Longitude: -4.864088836523479
Length of Site Engagement: September 2015 to May 2016

Loch Long (fig. 35 and fig. 36) was the focus of a thesis (Sutherland 1981) concerning deep-time sea-level changes, as the loch was a site of significant post-glacial rebound rising (also known as isostatic uplift) after the last Ice Age. More recently, according to a biogeochemistry evaluation of the Firth of Clyde, "[t]he second most contaminated loch is Loch Long with a range of 18–77 μg kg^{-1}" of PCB content (Edgar et al. 1999). During my nine months' engagement of the loch, I lived in Knockderry Castle, a Scots Baronial limestone heritage building in early stages of decay and a three-minute walk from Loch Long's foreshore. The castle's entrance featured the engraved Biblical reference: "Built on rock, so be our lives." The castle is a five-mile drive (or 45-minute walk) from the RNAD Coulport armaments facility. Deployed submarines can be seen half-submerged when they traverse the loch coming from or going to the open ocean.

Figure 35. Partial map of Scotland (‘ArcGIS Online’ n.d.).

Figure 36. Map of Loch Long (‘ArcGIS Online’ n.d.).

The presence of nuclear weapons, plastic refuse washed ashore, and heritage buildings proximal to the loch provided a nest of geophysical indicators of climate change and the Anthropocene, through which to create and develop the initial approach for performing geochronology. On-site performances of “Intime” included counter-clockwise circulation and knitting plastic bags harvested partly from the immediate shoreline of Loch Long (fig. 16, fig. 17, and fig. 23). All performances were co-devised with French visual artist Laureen Burlat.

3.7.1.1 Intimate with Loch Long, Scotland

Time: Morning of February 26, 2016
Tide: Low spring tide at 7:39 (Flater 1998)

Geochronologists unearth tephra. A Vanguard-class submarine carrying sixteen Trident nuclear missiles drifts from its loading dock down Loch Long to the North Atlantic, where it patrols the GIUK Gap for ninety days before returning to the RNAD Coulport armaments facility (Nicolson 2015). Light breeze, partly cloudy. Système préparatoire infrarouge pour l'alerte (SPIRALE) tracks ballistic missiles using infrared satellite imaging (Deriu 2010). Ships and submarines from American and UK governments continue regional patrol of the GIUK Gap, making landfall first in littoral zones (Nicolson 2015). Broken plastic and bags colour the foreshore of Loch Long's striated rock and large stones. Laureen Burlat and I scour the foreshore for plastic bags and the horizon for submarines.

Gender and cultural studies professors Astrida Neimanis and Rachel Loewen Walker argue for "reconfiguring our spatial and temporal relations to the weather-world and cultivating an imaginary where our bodies are makers, transfer points, and sensors of the 'climate change' from which we might otherwise feel too distant, or that may seem to us too abstract to get a bodily grip on" (Neimanis and Walker 2014). Soon after starting my PhD and moving to the eastern shoreline of Scotland's Loch Long in 2015, I tracked the path of an oncoming storm. The storm had recently moved south along the coast of the Eastern United States seaboard and had then swept east along ocean currents to bevy it towards the United Kingdom. After it would impact the west coast of Scotland, the storm was due to sweep north-northeast, and then loop north-northwest and west to bring rain and wind to Iceland's south coast.

This remarkable counter-clockwise movement of a large collusion of ocean and air currents, noticed through tracking a storm around the North Atlantic, impressed me. The storm would touch land in two continents and multiple countries, affecting the daily movements of humans and more-than-humans dwelling there. I wondered at the lifespan of a storm, and its larger counter-clockwise motion. (How) Could I develop a corporeal relationship with the larger body of ocean and air currents that carry a storm? If I could strategize a way to embody similar motion to this unusual counter-clockwise path of a storm, referred to in casual conversation as 'a sign of climate change,' would it assist me in

devising transformative action induced through experiential, embodied knowledge acquisition?

The idea of North Atlantic counter-(clockwise) movement increased when I saw my first half-submerged submarine drift down Loch Long from RNAD Coulport armaments facility. Vanguard-class submarines carrying Trident ballistic nuclear weapons are constantly on patrol within the North Atlantic, departing from west-coast Scotland to move through the GIUK Gap for ninety days. This hidden movement in the ocean's depths spurred my further interest in considering how to embody large-scale movements that indicated temporalities other than those with which I was familiar.

A few months into my practice as research, the French visual arts Masters student Laureen Burlat, at the time studying at École Supérieure d'Art et Design, joined me through an ERASMUS placement which positioned her proximal to a working artist of her selection. Burlat moved to Loch Long, and we commenced daily sessions that explored Extended Vocal Technique, bookbinding, audio recording, and engagements with Loch Long's shoreline. These practices were an integral part of my first-year research, as I weighed various strategies for how to devise performing geochronology. Burlat's visual art explores language materiality, and she has proficiency with French, English, Braille, and Morse code. Her multilingual dexterity underscores the practice-as-research emphasis on multiple languages amid collective research.

We walk Loch Long's rocky foreshore searching for plastic bags that have washed ashore as indicators of the new Anthropocene, geosynchronous indicators circulated through the oceans discussed further in **2.3 Performance Score: "Knots"**. We move in counter-clockwise circles for "Intime" exploration. For our "Intime" performance on February 26, 2016, we commence with a contemplative pace, which at times finds us synchronized but more often finds us meandering around the circle at our own paces. the slick, rocky foreshore ensures we step with care (fig. 37). As we gain familiarity with the quality of the rocks, we test our speeds by sprinting (fig. 38), but this is short-lived for the danger of turning an ankle; we maintain a slower pace which allows us to pause for impromptu beachcombing (fig. 39). After some time, we synchronize our meditative movement, stepping equidistant and in the same movement across the circle as a gradual balancing act (fig. 40). Laureen explores pause for beachcombing or to stare out at the ocean; our speeds oppose at one point when she stands still as I jog (fig. 41). The hallmarks of our initial experiments with "Intime"—including walking, running, beachcombing, synchronicity and polyrhythm, and equidistant placement—provide a

blueprint for the adaptation of the practice to other sites. By aligning our bodies with the counter-clockwise movements of ocean and air currents, and learning tidal rhythms in conjunction with moon cycles and local foreshore constituents, "[t]he order is reknitted: human beings are with and of the earth, and the biotic and abiotic powers of this earth are the main story" (D. J. Haraway 2016).

Figure 37. Stepping with care on Loch Long's rocky foreshore.

Figure 38. Sprinting on Loch Long's foreshore.

Figure 39. Beachcombing on Loch Long's foreshore.

Figure 40. Equidistant synchronicity in "Intime."

Figure 41. Opposite movement of running and standing within Loch Long's "Intime" performance.

3.7.2 Kinghorn, Scotland

Latitude: 56.06730239205504
Longitude: -3.1731273703612715
Length of Site Engagement: 20-24 February 2016, 7-12 March 2016, 16-19 November 2017, 16-20 May 2019

On Scotland's east coast, Kinghorn (fig. 42 and fig. 43) features an extensive sandy foreshore marked by empty razor clam shells at low tide. Kinghorn's shore is listed as a Site of Special Scientific Interest for its biotic and abiotic activity and a Special Protection Area with RAMSAR designation for its birdlife ('SiteLink' 2017). The sedimentary rocks and pillow lava of the Kinghorn Volcanic System formed during the late Viséan age within the Mississippian epoch (Browne and Woodhall 1999; Trewin 2002); eroded and intertidal pillow lava can be seen on the shore just north of Kinghorn (Claxons 2012).

Figure 42. Map of Kinghorn (‘ArcGIS Online’ n.d.).


Figure 43. Kinghorn early-morning foreshore, after an “Intime” performance. Strangers walk in the distance.

A Mississippian-epoch fossil of the reptilomorph *Casineria* was found across the Firth of Forth from Kinghorn in Gullane, East Lothian (Paton, Smithson, and Clack 1999). As an early-evolution amniote (young amphibian and older reptilian characteristics), *Casineria* resembles what today would be considered a small lizard. More recently, local industries are tied to oil extraction, with oil rigs undergoing construction and repair in the

neighbouring town of Burntisland ('Burntisland Fabrications Limited' 2018); rigs and ships are visible day and night from Kinghorn.

Staying in Kinghorn's artist residency and studio operated by visual artist Elizabeth Ogilvie gave me the opportunity to speak with both her and fellow studio artist Michael Craik about their practices, which I describe within **Chapter 1: Literature and Practice Review**. During the 2016 visits, Laureen Burlat and I performed multiple "Intime" circulations. In 2017, I worked with Canadian composer Rebecca Bruton *in situ* on attunement via vocal improvisation, listening, and circulation in soundscapes.

3.7.2.1 In Time with Kinghorn, Scotland

> **Time:** Mornings of February 22, 23, and 24, 2016; sunrises (7:54, 7:56) on November 17 and 18, 2017
> **Tide:** Low spring tide at 9:27, 10:00, and 10:31; low spring tide at 7:10 and 7:45 (Flater 1998)

Geochronologists unearth evidence of mass extinction events. Days dip darker past the autumn equinox. The cyclic motion of tectonic plates. The sinistral whorls of cochlea, of periwinkle shells. An antagonistic interdependence of Norway and the United Kingdom's governments and corporations plays out within North Sea oil extraction (Noreng 2016). An oil rig is vacated due to the approaching storm (Zhang 2017). Kinghorn's smooth sand and large littoral zone make comfortable walking and homes for an active benthic community of razor clams. Rebecca Bruton and I build melodies as memory waves within a foreshore's soundscape. Gentle breeze, crisp sunrise.

The end is also the beginning. Kinghorn was an early site for "Intime" exploration, and I returned to it in 2016 and 2017. For the first two visits to Kinghorn in 2016, Laureen Burlat and I devise and perform counter-clockwise choreography using an original French poem translated to Morse code as the structure for how we step around the circle. The work is prototypic for what distils into "Intime"'s format. I write the poem "Tourner en rond" incorporating the title and phrase "un temps attends" in a round. Laureen then translates it into Morse code (fig. 44). We work with French and Morse code because they are languages familiar to each of us, and we transcribe the dots and dashes of the Morse-code translation into tiptoe and flat-foot steps (fig. 45). During the initial visit to Kinghorn, we rehearse the encoded steps on the wood floor of the Sea Loft Artist Residency; the residency building is discussed in **3.7.9 Rooms that Perform: Sea Loft, Kinghorn, Scotland**. To synchronize our timing, we audio-record versions of spoken Morse code and

play this back through headphones while circling. We read aloud the French “Tourner en rond” as a duet pronounced in a round, where one person reads an initial line, and the second person commences the first line as the first person starts the second—a constructed delay or echo.

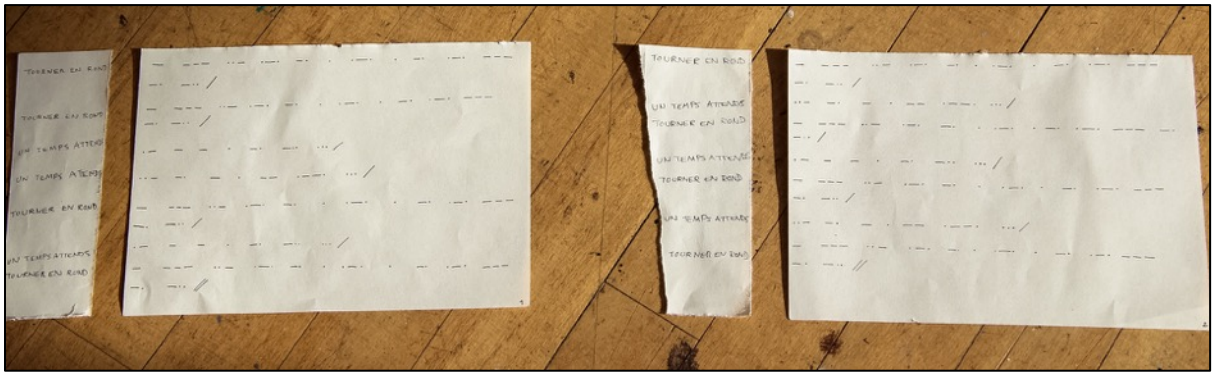

Figure 44. Handwritten translation of French poem “Tourner en rond” into Morse code.

Figure 45. The Morse code translation of “Tourner en rond” is adapted to choreographed footsteps.

We walk “Tourner en rond” inside the Sea Loft Artist Residency where we stay, and then transfer it to the foreshore (fig. 46). We choose to walk in bare feet to feel the qualities of the sand beneath our feet, and for the visual impression our feet and toe prints leave on the sand (fig. 47). We walk three times on the foreshore over a two-day period (fig. 48). Language and translation become embedded in the temporary marks we make on the sand.

Figure 46. Laureen Burlat and I perform the choreography for “Tourner en rond” within “Intime”’s circulation.

Figure 47. We walk “Tourner en rond” as “Intime” barefoot.

Figure 48. “Intime” is performed three times in a two-day period on Kinghorn’s foreshore.

As a public site on a town’s foreshore, early-morning dog walkers were frequently our audience (fig. 49 and fig. 50); the dogs occasionally joined in our circulations (fig. 51). During and after the “Intime” performance, we fielded questions from curious onlookers—including hours later, when our circle had been erased and we were otherwise not engaged in “Intime” activity. This provided us with an opportunity to introduce my artistic practice-as-research both as performance in commons and as discussion with locals.

Figure 49. Dogs and their companion humans are our early-morning audience.

Figure 50. Dogs and their companion humans pass frequently by our Kinghorn “Intime” performances.

Figure 51. This dog stands in the centre of a completed “Intime” circulation as the tide rises on Kinghorn’s foreshore.

The beginning is also the end. During Rebecca Bruton’s first visit to Scotland, she joined Laureen and me at Loch Long in April and May 2016, where we spent time developing a methodology for mutual conduction, using gestural cues. During this first visit, Rebecca and I debuted gestural cues as part of the Tectonics Music Festival in May 2016, which is co-curated by Ilan Volkov and held at the BBC Scottish Symphony Orchestra. In November 2017 en route to Kinghorn, Rebecca and I return to the BBC SSO to watch Ilan Volkov’s rehearsal with the orchestra. We had recently completed a work

session in Port Glasgow with Laureen (detailed in the upcoming *Sound of Mull* section), so this opportunity to listen was a fantastic segue for the "Intime" we would perform on Kinghorn's foreshore.

It was an exciting discovery for me to find Rebecca's corporeal impulses in our "Intime" circulation relied more upon a cerebral discussion of what might occur within such a performance, especially in relation to the soundscape. This level of discourse was not present in any previous iteration, with participants following an intuitive-led circulation. Vocal and contact improvisation that sprung from instinct was discussed after the circle, as were impulses of rule-setting and rule-breaking. Rebecca's questions *in situ* prompted an account of process while in progress of enacting a performance, and my explication did not shift our physical movement choices within our shared space the first day. We did, however, expand the possibility of "Intime" by incorporating sound-producing and sound-listening strategies as we walked or ran the circle.

We hit low tide at sunrise two mornings in a row, and we run to keep warm (fig. 52). On the second day's circulation, we place an audio recorder, obscured by seaweed, in the centre of our circle in order to capture the sonic experiments that accompany our movements (fig. 53). Bruton has intermittent periods of solo circulation while I leave the circle to reset the video camera (fig. 54). The strict circulation of the prior day gives way to sounding that spawns stretching, some light contact improvisation (fig. 55), and dance as authentic movement (fig. 56).

Figure 52. We run frequently in Kinghorn "Intime" performances to keep warm.

Figure 53. We place an audio recorder, obscured by seaweed, in the centre of the “Intime” circle’s site prior to circulation.

Figure 54. Rebecca Bruton circulates solo in “Intime” while I attend to the video camera.

Figure 55. Light contact improvisation emerges during our circulation.

Figure 56. Our bodies strike odd angles from goofy dances during the circulation.

As we listen to waves lap the foreshore and seabirds caw, our vocal offerings extend to a greater sense of attunement with the aural dynamics (volumes, pitches, duration, rhythm) presented at the site. This vocal attunement recasts our own response-ability within the site, as we grow our awareness of how our sounds may impact our co-inhabitants. We become-with the soundscape through our listening and response. Our physical movement is impacted, too, as we find it easiest to circulate on opposite sides of the circle when talking (fig. 57) but gravitate closer to one another during singing and sounding (fig. 58).

Figure 57. Walking on opposite sides of the circle supports our capacity to hear one another during conversations.

Figure 58. We gravitate towards one another during active sounding work.

Though unrelated to "Intime," Rebecca's description of her score *All I dreamt; twice as much* resonates with how we explore movement and listening within "Intime" as a mode of situated interconnection.

> This piece is fixed in intimacy, and the exquisite fragility of human contact. Small intervals become a kind of touching between two or more players; close listening cherishes presence while time slips, continuously and unremittingly felt as loss (Bruton 2017).

Bruton's sense of loss described through the fragility of human contact can expand to mourning with and of a site and its co-constituents when a soundscape is understood as ephemeral. What is heard now disappears, as sounds decay. What was audible at a site in previous epochs could never be heard—the sounds of prehistoric species, as an example, or the ways in which water and geologic entities interact sonically. The predictive imagining of future decades impacted by climate change, with biodiversity decreases, could trigger a sense of mourning for species that would no longer animate the soundscape with their calls. The experience of circulating within a soundscape, of listening to what is, imagining what was (lost), and hearing what may be soon lost, can offer a memorable acquisition of knowledge. The realization that the foreshore, too, is ephemeral in a larger time scale, can gift an understanding that what humans may feel as slow, little-changing material is, in fact, temporary, too.

3.7.3 Lomma Beach, Öresund, Sweden

Latitude: 55.6781715
Longitude: 13.058791799999995
Length of Site Engagement: 18 February 2017

As a pathway between the North and Baltic Seas, the sound (or strait) of Öresund ebbs and floods its tides along Lomma Bay (Lumborg 2005); the north-south, narrow geography of Öresund (fig. 59 and fig. 60) provides little moon-pull influence on the tides, and tidal fluctuation is experienced instead through shifts in ocean currents and incoming storms. The white-sand foreshore of Lomma Bay is a stretch of coast sensitive to erosion. A recent Masters thesis from Lund University confirmed that Lomma Bay's coast has retreated from erosion an average of 4.3 meters between 1963-2002, and a further 1.3 m between 2002-2010 (de Mas de Mas and Södergren 2011), marking it synonymous with climate-change hotspots at risk with rising sea levels. Considered a keystone species but also on IUCN's Red List of Threatened Species (International Union for Conservation of Nature and Natural Resources 2000), Öresund inhabitant eelgrass (*Zostera marina*) is frequently washed ashore with the tide (for more on eelgrass, see **4.6 Performance Scores: "Foreshore, in C" and "Météophor"**), and decrease in eelgrass as habitat over the past fifty years has raised inquiry into restoration (Infantes, Eriander, and Moksnes 2016).

Figure 59. Map of Öresund (‘ArcGIS Online’ n.d.).

Figure 60. Map of Lomma Bay (‘ArcGIS Online’ n.d.).

The cross-lingual word *sund* (or *sound*) indicates a body of water larger than a bay or bight, and figures into a site imaginary in relation to North Atlantic foreshores. Öresund is a relatively young sound, formed during the early Holocene sea level rise approximately 8,000 years ago. The selection of this site to conduct artistic practice-as-research arose from wanting to engage the types of sounds that could be formed in locations around the North Atlantic if sea levels rise as is the current prediction through climate modelling. Öresund (Swedish) and Øresund (Danish) translate to English as *Sand-sound* or *Ear-*

sound. These translations are figural in a metaphor with which I work in "(SUND):" "The shores have ears." Work on this sandy foreshore was explored for "(SUND)" as well as "Intime" (fig. 61). For the former, I observed local musicians and composers working *in situ* with hydrophone recordings of eelgrass, as well as performance of Aeolian guitar and zither by members of the Landscape Quartet. Participants included Halla Steinunn Stefánsdóttir, Stefan Östersjö, Nguyễn Thanh Thủy, Lan Yến, Kent Olofsson, Gina the Toy Poodle, and eelgrass. Lomma Bay's foreshore was selected for artistic research through an invitation I received from PAR researchers and supervisors working at Malmö Academy of Music, Lund University, and the Inter Arts Centre.

Figure 61. Lomma Bay foreshore, at the end of an "Intime" performance.

3.7.3.3 Intimate with Lomma Bay, Sweden

Time: Afternoon of February 18, 2017
Tide: Low neap tide at 13:37 (Flater 1998)

Geochronologists unearth patterns of erosion and flora succession. Eelgrass (*Zostera marina*) shields blue mussels (*Mytilus edulis*) from dislodgement during a storm (Reusch and Chapman 1995). Breeze, before the snowstorm. Stefan Östersjö wraps nylon string around a short tree on a sand dune, attaching both ends to his guitar; he then holds the guitar horizontal for the wind to strum this string. Eelgrass washes ashore as entangled loops.

Ø (Danish) and *ö* (Swedish) translate to English as *island*. Inscribing an *o* on a sandy Scandinavian foreshore through an "Intime" performance emplaces a temporary almost-word on land to be erased by a rising tide. As discussed in the earlier section on "The Sites," *sund* (or *sound*) describes a body of water larger than a bay or bight. The tangible site's name Öresund/Øresund translates to English as *Sand-sound* or *Ear-sound* and provides advance consideration of what role soundscape might play in attuning to the foreshore where "Intime" will be staged. It also provides entry points for collaborations with local music composers and musicians who work in practice-as-research capacities.

In anticipation of Öresund's "Intime" at Lomma Bay, Sweden, a public invitation for participants was extended within Malmö and the Inter Arts Center's community (fig. 62). On the day of the performance, participants explored the site prior to circulation through their lived experiences and arts practices. Stefan Östersjö is a leading classical guitarist, associate professor of artistic research at Malmö Academy of Music and Research Fellow at the Orpheus Institute, Gent. As a founding member of the Landscape Quartet, Östersjö wrapped fishing line around the trunk of a young tree and affixed it to his guitar (fig. 9). He then spent time exploring the sounds produced by the wind humming across the string—a technique of his invention called 'Aeolian guitar.' Östersjö's work exploring music creation and performance in outdoor environments led to his joint observation with collaborator and violinist Bennett Hogg that performing Aeolian instruments provides the artistic-practice researcher with "[t]he sense of being part of something far in excess of our own 'ensemble' space—being subject to, but also in dialogue with the world, wind, snow, birds, and the tree itself…." (Hogg and Östersjö 2015)

INTIME: A CASUAL INVITATION

Either side of the sound: ears.

This Saturday, February 18th, join Canadian-Icelandic intradisciplinary artist Angela Rawlings for an uncommon hour-long interaction with an Øresund/Öresund shore (at Lomma Beach, Sweden). We'll be moving the whole time, so wear weather-appropriate clothes and shoes, and bring any food or drink you'd like to imbibe.

Our shoreline interaction may spur participants to explore estrangement, intimacy, rural ritual, and/or relationship with human and more-than-human bodies. The interaction may be considered geopoetics performance-as-research. There will be ears, and the shore will be a room.

This work is an in-progress collaboration between Angela and Icelandic performer, composer, and curator Halla Steinunn Stefánsdóttir (PhD candidate at Lund University). Our interaction therefore will be video-documented with the possibility of partial screening at the Inter Arts Centre, Malmö on Monday, February 27th during a public day-long workshop presented by Halla and Angela. All participants will be asked to share permission for future screenings of the video documentation.

WHERE: Lomma Beach
WHEN: 14:30-16:00
HOW: The meeting point is at the Lomma Sjögatan bus stop at 14:30.
You may take bus 132 (leaving from Södervärn at 13:56) to Lomma Sjögatan. Walk to the beach, and head right along the shore. Call Angela at (0) 73 963 23 90 for our precise location on the day.

This event is lovingly co-presented by Lund University (Malmö Academy of Music), University of Glasgow, and Laboratory for Aesthetics and Ecology.

Figure 62. Invitation for "Intime" at Lomma Bay, Sweden.

Vietnamese đàn tranh player and PhD candidate, also at Malmö Academy of Music, Nguyễn Thanh Thủy positioned herself atop a sand dune to experiment with the zither's Aeolian potential (fig. 63). Her daughter cartwheeled, built a sandcastle, and drew in the sand. Composer and Malmö Academy of Music teacher Kent Olofsson joined "Intime" with his toy poodle Gina. Violinist and PhD candidate Halla Steinunn Stefánsdóttir, whose work and collaboration is discussed in **1.8 Case Studies: Time, Sand, Sign** and

3.7.6.1 In Time with Kelda and Hjörseyjarsandur, Iceland, used her Zoom audio recorder and hydrophone to explore the sonic output of tidal pools plus both dry and wet eelgrass (fig. 11).

Figure 63. Nguyễn Thanh Thủy explores the Aeolian potential of her đàn tranh.

The foreshore floor is always a player. The wind quality always affects the circle, and this places the body exactly in relation to what forms and informs deposition and erosion. At Lomma Bay, the eelgrass became a key participant, as did the February zero-Celsius temperature. As I walked, I tuned into the circular, drying clumps of eelgrass that littered the foreshore. Their c-shaped curves bent as our circle did and carried the push of waves within their memory-forms (fig. 64). The score “Foreshore, in C” arose during this engagement with eelgrass, and is discussed in **4.6 Performance Scores: “Foreshore, in C” and “Météophor”**.

Figure 64. Eelgrass on Lomma Bay's foreshore.

Most participants are practiced improvisers, and this becomes apparent at the outset of "Intime" as we circulate (fig. 65 and fig. 66). There is frequent partial synchronicity in rhythm or speed, including moments of stillness. We also find ways to introduce counterpoint, such as the asymmetric placement of where we stand (and in what direction we face) during a moment of pause. Everyone starts by running, though Kent Olofsson slows to a walk while filming with his phone camera from inside the circle; he gifted this footage to the composite video (fig. 67 and fig. 68). Though we never verbally cue one another, there are moments of partner work, such as when I walk with Thủy or when Stefan and Halla race around the circle (Halla opting for clockwise rotation) (fig. 69). Many collective performance choices within the circulation can be read as strong aesthetic moments, such as when we face inland (fig. 70) or stare at Öresund's horizon (fig. 71). The young girl's sense of play permeates the group; she digs holes along the circle, traces it with a stick. We pause from circling to rhyme our bodies with the ebb and flood of the tide (fig. 72), which feels like a revelatory mode of embodied response embraced on the shore.

Climatic indicators linked with multiple temporalities and climate change—including wind, weather, and seasons—were present at this site. Being February and cold, bulky clothing changed the qualities of movement. Stefan's tuning-in to wind with his Aeolian guitar prior to commencement meant I had heightened awareness to wind speed

and direction as I circulated, which linked into the larger sense of ocean and air currents commingling to carry weather around the North Atlantic, which would extend its reach at times to impact Öresund. This relational sense-ability with the movement of large-scale air currents extended to a feeling of interconnectedness with my human performers, which delivered joy through synchronous movement with each other and with the in-and-outflows of the tide. This kinship extended to the C-shapes formed by deposited eelgrass, as we all rounded our shapes to navigate the temporary space of the foreshore.

Figure 65. “Intime” participants explore improvisation.

Figure 66. “Intime” participants explore improvisation.

Figure 67. Kent Olofsson, accompanied by his dog, films his circulation with his phone's camera.

Figure 68. Kent Olofsson uses his phone's camera to film his procession in "Intime."

Figure 69. Partner work occurs within “Intime.”

Figure 70. Participants face inland.

Figure 71. Participants face Öresund's horizon.

Figure 72. Participants move forwards and backwards with the tide's ebb and flood.

3.7.4 Herøya Industripark, Grenland, Norway

Latitude: 59.102103579667045
Longitude: 9.651270640380858
Length of Site Engagement: 9-13 May 2017

Scandinavia's first Global Geopark is Gea Norvegica, located in Grenland (fig. 73 and fig. 74), having received the designation in 2006 with a follow-up UNESCO confirmation in 2015. The oldest rocks date 1.5 billion years ago to the Precambrian

Gothian orogeny, and subsequent combinations of volcanism and glaciation provide the geological diversity which lead to its geopark designation (‘Gea Norvegica’ 2017; ‘Gea Norvegica Geopark’ 2018). Human engagement with the region’s geologic resources abounds, with the previous century of industrial activity including work with aluminum, ammonia, calcite nitrate, carbon dioxide, concrete, fertilizer, flour, hydrogen, magnesium oxide, porcelain, power, pulp and paper, solar cell panels, shipbuilding, and vinylchloride (Angela Rawlings 2017), and most is centered around the fjords’ ocean access. Pollution impacts including eutrophication caused by persistent organic pollutants (POPs) and the potential for remediation have become focal for scientific research in the region (Ruus et al. 2014; Hanrahan 2010). As ecosystem wellness indicators, blue mussels (*Mytilus edulis*) are popular in discussion with local residents given the mussels’ inclusion in human diets; Norway even created a telephone hotline for residents to check the edibility of mussels in their region (‘Unngå Fisk Og Skalldyr Fra Forurensede Havner, Fjorder Og Innsjøer’ 2011).

Figure 73. Map of Grenland, Norway (‘ArcGIS Online’ n.d.).

Figure 74. Map of Herøya Industripark (‘ArcGIS Online’ n.d.).

An invitation to participate in the inaugural Greenlightdistrict Eco-Arts Festival in Skien and Porsgrunn, Norway led to devising an “Intime” engagement with Herøya’s foreshore. Participation included touring the Herøya Industripark to learn about their activities. “Intime”’s circular performance faced Herøya Industripark Norway with a view towards an INEOS shale gas ship emblazoned with “Shale Gas for Chemicals.” This ship came from USA. Green rock sampled from the site is slag from Herøya Industripark, which proliferates in the region and city-centre of Skien. “Intime” circles were run with visual artist Cecilia Hultman (SE) (fig. 75), who also performed drawn geologic actions for video documentation. Cecilia’s work is discussed in **Chapter 1: Literature and Practice Review**.

Figure 75. Herøya Industripark foreshore, during an “Intime” performance. Cecilia Hultman walks counter-clockwise.

3.7.4.1 In Time with Herøya Industripark, Norway

Time: Morning of May 10, 2017
Tide: Low spring tide at 11:49 (Flater 1998)

Moon cycles pull tides. Geochronologists unearth evidence of major storms that caused flood and tsunami. A Norwegian industrial zone surfaces ecosystem toxicity from PCBs along a pebble foreshore spare in marine and benthic life diversity. Eelgrass (*Zostera marina*) shields blue mussels (*Mytilus edulis*) from dislodgement during a storm (Reusch and Chapman 1995). Windchill, rain. Cecilia Hultman and I embrace; the circular forms of our arms wrapped around the other’s torso ground us. We hold our writing hands mid-air, trace the letter O with our index fingers.

Our collaboration began with a hug, the strong physical contact held, prolonged, providing a sense of grounding after the initial fear of unfamiliarity and comprehending boundaries was surpassed. Swedish visual artist Cecilia (Cissi) Hultman—whose work I discussed in the **Literature and Practice Review**—and I had been invited to participate in a literary workshop as part of the Greenlightdistrict Eco-Arts Festival in Skien, Norway. In the few days before our hug, we toured Herøya Industripark with fellow writers and curators, shared in-progress creative works, and cohabited morning and evening routines. The hug was initiated as farewell but became performative through the strength of connection and willingness to exist bodily in what temporally appeared as “too long.” In

that moment, Hultman and I birthed a collaboration where we would explore the potency of the hug and other familiar movements as corporeal sites with the power to estrange.

Two months after our initial exchange, Hultman and I met again in Skien for the Greenlightdistrict Eco-Arts Festival, and there we agreed to perform "Intime" partnered with other physical explorations of how to perform geochronology. At the recommendation of a local archaeologist, we located a beach adjacent to Herøya Industripark. The shore was a combination of rock and sandy mud, made muddier by the constant drizzle that attended our run. To the west and north across the fjord were industrial sites. An INEOS shale-gas ship from the USA was anchored in the fjord; on its side was emblazoned: "Shale gas for chemicals" (fig. 76). I spotted a second ship with "Shale gas for progress" printed on it. "Progress" and "chemicals" act as interchangeable, aligned within this syntax. Hultman's alarmingly bright-red rubber boots juxtaposed with INEOS' "Shale Gas for Chemicals" ship in the fjord as we commenced our "Intime" circulation.

Figure 76. Cecilia Hultman's red rubber boots juxtapose INEOS "Shale Gas for Chemicals" ship.

I join our "Intime" circle after pushing play on the video camera. Cissi is already in circulation as a way to speed up the amount of time we will stay in the rain, marking the circle as I adjust the camera frame and focus (fig. 77). Synchronized, we maintain equidistant placement and a mechanized rhythm, quite different from the approaches manifesting with collaborators in Loch Long and Lomma Bay (fig. 78). Even when I initiate an increase of speed as a strategy to disrupt our equal pace and equidistant

placement, Cissi responds by increasing her speed so we maintain rhythm and spacing (fig. 79). I eventually break the rhythm by investigating slag on the foreshore; Cissi casts a look to Herøya Industripark, and this marks the shift of our mechanized movement (fig. 80). We intuitively adopt a game of follow-the-leader (fig. 81). Our circulation is hurried due to the rain and cold temperature. At one point, Cissi opts for clockwise circulation (fig. 82), which feels radical in her sudden reversal. To close our "Intime," Cissi reduces her speed and gait to spin in tiny, tight circles counter-clockwise. Her strategy appeals, and I join her in this nostalgic childhood dizzying (fig. 83).

Figure 77. Speedy circulation in the rain.

Figure 78. We maintain a mechanized rhythm in “Intime.”

Figure 79. We maintain synchronicity despite an increase in speed.

Figure 80. I beachcomb to disrupt our rhythm as Cecilia Hultman glances at Herøya Industripark.

Figure 81. A game of follow-the-leader emerges.

Figure 82. Cecilia Hultman reverses her circulation.

Figure 83. We spin counter-clockwise in tight circles.

While I could not see the eelgrass with which I became familiar at Lomma Bay, its likely presence in the waters by Herøya Industripark—which houses over one hundred companies producing fertilizer, toothpaste, PVC, and more—led me to wonder about regional ecosystem toxicity. Both eelgrass and blue mussels (*Mytilus edulis*) are considered keystone species, and eelgrass has a facultative mutualism with blue mussels in shallow water (International Union for Conservation of Nature and Natural Resources 2000). Herøya Industripark's persistent organic pollutants, generated through various

industrial processes and contained within ship-hull paint, circulated in my mind as I moved counter-clockwise on the foreshore. INEOS' shale-gas ship drifts in the fjord.

The presence of rain made the "Intime" performance mildly inhospitable for a long performance. This notion of inhospitality extended, as I circulated, to raise my curiosity towards the impact of the industripark on the surrounding ecosystem, particularly notable in blue mussels through Persistent Organic Pollutants. Nancy Tuana points to "the urgency… of rematerializing the social in all its meanings" (Tuana 2008) through discussion of PVC production and its viscous encounters with human health. Facultative mutualism. A hug. The hidden chemical interplay of blue mussels and PCBs has a decades-long history, rendering edibility of the mussels monitored due to issues of toxicity. In Norway, there is a government-run mussels-watch program that determines the edibility of mussels due to toxic testing; this fjord is a primary reason the program was created. Locals can call Blåskjelltelefonen to learn whether or not blue mussels are edible. In the presence of Herøya Industripark,

"Intime" as artistic practice embraces its response-ability in the forms of witness and protest. Tuning into the more-than-human realities, even though unseen and unheard, prompted me consider during my "Intime" circulation how my own consumption choices linked into the product components developed at Herøya and therefore also impacted the inhospitality and toxicity evident at the site. The more I considered this, the stronger my anger grew over my own knowledge gaps regarding the inflows and outflows of industrial production. I felt anger over my ignorant culpability, and this anger prompted the urge for response in the form of protest. Circulating in a location proximal to an industripark, a nuclear weapons storage facility (as in Loch Long), or oil rigs (as in Kinghorn) enabled the capacity to witness them while simultaneously urging my own civil disobedience. "Intime," itself, became a vehicle for performing protest of the continued impacts of such human developments.

3.7.5 Nidelva, Trondheim, Trøndelag, Norway

Latitude: 63.42826896237544
Longitude: 10.378058323681671
Length of Site Engagement: 10 September 2017

The invitation to engage with an urban foreshore along Trondheim's Nidelva river (fig. 84 and fig. 85), a tributary emptying its freshwater into the North Sea, meant a focused encounter with a region teeming with birdlife. The mixed freshwater-and-saltwater

provides a feeding habitat for a variety of birds. The IUCN Red List includes the long-tailed duck (*Clangula hyemalis*), Atlantic puffin (*Fratercula arctica*), horned grebe (*Podiceps auritus*), black-legged kittiwake (*Rissa tridactyla*) as vulnerable along Trøndelag coast given impacts of climate change and pollution (*The IUCN Red List of Threatened Species* 2000).

Figure 84. Map of Trøndelag, Norway ('ArcGIS Online' n.d.).

Figure 85. Map of Trondheim ('ArcGIS Online' n.d.).

Engagement with Nidelva and Trondheim inhabitants arose through an invitation to participate in Kunsthall Trondheim's group exhibition "Et Nytt Vi / A New We," co-curated by the Laboratory for Aesthetics and Ecology. "Intime"'s counter-clockwise circles were performed on the muddy foreshore of the Nidelva River, where saltwater and freshwater intermingle. The urban site is in a currently contested zone as commons in the process of being leased to a commercial development project. Participants in "Intime" included Scandinavian artists and academics Heli Aaltonen, Dea Antonsen, Ida Bencke (along with her baby Alvin), Rosemary Lee, Kim Ménage, Elena Lundquist Ortíz, and Libe García Zarranz (fig. 86).

Figure 86. Nidelva foreshore, during a morning "Intime" performance. Curators, academics, and ducks consider the mud.

3.7.5.1 Intimate with Nidarø, Norway

> What might becoming a body of water—ebbing, fluvial, dripping, coursing, traversing time and space, pooling as both matter and meaning—give to feminism, its theories, and its practices (Neimanis 2012)?

Time: Morning of September 10, 2017
Tide: Low spring tide at 8:52 (Flater 1998)

Geochronologists unearth linguistic and societal depositions via human settlement. Still, after the rain. The porous mud of Nidelva's sweetwater estuary teems with birdlife near a half-submerged car tire. Seabirds circle overhead. In the new drowned Wonderland, Alice runs the Caucus-race with Mouse, Eaglet, Dodo, Lory, and Duck (Carroll 1865). Seabirds wheel above as Laboratory for Aesthetics and Ecology curators walk counter-

clockwise in mud. Wiccans close the sacred circle by walking widdershins (Grimassi 2000).

In Trondheim's Nidarø foreshore, we caught the tide a few days after the full moon. The foreshore was thin along the Nidelva as it met the North Atlantic, and its thick grey mud attracted feeding shorebirds including gulls, geese, magpies, mallards, and an imported Asian duck. Recommended by Kunsthall Trondheim curator Carl Martin Faurby, I visited the site with Kunsthall Trondheim employee and visual artist Amalia Marie Fonfarra, where we assessed whether the foreshore would be wide and deep enough to facilitate our foreshore activities. Fonfarra and I visited the foreshores on the afternoon prior to our "Intime" performance when the tide was at its lowest to get a sense of how we would engage the same location during the low tide of the next day. We diverged from the initial two proposed sites to opt for a stretch of foreshore that was larger and had greater public exposure (including viewing access from two neighbouring bridges). During our visit, we took several photographs of the site specifically to ascertain what angles would be ideal for filming and photographing the performance. Fonfarra agreed to operate video and digital cameras, so these responsibilities were shifted from me for this event. This helped me to focus more on introducing the work to the larger group of attendees, and to envision the video- and photo-editing work I would do after the performance. For the latter, I would have three days to edit work that would then be included as projections in Kunsthall Trondheim's autumn exhibition "A New We."

On the performance morning, we meet at Nidelva's foreshore to perform "Intime." Prior to commencing the "Intime" circulation, local visual artist Yngve Zakarias offers an oral history of our site including settlement over one thousand years ago, the presence of World War II bunkers, and the current contentious municipal plans for urban development which threatens an endemic fungus growing solely on hawthorn trees proximal to the shoreline. The potential presence of an 11th-century medieval monastery on Nidarø adds to the city's tension (Sørbø and Langseth 2017). Zakarias' schedule precludes his participation in the circle. A female-centered circulation of "Intime" becomes apparent to and exciting for several of the participants, as does the possibility of our circulation taking on the guise of protest.

As with any larger-group "Intime" performance, I encourage the participants prior to starting to attend to their own bodily urges; if they need to rest, to drink, to leave, they should feel free to come and go without worry of breaking the group activity. Circulating from 10:30 to 11:45, the participants enact this attendance to bodily requirements, entering

and exiting the circle with some fluidity (fig. 87). Laboratory for Aesthetics and Ecology curators Dea Antonsen, Ida Bencke with her baby Alvin, and Elena Ortíz Lundquist marvel at the thick, squelching mud. NTNU researchers Libe García Zarranz, Kim Ménage, and Heli Aaltonen join the procession, enriching discussion through their particular research fields. Trondheim residents Danish-American visual artist Rosemary Lee and Kunsthall Trondheim co-curator Katrine Elise Pedersen take a break from their work at the art gallery for a quick circulation on Nidarø's foreshore. In this confluence of feminist attendance, I think to intersectionalist scholar Sara Ahmed's statement "Feminist theory is world making" (Ahmed 2017) partnered with Neimanis, who describes water as "a conduit and mode of connection" (Neimanis 2012).

Figure 87. Libe García Zarranz and I exit "Intime," walking past Dea Antonsen's garbage pile (visible between us).

Dea sets herself the task of collecting human-produced garbage that she notices mired in the mud (fig. 88) and forms a small cairn near the circle with her collection. Baby Alvin is carried the entire procession, passed between the arms of most circle participants and spurring discussion of motherhood (fig. 88, fig. 89, and fig. 90). The constancy of dialogue becomes the hallmark of this "Intime" circulation. While most participants opt at some point for a quieter, contemplative circulation (fig. 89), more often the collective walks side-by-side in twos or threes sharing active conversation on life and work experiences (fig. 90). Heli brings bread to feed the birds as a final enactment in the circle,

where the birds crowd what has otherwise been a spectator-space for them the previous hour (fig. 91).

At Nidarø, at-risk birdlife proved the most present biotic indicator, while the garbage pulled from the mud entangled geomorphologic indicators of climate change and the so-called Anthropocene. This offered a becoming-with more-than-human assemblages as we navigated humans in relation to humans, humans relating to water, to trash, and to the attendant birds. Dea's choice to extract garbage offered a tuning-in for us all as we circulated, paying attention to refuse present on the site. The removal of mired garbage impacts how benthic and ornithological communities inhabit and navigate the site. The decision to render the circulation a productive hour of such specific foreshore restoration offered another shade of human and more-than-human response-ability.

I faced an eco-ethical and aesthetic quandary when Heli introduced bread into the circle, as bread can cause harm when fed to ducks. Her gesture did, however, invite the flock into the circle, which was such a powerful moment to witness the birds circling overhead and marking our footsteps with their own. Heli began the circulation feeding bread herself, but I joined in despite my reservations. My discomfort in my choice persisted given the impact on the birds, and this experience remains a learning moment of my own culpability.

Figure 88. Dea Antonsen leads the "Intime" procession, carrying a hubcap she found half-submerged in the foreshore.

Figure 89. Most participants opt for solo circulation at some point during Nidarø's "Intime."

Figure 90. Conversation is the hallmark of Nidarø's "Intime" circulation.

Figure 91. Heli Aaltonen leads a final procession sprinkling breadcrumbs for birds.

3.7.6 Kelda and Hjörseyjarsandur, Snæfellsnes, Iceland

Latitude: 64.4792090138461

Longitude: -22.20003347929685

Length of Site Engagement: 18 October 2016 and 26-27 August 2017

Engagement with Hjörseyjarsandur and Kelda in Iceland (fig. 92 and fig. 93) came through intuition and living proximal to the sites, as with Loch Long. Most of the sand around Iceland is black sand, the result of ground basalt and the country's young geologic history courtesy of volcanism. The blond sand of Hjörseyjarsandur, an uninhabited island off the southern coast of Snæfellsnes peninsula, carries with it a distinct link to geology not present on Iceland, as the Gulf Stream reaches to these southern coasts. To reach Hjörseyjarsandur from the mainland, one must walk across a *kelda*, where ocean drains entirely from two directions during low tide. Kelda's foreshore is comprised of lugworm-rich (*Arenicola marina*) quicksand and mud. Nearby on this peninsula, SOSUS installed a network of hydrophones in the latter 20th connecting a handful of rural Listening Centres in Iceland, Norway, and Scotland (Duke and Stockholm International Peace Research Institute 1989).

Figure 92. Map of Southwest Iceland (‘ArcGIS Online’ n.d.).

Figure 93. Map of Hjörseyjarsandur and Kelda (‘ArcGIS Online’ n.d.).

At Hjörseyjarsandur and Kelda, I perform “Intime”’s counter-clockwise circulations with Steinar Bragi and Halla Steinunn Stefánsdóttir (fig. 94). Halla places her own hydrophone in the ocean to eavesdrop on the benthic community (fig. 95). I also video-record seaweed caught in succulent plants on the foreshore, tracing circles from blowing winds on a less common blonde-sand foreshore of Hjörseyjarsandur.

Figure 94. Hjörseyjarsandur foreshore, after a sunset “Intime” performance.

Figure 95. Kelda foreshore, before an afternoon “Intime” performance. Halla Steinunn Stefánsdóttir audio-records the incoming tide.

3.7.6.1 In Time with Kelda and Hjörseyjarsandur, Iceland

Time: Sunset (18:23) on October 8, 2016; sunset (22:30) on August 1, 2017; morning of August 2, 2017
Tide: Low neap tide at 16:53; low neap tide at 20:09; low neap tide at 8:32 (Flater 1998)

Between shores of Greenland, Iceland, Norway, and the UK, the Sound Surveillance System (SOSUS) monitors military, cetacean, and seismic movements via classified and declassified Department of Defence hydrophone networks laid on the ocean floor (Benson and Rehbock 2002; Duke and Stockholm International Peace Research Institute 1989). An Icelandic *kelda* drains ocean water twice daily, revealing a foreshore of quicksand littered with fishing buoys and the ejecta of lugworms. Intermittent wind gusts, sun. Lugworms (*Arenicola marina*) eject sand in loops and spirals on littoral zones at low tide (Tyler-Walters 2008). Halla Steinunn Stefánsdóttir rigs a hydrophone to record eelgrass in a tidal pool. The rising tide erases sand spirals.

The first time I perform "Intime" at Hjörseyjarsandur and Kelda, it is in the company of novelist Steinar Bragi—though I primarily circle alone taking care with the mud and quicksand (fig. 96). Steinar Bragi enters the circle just once, dragging a large piece of wooden debris from a ship or neighbouring farm (fig. 97); the pole is heavy to drag through the mud, and the weight of his effort makes my already-challenged sojourn feel much easier and lighter. Before and after this "Intime," we survey the shoreline for shells, bones, carcasses, and anomalous human-made materials. Hjörseyjarsandur is an island uninhabited by humans, accessible twice daily when the North Atlantic drains from the kelda to display a loose sand-and-mud foreshore. He notices on Hjörseyjarsandur a string of seaweed half-buried in sand, the wind swirling the seaweed to create circular patterns in the sand (fig. 98). I film several points along the beach where seaweed traces circles, and this macro-shot work becomes part of the "Intime" video documentation.

Figure 96. I circle alone at Kelda.

Figure 97. Steinar Bragi drags a large piece of wood for his short procession.

Figure 98. Seaweed half-buried on Hjörseyjarsandur traces circles in the sand.

The second and third times I perform “Intime” at this site, it is in the company of Halla Steinunn Stefánsdóttir, with whom I previously collaborated at Lomma Bay as discussed in **3.7.3.3 Intimate with Lomma Bay, Sweden**. On Hjörseyjarsandur, we perform “Intime,” making a larger circle than usual given the impressive size of the foreshore. We play follow-the-leader, exploring pace and movement (fig. 99). The circulation is an interior event, with the circle size precluding much opportunity for the direct interaction we experienced at Lomma Bay. After we finish circulating, we attend to our separate practices. As the sun sets and the moon rises, I photograph the temporary tattoo our footsteps have left (fig. 94) while Halla audio-records soundscapes at Hjörseyjarsandur and Kelda (fig. 100). Halla tells me after we finish the “Intime” at Hjörseyjarsandur that she was drawn to pause and look out at the ocean (fig. 101), but never to face inland.

Figure 99. Follow-the-leader materializes in Hjörseyjarsandur's "Intime."

Figure 100. Halla Steinunn Stefánsdóttir audio-records Kelda's soundscape as the moon rises.

Figure 101. We stare at the North Atlantic Ocean's horizon in the middle of our "Intime" circulation.

Kelda is a site of lugworm mounds, quicksand, and mud. Within half an hour of our circulation, the tide returns. We watch the ground as we walk (fig. 102), to ensure we don't sink into the deep mud indentations our previous steps have created. Standing in one spot also places us at risk of sinking into the mud, so we pause only once to stare across the foreshore at a distant mountain range (fig. 103). The gesture stands as counterpoint to Halla's comment the previous evening, where she now chooses to gaze inland.

The quality of the foreshore's mud made it a challenge to move, offering yet another understanding of speed and quality of movement possible in "Intime." Lugworms were the most prominent biotic indicator at the site, and the presence of their ejecta also delivered an alarming awareness of how our footsteps might impact species *below* our circulation. This extended my attunement to lugworm movement through the mud in relation to my own movement. It also delivered the realization that my presence may be impacting biotic and abiotic entities in ways I could not ascertain. This knowledge acquisition stayed with me in future "Intime" circulations raising my concern for the benthic communities present but unseen at other sites. It also extended to how I moved through my days beyond the performance, carrying with me a curiosity for the type of communication my scent, temperature, movement, sound, and touch could be extending to other more-than-human entities—and the response-ability inherent in those entities, even if I was unable to intuit the responses my presence might elicit.

Figure 102. We watch the ground as we circulate in Kelda's mud and quicksand for "Intime."

Figure 103. We stare at a distant mountain range as the tide returns to Kelda.

3.7.7 Rooms that Perform: Black Room, Inter Arts Center, Malmö

Latitude: 55.5941336

Longitude: 13.007194400000003

Sea Level: >10 m

Length of Engagement: 25-27 February 2017

Layout: Conventional black box theatre with video projection and sprung floor

The Inter Arts Center's Black Room (fig. 104 and fig. 105) was used as a performance and exhibition venue for the group show "(SUND)." Artistic research gathered on-site at Lomma Bay during the previous week was developed for installation in this non-site; this research was outlined in **3.7.3.3 Intimate with Lomma Bay, Sweden**. Exhibitors and performers included Halla Steinunn Stefánsdóttir, Angela Rawlings, Stefan Östersjö, Katt Hernandez, Nguyễn Thanh Thủy, and Jenny Käll.

Figure 104. Black Room exhibition space, facing west-northwest, Inter Arts Center, Malmö ('Black Room: Inter Arts Center' n.d.).

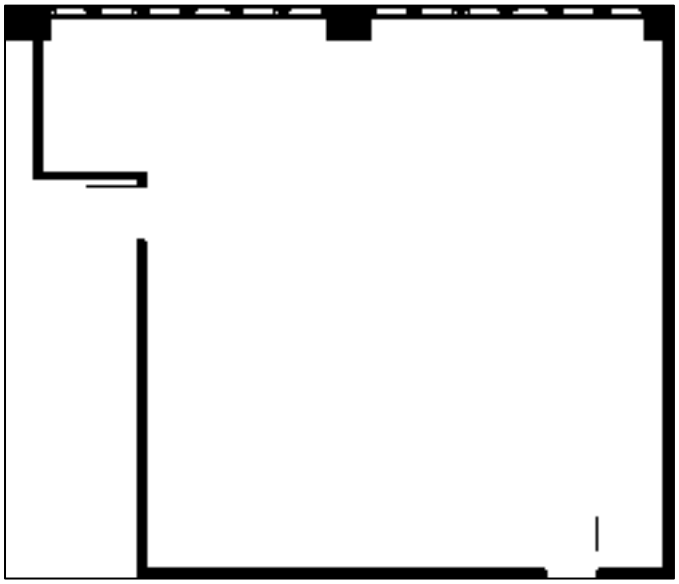

Figure 105. Black Room floor plan, Inter Arts Center, Malmö ('Black Room: Inter Arts Center' n.d.).

3.7.7.1 Exhibition and Performance: "(SUND)"

The Inter Arts Centre provided gallery and performance space in its Black Room to screen "Intime," show "(SUND)," and install audio works and sculptures by Stefánsdóttir, Östersjö, Katt Hernandez, and Jenny Käll. Östersjö's *of the wind and the tree* is a sound sculpture based on Aeolian guitar recordings made at Lomma Bay during our circulation; see **1.6 Case Studies: Tide, Sound, Line** and **3.7.3.3 Intimate with Lomma Bay, Sweden**. Stefánsdóttir's soundscape composition she made at Lomma Bay (**discussed in 1.8 Case Studies: Time, Sand, Sign**), and was partnered with soundscape recordings enacted by Katt Hernandez as she walked circles in Stockholm at the same time as our Öresund engagement. Visiting artist Jenny Käll lent a sculpture to our exhibition.

Stefánsdóttir and I also devised a sculptural installation for her audio-recording of eelgrass, presenting the species' audible and visual materialities within the exhibition space. A deep, wide, open-mouthed clear glass vase was selected for handfuls of dried eelgrass. On the vase's bottom, a dwarf kit transducer was placed and played. It amplified Stefánsdóttir's recording through the resonance of the vase. The curious sculpture of the grass in glass was spot-lit in the gallery, and the eelgrass' Lomma Beach audio recording was audible for the intimate listener who cocked her ear into the vase (fig. 106).

Figure 106. Halla Steinunn Stefánsdóttir listens to her foreshore soundscape composition in the eelgrass sculpture.

In anticipation for the exhibition, we circulated a second invitation[28] describing the artworks that would be featured (fig. 107). At moments during the day-long exhibition, participants gathered in the space for an improvised sound performance working with our instruments (Stefánsdóttir and Hernandez with violins, Östersjö with guitar, Nguyễn with đàn tranh, and me with voice); our sounds responded to the soundscape compositions of Stefánsdóttir and Hernandez, offering a feedback loop centering on an extended Öresund-of-the-memory. I also wrote a score called "Ö or Ø" in *Sound of Mull* that doubled as instructions inviting people to enter the space without shoes (fig. 108); this had a practical aspect, as a way to minimize footsteps within the sound installation and also to invite greater intimacy and a sense of home.

(SUND)

Öresund. Either side of the sound: ears. Either side of the sund: sand.

(SUND) is an in-progress intradisciplinary event that enacts an Öresund imaginary, transposed as a cabinet of curiosities within the theatre's familiar black box. Poetic lines of *Zostera marina L.* are catalogued by hydrophones buried in their shush in low tide, then collected in glass vials for observation. The strait's fresh wind sounds the strings of a tree-wrapped guitar and bemittened đàn tranh. Sensorial tension resounds in the improvising visitors who circulate on site and in memory. Throughout, a geopoetics. Sund. Sand. Land.

You (yes, *you!*) are invited to circulate in **(SUND)** on Monday, February 27th from 13:00 to 20:00. We will open the Inter Arts Centre's Black Room (fourth floor) to guest and would-be collaborators to experience a work-in-progress.

Figure 107. Invitation for "(SUND)" at Inter Arts Center, Malmö, Sweden.

[28] The first invitation announced the *in-situ* performance of "Intime" at Lomma Bay, Sweden (Figure 62).

Ö or Ø

Here is the room. Here you are.

Shoes. You remove your shoes before entering the room because of the floor. The floor is soft, sprung, and each footstep resounds its bass into the room. Without shoes, you enter the room and feel the soft shush of the floor beneath your feet.
Spring.

Land.

The room is a map. There are corners. Corners align with directions.

This manifest is a direction.

Ö.

An Ö may be an island in Sweden like an Ø may be an island in Denmark. Or Öre or Øre may be ears.
Listen. The room may be an island or Ø.

Through our feet we listen to the room become an island. Or a strait. Sound. Sund.

The room performs.

Figure 108. Excerpt from "Ö or Ø," a score in *Sound of Mull*.

3.7.8 Rooms that Perform: Kunsthall Trondheim, Trondheim, Sør-Trøndelag, Norway

Latitude: 63.43048220000001
Longitude: 10.400483000000008
Sea Level: 15 m
Length of Engagement: 13 September to 2 December 2017
Layout: White-cube gallery with natural lighting, high ceilings, and concrete floors

Kunsthall Trondheim (fig. 109 and fig. 110) provided the non-site for installation of two works: "Intime" and "(SUND)," as part of their group exhibition "Et Nytt Vi / A New We" co-curated with Laboratory for Aesthetics and Ecology.

Figure 109. Kunsthall Trondheim (Mikalsen 2017).

Figure 110. Kunsthall Trondheim (Mikalsen 2017).

3.7.8.1 Exhibition: “(SUND)”

My process includes public performances, inviting audience to participate in work-in-progress. To be witnessed in circulation and to receive responses to “Intime” raises my

sensitivity to how human activities may be sensed by more-than-human entities where we circulate. A public invitation to participate in "Intime" was issued through Kunsthall Trondheim (fig. 111), as part of a group exhibition co-curated by the Laboratory for Aesthetics and Ecology (LABAE) positioned as a "multispecies think tank" (Bencke, Antonsen, and Ortíz Lundquist 2017). Prior to our "Intime" circulation in Norway, LABAE invited exhibition contributors to alter their curatorial statement; I left the statement on a foreshore overnight, inviting an Icelandic spring tide to revise (fig. 112).

INVITATION: THERE WILL BE EARS, AND THE SHORE WILL BE A ROOM

Participate in one of the works in Kunsthall Trondheim's upcoming show *A New We.* The exhibition is co-curated with Laboratory for Aesthetics and Ecology.

There will be ears, and the shore will be a room
A geopoetic performance with Nidarø
Where: We will meet at the entrance of Trondheim Spectrum.
When: Low tide, 10:00-12:00, Sunday, September 10

Join interdisciplinary artist a rawlings (CAN/ISL) for an interaction at the foreshore of Nidarø. Together we will explore estrangement, intimacy, ritual, and relationships with human and more-than-human bodies. The interaction may be considered geopoetic performance-as-research: *There will be ears, and the shore will be a room*.

We'll be moving the whole time, so wear weather-appropriate clothes and shoes, and please bring your own food.

Our interaction will be video-documented for screening at Kunsthall Trondheim during the exhibition *A New We* from September 14 – December 21, 2017. All participants will be asked to share permission for future screenings of the video documentation.

Figure 111, Invitation to participate in Trondheim's "Intime," ('Invitation: There Will Be Ears, and the Shore Will Be a Room' 2017).

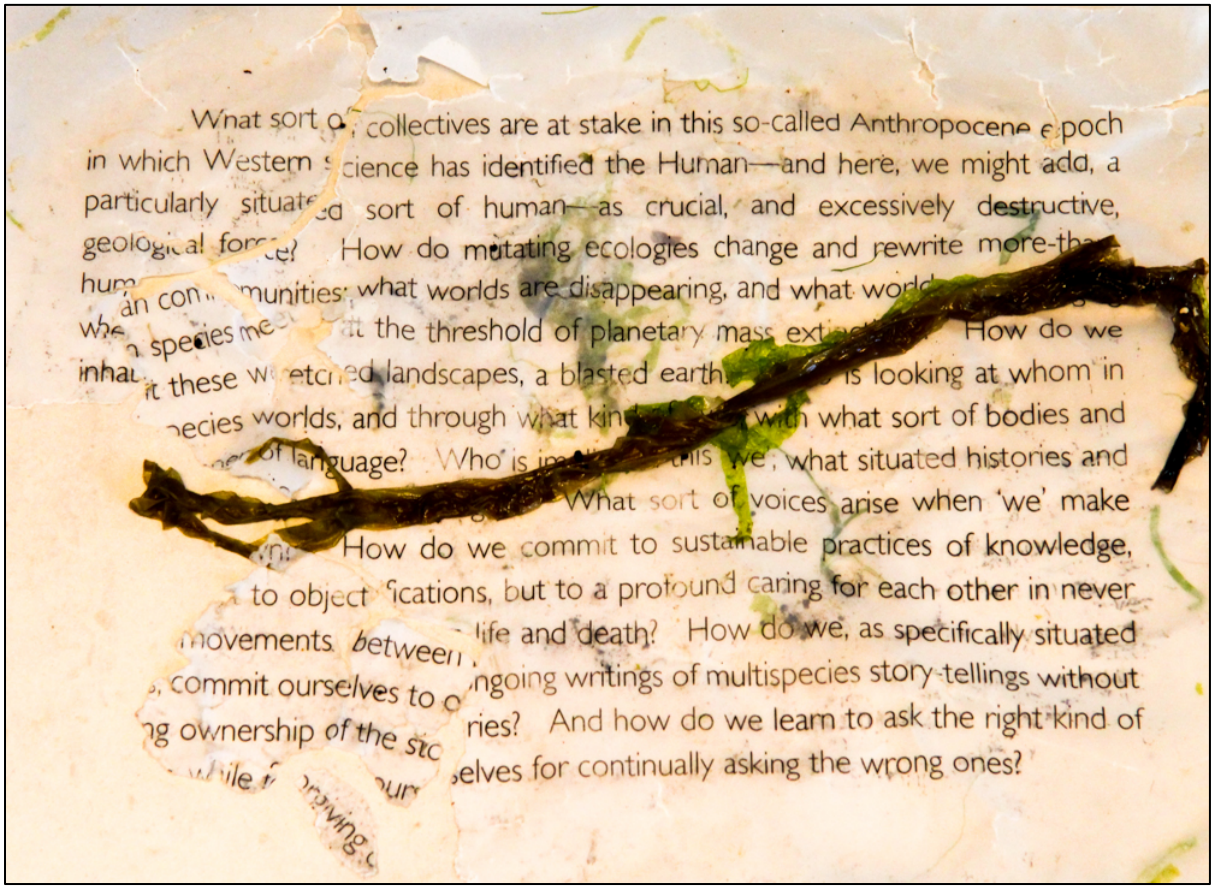

Figure 112. An Icelandic spring tide revised the Laboratory for Aesthetics and Ecology's curatorial statement in advance of their exhibition "A New We" at Kunsthall Trondheim.

After the "Intime" circulation as outlined in **3.7.5.1 Intimate with Nidarø, Norway**, I spent a few days prior to the exhibition's opening to edit two videos of "Intime" circulations. The first is an expansion of the composite "Intime" video, projected onto a pillar in the gallery space (fig. 113). The second is a Nidarø-specific video where the circulation is overlapped at a few junctures, producing a ghost-like effect as participants double, fading in and out over minutes (fig. 114 and fig. 115). This video was projected onto Kunsthall Trondheim's front window where it looped as an interface with outdoor passers-by and the indoor attendees (fig. 110). I also installed "(SUND)" on the floor throughout the gallery with the assistance of Antonsen and Ortíz Lundquist; see **3.7.9.1 Mapping "Intime" as "(SUND)"**.

Figure 113. The composite “Intime” video documentation is projected (foreground) onto a pillar in Kunsthall Trondheim (Mikalsen 2017).

Figure 114. Still from edited video, showing a ghost-like overlapping of participant circulation in “Intime.”

Figure 115. Still from edited video, showing a ghost-like overlapping of participant circulation in “Intime.”

Durational performance instigates conversations among participants beyond the moment of participation. I witness this at the exhibition opening and in conversation with NTNU professor Libe García Zarranz. She invited my return to Trondheim in February 2018 as a guest lecturer and performer for her students and community, and her introductions frequently included a description of her experience of “Intime” with an emphasis on the counter-clockwise. LABAE curatorial intern Andrea Pontoppidan reflects for the Norwegian Writers’ Climate Campaign on her second-hand engagement with “Intime,” through viewing the video installation and conversing with Nidarø participants, by writing, “We are inextricably linked to materials that are part of a completely different premise than ours. Can we find a new intimacy here?” (Pontoppidan 2017) Through the reflections of García Zarranz and Pontoppidan, I reposition my understanding of “Intime”’s impact on fellow researchers to enfold their “Intime”-positioned narratives into future tellings of how “Intime” performs.

3.7.9 Rooms that Perform: Sea Loft, Kinghorn, Scotland

Latitude: 56.06730239205504
Longitude: -3.1731273703612715
Length of Site Engagement: 20-24 February 2016, 7-12 March 2016, 16-19 November 2017, 14-18 May 2019
Layout: Old cinema renovated into large artist studio with natural lighting, high ceilings, and wood floors

In addition to facilitating "Intime" circulations staged on Kinghorn's foreshore in 2016 and 2017 as discussed in **3.7.2.1 In Time with Kinghorn, Scotland**, Sea Loft Artist Residency became the site of the final performance and exhibition for *Sound of Mull*. Sea Loft is the home and artist studio of Elizabeth Ogilvie, whose work *Out of Ice* was described in **1.4 Case Studies: Water, Ice, Fog**. The studio is also the work-place of visual artist Michael Craik, whose processual watercolours are detailed in **1.6 Case Studies: Tide, Sound, Line**. The opportunity to stage the final performance and exhibition in proximity to the workspaces of two artists whose work featured in **Chapter 1: Literature and Practice Review** offered a remarkable chance to entangle practices and processes within the same site, performing influence and confluence at the heart of my geopoetics praxis. Performance featured my long-time collaborators Maja Jantar and Halla Steinunn Stefánsdóttir, the latter of whose work is discussed in **1.8 Case Studies: Time, Sand, Sign**.

At the Sea Loft event, the book *Sound of Mull* was launched and "Intime" video documentation was screened in its entirety (fig. 116). The exhibition placed in the main space of Sea Loft included "(SUND)" installed on the floor, as well as Laureen Burlat's *Trash Strata* documenting "Knots" explained in **2.3 Performance Score: "Knots"** and the violin neck from "Violinouflage" (fig. 117) as discussed in **2.9 Performance Score: "Violinouflage"**. Performance in the upstairs loft featured violinist Halla Steinunn Stefánsdóttir, vocalist Maja Jantar, and me (also vocalizing) as we worked through the structured improvisation of several *Sound of Mull* scores (fig. 118)[29]; further details of our score work can be read in **4.6 Performance Scores: "Foreshore, in C" and "Météophor"** and **4.10 Performance Scores: "Sea Level," "Vibrato, Ebb, Flood," and "Echolocation"**.

[29] Part of the performance is available to view online at https://vimeo.com/359334923.

Figure 116. Halla Steinunn Stefánsdóttir watches “Intime” video documentation, with “(SUND)” wind barbs installed on the floor in front of her.

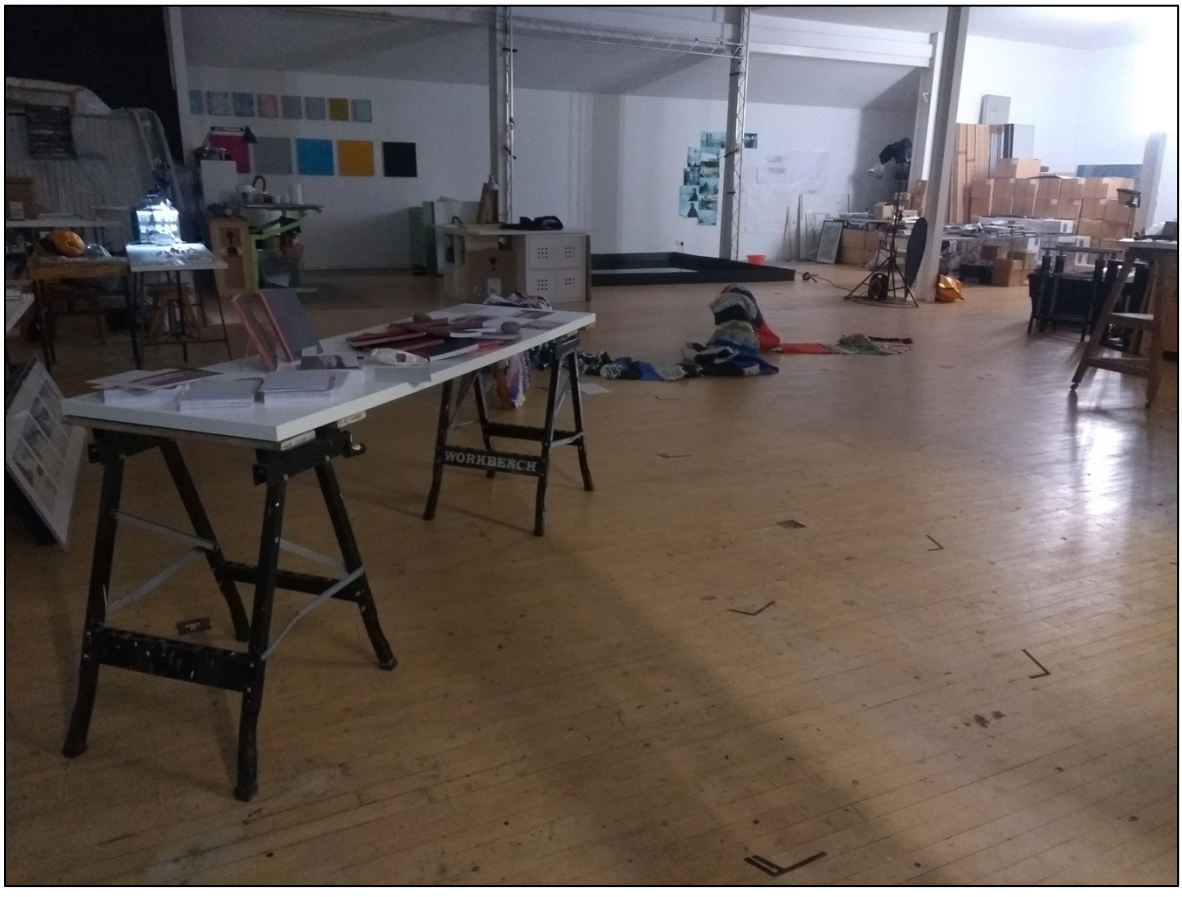

Figure 117. Sea Loft exhibition.

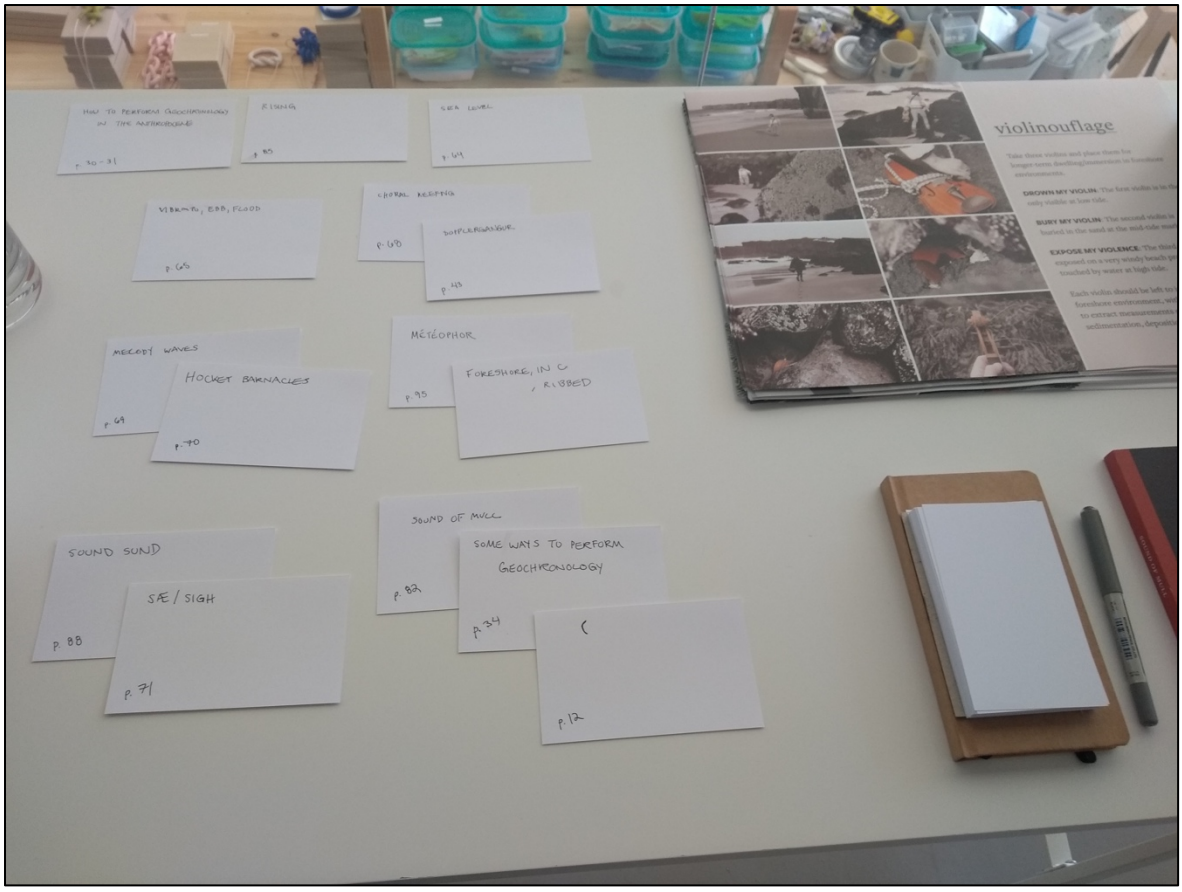

Figure 118. Record cards display titles of performance scores ordered for the performance by Halla Steinunn Stefánsdóttir, Maja Jantar, and me.

For the performance at Sea Loft (see **3.7.9 Rooms that Perform: Sea Loft, Kinghorn, Scotland**), Halla Steinunn Stefánsdóttir, Maja Jantar, and I collectively decided which scores we would use from *Sound of Mull* to create our voice-and-violin concert. The selection process occurred from May 15th to 18th, over the three days preceding and also including the performance date of May 18th. Each day, we rehearsed our selected scores, reordering, removing, and adding as we discovered an optimal flow of the material. Due to several scores that rely on structured improvisation (including "Météophor"), our rehearsals allowed us to understand the score's terrain without establishing repeatable sonic material. Like every visit to a foreshore, the element of improvisation at the heart of the scores allows for liveliness and flexibility in what was shared during our event on May 18th.

The event ended with a participatory "Intime" circulation on the foreshore, featuring three counter-clockwise circulations in tandem. The date of May 18th, 2019 was selected to coincide with the full moon, to ensure tidal ebb and flood would be at its most

extreme to accommodate optimal “Intime” circulation. This was staged close to low tide at 21:16 and sunset at 21:24.

3.7.9.1 Mapping “Intime” as “(SUND)”

In the performance score “Ö or Ø” (fig. 108), the lines “Either side / of the sound: ears. Either / side of the sund: sand.” become a double entendre on the auditory phenomenon of sound as well as the body of water surrounded by shoreline. In either case, ears listen, or foreshores bracket the body of water with a comparable curvature to parentheses or ears. This double entendre led to the creation of the title “(SUND),” where the letter O in the middle of SOUND is pulled apart: O becomes ( ) for its visual similarity. ( ) is then pulled farther apart to insert the sund (all remaining letters of sound minus the O) between the modified O. The word “(SUND)” could stand alone as a visual poem, but I opted to adapt it for the title of a performance score.

“(SUND)” is a gallery-floor installation that plots a meteorological mapping of wind currents over the North Atlantic, rendering any room into a room that performs. Any “(SUND)” installation is directly related to a performance of “Intime” (see **2.11 Performance Score: “Intime”**) so I take a snapshot of the wind speed and direction over the North Atlantic that aligns with the dates and times when an “Intime” performance occurs (fig. 119 and fig. 120). This subtle path, constructed of gaffer tape, depicts wind barbs indicating the wind speed and direction of the currents on the date of an “Intime” performance. Wind currents roved from the British Isles to west-coast Scandinavia and southern Iceland. Installation of “(SUND)” within gallery space re-maps the wind currents with fidelity to cardinal direction. “(SUND)” was installed in the Inter Arts Center’s Black Room for a February 2017 exhibition (see **3.7.7 Rooms that Perform: Black Room, Inter Arts Center, Malmö**); in Kunsthall Trondheim for the “A New We” exhibition running September to December 2017 (see **3.7.8 Rooms that Perform: Kunsthall Trondheim, Trondheim, Sør-Trøndelag, Norway**; and at Sea Loft for the May 2019 exhibition and performance of *Sound of Mull* (see **3.7.9 Rooms that Perform: Sea Loft, Kinghorn, Scotland**).

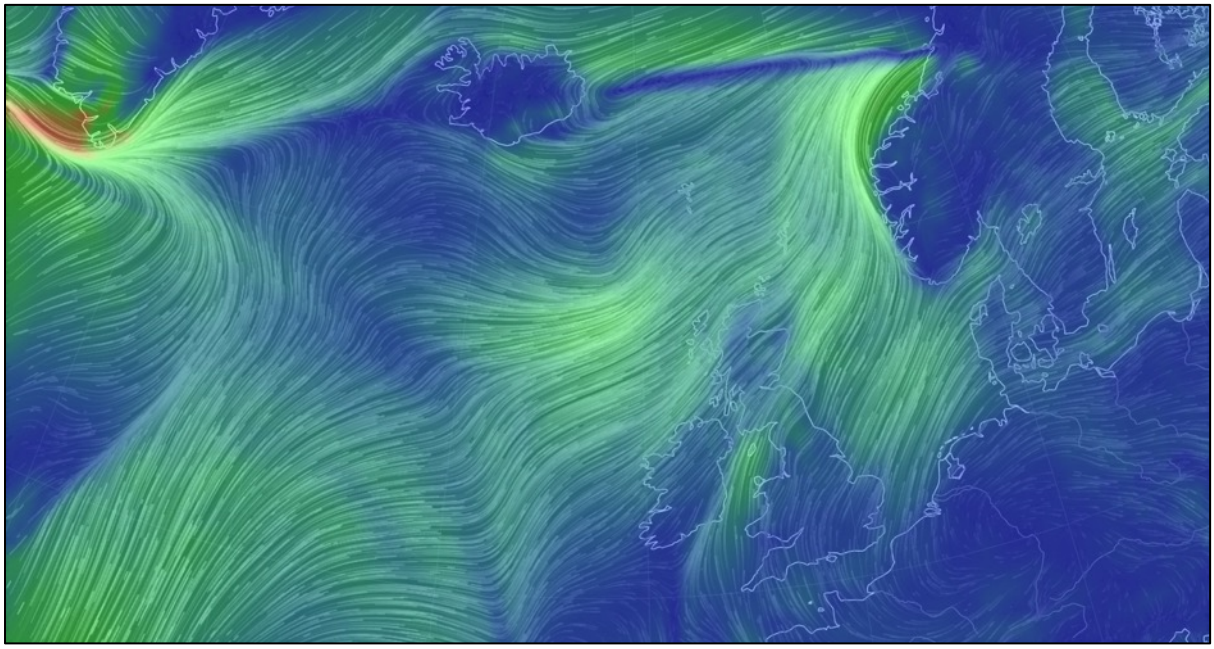

Figure 119. Surface wind speed and direction on February 18, 2017 at 14:00 (Beccario 2017), used to plot "(SUND)" for the Black Room installation.

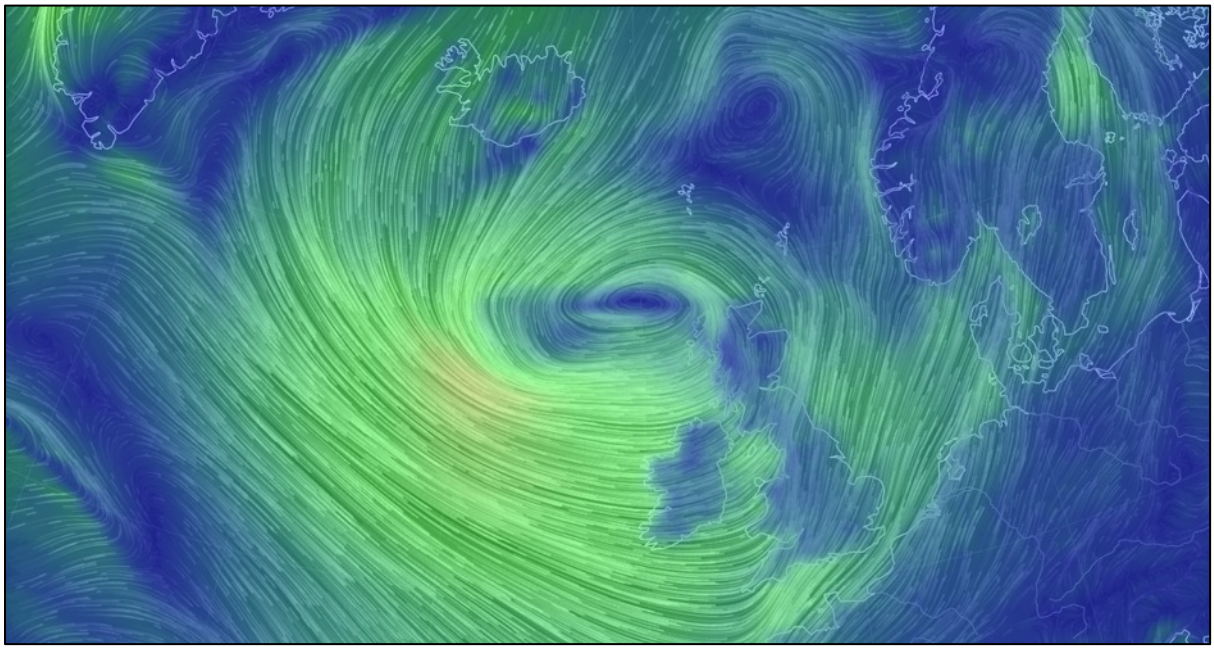

Figure 120. Surface wind speed and direction on September 10, 2017 (Beccario 2017), used to plot "(SUND)" for the Kunsthall Trondheim installation.

Gaffer tape is a much-used tool for a theatre technician, used to mark the position of set pieces and to mark blocking for performers. This tape emplaces; it bookmarks place for future return. The tape denotes position and viewing. For "(SUND)," I use gaffer tape, with its theatre referents, to design wind barbs on a floor. The marking system of a theatre house converges with the meteorologist's air current symbol, both offering straight-line designs of two or more lines. The wind barb indicates speed (knots) depending on the

number of short or long lines on the vertical line's ascender. Speed-lines are positioned to be drawn from the cardinal direction from where the winds blow.

The floor is black in the Black Room, so I opt for white gaffer tape to demark the wind barbs (fig. 121). Kunsthall Trondheim's floor is grey and Sea Loft's floor wood, so black gaffer tape offers the strongest legibility on the floor (fig. 122). A single wind barb in Kunsthall Trondheim provides a measurement schematic (fig. 123); all wind barbs are cut by hand (fig. 124 and fig. 125).

Figure 121. Wind barb constructed of white gaffer tape on the Black Room's floor.

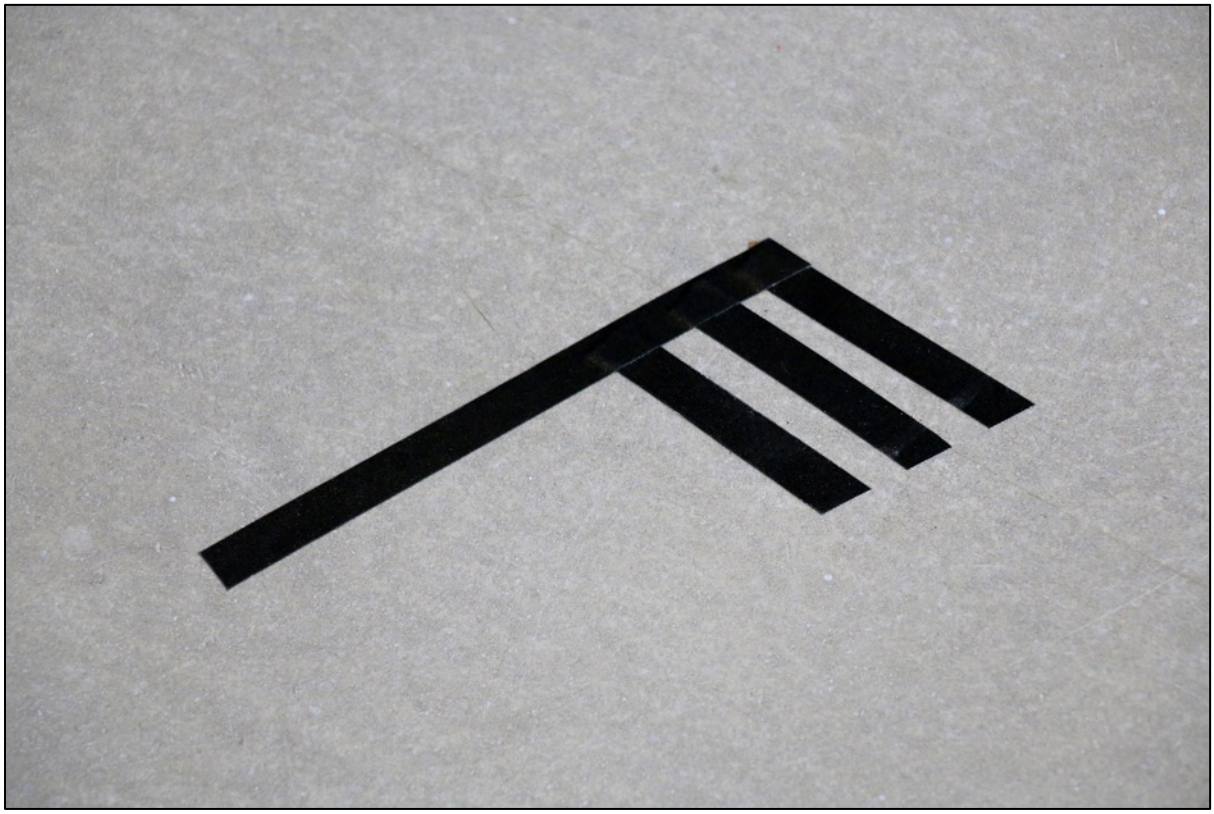

Figure 122. Wind barb constructed of black gaffer tape on Kunsthall Trondheim's floor (Mikalsen 2017).

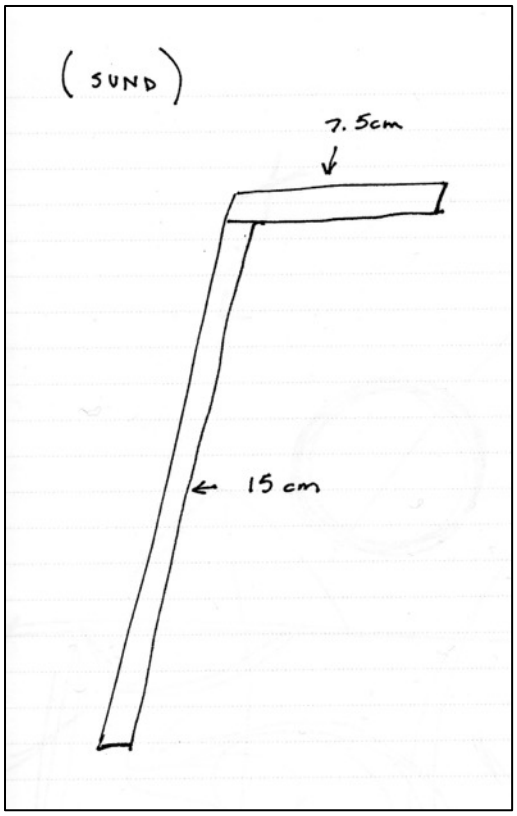

Figure 123. Measurements of a wind barb to be constructed for Kunsthall Trondheim's "(SUND)" installation.

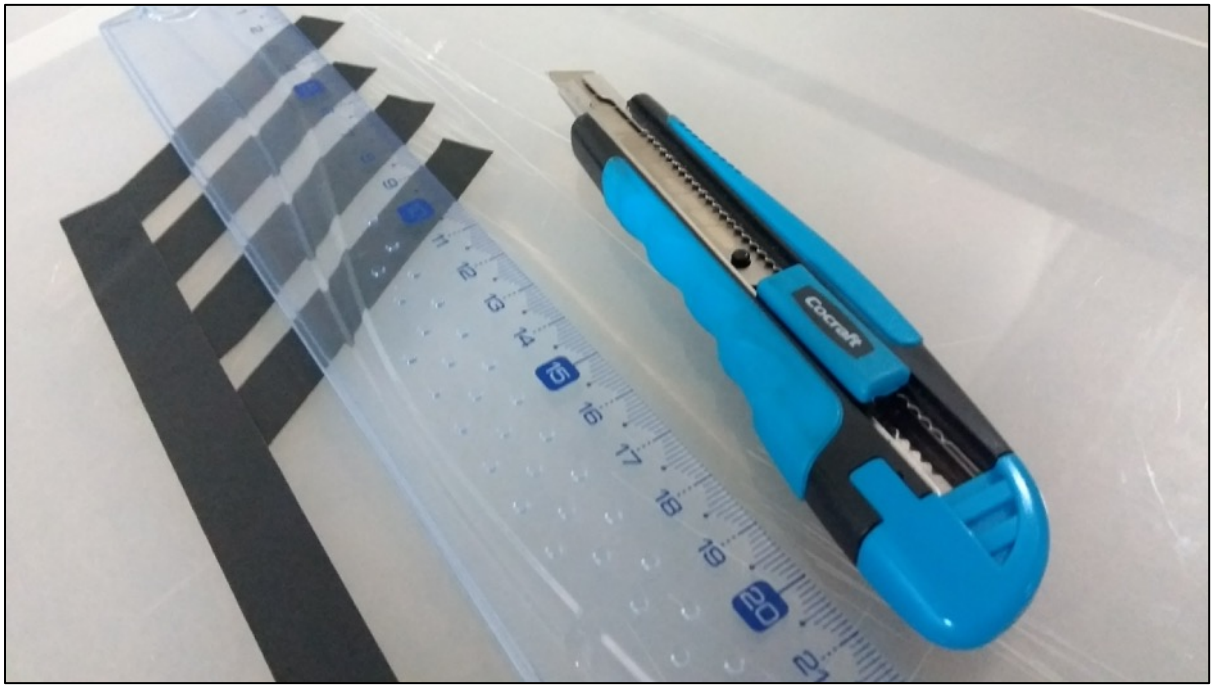

Figure 124. Hand-cut wind barbs in progress at Kunsthall Trondheim.

Figure 125. Hand-cut wind barbs are prepared for Kunsthall Trondheim's "(SUND)" installation.

In the Inter Arts Center's Black Room, I position the wind barbs in a roughly counter-clockwise motion that circumnavigates the perimeter of the gallery (fig. 126). When installing the gaffer tape, I move around the room in a counter-clockwise motion to continue the artistic research as practice. Such a slower circulation with the wind barbs, crawling counter-clockwise while dragging a gaffer tape and wind-barb map with me, transforms my understanding of the ritual capacity of installation work alongside the significance of moving the same paths (in my case, counter-clockwise circle) at different

speeds. The barbs wind around installations by Stefan Östersjö, Jenny Käll, Halla Steinunn Stefánsdóttir, and me (fig. 127).

Figure 126. Wind barbs installed around the Black Room's perimeter.

Figure 127. Wind barbs navigate in proximity to other installations in the Black Room, including Stefan Östersjö's *of the wind and the tree* in the foreground.

At Kunsthall Trondheim, Laboratory for Aesthetics and Ecology curators Dea Antonsen and Elena Ortíz Lundquist conjure the North Atlantic wind currents through their installation of "(SUND)" near midnight on the night prior to the exhibition's opening. Their curatorial decisions on where to place the wind barbs include referencing my recommended placement with wind direction and speed (fig. 128) with consideration for how the barbs will choreograph the space and how the barbs may indicate standing points to some gallery attendees (fig. 129). They think through the relationship of the barbs to all artworks within the gallery, as well as the physical spacing and visual impact of the barb's placement. Their choices are guided by a combination of embodied knowledge, professional training, and instinct. As participants of "Intime," they also rely on their previous experience circulating on the Nidarø foreshore (fig. 88 and fig. 89) to envision a path through the space that reflects elements of "Intime"'s encoded practice.

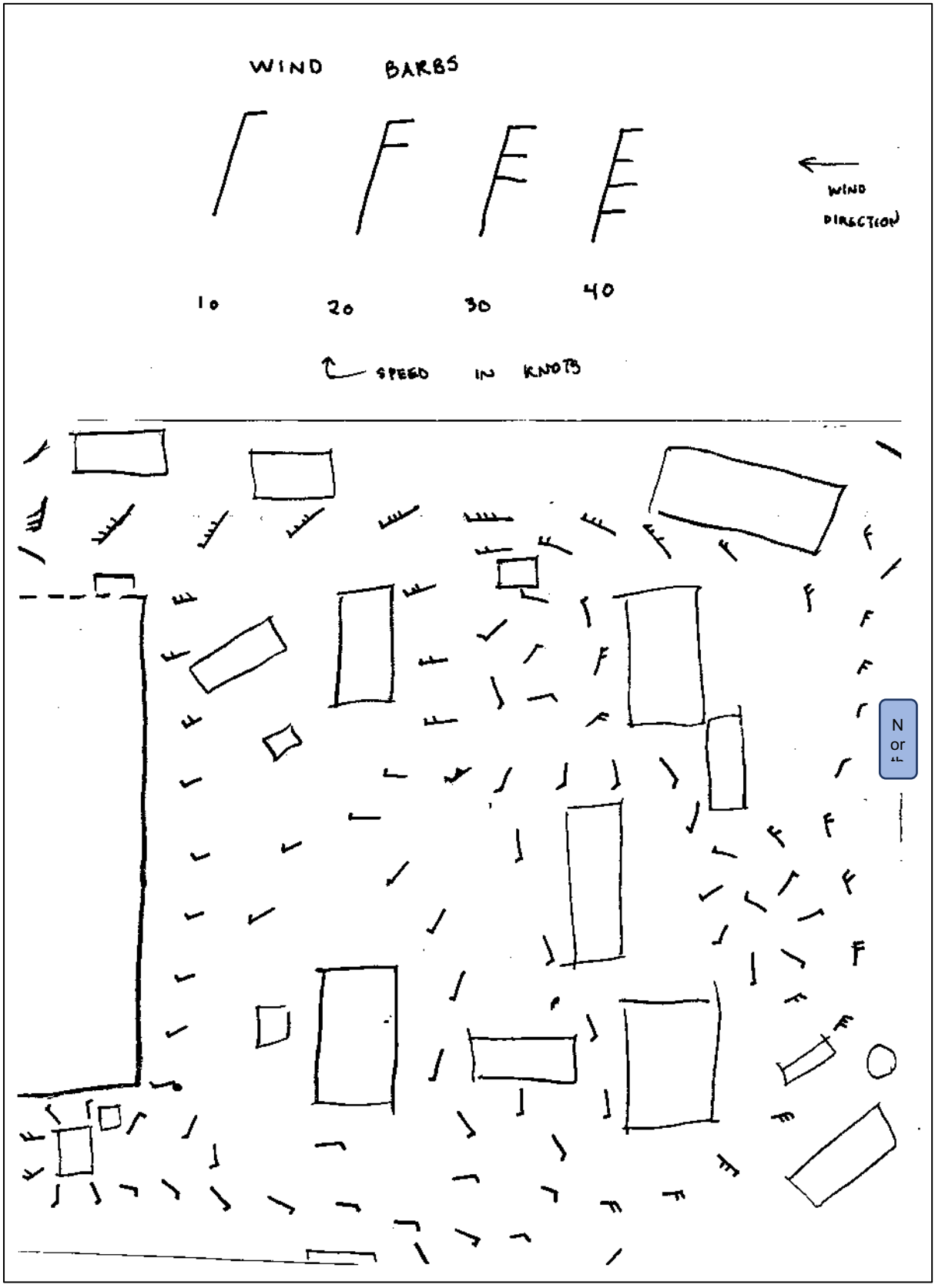

Figure 128. I draw a map of Kunsthall Trondheim's interior including placement of "A New We" exhibition works and recommend direction and location of wind barbs. 'North' labels the north side of the room.

Figure 129. Wind barbs in "(SUND)" are situated throughout Kunsthall Trondheim, providing alternative choreography or blocking within the space.

In an essay for the Norwegian Writers' Climate Campaign, Andrea Pontoppidan describes a tour of Kunsthall Trondheim's "A New We" exhibition, led by co-curators Dea Antonsen and Ida Bencke.

> We went from work to work and there was a flow and self-confidence in our movements. Control in the transitions. But suddenly Dea stops and says, "It's as if what we are doing now is to suggest that there is only one way to go through the exhibition. But that does not have to be. There are other choreographies that are suggested in the room." She points down to the floor, where little black characters spread over the entire floor area of the room (Pontoppidan 2017).

The installation work cannot exist without direct engagement with tangible sites. Instead, "(SUND)" becomes a cosmopolitan assemblage, where multiple sites commingle, and where responses to sites enable response-abilities through becoming-with large-scale air currents in the context of the familiar gallery space. The potential choreographies afforded through "(SUND)"'s placement within a gallery enables response to the referential sites inscribed through the gaffer tape, as well as the immediate site of the gallery.

At Sea Loft, I installed "(SUND)" throughout the vast artist studio, with the primary counter-clockwise collusion of air currents establishing the location of artworks (*Sound of Mull* book table, "Knots" plastic train, and "Violinouflage" violin neck) (fig. 117). In an extension of the score adapted for Sea Loft, wind barbs also lead from the main

hall into the “Intime” video-screening room. Similarly, wind barbs began outside of the building, inviting audience to be swept inside. Finally, “(SUND)” led upstairs as well, to the loft space where we performed.

In the context of performance, Nick Kaye asserts that “[t]he site… is not available as an ‘object’, for it is not static: the site is mobile, always in a process of appearance or disappearance” (Kaye 2000b, 96). While this resonates with the geomorphological processes of erosion, deposition, intrusion, and extrusion, “(SUND)” transposes such mobility into the gallery as a room that performs. Wind barbs signal geomorphological agents in the gallery, thereby conjuring a site imaginary. This offers a temporary appearance of an otherwise unfixed site. The inaccessible site imaginary appears as the confluence of the North Atlantic Drift, the Irminger Current, and the Labrador Current is framed within the physical boundary within the gallery’s space. The wind-current site in question, though inaccessible, is simultaneously disappeared through the replacement of ecological materials (wind, water) with gaffer tape. That the gallery “expos(es) the absence of the site in an exacerbation of the gallery’s objectifying function (Kaye 2000b, 94)” renders the disappeared site apparent through the presence of its absence.

Chapter 4: Temporalities

4.1 Geochronology

Researching through artistic practice how to perform geochronology in the Anthropocene unsurprisingly and perhaps necessarily prompts consideration of temporalities. For this section of my conceptual framework, I consider geochronology as a framework of thought that outlines historical and deep time indicating and constructed of multiple temporalities of more-than-human entities. I also indicate how human relatability to multiple temporalities may be accessible through experiential knowledge acquisition via devised performance instructions and actions that activate temporal materials. My artistic practice-as-research attempts a bridge between a physical-sciences approach to the Geologic Time Scale and a humanities approach to thinking-with the more-than-human through the lens of inherent multiple temporalities, particularly in light of the Anthropocene as a proposed geological epoch.

In the **Introduction** to this dissertation, I describe geochronology as providing a timescale to assemble a geologic planetary history through data extracted from sediment, fossils, and rock. Scientific dating methods provide a timeframe for the stratigraphic units that comprise the Geologic Time Scale, commencing with the Earth's inception in the Precambrian supereon 4.6 billion years ago. While this supereon lasted roughly 4 billion years, the internationally agreed Geologic Time Scale, as used by geochronologists, sub-divides it into shorter stratigraphic units (of eons, eras, and periods) based on significant glaciations, orogenies, biological proliferations and extinctions, and climatic warming and cooling. Subsequent to the supereon, the next 540 million years continues its division of geologic time into eons, eras, and periods based on these significant events, but includes the additional subdivisions of epochs and ages.

Already in the configuration of the Geologic Time Scale, we witness the blend of multiple temporalities through biotic and abiotic events. These events determine the geologic narrative (or geologic logic) of the simultaneous shorter and longer stratigraphic units (supereon, eons, eras, periods, epochs, and ages) (fig. 130). As an example, the Holocene epoch commenced at the end of the last glacial period 12,000 years ago continuing until the moment of this writing; a proposal to subdivide the Holocene into the three ages of Meghalayan (4,200-now), Northgrippian (8,200-4,200), and Greenlandian

(11,700-8,200) was ratified by the Executive Committee of the International Union of Geological Sciences in 2018 (Walker et al. 2019).

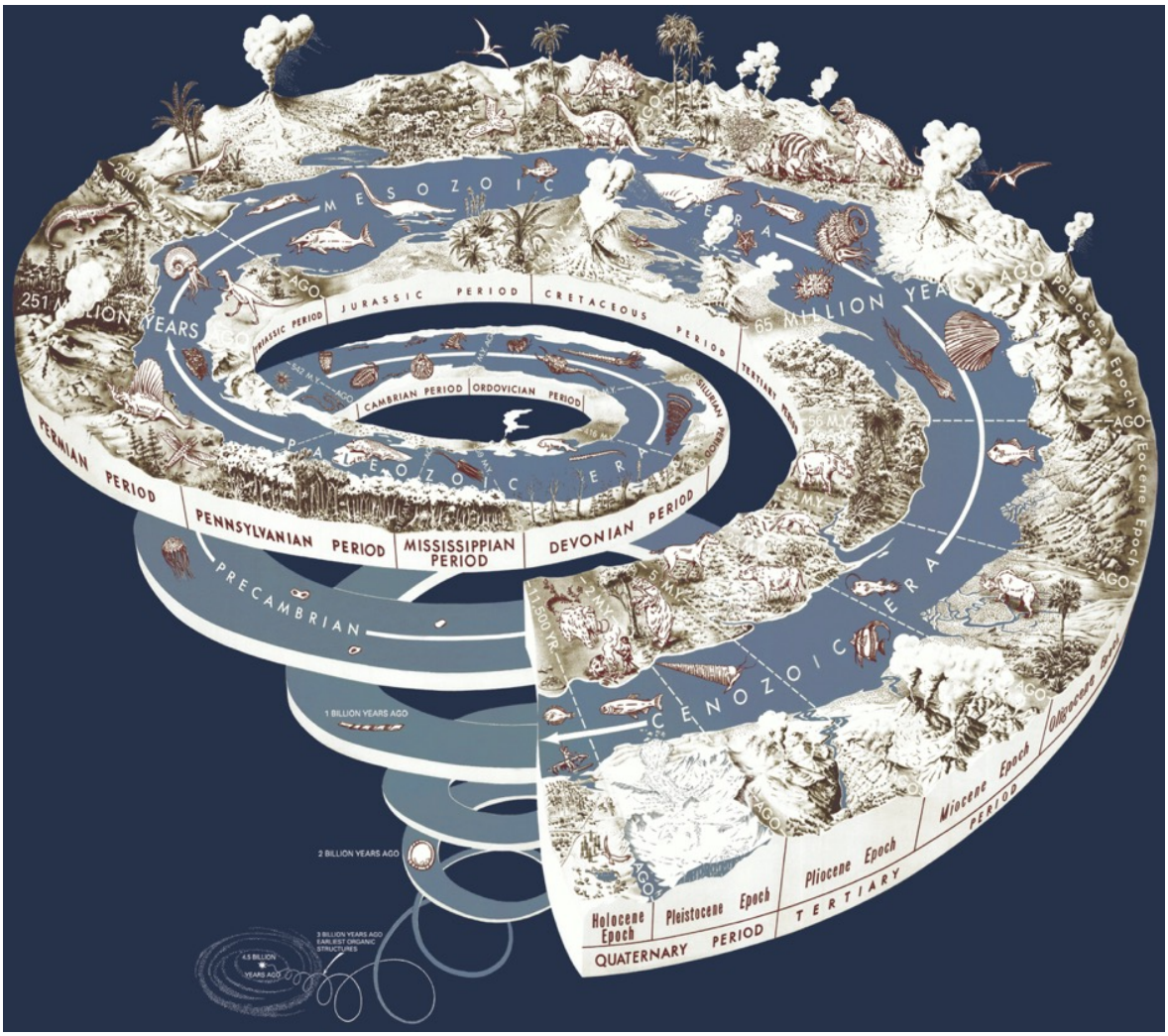

Figure 130. Geologic Time Scale (Graham, Newman, and Stacy 2008).

The challenge with these large swaths of time—extending to millions and billions of years—is their unrelatability in a felt sense. How can a human, with an average life span of 79 years, relate to such temporal expansiveness? Through this question, I considered if there might be a way to develop temporal relationship not through the concept of deep time itself, but with the current-day temporal markers that carve up the Geologic Time Scale—markers of biotic and abiotic lives, of sediment, of rock, of fossil, of the drivers of geomorphologic change. If a relationship could be established with the entities indicating geologic planetary history, and if that relationship has at its core an emphasis on multiple temporalities, then perhaps the relatability of deep time could be approached from a peripheral angle. This tuning-in to human and more-than-human temporalities may then provide a way to become-with the more-than-human and further understanding of interconnection, interdependence, and strategies for human sustainability.

4.2 Performance Scores: "Performula Anthropo*tempos*" and "Performula Anthropos*een-and-heard*"

When we think of a performance, we might imagine an event that happens in a chronology. But how is this event a kind of layer settling on (and supported by) other layers of knowledge we have used? Time, in this sense, isn't horizontal, but vertical. Here, I conjure metaphorically both the root (radical, verticality) and sedimentary layers. The performance feeds on the nutrients provided in multiple sediment (intertextual) layers, sketching out multiple timelines through a narrative places human and non-human entities in temporal relationships. Narrative becomes the binding material to support an attempted comprehension of temporal spectres otherwise difficult to metabolize.

In order to situate geologic time in a temporal context relatable to humans in a felt sense, I created "Performula Anthropo*tempos*" as a template—or performance formula—which could be adapted to performance projects, whether of my own devising or another creator's. I convert geologic-time years into human-time seconds; seventy geologic-time years (the approximate proposed length of the Anthropocene, if it is confirmed to commence with the Trinity nuclear detonation) would equate to 7 human-time seconds in this formula. At this temporal equation, the age of the Earth (4.6 billion years old) would be comparable to 14 years, 6 months, 30 days, one hour, forty-six minutes, and forty seconds. A performance that runs for 14+ years is ambitious, so I opted to reduce the equation further dividing all by seven. The Anthropocene then, in human-time, would convert to one second.

I then used "Performula Anthropo*tempos*" to create a second performance formula called "Performula Anthropo*seen-and-heard*." The performula adopts as its temporal basis the reduced geologic-time to human-time conversion based on the Anthropocene lasting for one second in human-time. "Performula Anthropo*seen-and-heard*" outlines performance notes for a two-year, non-stop sound composition exploring the soundscapes of major geologic events that comprise the supereons, eons, eras, periods, and epochs of the Geologic Time Scale. Within the compositional notes, I include references to environmental audio recordings, use of hydrophones, and geographic features used as instruments. I reference to Aeolian sounds in the Carboniferous Period as homage to Stefan Östersjö's work with the Landscape Quartet as outlined in **1.6 Case Studies: Tide, Sound, Line**.

4.3 The Anthropocene

> [Q]uestions of what it means to inhabit a deeply stratified, self-transformative and potentially catastrophic planet may be as constitutive of western modernity as they are signatures of contemporaneity (Clark and Yusoff 2017).

This proposal is enhanced by the recent recommendation of the Anthropocene to be designated the most recent, and current, epoch following the Holocene (Zalasiewicz et al. 2017). In the 21st century, the term 'Anthropocene' has surfaced as an important linguistic node for both the physical sciences (in particular geology and archaeology) and the humanities. If ratified by the International Commission on Stratigraphy, the Anthropocene would signal the impact of humans acting as geologic agents, evident in planetary sediment.

The phrase 'uncertain times' takes on particular potency as the current epoch (Holocene) faces possible closure with the adoption of the Anthropocene. Researching temporality emphasizes the potential to hold in mind two or more times simultaneously (the implications of being Holocene *and* Anthropocene, or between), as well as the impact of reconfiguring one's sense of time in the flux of Geologic Time Scale rebranding. Where adoption of ages or epochs has previously been a matter largely of interest within the physical sciences, the proposal of the Anthropocene has sparked an unanticipated and wide-ranging reaction outside of the physical sciences, due to the neologism Anthropocene (emphasis of debate on Anthropos-), the implication that humans are acting as a geologic force, and consideration for the start date of the epoch.

The introduction of the Anthropocene as a potential geological unit places geochronology within fields of new confrontation within the discipline itself. Is it possible to assign a date at the start of a geologic unit and, if so, what criteria would indicate the predictive length of this unit? There is concern that introducing this epoch shifts the focus from an emphasis on geochronologic time units as being determined by their durational content, since current discussion and assignment of the Anthropocene attempts to define its veracity through where it begins rather than what occurs during its progression (Finney and Edwards 2016). While all propositions account for humans acting as a geologic force, the assignment of an epoch hundreds if not decades of years in length will push geochronology into new territory where the future geologic markers of the epoch are not discernible, as they have not yet occurred.

Geologists also debate about the etymology of the term 'Anthropocene', since "[i]t is difficult… to see the justification for introducing a new term of dubious etymology into the international [Geologic Time Scale]" (Walker, Gibbard, and Lowe 2015, 205). Walker et al. note that *-cene* means new, and the previous naming practice affixed to *-cene* (Plio-, Mio-, Eo-, Oligo-) are derived from Greek words meaning less, more, most, whole. The Anthropocene as the 'human new' deviates from established GTS etymological naming practices. As well, *-cene* denotes a particular acknowledgement of temporal demarcation as epoch or series, which Walker et al. debate through their argument that "the 'Anthropocene' might be designated a unit of lesser rank, ie. stage, age, or even sub-stage/sub-age status" (Walker, Gibbard, and Lowe 2015, 205)—which would not make it a *-cene* at all.

Beyond the physical sciences, debate has ranged widely over the choice of 'Anthropos-.' The implication that humans are now acting as geologic agents spurs urgent debate over *which* humans, and which human activity. A strong argument against the term 'Anthropocene' from the Humanities has emerged from Donna Haraway, who proposes her

> objections to the Anthropocene as a tool, story, or epoch to think with: (1) … they are not about ongoingness. … (4) That History must give way to geostories, to Gaia stories, to symchthonic stories. … (8) Anthropocene is a term most easily meaningful and usable by intellectuals in wealthy classes and regions; it is not an idiomatic term for climate, weather, land, care of country, or much else in great swathes of the world, especially but not only among indigenous peoples" (D. J. Haraway 2016, 49).

Heather Davis and Zoe Todd argue that the Anthropocene casts "'humanity'—but more accurately, petrochemical companies and those invested in and profiting from petrocapitalism and colonialism—[as having] had such a large impact on the planet that radionuclides, coal, plutonium, plastic, concrete, genocide and other markers are now visible in the geologic strata" (Davis and Todd 2017, 765).

Numerous neologisms have been offered to counter the Anthropos- emphasis of the Anthropocene—neologisms intended to overtly politicize the originary term (Anthropos-) by identifying human activity that has promulgated the result of humans acting as a geologic force. In my introduction, I mentioned Misanthropocene (Clover and Spahr 2014), Manthropocene (Raworth 2014), Chthulucene (D. Haraway 2013), and Anthropo-not-seen (de la Cadena 2015) as variants conjuring speciesism, gender dominance, and multispecies entanglements. Proliferation of neologisms arising from scholars in multiple disciplines underscores a geopoetics, a term ascribed by sociologist Jason W. Moore to his

own alternative of Capitalocene (Moore 2016). For Moore, the Capitalocene is a fitting moniker as "anthropogenic… global warming is capital's crowning achievement" (Moore 2016). Economist Kate Raworth's Northropocene (Raworth 2014) and philosopher Peter Sloterdijk's Eurocene (Sloterdijk 2015) place the responsibility for humans as a geologic force squarely on both colonialist and capitalist dominance arising from the Global North. Edward O. Wilson proposed "Eremocene"—Epoch of Loneliness—as a way to communicate the defaunation, loss of biodiverse abundance, and functional extinction that he sees as markers of humans behaving as geologic forces (Wilson 2013). Jussi Parikka's Anthrobcene (emphasizing media technologies' geologic impact) (Parikka 2015) and *The New York Times*' editorial's Plasticene (*The New York Times* 2014) assert the environment degradation caused by anthropogenic activity.

According to some scholars within the physical sciences, articles on the Anthropocene outside of the physical sciences do not "consider the mission of the International Commission on Stratigraphy (ICS), nor [do they] present an understanding of the nature of the units of the International Chronostratigraphic Chart on which the units of the geologic time scale are based" (Finney and Edwards 2016). But, as Davis and Todd explain,

> [t]his recommendation [of the term 'Anthropocene'] clearly has political implications beyond the bounds of the discipline of geology, for stating that we are living in a geologic epoch determined by the detritus, movement, and actions of humans is itself a political act (Davis and Todd 2017, 762).

The wide-ranging interest in situating the Anthropocene within larger cross-disciplinary contexts speaks to the urgent needs within academic discourse to engage values of interconnection and interdependence. It is through entangling politics, ethics, and responsibilities within research nodes, as well as decomposing and recomposing methodologies, that responses may surface for the attitudinal and technological necessities of human sustainability.

As such, the term 'Anthropocene' acts as a hotbed for multiple temporalities—based on its many potential start points, and its possible deviation from GTS naming practices. As my interdisciplinary research straddles the humanities and the sciences, tensions emergent within the disciplines in these different fields have proven a particular focus and challenge in parsing how to position my engagement with the proposed Anthropocene. Performing geochronology *in* the Anthropocene positions my research within an unfixed and fluctuating sense of a geologic temporal moment of now. It is through this fluctuation that my urgency to grapple with temporal relationship emerges.

4.4 Performance Score: "How to Perform Geochronology in the Anthropocene"

> The Anthropocene is certainly not the best concept to address these questions of environmental justice and decolonization. However, it has been incredibly generative in providing a term that groups together the horrors of environmental crisis and in re-animating our relations with the world in a manner that draws, but is also differentiated from, the environmental movements of the past (Davis and Todd 2017).

I made the choice to work with the term 'Anthropocene' as a way to stay with the trouble of it (nodding to Haraway here). Beyond its potential ratification by the International Commission on Stratrigraphy, the Anthropocene has become a failed name that signals a **temporal weirding**[30] sensed by humans, attributed to global warming and felt in part through increased storminess, rising tides, and mass extinctions. As a way to activate this, I wrote the performance score "How to Perform Geochronology in the Anthropocene" as a way to sensitize performers to the hidden geochronologies accessible through imagined soundscapes of past glaciations, orogenies, and shifts in biodiversity.

"How to Perform Geochronology in the Anthropocene" is written in the style of a guided meditation. The geologic-time events referenced are interconnected with geophony and biophony components (see **4.7 Temporal Attunement via Listening** for definitions of geophony and biophony) outlined in "Performula Anthropo*seen-and-heard*" (see **4.2 Performance Scores: "Performula Anthropotempos" and "Performula Anthroposeen-and-heard"**). The score could be enacted by a solo performer following the instructions for themselves, or it could be read aloud for a group to engage. I made an audio recording of the score for people interested in practicing the score through auditory lead. This recording is freely available via SoundCloud.

4.5 Multiple Temporalities of Foreshores

> To call human beings geological agents is to scale up our imagination of the human. Humans are biological agents, both collectively and as individuals. They have always been so. There was no point in human history when humans were not biological agents. But we can become geological agents only historically and collectively, that is, when we have reached numbers and invented technologies that are on a scale large enough to have an impact on the planet itself. To call ourselves geological agents is to attribute to us a force

[30] Temporal weirding follows Thomas L. Friedman's neologism of "global weirding," accounting for meteorological oddities attributed to climate change (Friedman 2010).

> on the same scale as that released at other times when there has been a mass extinction of species (Chakrabarty 2009, 206-7).

> Patterns of unintentional coordination develop in assemblages. To notice such patterns means watching the interplay of temporal rhythms and scales in the divergent lifeways that gather (Tsing 2015, 23).

The starting point for the proposed Anthropocene is debated among physical sciences and humanities scholars. The Anthropocene Working Group, comprised of scholars largely within the physical sciences, proposes the start of the Anthropocene as "[t]he year 1945, …selected because it marks the first atomic bomb explosion that initiated a period of atmospheric testing, the results of which are seen in radionuclides in ice cores and lake cores" (Finney and Edwards 2016). This led to the proposal of Atomicocene as an alternative neologism for the epoch (Freeman 2015), with its emphasis on the arrival of nuclear weapons. Davis and Todd suggest the start of the Anthropocene as AD 1610 (Davis and Todd 2017), which marked the commencement of colonialism and aligns with the 'great acceleration' and the 'golden spike.' In a broader contemporary discussion on climate change and anthropogenic impact, the Anthropocene plays a utilizable role in illustrating the impact human productivity is having on the planet.

The Anthropocene as a contested, potential geochronologic unit adapted into the Geologic Time Scale is situated, in part, in sediment records sampled from coastal and marine ecosystems (Finney and Edwards 2016). An evolving outcome from geochronological dating is to apply comprehension of past events to develop strategies for mitigating impact of future catastrophes. This holds especial significance for events related to climate change—including increased storminess, storm surge, rising sea levels, glacial melt, and erosion. The confluence of the multiple temporalities suggested by the Anthropocene and climate change evokes a geologic 'now,' which Media Studies professor Elizabeth Ellsworth and artist Jamie Kruse describe as "a teeming assemblage of exchange and interaction among the bio, geo, cosmo, socio, political, legal, economic, strategic, and imaginary" (Ellsworth and Kruse 2013, 26). I place my research with the geologic 'now' of vulnerable and temporally-rich foreshores.

In alignment with English literature scholar David Farrier's conjecture that "[t]he extraordinarily long view which thinking in terms of the Anthropocene demands has prompted widespread reflection on the conceptual value of geological processes" (Farrier 2014, 2), I seek geomorphological and biotic indicators of deep time, climate change, and

the so-called Anthropocene when engaging foreshores. Geomorphological and biotic indicators can include the weather; the quality and quantity of rocks, fossils, and sand type; endemic and/or at-risk flora and fauna such as bristleworms and eelgrass; blue mussels as keystone indicators of ecological health through their embodiment of Persistent Organic Pollution (POPs); the remnants of archaeological sites of special interest; offshore oil rigs visible from the shoreline; industrial ships carrying shale gas; nuclear submarines; and plastic bags washed ashore. Temporalities embed themselves in figural terms and in a nexus of industrial-military processes that mark the Anthropocene and climate change: extraction of crude oil as a conglomeration of remains of prehistoric organisms, fossil fuel, nuclear warfare. The term 'climate change' itself proposes an unfixed sense of time with its change, while 'sustainability' implies learning to adapt to rapid change in order to maintain a status quo. How can we tune into the language we use when we speak about these contemporary urgencies, in a way that foregrounds and regrounds their temporal implications?

Geochronological diction metamorphoses scholarly metaphors with its durational revelations: sedimentation, flow, stratification, streams, erosion, intrusion, extrusion, displacement, emplacement, deposition. Over time, foreshores reinscribe themselves, revise themselves. The shoreline fluctuates with a rapid temporal evidence of the geomorphologic actions of erosion, deposition, intrusion, and extrusion. This fluctuation is so rapid it is possible for humans to experience, giving haptic insight to geomorphologic forces that otherwise happen on a much longer, slower temporal rate elsewhere in the Earth's geological reformations. Engagement with the foreshore, therefore, provides embodied opportunity to experience such forces and then extrapolate a sense of them to comprehend their different temporalities playing out in non-foreshore sites.

Let's explore key markers of multiple temporalities that we may witness in the foreshore. The surface of ocean, the coastline, and the sediment layer are neither borders nor boundaries, but moments of recognizable interchange. We could consider the life cycles or life spans of inhabiting entities we witness on-site, or the original appearance or emergence of the species into the local ecosystem. We could also consider the length of more-than-human species' decomposition or decay, or their disappearance, expiration, or extinction dates. The circulatory phases of geophysical entities provide another access to temporal difference, expressed through diurnal, lunar, and other celestial body transits; tidal ebbs, floods, and neap/spring fluctuations; and seasons. The duration of a weather system, and evidence of previous impactful weather systems, as well as weather prediction

through viewing sky conditions are all relatable temporal events. The ephemeral and transient nature of weather further provides a provocative yet fleeting brush with multiple temporalities through the interplay of light, sound, precipitation, temperature, and ecosystem entities' interactions with weather systems.

Consider, too, the tension that speed evokes to expanding one's sense of multiple temporalities with the slow accretions of environmental change through biocides (pesticides, insecticides) and habitat destruction. Consider the life cycle of human-produced garbage noticeable at a foreshore site, as well as the materials used to produce the garbage; plastic bags are constructed from crude oil (a product sourced from petroleum, which is decayed organism material millions of years old). We might extend our sensitivity into deep time through consideration of previous glaciations evident in stone or mountain formation at or adjacent to the site. Any mountain range present leads us deeper into time if we consider its initial appearance through orogeny. The same is true if past shorelines are visible through nearby sea cliffs. The ocean water itself carries with it deep time.

As a research field with implications for future ecosystem habitability by humans, geochronology—refracted through human geography and performance studies—may provide clues and queues for enacting a **multi-entity justice** within the entangled temporalities of climate change and the Anthropocene. By this term, I adopt Ursula Heise's "multispecies justice[31]" (Heise 2016, 17) but extend the concept of becoming- and thinking-with to embrace or entangle both biotic and abiotic entities—not solely emphasizing the biotic or conventionally defined "living" as implied in "multispecies." 'Multi-entity' recommends categorical, relational consideration for biota (plant, animal) and abiota [water bodies, weather, geologic form(ul)ations]. This is likewise differentiated from *environmental justice* as the term suggests placement/location and unity/whole rather than the many entanglements implied by 'multi-entity' and urging response (response-ability, responsibility, responsiveness). Geochronology offers application for future *intra-dwelling* by surfacing or obviating temporal multi-entity circulation within ecosystem sites, extracting narrativized realizations of the past to create strategies for precautionary action and pro-active caution.

[31] In *Imagining Extinction: The Cultural Meanings of Endangered Species*, Ursula K. Heise describes the multispecies ethnography emerging from anthropological research as "a conceptual and political framework for rethinking environmental justice as 'multispecies justice,' reaching across differences of culture as well as of species (Heise 2016, 17).

4.6 Performance Scores: “Foreshore, in C” and “Météophor”

Activation of multiple temporalities emerges from the more-than-human entities visible at a site: eelgrass of Lomma Bay in winter (see **3.7.3 Lomma Beach, Öresund, Sweden**), rippling sand exposed at Hjörseyjarsandur during low tide (see **3.7.6 Kelda and Hjörseyjarsandur, Snæfellsnes, Iceland**), an approaching spring storm at Skarðsvík (see **2.9 Performance Score: “Violinouflage”**), year-long crude oil extraction offshore of Kinghorn (see **3.7.2 Kinghorn, Scotland**), submarine circulation of Loch Long (see **3.7.1 Loch Long, Scotland**), and shale-gas ships in Eidangerfjorden (see **3.7.4.1 In Time with Herøya Industripark, Norway**). On the ocean floor, SOSUS hydrophone networks connect shorelines of USA, Iceland, Norway, Denmark, and Scotland. Overheard, wind currents shepherd increased storminess to contact foreshores bordering the North Atlantic.

Eelgrass at Lomma Bay formed the material for the performance score “Foreshore, in C.” Though considered one of the most productive ecosystems on Earth, seagrass meadows decline at a rate of 1.5% per year due to in large part to eutrophication, overfishing, and climate change. After an “Intime” circulation at Lomma Bay, I photographed several piles of eelgrass that had washed ashore during the last high tide. The eelgrass piles formed incomplete circles, their strands formed by the waves into C-shapes (a wonderful homonym with ‘sea’) or parentheses. To become-with eelgrass and its plight, I adopted the photographs into scores for structured improvisation, inviting performers to sonify the visual representation of archived eelgrass using voice or instrument. The flexibility of improvisation encourages the performer to be in the moment as they engage with sonic dynamics perceived through the shapes, textures, colours, spatial arrangement, and synaesthetic prompts (scent, soundscape) evoked by the photograph. “Foreshore, Ey(r)” follows a similar approach with moon-snail seashells., while “Foreshore, Ribbed for Please” likewise relies on improvised sonification of rippling sand.

“Météophor” relies upon wind currents documented by the digital software available at earthschool.null.net[32]. As discussed in **3.6 The Foreshore** and **3.7.9.1 Mapping “Intime” as “(SUND)”**, I checked how wind currents over the North Atlantic were configured at the moment of each “Intime” performance. The wind currents were archived by taking a screenshot of the visual data presented on earthschool.null.net. In

[32] Screen-captures of the wind currents are used with permission of the site’s creator, Cameron Beccario.

addition to these wind-current maps being used to denote direction and speed in the "(SUND)" installations [see **3.7.7.1 Exhibition and Performance: "(SUND)"**; **3.7.8.1 Exhibition: "(SUND)"**; and **3.7.9.1 Mapping "Intime" as "(SUND)"**], I also used the maps for the performance score "Météophor." The score follows similar improvisational instructions to "Foreshore, in C," though this time performers are invited to embody the visual scores through movement or sonification. This provides the opportunity to form relational empathy with a spatially large and temporally different body than eelgrass, moon-snail shells, and sand provided. Also, "Sæ/Sigh" developed from a comparable approach to "Météophor," with its reliance on satellite photography of North Atlantic foreshores.

"Météophor" proved a valuable tuning-in tool as Halla Steinunn Stefánsdóttir, Maja Jantar, and I prepared for our voice-and-violin performance at Sea Loft, previously mentioned in **3.7.9 Rooms that Perform: Sea** Loft, Kinghorn, Scotland. We located the weather map on earth.nullschool.net as a component of our performance, improvising to the visual movement of wind currents during our performance. Halla Steinunn opted to watch the weather out the window as we performed, so we engaged both on-site weather and the larger North Atlantic wind currents. Prior to the performance, we spent time circulating on the foreshore, coming into contact with wind, sand, and ocean as well as more-than-human species present there.

4.7 Temporal Attunement via Listening

> The earth is bigger than you, so you might as well coordinate with it (Paxton and Smith 1987).

> [S]oundscape design is not design from above or abroad but from within, achieved by stimulating larger and larger numbers of people to listen to the sounds about them with greater critical attention. … We must learn how to listen. … After we have developed some critical acumen, we may go on to larger projects with social implications so that others may be influenced by our experiences (Schafer 1992, 11).

How do we determine the 'start' of a more-than-human entity, its 'birth'? Instead of asking *where* a river begins and ends, how does our comprehension of 'rivering' (being a river) change if we ask *when* a river begins and ends? When does a mountain 'start'? How do we plot the life cycle of a storm, considering both when and where it commences and completes? How do we sense time pertaining to sediment accumulation, weather

systems, a human day, a fox's day, a volcano's life span, a glacier's life span? When does trauma commence?

The multiple, entangled temporalities suggested in the above more-than-human entities reconfigure through the tension of speeds indicated in the terms *deep time* and *sustainable futures*. Sustainability means learning to adapt to rapid change, rather than maintaining the status quo. The mutual impacts of human and more-than-human interconnectedness play out in our past narratives, future speculations, and potential resiliences and survivabilities. Such narratives are described by Farrier as a poetics of haunted time:

> forced to identify with such 'deep time' processes, we also conjure the ghosts of those whose lives to come will be shaped in drastic ways by our actions in the present. In a very real sense, a future we shrink from contemplating is haunted by a past we cannot imagine (Farrier 2014, 2).

As a focal point of my artistic practice-as-research, I consider how the creative process provides keys to attune to multiple temporalities, whose existences are impacted by, preclude, and speculatively extend beyond the human. The implication of such a creative process enables geo-ethical engagement through the development of a geopoetics; see **2.4 Geopoetics and Attunement**.

To activate the geopoetic, I assume abiotic and biotic entities are communicative, response-able entities. I propose to tune into the communicative capacity of a plant or a planet. Attunement through and with our senses opens up the potential to sense and engage more-than-human communication. I propose **tempoception** as a way to sense time and temporalities in relation to self, human, and more-than-human entities. The work of performing geochronology is an attempt to attune one's tempoception through experiential knowledge acquisition.

To construct a rubric for tempoception, I will first introduce categories for listening. In my own practice prior to the PhD, I have found that listening, sound improvisation, contact improvisation, and authentic movement draw enhanced awareness of chronologic time. To what and for what do we listen? How does a person attune to one's own sense of time? How might a person attune to more-than-human temporalities beyond human physiology?

We listen intrapersonally, interpersonally, and to group (or soundscape) configurations. R. Murray Schafer's experiential exercise 'ear cleaning' foregrounds

strategies to tune into sounds produced by one's self, sounds produced by a proximal other, and sounds that amalgamate to form the soundscape in which one is situated (Schafer 1992). One may listen for semantics (to comprehend meaning), for acquisition (what do I want from this?), and for judgement. Schafer's 'ear cleaning' is key to audible attunement, as ear cleaning is the action of listening to a soundscape with attention in order to "improve the sonological competence of total societies" (Schafer 1997, 181). Ear cleaning provides an opportunity to listen to sounds produced by the self, sounds produced by another, and sounds produced within an environment—sounds produced in the anthrophony, biophony, and geophony (Krause 2016). We work to value more-than-human sounds alongside human-produced sounds. We acknowledge what sounds we note and notice, and our affective reactions to sounds.

Listening as enacted through vocal improvisation adds yet another layer of tuning into one's sense of timing and the timing of those with whom one interacts. In discussing the conception of time within the improviser, Evan Desaulnier and Ellen Waterman comment that

> improvisers have a continual focus on the present with a constant memory of the immediate past, but can also employ future improvisational strategies as they have a constant, albeit varying, anticipation of future time coordinates (Desaulnier and Waterman 2008, 21).

The act of listening while producing sound attunes the listener as an active and activating respondent, developing a sense of performative timing through the intuited, spontaneous production of sound.

Listening—as outlined through both ear cleaning and through improvisation—is a temporal act, and temporality is a subjective progression through moments as a human perception of time. I propose a rubric for tempoception that follows these outlines of listening. One may attune to one's own sense of bodily timing (breath, heartbeat in a present moment, extending to how long a second feels, how long a minute, how long an hour, a day, a month, a year). In proximity to another, one may elaborate the temporal differences demonstrated by the bodies (how long it takes for one to eat versus another, differences in age, how long one can hold a long tone, etc.). The meat of the matter unfolds when one considers temporal resonance and dissonance in relation to the -scape (timescape) in which one is situated. Through consideration of one's felt, attuned sense of one's own timing, the life spans of myriad more-than-human entities (from weather to bivalve to sand) open for consideration and forge bridges for interconnection—yet another possible way to become-with the more-than-human.

I entangle development of tempoception with Tsing, Schafer, and Oliveros' engagements with listening. Tsing positions listening as a form of noticing, specifically in polyphonic music that attunes to simultaneous melodies and dissonance: "This kind of noticing is just what is needed to appreciate the multiple temporal rhythms and trajectories of the assemblage" (Tsing 2015, 24). Both Schafer's and Oliveros' listening exercises situate the participant in a present site. Their pedagogies and strategies to create artistic output are situated and embodied, invoking the experiential as a necessary component to enact comprehension through listening. To what, in my sensorium, do I have access? What local markers provide access to a sense of past or future? I propose to extend this sense of listening within my artistic practice-as-research by considering how we may attune to temporal difference and dissonance by imagining extinct soundscapes throughout geologic time and within speculative futures.

4.8 Performance Scores: "Melody Waves" and "Hocket Barnacles"

The process is the result. The result evidences the process. I have found, in particular, that processual artwork that allows for participatory engagement offers the strongest strategy for embedding a transformative experience within the person who engages the work. Listening while sounding is an example of relational empathy. How can I be with my own experience while also reaching to incorporate and relate to the experience of someone proximal to me?

In improvised work, the sense of spontaneity mixed with response-ability heightens these listening relationships. Any collaborative partner has a constrained "vocabulary" or "palette" for their potential actions. I have a sense of that vocabulary, but I cannot anticipate exactly how this might unfold or what choice or impulse they might enact. This can hold true for sand or tide. It is governed by the constraints of its corporeal components, and so I can anticipate up to an extent how it might behave.

While working with Rebecca Bruton and Laureen Burlat during an artistic practice-as-research workshop in 2017, we explored our sonic vocabularies through the structured improvising potential of "Melody Waves / Memory Waves." The score functions on the principle of co-devised composition, where each contributor is an equal player in offering and developing sonic material for a composition. The process works in a round, with each person contributing a short sonic element which can be easily remembered by all players. Once all members have contributed their element, the group then practices intoning all

elements as a collective composition. The elements may be performed on their own, or as a whole, linked composition. They may be performed by one, more, or all players simultaneously or in a round. Different elements may be overlapped or reordered, or even extended to develop new themes from compositional material.

In order to practice this without the need for vocal intrusion to suggest where we go next, Laureen, Rebecca, and I developed a series of conduction gestures to aid our collective composition. Rebecca and I previously had experience with conduction gestures through our work with Christine Duncan's Element Choir, and I have additionally explored alternative conduction techniques through Misha Glouberman's renegade edition of John Zorn's Cobra, as run in his workshop "Terrible Noises for Beautiful People." Rebecca and I initiated co-conduction gestures during our 2016 practice-as-research workshop, the results of which were performed publicly for Tectonics Music Festival in Glasgow that same year. For "Melody Waves / Memory Waves," conduction-gesture vocabulary allowed us to co-conduct on the fly, weaving together the myriad possibilities that "Melody Waves / Memory Waves" presented as well as incorporating other scores like "Hocket Barnacles." A list of the co-conduction gestures we created is included in the Appendix of *Sound of Mull*.

In the audio recording "Melody Waves 6,"[33] you will hear our improvised engagement with "Melody Waves / Memory Waves." Rebecca introduces a melodic sung line, followed by Laureen's extension of the tonal theme. I introduce a short verbal fragment, "But if I came the other day, I would have seen…" We then repeat each melody wave separately, then as a collective sing and speak all as a combined unit. From there, we co-conduct one another to either sing or speak different melody waves, later in the recording overlapping the elements. We finish with a short digression into "Hocket Barnacles," pronouncing "seaweed" in turns.

4.9 Tempoception and Interconnectedness

A quiet bass drone emanates from Loch Long in 2015. Deeper than wind through the autumn trees and more monotonous than the ebb of wave crash on the shoreline, the drone shifts via Doppler effect over five minutes. Its source is a Vanguard-class nuclear-powered ballistic missile submarine, freshly deployed from the nuclear-warhead storage and loading facility at RNAD Coulport. A submarine, situated within the romanticized,

[33] A private audio-recording that documents this is available to hear on SoundCloud.

pastoral landscape of rural Scotland, takes on a similar sighting mechanism to wildlife. One may sense the presence of roe deer, porpoise, eagles, submarine. Heard: brush-scruff, splash, leaf displacement, drone.

Escorted by several military and coast-guard boats, the submarine dwarfs the loch as it slides south towards submersion and open ocean. A submarine deployed with nuclear missiles symbolizes simultaneously an instant obliteration of human life (and therefore human's experience of time) as well as a strategy to extend a status-quo human existence given theoretical human-produced threats. In other words, a submarine symbolizes obliteration of time and extension of it. In operation, a submarine seeks invisible knowledge—not through sight, but through listening. Those directing the submarine are not responsible for its destination or its ultimate activity; these are governed by people collectively at great distance from the submarine. These people use their submarine to listen.

From music theory, the terms 'attack, sustain, decay' describe the progression of a soundwave from its initial appearance (attack), through its duration (sustain) and disappearance (decay). The confluence of English-language temporal terminology of attack, sustain, and decay binds geochronology, nuclear warfare, and music performance. In his treatise on slow violence, Rob Nixon poses the question "… how can we imaginatively and strategically render visible vast force fields of interconnectedness against the attenuating effects of temporal and geographic distance" (Nixon 2011, 38)? For this dissertation, my response to Nixon's question is to attune through performance scores focused on tempoception.

4.10 Performance Scores: "Sea Level," "Vibrato, Ebb, Flood," and "Echolocation"

In yet another experiment with temporal weirding partnered with the voice or violin, I developed an interconnected set of scores exploring "the gradual up- or down-tuning of the familiar[34]." The performance score "Sea Level" introduces the compositional tool to produce sound with voice or violin on a long tone, moving slowly up or down one semi-tone over the duration of the tone. This activity is equated with water-related markers of global warming (increased storminess, glacial melt, tide ebbs and floods).

[34] This instruction is the closing statement of the performance score "Sea Level" in *Sound of Mull*.

Semi-tonal up- and down-tuning continues its exploration in the score "Vibrato, Ebb, Flood." Here, the semi-tonal measurements of vibrato (voice) or glissando (violin) between the higher and lower pitches become the sonic material for the performance. As a durational, and unwieldy, challenge to performers, they are invited to play this work for "the length of one tide's ebb or flood period (roughly six hours)." Aligning performance with the more-than-human tidal temporality requests a strategy for sustain-ability (García Zarranz 2018)—both in terms of a musical 'sustain' (see **4.9 Tempoception and Interconnectedness**) and also in the physiological capacity to continue such performance.

In conversation with Rebecca Bruton during our *Sound of Mull* practice-as-research workshop in 2017, she describes just-intonation. Just-intonation arises from Pythagorean tuning based on the Golden Ratio, while the oft-used contemporary scale of the Equal Temperament System was invented during the Industrial Revolution as series of twelve equidistant semi-tones between a fundamental and its octave. Just-intonation offers a more relational way of thinking about music, as the phenomena of pitch emerges in relation to other pitches (with an intuitive physics). Discussing this with Rebecca, she then led Laureen and me to explore intervals. We sang a fundamental, and then a fundamental and its octave. The work we explored led to the alterative score instructions found in "Echolocation."

The score "Echolocation" extends "Vibrato, Ebb, Flood" to have multiple performers playing the up- and down-tuning in opposition. Where one player or group starts with the lowest pitch, the other player or group starts with the highest. They then simultaneously move up or down, meeting momentarily in the central pitch as they intone. This compositional tactic creates a disconcerting aural effect, as the changing proximities of pitches juxtaposes occasional harmony with more frequent dissonance. In the Sea Loft performance,"Echolocation" was incorporated as the central score in our overall composition.[35] The score was used as a foundation that we developed through improvisation, weirding the soundscape and its temporal associations through an affective, urgent siren-call.

[35] The performance is available in part on Vimeo. "Echolocation" begins at 8:45 in this recording and ends at 11:45.

Conclusion

At the Crux

> The singularity of interspecies gatherings matters; that's why the world remains ecologically heterogeneous despite globe-spanning powers. The intricacies of global coordination also matter; not all connections have the same effects. To write a history of ruin, we need to follow broken bits of many stories and to move in and out of many patches. In the play of global power, indeterminate encounters are still important (Tsing 2015).

Interdisciplinarists unearth the geopoetics of mass extinction events. They entangle and blur the abiotic affect of snowstorms, crude oil, tide ebb, disgorged basalt, hurricane-force winds, tide flood, and coastal erosion. They listen to brush-scruff, splash, leaf displacement, drone. Interdisciplinarists consult a tide chart to determine ebb and flood times for the coastline where they'll perform. They unearth depositions of collective ecological memory in intertidal zones. Tempoception attunes interdisciplinarists to the temporal weirding of the proposed Anthropocene. They build melodies as memory waves within a foreshore's soundscape. Interdisciplinarists run in counter-clockwise circles on foreshores to cultivate relational empathy with the North Atlantic and its past, present, and future co-constituents. They apply experiential knowledge to forecast events of future precaution or anticipation.

The biggest news in geology so far this century may be the proposal of a new geological epoch—the Anthropocene (see **4.3 The Anthropocene**). When casting consideration on deep time and sustainable futures, there became no doubt for me that the Anthropocene must become a pivotal part of my PhD research and narrative as I dug into the topic of geochronology and considered a multitude of approaches to performance. To approach geochronology—and specifically the Anthropocene—through an artistic practice-as-research methodology, I formulated three research questions.

- How does research into less familiar scientific concepts and knowledge production impact the drivers of developing new artistic practice, thereby altering or shifting my understanding of what artistic practice can do?
- How does participatory, experiential engagement sensitize people to the hidden geochronologies of everyday life?

- What does it mean to make performance at the crux of climate change and the proposed introduction of the Anthropocene as a geochronological delineation of time?

My dissertation explicitly engages these research questions through performance scores that act as experiential platforms to think with, around, and through these questions. My project intended to explore human capability to relate to multiple temporalities beyond the scope of familiar human time frames as a way to cultivate a relationship with more-than-human semiosis at this moment of climate change. In relation to the questions and resulting research, I have discovered that the value of scripted and improvised artistic practice could be a significant contribution to developing response-ability required to address ecological crises. The practice-as-research also resulted in the (im)possibility or even imponderability to attune in the short term to geochronologies and more-than-human semiosis—specifically geosemiosis. The potential of longer-term sensorial attunements (through listening to what cannot be heard, or through development of one's tempoception) remains tantalizing territory for further practice-as-research.

As a way to research performing geochronology through sensorial attunement in the context of climate change, I opted to situate my performances and performance scores in the uninhabitable-by-human site of the foreshore. Selecting the North Atlantic foreshore (see **3.6 The Foreshore**) allowed exploration of the relationship between water and sand (flooding, storms, eutrophication, loss of biodiversity, Aeolian sands, coastal dunes), and how humans have participated in non-linguistic conversations with these ecosystem components over the past centuries. Site engagement happens with sea level at zero meters with every foreshore selected, but the fluctuating past and future depths of sea level enhances a temporally charged relationship with each site approached. The conversation extends to sites imaginary via the confluence of North Atlantic wind currents remapped through counter-clockwise deviations. The Anthropocene has been proposed to commence as nuclear material is present in global strata samples, and so sites like the GIUK Gap—made infamous by the circulation of nuclear-missile submarines during the Cold War and beyond—conjure a site imaginary linked to the nuclear. Such sites are inaccessible to a performer or audience if viewed in the immediate notion of what can be physiologically sensed when on site, but parallel and transposed open to a world of relational empathy.

What began as attempted embodiment of counter-clockwise ocean and air currents, the circulation of submarines, and the whorl of periwinkle shells or cochlea has grown to a tome of performance scores entangling human bodies with the liminal space of the

foreshore. *Sound of Mull*'s scores (see **2.13 Performance Score Collection: *Sound of Mull***) approach the question of what it means to make performance at the crux of climate change and the introduction of the Anthropocene as proposed geological delineation of time. The scores form an invitation to put one's self in the position of sedimentary particles, exposed to wind and weather. By investigating the sites, movements, and collaborative practices, "Intime" (see **2.11 Performance Score: "Intime"**) is a platform for experiential knowledge acquisition that holds the possibility for pedagogical and creative application beyond my PhD research. Practiced within foreshores at low tide, "Intime" explores multiple temporalities and intimacy both through the durational performances and within edited video documentation.

Writing the PhD happened in layers. I started with the **Introduction** framing geochronology, the Anthropocene, and my research questions pertaining to how I would use artistic practice-as-research to create performance that investigates scientific subjects. Next, I created **Chapter 1: Literature and Practice Review**, which included surveying contemporary arts practitioners with in-person interactions with several (namely Elizabeth Ogilvie, Minna Kurjenluoma, Michael Craik, Halla Steinunn Stefánsdóttir, and Cecilia Hultman). Artistic practice-as-research—developing creative output—commenced in tandem with writing the **Introduction** and Literature and Practice Review. I followed this with a rough draft of **Chapter 2: Methodologies**, but it was too early in my process for cogent articulation. The draft became a pre-draft for a chapter I rewrote two years later. I invested myself in artistic practice-as-research to better understand the conceptual framework and analysis of process I would eventually entangle in **Chapter 2: Methodologies**, **Chapter 3: Sites**, and **Chapter 4: Temporalities**. I needed to develop the creative work before I could describe what the work attempted to do.

The practice-as-research was designed to follow instinct that produces simultaneous and derivative artworks. As an example of simultaneity, I mean that the impulse to produce scores occurs at the same time as devised performance arises. To exemplify derivative production, the video-documented enactment of performance leads to archival video that can be edited for later exhibition (see **2.11 Performance Score: "Intime"**). Likewise, ideas for embodiment and sonification scores such as "Foreshore, in C" and "Météophor" (see **4.6 Performance Scores: "Foreshore, in C" and "Météophor"**) arose while performing "Intime" circulations. These interconnected praxes and performances created a healthy diversity of creative approaches, artistic media, and

production outputs that encouraged experiential knowledge exchanges with my collaborators and "Intime" participants.

The human and more-than-human bodies entangled within and encountered through *Sound of Mull* performances offered a cosmopolitan assemblage of interconnected becomings. At Loch Long, Laureen Burlat's physical transformation of plastic bags through the score "Knots"—knitted into a train she wore as she entered the loch—provided a becoming-with crude oil and water (see **2.3 Performance Score: "Knots"**). Stefan Östersjö's demonstration of the Aeolian guitar at Lomma Bay gifted a becoming-with wind (see **1.6 Case Studies: Tide, Sound, Line**). Cecilia Hultman's embodiment of erosion, deposition, and intrusion at Herøya offered a becoming-with geomorphic forces (see **1.8 Case Studies: Time, Sand, Sign**). Halla Steinunn Stefánsdóttir's audio-recordings in Lomma Bay, Hjörseyjarsandur, and Kelda demonstrated a think-doing of becoming-with tide and eelgrass (see **1.8 Case Studies: Time, Sand, Sign**). The Laboratory for Aesthetics and Ecology's exhibition "A New We" at Kunsthall Trondheim explored becoming-with more-than-human assemblages (see **3.7.8.1 Exhibition: "(SUND)"**). Rebecca Bruton's vocal and listening experiments at Kinghorn blossomed a becoming-with the soundscapes of the foreshore (see **3.7.2.1 In Time with Kinghorn, Scotland** and **4.8 Performance Scores: "Melody Waves" and "Hocket Barnacles"**).

These attempts to become-with netted desire to return and perform the circle walks again and again. By being with the foreshore, I thought of the foreshore with greater frequency than I had. I thought about my next visit to a foreshore, and how the experience might be inviting others into the practice. I imagined issuing a call to friends proximal to foreshores elsewhere in the world, inviting their circulations to see how they might similarly breed a sense of intimacy with the foreshore. Falling in love with the foreshore becomes a way out of a shame-based environmental movement of the past decades, instead sparking curiosity for the site and its co-constituents. Learning the names of co-constituents, their multiple temporalities and behaviours, their forms of communication, our interdependent with them—these gestures amass to nurture care for the more-than-human.

Performance Insights

My attempt to cultivate an embodied knowledge of North Atlantic counter-clockwise surface wind, as it impacts foreshores, netted these stages of development:

- **Defamiliarization and estrangement**. I took a familiar activity (walking on a foreshore) and subverted it by extending the amount of time I walked. I also walked in counter-clockwise circles, a task simple or boring to imagine performing. The repetitive activity proved to be anything but repetitive.
- **Noticing or attunement**. Walking in a location would eventually become meditative, and through that relaxed state I would lessen my active thoughts. This would prompt sensorial opening, for lack of a better term. I would notice (sight) eelgrass with an intensity that drove my curiosity to it. I would listen to the arhythm of the waves crashing, counting seconds between each crash to see if I could sense its bodily rhythms (I could not — hence describing as arhythmic).
- **Association**. In a state of relaxation and estrangement, I would have sudden associative thoughts on how to generate or revise a score, edit a video, build an object. These associative events were short reveries within a circle walk, easy to flag for remembering later (assigning each a keyword to recall it), and then dismiss from thought to be again present with the walking.
- **Following**. I would follow the playfulness of my human collaborators as a way to disengage my own agenda, facilitation, leading tendencies within the circle. I would extend this following of playfulness to following what ecosystem components were indicating through force of wind, arhythm of wave crash, gull calls, or sinkhole avoidance. The site ended up as a collaborative partner through this following, and my following became a responsiveness. I enabled myself to be response-able by following.

Sound of Mull's method grew from a conversation with Danish artist Elle Mie Ejdrup Hansen, whose works include epic shoreline engagement and facilitative experience for other people. This conversation coincided with my first sighting of a Polaris nuclear missile submarine in Loch Long, deployed for deep-sea circulation. Shoreline, circulation, North Atlantic Drift. I perceived a larger counter-clockwise spirallic movement in NAD, and a similar depart-return circularity to submarine missions. This led me to consider how enactive, durational spiralling as a human-based movement could both open empathic relation for the movement tracks of other-than-human path-making *and* offer extensive awareness of bodily connections through patterned movement. How to make the familiar unfamiliar? The development of "Intime"'s spiralling has depended upon both locations where it occurs, as well as the human collaborators who join my experimentation.

There is power in going to the site itself, inviting people to take responsibility for direct engagement with a location instead of the theoretical, abstract, disembodied notion of what the place is. The idea of the place is not the place. Emplacement (through site-specific, site-dependent, site-respondent *in-situ* field work) is a significant method of knowledge acquisition for this project, shifting the theoretical into the embodied. As acquired in the many iterations of "Intime," direct engagement with the foreshores attuned practitioners to soundscapes, at-risk keystone species such as blue mussles, seabirds, and eelgrass, and as well as indicators of human activity as geologic agents via nuclear submarines, an industripark with a shale-gas ship, oil rigs, and plastic bags. Once attuned, the capacity for response-ability surfaced in urges to listen, witness, protect, and protest.

Attempts to select sites through a rubric of archaeological site of special interest, climate-change hotspot, nature preservation, and geologic site of special interest prove a dead end early in the process (within the first three months of the PhD). I am hampered by physiological constraints (health and wellness) as well as potential budgetary limitations (cost of travel and accommodation to the Orkneys for a longer-term duration, as example, would eat up a substantial chunk of budget). Around this time, I see my first submarine in Loch Long. Instead of seeking distant sites, I work with the site at hand and retool my site rubric to consider sites with Anthropocenic markers, sites vulnerable to climate change, sites' potential to relate to geographically distant sites, and accessibility of site (accessibility including affordability and less physiologically demanding).

Observing the artistic research of each participant in relation to the shoreline provided avenues for tuning-in to the environment, which then fed into our "Intime" performance. The cold temperature encouraged us to run as a group. Östersjö took my prompt that we'd be running in circles literally and spent half an hour as a runner. This provided urgency for some of us to shift between running and walking, while others of us deviated from the path to walk wider and wider circles outside the primary path, video-record with a cell phone, or even eviscerate the sand with a stick. The daughter's sense of play and willingness to disrupt the counter-clockwise movement rule also encouraged the collective to experiment with pace, pause, and small-group interactions. What began as a circle-walk grew into experiences of the myriad ways in which we could collectively interrelate within and outwith the circle space.

Stefánsdóttir and I circulated together at Lomma Bay, Hjörseyjarsandur, and Kelda. These multiple encounters with each other's artistic practice as research led us to seek ways to tie our creative outputs together. Stefánsdóttir and I devised a repeatable project

that would tie ecosystem interaction and activation within my "Intime" circulation, her soundscape recordings, and our audio/visual compositions resulting from those engagements. We included site-respondent adaptation of the project, dependent on local-dweller knowledge and site-as-material realities. We adapted and pitched our project for the Reykjavík Arts Festival as *Heimur þýðir heima | World means home* as a way to respond to their theme of "home" and for Stavanger's Prosjektrom Normanns as "(SUND)" to focus on the abundance of geographic and geophonic sounds in the Norwegian region. Like "Intime"'s structure, our collaborative project repositions its attendant work as responsive to the place where it is adapted, setting up potential for this response-ability to generate renewed attunement and becoming-with.

Interestingly, it was the processual work involved with the "(SUND)" installation that provided me with the strongest sense of relational empathy (see **3.7.9.1 Mapping "Intime" as "(SUND)"**). During the initial installation in the Black Room, I handcut wind barbs—a task that took an hour. Then I crawled along the floor in a counter-clockwise circle, installing the gaffer-tape wind barbs on the floor. This slowing-down of the counter-clockwise movement, which I had been practicing in hour-long durations for "Intime" performances, provided me with an encounter of my own multiple tempos exploring the same movement. I had more time to think about North Atlantic wind currents while crawling and carefully placing wind barbs aligned with shifts in wind-current speed and direction, which allowed a growing sense of relationality to the currents that drive the increased storminess affiliated with climate change.

As a result of this realization, I invited Antonsen and Ortíz Lundquist to place the wind barbs in the Kunsthall Trondheim exhibition. Both had previously participated in "Intime," so I was curious to learn if the subsequent exercise of placing wind barbs in a slower counter-clockwise intention would impact their conceptual relationship with North Atlantic currents. They confirmed that the activity enhanced their understanding.

"Intime" is a generative practice, capable of fomenting new ideas for creative output. By working with multiple collaborators, I not only learn about the possibilities of what happens with and for them in the circle; I also facilitate conversation of the ideas and works that might grow from "Intime" circulation. Some of the collaborators select to deepen our practice together, seeking collaborations beyond the "Intime" circle. A selection of these collaborations have been documented as performance and sound scores within *Sound of Mull*, including "Knots" with Laureen Burlat (see **2.3 Performance**

Score: "Knots") and "Météophor" with Halla Steinunn Stefánsdóttir and Maja Jantar (see **4.6 Performance Scores: "Foreshore, in C" and "Météophor"**).

Contribution to Geopoetics

My contribution to the burgeoning field of geopoetics comes, partly, through neologisms and concepts developed during my artistic practice-as-research. In the **Introduction**, I explain how **collective human memory** may not retain bioregional details that support human survival in the face of catastrophes. Geochronological research, however, can **access collective ecological memory** through sediment as a way to extrapolate narratives of past planetary disasters in order to apply consequential knowledge to predictive modelling and precautionary planning. In a desire to establish more-than-human equality for both biotic and abiotic entities, I champion multi-entity justice in **4.5 Multiple Temporalities of Foreshores** as a way to cultivate **relational empathy**, as discussed in **2.8 Response-ability as a Method**, with abiotic constituents on a similar level to the already-established awareness of biotic, or multispecies, entities. I do this, in part, by exploring the **abiotic affect or atmosphere** generated in artistic practices that involve more-than-human entities as figural in rooms that perform (see **1.3 Affective and Ethical Urgencies**). In order to generate relational empathy, I assert that **attunement** is a core component of a geopoetics praxis that aims to activate sensorial interconnection through **sense-abilities** between humans and more-than-humans; see **2.4 Geopoetics and Attunement** for further discussion. Finally, tempoception is introduced as a sense to develop through attunement, which may evidence the **temporal weirding** currently playing out in global warming and human-forced activities that have led to propose the Anthropocene (see **4.9 Tempoception and Interconnectedness**).

Through my prompt to "listen for what cannot be heard" (in *Sound of Mull*, 13), I invite audience into an impossible activity and simultaneously introduce the dissertation's main contribution to knowledge. Positioning this at the outset of *Sound of Mull* provides a significant key to the performance scores overall—as invitations to consider engagement with the impossible—with large-scale North Atlantic air currents; with the orogenies, glaciations, and extinct species in deep time; with benthic communities unseen in foreshore sands; and with the impact of humans acting as geologic forces. Such provocation may activate speculative senses such as tempoception, listening beyond the scope of audition, and attunement to geosemiosis.

Through the collusion of performance scores and improvisation, another significant contribution to knowledge arises. Where scores provide structure through which to plan action, an improvisation practice strengthens instant responsiveness to unfolding events. Structural planning and adherence, when combined with intuited action, describes the response-ability necessary to address ecological crises. Ecologically oriented haptic and tacit knowledge acquisition through the guise of artistic practice, as demonstrated in the *Sound of Mull* performance scores, holds the potential to train adaptability, resilience, and sustainability in participants from multiple disciplines.

As a research field with implications for future ecosystem wellnesses and human sustainability, geopoetics—as refracted through geology, human geography, archaeology, and performance studies—may provide clues and queues for enacting a multi-entity justice. I propose geopoetics as planetary-aware artistic praxis that foregrounds creative output abundant with interdependent, more-than-human empathy. I also exercise a geopoetics practice-as-research that aims to be interdependent, response-able, ecocentric, and collaborative. My research asserts that geopoetics is comprised of attunement, defamiliarization and estrangement, entanglement, and relational empathy; any experiential learning acquisition obtained through enacted practice-as-research may result in a transformative action through one or more of these methods. This has the potential for a person to experience the familiar in a different way. It is my hope that geopoetics will contribute to refiguring human and other-than-human relationships, which occurs when places can be human-makers, and humans are place-makers.

Through siting comparative similarities of the small-scale circulation of isotopes-as-chronometres or the larger circulation of air currents and nuclear submarines, strategies can emerge for devising a real-time in-person site that provides space to explore relational empathy in the context of climate change and the Anthropocene. With any body proximal to sites-imaginary, buffeted by ocean winds and moving on sand responsive to the tide of a tangible site, a performer or audience receives sensorial information delivered through embodied contact with the materialities of these sites. This information, especially with repeated durational contact, offers modes of tacit learning and knowing through which relationship may be extrapolated and an ethics of site might be formulated by analysing the affective urgencies (joy, anger, awe, love, loss) produced through site engagement. To engender care, one considers the tangible of any body. How similar in size or age must another body be for the proximal performer or audience to cultivate a relationship of empathy with more-than-human sites imaginary and physically accessible sites?

Attunement raises questions of ethical engagements with more-than-human entities. What are the implications of listing a more-than-human entity as a collaborator or co-creator of a work? Should this be done more explicitly as a way to acknowledge the inherent rights of more-than-human entities? Or is it applying anthropocentric concepts onto entities whose consent we do not, yet, understand how to request?

The desire to engage more *direct* performative interactions, at least, encourages a curiosity for the more-than-human as focal or figural, not solely background, material, object in creative work. A shift towards reframing what collaboration entails might help to resensitize humans to the impacts we have on the more-than-human that nurtures us and co-dwells with(in) us—not just externally as with foreshores, but internally as understood with microbiomes, heavy metals, water. Understanding our own inputs and outputs in the flow of our own life-cycle assessment could help to reposition the creative work we produce—offering a more careful and caring praxis that transforms geopoetics into geopo*ethics*, into geopoe*litics*, into *geopolitethics*. The personal is political[36], and the personal performs its entanglement with more-than-human co-constituents of being and becoming, even without our awareness.

Implications for Further Interdisciplinary Research

How do we raise sensitivities to what we assume we 'know'? Undertaking interdisciplinary research offers an opportunity to estrange familiar paths and approaches to knowledge acquisition. Attunement within a site can raise awareness to what is not known, sparking curiosity to know more. What are those sand mounds? Why is this shale gas ship anchored in this fjord? How do the industriparks, oil rigs, and nuclear storage facility impact the ecosystems in which they circulate? What happens if the sea level rises here; how might this transform the shoreline, impact keystone species, or affect survivorship of human populations proximal and at a distance? How might researching the drivers of past geomorphological changes shift understanding of ecosystem sustainability in the flux of the current climate crisis?

Sourcing answers to such questions will require cooperation between disciplines. In this way, interdisciplinarists can devise ways to communicate between disciplines through foregrounding structural and diction similarities and differences between disciplines.

[36] "The personal is political" is a slogan attributed to second-wave feminism, coined and collectively authored by participants in the women's movements of the 1960s and 70s.

Interdisciplinarists become membranes, become foreshores negotiating the interactions of disciplinary knowledges. Interdisciplinarists become-like foreshores.

Humans only play a momentary role as geologic agents (Hooke 2000; Wilkinson 2005); geochronology's emphasis on deep time provides a basis for sites to be defined by non-human entities alongside human counterparts. This underscores human geography's emphasis on human and more-than-human relationships as co-constructive of site (Cresswell 2013), and expands the material emphasis of archaeologists when figuring the parameters of a site. A shift in an understanding that "humans are place-makers and places make humans" (Madden 2010) unfolds in performative actions by emphasizing temporality and human-planetary interconnectedness. Richard Gough and Sodja Lotker's assertion within a performance studies context that "[w]e perform scenographies and they perform us" (Lotker and Gough 2013) opens the door for a reflexive agency in defining sites as enactive and enacted. The combination of theoretical and applied knowledges from geology, archaeology, human geography, and performance studies provides a key towards an interdisciplinary definition of site as a co-devised, interdependent space—tangible or imagined—whose boundaries may configure through provisional, polytemporal geophysical movement on a variety of scales and depths.

My artistic practice-as-research is entangled with methods of experiential knowledge, transformative action, and action competence figural within sustainability pedagogy. Through experiential learning, a person undertakes a process that renders learning experience as active—behaviour that, when successful, can trigger transformative action (Jensen and Schnack 1997; Hamilton and Wills-Toker 2006). Sustainability pedagogy is a field outside of the interdisciplinary research I set out to undertake—originally interlinking theatre and performance studies, human geography, geology, and archaeology—but its relevance to the development of my methodology meant yet another broadening of disciplinary engagement. Foregrounding tacit learning and the experiential through non-standard forms beyond the disciplines may embolden the discipline-specific researcher to approach their subjects with increased awareness of their own bodies in relation to the more-than-human entities with whom they interact and interdepend. As well whether in the academic articles of the humanities and social sciences or in the scientific reports of the physical sciences, the flexibility to read widely and knowledgeably across disciplines is a practical skill required of the interdisciplinarist. Once this skill is activated, a world of cross-discipline comprehension and pollination becomes accessible.

It is important to demystify artistic praxis in encounters with researchers in other disciplines, as it often comes across as mysterious how it unfolds. Artistic practice-as-research as a methodology has the potential to elucidate its inner workings, particularly when partnered with vocabulary, concepts, and field-research materials of the physical sciences. As a practicing artist and creative writer, I found the challenge to analyse the creative output's practical and conceptual efficacy provided a revitalizing strategy to consider how I communicate the work's potentials in different audience contexts. The creative output surfacing through the artistic practice-as-research attempts to make tangible an ineffable awe that gulfs a body beyond the 'sense' of cultural languaging or the 'fact' of scientific knowledge.

Staying-with

> [S]taying alive—for every species—requires livable collaborations. Collaboration means working across difference, which leads to contamination. Without collaborations, we all die (Tsing 2015).

In a state of aphasia, of pause, we come again to the question of how to respond to global heating with the proposed Anthropocene as the harbinger of anthropogenic action inscribing itself in planetary sediment. Geologic times blend their boundaries as sounds overlap their attacks and decays; it can be a challenge to distinguish an exact moment where one ends and another has begun. We cannot access the vast surface and depth of water, space, site present within a sound. Fleeting human contact with coastline is possible. I continue to be interested in positioning Schafer's ear-cleaning exercises and Oliveros' Deep Listening pedagogy proximal to the concepts of deep ecology and deep time. Oliveros suggests that her understanding of 'deep' as entangled with "complexity and boundaries, or edges beyond ordinary or habitual understandings" (Oliveros 2005). Rather than freezing when faced with the shock and trauma of global warming, could we form an estrangement from what we think we know—leaning into pre-semantic or proto-semantic strategies of vocal utterance as a way to decongest thought and approach our bodies and dwellings in new ways?

Is there a way to create a performance that does not have an "end"? A performance that indicates there is always more to do? A performance that demands "a radical transformation of performativity" (Lavery 2015)? Isn't this kind of optimism, the wish for human sustainability interdependent and respectful with the planet's co-constituents,

exactly what we need to perform as we “stay with the trouble” of this current climate crisis?

Thinking-doing and becoming-with feature a process of acknowledging one’s estrangement from a system or other, as well as an entanglement with a system and other. Becoming-with encourages intimacy and committedness through acknowledgement of interconnection. Beyond acknowledgement, we might next cultivate lifestyle practices that encourage staying-with our interconnection to and interdependence with one another whether human or non, practices of carefulness. We might continue our caring practices of staying-with all the change and force that troubles.

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