FUTURE FOREST SPACE

THE PHILOSOPHY OF BECOMING IN SITE-SPECIFIC GENERATIVE SOUND INSTALLATION

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Abstract

This thesis examines my site-specific generative sound installation and musical composition, Future Forest Space, through Deleuze's philosophy of becoming, and proposes a dynamic ontological perspective on generative music, sound and interdisciplinary art.

Future Forest Space was an interdisciplinary public artwork created for the Radio Forest pavilion in the Klankenbos forest in Neerpelt, Belgium, in 2017. Its objective was to develop a new musical aesthetic and function by transforming sounds from the forest into an abstract musical environment that would correspond to and elevate its architectural, environmental and social surroundings; the idea was to create a "space of the future" – a conceptual as well as an actual space between architecture, music and environment that would invite visitors to engage in the idea of long-term thinking while providing a contemplative environment for everyday activities.

The thesis considers the practical realisation of the installation and provides an ontological analysis of the empirical processes behind the work; the focus is on the complexity, indeterminacy and ambiguity of these processes. Brief overviews of generative music, site-specific art, sound installation and the history of becoming are provided as an introduction. The three key elements of the installation – sound, generative composition and site-specificity (architecture and environment) – are examined using both a system theoretic approach to the ontology of becoming and Deleuze's original concept of it; other major concepts of Deleuze's ontology – difference, virtuality, multiplicity, assemblage and deterritorialization – are applied similarly. The practical work is examined in regard to its aesthetic and technical actualisations.

The emergence of complex, liminal and ambiguous conditions and processes within such an interdisciplinary, heterogeneous and generative work presents novel and dynamic creative potential, which is, however, often left unaddressed when discussing sound's relation to space and environment or the function of music in general; it is also difficult to address (for further applications) without reducing it into idealised representations of art and science, the paradigms of which continue to be largely based on static transcendent ontologies (e.g. those of Aristotle and Hegel). To understand this emergence and explore its potential from a similarly dynamic and creative paradigm, the philosophy of becoming offers a system that is capable of presenting actual ongoing existence; it provides an ontological ground based on change, heterogeneity and the inexhaustible novelty-producing process that underlies all phenomena, capturing the fundamental aspects of complexity and complex systems through its conceptual tools.

Keywords becoming, complexity, Deleuze, environment, generative music, site-specificity, sound installation

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Tiivistelmä

Tämä opinnäytetyö käsittelee Future Forest Space -nimistä paikkasidonnaista generatiivista ääni-installaatiotani ja musiikkisävellystäni Deleuzen tulemisen filosofian pohjalta, ja esittää dynaamisen ontologisen näkökulman generatiiviseen musiikkiin, ääneen ja monitaiteeseen.

Future Forest Space oli monitaiteellinen julkinen teos, joka toteutettiin Klankenbos -metsän Radio Forest -paviljonkiin Neerpeltissä, Belgiassa, 2017. Hankkeen tavoitteena oli kehittää uudenlaista musiikin estetiikkaa ja funktiota muuntamalla kyseisen metsän ääniä abstraktiksi musiikilliseksi ympäristöksi, joka vastaisi ja nostattaisi sitä ympäröivää arkkitehtonista, ympäristöllistä ja sosiaalista tilaa; ajatuksena oli luoda ”tulevaisuuden tila” – käsitteellinen ja todellinen tila arkkitehtuurin, musiikin ja ympäristön välillä, joka houkuttelisi yleisöä pitkäjänteiseen ajatteluun samalla kun tarjoaisi mietiskelevän ympäristön päivittäiselle toiminnalle.

Opinnäyte tarkastelee installaation käytännön toteutusta ja esittää ontologisen analyysin teoksen taustalla vaikuttavista empiirisistä prosesseista; painopiste on näiden prosessien monimutkaisuudessa, määrittelemättömyydessä ja moniselitteisyydessä. Johdantona esitetään lyhyt yleiskatsaus generatiiviseen musiikkiin, paikkasidonnaiseen taiteeseen, ääni-installaatioon ja tulemisen historiaan. Installaation kolme avainelementtiä – ääni, generatiivinen sävellys ja paikkasidonnaisuus – käsitellään käyttämällä sekä systeemiteoreettista lähestymistapaa tulemisen ontologiaan että Deleuzen alkuperäistä konseptia siitä; Deleuzen ontologian muita keskeisiä konsepteja – ero, virtuaalisuus, moneus, sommitelma ja deterritorialisaatio – sovelletaan samalla tavoin. Käytännön työ käsitellään suhteessa sen esteettiseen ja tekniseen toteutukseen.

Monimutkaisten, liminaalien ja epäselvien olosuhteiden ja prosessien syntyminen tämänkaltaisessa monitaiteisessa, heterogeenisessa ja generatiivisessa työssä sisältää uudenlaista, dynaamista luovaa potentiaalia, joka kuitenkin jää usein huomiotta käsiteltäessä äänen suhdetta tilaan ja ympäristöön tai musiikin funktiota yleensäkin; sitä on myös vaikea käsitellä (uusia sovelluksia ajatellen) pelkistämättä sitä idealisoituihin taiteen ja tieteen representaatioihin, joiden ajatusmallit perustuvat edelleen pitkälti staattisiin transsendenttisiin (esim. Aristoteleen ja Hegelin) ontologioihin. Tämän emergenssin ymmärtämiseen ja sen potentiaalin tutkimiseen samankaltaisesta dynaamisesta ja luovasta ajatusmallista käsin, tulemisen filosofia tarjoaa järjestelmän, joka kykenee ilmentämään varsinaista tapahtuvaa olemassaoloa; se tarjoaa ontologisen perustan, joka pohjautuu muutokseen, heterogeenisuuteen ja ehtymättömään, uutuutta synnyttävään prosessiin kaiken ilmiöllisyyden taustalla, tavoittaen näin konseptuaalisten työkalujensa avulla kompleksisuuden ja monimutkaisten järjestelmien perustavanlaatuisen olemuksen.

Avainsanat tuleminen, kompleksisuus, Deleuze, ympäristö, generatiivinen musiikki, paikkasidonnaisuus, ääni-installaatio

The audio material for this thesis can be found at: https://ilpojauhiainen.com/portfolio/future-forest-space-2017-site-specific-generative-sound-installation-music-composition-for-klankenbos-neerpelt-belgium/

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Chapter 1

Introduction

"Gardening, not architecture" – Brian Eno

Future Forest Space (2017) is a site-specific, generative sound installation and musical composition, created for the Radio Forest pavilion in the Klankenbos public park and 'sound forest' in Neerpelt, Belgium. It is made of sounds recorded in the Klankenbos forest and transformed into an abstract environmental music, or musical environment. The idea has been to create a public artwork that corresponds to and elevates its architectural and environmental condition through sound, and to develop a new musical aesthetic through the use of environmental sounds and generative processes as well as contemplating the idea of future forests and our evolving relationship with the nature. The piece has been inspired by curator Hans-Ulrich Obrist's comment about how art and architecture should provide "spaces of the future" – physical and immaterial spaces that allow us to "experience" a different, possible, better world. The aim has been to provide such a space – a conceptual as well as an actual space between architecture, music and environment that would invite visitors to engage in the idea of long-term ecological and societal thinking while providing a contemplative environment for everyday activities.

The composition is self-organizing, i.e. generative, in nature and basically infinite, with the sonic events occurring and combining in random and probabilistic manner. It has silent passages of variable lengths, allowing sounds from the environment to come into focus again and appear as part of the composition. The sound is reproduced into the space through the walls of the pavilion and the body of a large metal sculpture outside – by audio transducers installed inside which turn the structures into large "invisible" speakers – which softly emits the sounds into the environment. The music blends sonically and behaviourally with the existing sounds of the forest and appears almost as a natural part of the soundscape, yet introduces layers of newness, unfamiliarity and artificiality to it. The architecture and spatial perception of the pavilion as well as the everyday function of the space – an information and meeting point, a refreshment area, and a workshop and educational facility – have been other considerations for the aesthetics of the work: the piece should enhance visitors' experience of the building while being non-intrusive enough to accommodate and create a new aural space for all these everyday activities.

The installation was made for the Pfeifen im Wald summer exhibition in July 2017, and it ran from 21st July to 23rd September 2017. The exhibition was realised as part of a sound art course taught by professor Andreas Oldörp at HBKsaar[1], during which six students from the school developed temporal sound installations for the Klankenbos forest. After the exhibition I was asked by Musica, the arts organization managing Klankenbos, to submit an audio recording of Future Forest Space for their permanent collection: a 6-minute version is now available at the Radio Forest

[1] The host school of my exchange studies.

pavilion as part of their soundscape archive, accessible to visitors from a digital information stand inside the pavilion.

This thesis consists of a practical work which is the Future Forest Space installation – the musical composition of which is presented here on the accompanying USB flash drive – and of a written analysis, which examines the aesthetic and practical realisation of the installation with respect to its three main aspects: sound, generative composition and site-specificity. Since the installation operates in between music, sound art, installation and environmental art, the thesis aims to understand the actual identity (existence) as well as creative potential of such liminal and heterogeneous work. My aim is to provide a dynamic ontological perspective on generative music, sound and interdisciplinary art, and as a theoretical framework I will be using the philosophical concept of *becoming* from the French philosopher Gilles Deleuze (1925-1995). Deleuze's ontology of becoming could be summarised as an *on-going creative expression of difference*, of endless novelty, and it is this that makes it such an interesting tool for analysing fields like generative music, which itself is about on-going processes of change, and interdisciplinary aesthetics like those of site-specific art, which in their very construction move between creative expressions of differences. Deleuze asserts that his philosophy should not be read as any authoritative and static, transcendent truth (e.g. in the Platonist and Aristotelian sense), but instead employed as a dynamic toolbox for generating new understandings and philosophical concepts from empirical observations. This is also what I have attempted to do here: the thesis is equally an understanding of becoming from the perspective of Future Forest Space as it is an observation of the installation in a process of various becomings. My aim is to address certain indeterminate, liminal and complex conditions and processes that might be difficult to quantify, categorise or describe otherwise – such as where sound becomes architectural space and what happens to a natural sound when it is transformed into an artificial rhythm, among others – and to understand these from a more creative and novel perspective than those offered by, say, acoustics and psychoacoustics. In doing so I hope to unravel more of the dynamic, ongoing creative potential that such open-ended conditions and processes present, and to consider new functions and aesthetics for music, especially in relation to architecture, space and environment – as my concept for the installation had set out to do. For I think that it is through these kind of liminal, ambiguous and dynamic spaces – be they material or immaterial, conceptual or practical – that new ideas, expressions and possibilities emerge and form unexpected connections with the world, suggesting spaces of the future.

1.1 Structure and Scope

The first chapter introduces the Future Forest Space installation and my theoretical approach to it and explains my motivation for these. I introduce the concepts of *generative music*, *site-specificity* and *sound installation* as well as a brief history of *becoming* here. The second chapter examines the installation through the theoretical framework of becoming, with focus on four key areas of the work: the sound, the composition, the architecture and the environment. The third chapter describes the practical application – the physical installation and the musical composition – in detail. The fourth chapter forms the conclusion where I briefly consider the possibilities that the installation and the concept of becoming might suggest for the future. This is followed by bibliography.

The aim of this thesis is to examine the Future Forest Space installation and its musical composition by their practical elements (building blocks), and to analyse the final realisation of these through the philosophical concept of becoming. I will approach the installation as a whole, i.e. this is not about site-specific, installation or generative art per se but these will be discussed as part of the

overall work. Furthermore, my focus here is more on the artistic than technical considerations of the work, in keeping with my own interest in art-making in which technology serves often merely as a tool in the background; I will nevertheless detail the technical setup to the point. Similarly, I will use the concept of becoming merely as a tool to examine the artistic qualities, processes and potential of the work, this tool consisting only of the most fundamental idea of becoming: my aim is not to provide a comprehensive understanding of the concept nor of Deleuzian ontology, since this would be beyond the scope of this Master's thesis and one's Master's studies. As the main literary sources on Deleuze's ontology I will be using Deleuze & Guattari's book *A Thousand Plateaus – Capitalism and Schizophrenia*; a paper by David R. Weinbaum titled *Complexity and the Philosophy of Becoming*, which discusses Deleuze's philosophy of becoming in system theoretic framework and as a new foundation for the study of complex systems (considering that my installation and its musical composition are based on a system – and aspiring to the condition of a complex one – I find this source rather useful); and a book by Ronald Bogue titled *Deleuze on Music, Painting, and the Arts*, which offers a systematic overview of Deleuze's writings on music and the arts from the humanities' perspective while also considering the relationship between the nature and music – the core elements behind the installation.

1.2 My Motivation

The questions "why are we doing what we are doing?", "why am I interested in this?" and "what is the purpose, the usefulness of my work?" have both inspired and troubled me ever since I decided to choose music and art as my career. This stems from my personal conviction that the arts could play a catalysing and constructive role in the development of the world, equal to politics and economics. After 20 years these questions show no sign of abating nor reaching resolution – especially in the current world of deepening global problems – and while I have found several answers to them, an underlying, deeper desire to understand my interests and work remains. Hence I thought of approaching Future Forest Space through philosophy, more fundamental inquiry, especially since several of my interests are present in the work: generative music, site-specific art, ecology, emergence, complexity, systems thinking, and combinations like art and architecture, sound and space, natural and artificial, inside and outside, immaterial and material, music and sound art. I was introduced to the concept of becoming shortly after, in particular Deleuze's version of it, and found it to be a strikingly apt, versatile and dynamic concept to examine and understand processes and liminal conditions like those suggested in my themes. I am aware that Deleuze has been an influential philosopher in the fields of art, architecture and science over the past decades, his work being probably over-used by now, but since this is my first foray into philosophical research and writing, I thought of starting here. And I do find his thinking being contemporary still, useful for examining a practical work like the one at hand: it is realistic, experimental and empirical, based on philosophical observations of the real world[2]. What also draws me to Deleuze's approach is his insistence that his philosophy should not be read as static authoritative work but used instead as a dynamic ('rhizomatic') toolbox to generate new concepts and thinking constructive to the present and future situations[3]. I intend to employ this toolbox in such a way also, and apply the concept of becoming creatively to the processes and conditions behind the installation.

In terms of sound, space and environment, my interest in them goes all the way back to my childhood. I grew up in a village permeated and surrounded by forests and meadows, rivers and

[2] It is a novel kind of realism – transcendental empiricism – in that it examines how both subjects and objects can be produced out of a virtual plane that does not assume either.

[3] Trial and error, tinkering and speculation are necessary tools in a philosopher's toolbox according to Deleuze.

lakes, hills and flatlands. The forest was our playground where we would embark on adventures, discover worlds, construct possible realities, create spaces, and exercise our imagination as well as our physical skills. My father, now retired, worked in the forestry for all his life, and as a child I would often accompany him to work, immersed in and perplexed by the sound of harvester machines operating in the woods, and by the stillness that followed when we stopped for lunch outdoors. When we got our first electric organ in the house, I proceeded to recreate the sound of the forest harvester by adjusting the organ's settings in a wrong way. I was five at the time.

Years later, however, as a composer, music producer and recording artist I have come to feel disillusioned with the music industry as it is. Releasing music as physical records and digital streams no longer feels special or meaningful since the music publishing landscape has become flooded with seemingly endless new releases every week, owing to the advances in music production software (everyone with a laptop carries a professional recording studio with them). One's longly crafted labour of love tends to disappear into an "ocean of indifference" the moment it is released, together with millions of other albums; it has no similar cultural importance and resonance as it might have had, say, in the 1960s and 70s when popular music was still young, novel and often charged with ideological undertones, helped by breakthroughs in the recording and sound production technology. The music publishing nowadays has become oversaturated (a counter-argument could also be made for why this could be a good thing, but this is not the subject of this thesis), and the music no longer occupies a central or cohesive narrative in our culture, in my opinion.

It is against this scenario that I have come to find site-specific artworks, like music created for a specific space and duration, very appealing, exciting and meaningful. It is the nature of their exclusivity (inclusive to all who come to visit them), uniqueness and temporality, combined with architecture, environment and social function, that makes them feel special and useful – compared with the "ocean of indifference" of all those records stacked in record stores or the endless streaming of digital files. In site-specific pieces, it is not about one's artistic work existing and drifting in isolation in an obscure world of internet clouds and distant servers (as one might describe online publishing), but the work is rooted in the actual reality and life through the physical space it is exhibited in: the architecture, the environment and the social function of the space all become extension of the work, and the work is woven into the fabric of everyday life; it acquires a practical function. It becomes locally meaningful, instead of globally meaningless. And since I always thought I would become an architect or geologist instead of a sound artist – had sound and music not held such captivating fascination later on – it feels artistically and intellectually rewarding to be able to address the notions of space and the built and natural environment in a piece of music. One feels as if designing a new kind of space and its functionality, as well as learning about the surrounding environment, when making a site-specific composition.

Along with this shift from recorded music toward site-specific compositions, a different kind of compositional process and representation from that of the recorded music has begun to interest me and become part of my work over the years: generative music. I will explain the concept of generative music in the following subsection, but in short, it is music that, once set in motion, will go on to create itself over time, evolving from the rules and parameters defined by the composer and/or a system (usually a set of computer algorithms). It is in this sense closer to the idea of life and complex systems such as cities and ecosystems than fixed pieces of art like paintings or packaged products like musical records. And it is this very idea of *lifelikeness* that fascinates me most: complexity emerging from simpler elements interacting, structures changing and evolving in self-organizing (often random or probabilistic) fashion, and each occasion unfolding in unique and ephemeral manner. Whereas recorded music aims to reproduce itself uniformly on each play,

generative music produces a variation or a completely new version of itself throughout each playback, making it resemble live music where each performance is often more or less unique, varying from one to another. And like with the site-specific art, this uniqueness and temporality[4] is what makes generative music acquire a more meaningful and interesting quality to me, in contrast with the traditional music publishing; like a river, it exhibits a consistent character yet it is always changing – it is in a constant process of renewal, of *becoming*.

1.3 Generative Music

Generative music is a form of music in which a piece of music creates itself from an initial set of musical elements and behaviours and rules defined by the composer and/or a system (natural or artificial). It is an "approach to music creation concerning itself with neither improvisation nor explicit composition, but rather with framing an indeterminate system from which music can emerge" (Priestley, 2014, p. 1). It is therefore not a musical genre or style on its own but rather a compositional practice where the composer is more concerned with creating or discovering a system or a process – physical or virtual – that will then generate the music autonomously of the composer, than with writing the composition from start to finish in the traditional sense. In generative music the role of the composer could be seen more as that of a gardener than an architect, to use Brian Eno's analogy (Edge, November 10, 2011). Or to borrow another metaphor of his, "generative music is like trying to create a seed, as opposed to classical composition which is like trying to engineer a tree" (Toop, 2004, p. 182).

The term 'Generative Music' was originally used and popularised by Brian Eno with his 1996 release *Generative Music 1*. This was a floppy disk release for PC computers with certain kind of soundcards (Creative Labs AWE32 or SB32 soundcard or TDK MusicCard, to be precise), and it would generate endless variations of 12 compositions created by Eno and made with SSEYO Koan software (Intermorphic, n.d.). Inspired by cybernetics and systems theory, Eno had been using generative processes and systems in his music for records and installations throughout his career, starting with the 1975 release *Discreet Music*: these often consisted of analogue systems like tape loops of differing lengths or sets of CD players in a shuffle mode playing simultaneously, resulting in ever-changing, indeterminate compositions. From *Generative Music 1* onwards these systems have become increasingly digital and more elaborate, realised with dedicated software like those by Intermorphic (the developers of the aforementioned Koan) or through computer algorithms using the Objective-C programming language, eg. for his apps *Bloom, Trope* and *Scape* with Peter Chilvers (Digicult, n.d.).

Ideas similar to generative music, however, predate *Generative Music 1* at least by two thousand years to ancient Greece: the Aeolian harp was "played" by the movement of wind over its strings, which initiated harmonic resonances to create the harp's eerie sound (Hankins & Silverman, 1995). Later in the Middle Ages various algorithmic and mathematical methods were used to generate melodies and permutations of rhythmic and melodic patterns: the earliest known example of an algorithmic composition dates from the 11th century by Italian composer and music theorist Guido D'Arezzo, who ca. 1026 developed a method for mapping the vowels of a text to a set of pitches to generate melodies (Diaz-Jerez, 2000); and isorhythmic motets of the 14th and 15th centuries used the repetition of rhythmic and melodic patterns of differing lengths for the voice

[4] A generative composition can in theory continue infinitely, depending on the set parameters, but since each playback is always different and the elements in the composition keep reconfiguring in a random or semi-random manner throughout the playback, it makes each passage in the composition attain a temporal, unrepeatable quality.

parts, resulting in numerous possible rhythm-melody combinations (Diaz-Jerez, 2000) – an idea which would resurface in the 20th century in the form of *process music* and tape loops. In the classical period the *Musikalisches Würfelspiel* ("musical dice game") became a relatively popular system among composers to randomly generate music from precomposed measures using dice: the technique was pioneered by Johann Philipp Kirnberger in 1757, and one of its most well-known versions is Mozart's manuscript K. 516f from 1787 (Diaz-Jerez, 2000). But while Mozart's sequence of measures generated through chance still had to conform to the stylistic rules of the time, John Cage, using similar aleatoric procedures two centuries later, was free to break every stylistic convention of his time. Alongside Cage, the use of chance and randomness as a compositional technique became commonplace among the 20th century avant-garde composers, among them Charles Ives, Henry Cowell, Earle Brown, Cornelius Cardew and Pierre Boulez, as did the idea of music emerging from a process – the music being the process itself rather than a fixed score – like in the works of Elliot Carter, Alvin Lucier, Karlheinz Stockhausen, Terry Riley and Steve Reich. Similarly, the use of natural and scientific systems as means to generate music began to take hold: from Joseph Schillinger's *System of Musical Composition* in 1920s and 30s[5] to Edgard Varèse's science-inspired organization of electronic sound, from the stochastic processes of Iannis Xenakis in the 1950s to the application of information theory to music by Lejaren Hiller, whose 1957 composition *The Illiac Suite* is allegedly the first composition created with a computer. This art-science approach to music by the 20th century composers could be seen as a revival of the idea of music proposed by the ancient Greeks (Diaz-Jerez, 2000).

'Generative music' is often used interchangeably with 'algorithmic music', given that a lot of contemporary generative music is being created with the help of computer-generated algorithms (Collins, 2008). And while there is a good argument for the methodological clarity of music related research to refer primarily to 'algorithmic composition' when speaking of automated compositional processes (Pearce, Meredith, & Wiggins, 2002), it should be emphasised for the sake of a more comprehensive definition of generative music and art that they also include non-computer, non-algorithmic systems and works. According to Philip Galanter, "generative art refers to any art practice where the artist uses a system, such as a set of natural language rules, a computer program, a machine, or other procedural invention, which is set into motion with some degree of autonomy contributing to or resulting in a completed work of art" (2003, p. 4). A procedural invention can include, for example, "a chemical reaction, the use of living plants, condensation and crystallization processes, melting substances, or any other physical process that can take place autonomously" (Galanter, 2006, p. 1). I will primarily use the term 'generative music' in this thesis even when discussing computer-generated algorithmic music: it is the idea of a more universal concept of generative processes – biological, social and technological – that the term implies that appeals to me.

1.4 Site-Specificity and Sound Installation

The term site-specific refers to a work of art designed specifically for a particular location and that has an interrelationship with the location (Tate, n.d.). The location can be understood as an actual physical site, a network of interrelated spaces and economies (e.g. the art world ecosystem), or a broader cultural, social and discursive sphere (Kwon, 2002). The concept emerged in the wake of Minimalism in the late 1960s and early 1970s as a reaction to the growing commodification of art

[5] Although greatly criticised as having no scientific or mathematical foundation whatsoever, the system does describe eg. the growth patterns of plants, seashells etc. as possible compositional models, and is aimed at generating complex patterns from simpler elements.

that saw the capitalist market economy circulate art works as transportable and exchangeable commodity goods, and to the prevailing ideals that regarded art objects as 'pure' and autonomous of their surroundings, disembodied experiences with intrinsic meaning and value. Site-specific art sought to instead relocate the meaning and the subject of the work to the possibilities of its spatial and temporal context and lived bodily experience, with the works becoming complete by the physical presence of the observer only. Its aim was to exceed the limitations of traditional media, like painting and sculpture, as well as their institutional setting (Kwon, 2002). "The uncontaminated and pure idealist space of dominant modernisms was radically displaced by the materiality of the natural landscape or the impure and ordinary space of the everyday. And the space of art was no longer perceived as a blank slate, a tabula rasa, but a real place." (Kwon, 2002, p. 24). While the site originally referred to a physical, tangible location only, through the practice's expanding institutional critique and the nomadic movement of the artist from familiar art contexts to more "public" realms, the site can now be as various as "a billboard, an artistic genre, a disenfranchised community, an institutional framework, a magazine page, a social cause, or a political debate. It can be literal, like a street corner, or virtual, like a theoretical concept" (Kwon, 2002, p. 16).

According to sound philosopher Brandon LaBelle, sound installation "brings together sound and space in a provocative and stimulating manner, often drawing upon architectural elements and construction, social events, environmental noise, and acoustical dynamics, in and out of the gallery, while drawing upon musical understanding" (2006, p. 151). It moves from the "time of music" to the "space of sound", replacing the insular domain of musical performance with spatial geographies, and freeing up sound's durational performance to emphasise spatial and environmental conditions. "To encounter sound installation, one spends time within space, immersed in a listening that brings one to space through an acoustical unfolding wedded to movement and duration" (LaBelle, 2006, p. 162). Its origins are in the visual arts and experimental music of the early 1950s through to the 1970s, especially in the crossover practices between them where sound played an integral part, expanding the disciplines of music composition, art installation and performance practices by utilising the intensities of aurality – from language and speech, recorded sound and spatial noise to amplified and acoustic events. The development of Installation art in the late 1960s and early 1970s defined sound further as a spatial and environmental element and gave rise to sound installation which in turn brought the legacy of experimental music and its performative vocabularies, developed by Fluxus and Minimalism, into the newly recognised practice of Installation art. (LaBelle, 2006). An alternative term for installation art is 'environments' – first used by artist Allan Kaprow in 1958 – which are mixed-media constructions or assemblages usually designed for a specific place and for a temporary period of time (Tate, n.d.).

1.5 A Brief History of Becoming

In philosophy, becoming is the possibility of change, a process. The concept originated in ancient Greece in the sixth century BCE, where its earliest appearance is credited to the philosopher Heraclitus of Ephesus. According to his flux doctrine, the world is constantly undergoing motion and change, with things remaining what they are only by changing what they contain; that "some things stay the same only by changing" (Graham, 2015, para. 23) and "the very nature of life is flux, is change" (Mark, 2012, para. 2). Using Heraclitus' metaphor of river as an example, the waters are always changing but the rivers themselves stay the same, and it is precisely because the waters are always changing that there are rivers at all (otherwise they would turn into ponds or lakes). (Graham, n.d.). "The point, then, is not that everything is changing, but that the fact that some things change makes possible the continued existence of other things." (Graham, n.d., para. 10).

Around the same time another pre-Socratic Greek philosopher, Parmenides, introduced the concept of being, which stood in direct contrast to Heraclitus' idea of becoming: it held that the multiplicity of existing things, their changing forms and motion, are but an appearance of a single eternal reality ("Being"), and that "all is one". From this concept of Being, he went on to say that all claims of change or of non-Being are illogical. (Parmenides, n.d.). These two concepts, becoming and being, came to form the basis of metaphysics, the study of the fundamental nature of reality ("how do things exist?"), and its sub-field ontology, the study of existence ("what is existence?")[6].

Heraclitus' ideas are recognised as the foundation of process approach and process philosophy in the West[7], a philosophical tradition of which Deleuze is also part[8]. Process philosophy is based on the premise that being is dynamic and that the dynamic nature of being should be the primary focus of any comprehensive philosophical account of reality and our place within it (Seibt, 2017). It emphasises becoming and changing over static being, and argues that the language of development and change are more appropriate descriptors of reality than the language of static being (Hustwit, n.d.). In contrast to this, the dominant research paradigm in the history of Western philosophy since Aristotle has been 'substance metaphysics' – first formulated by Parmenides – which posits that the primary units of reality (called "substances") must be static – they must be what they are at any instant in time – and hence being should be thought of as internally undifferentiated and unchangeable, eternal; the dynamic features of this eternalist being are either mere appearances or ontologically secondary and derivative. (Seibt, 2017). In other words, process philosophy posits that being emerges from and is the product of becoming (process of change), whereas in substance metaphysics and most Western philosophical tradition becoming is treated as a temporal appearance (illusion) within a static, transcendental being. This contrast between becoming and being, according to Weinbaum, can be traced back to the "influential works of Heraclitus and Parmenides, but it is only in the work of philosophers such as Nietzsche, Bergson and prominently in Deleuze's that becoming regains primacy" (2015, p. 8). Deleuze's philosophy of becoming will, in turn, become a further departure from those of other postmodern philosophers, in that it replaces identity and being altogether with difference and becoming (individuation).

[6] Ontology asks 'what' questions, while metaphysics asks 'how' questions.
[7] In Eastern traditions, Taoism and Buddhism have similar process approach in many of their doctrines.
[8] The term "process philosophy" is primarily associated with the work of the philosophers Alfred North Whitehead (1861-1947) and Charles Hartshorne (1897-2000).

Chapter 2

Research – Becoming Future Forest Space

"Art is an imitation of nature not as she is but in her manner of operation" – John Cage

Future Forest Space is an interdisciplinary artwork, a work in between the arts, encompassing and existing between music, sound art, installation art, environmental art, architecture and generative art. It is essentially a generative musical composition, realised as a site-specific sound installation (sound environment) in the contexts of sound, installation and environmental art. As a site-specific work it is conceived as having an interrelationship with its location, forming new assemblages with surrounding elements and presented as if it were a natural characteristic of the architecture and the environment around it. It is experimental in nature, seeking to develop a new form of expression and arrive aesthetically somewhere new[9]. This attempt to free itself from traditional presentations of music, to create a new kind of music out of the surrounding local sounds and to establish a new architectural and environmental condition or territory through sound are all processes which Deleuze and Guattari[10] would call "deterritorializing the refrain" (2004, p. 331) – transforming established (territorial) motifs and rhythms by creating new expressive qualities and autonomous rhythms, and reorganizing functions and reconfiguring the relations of elements within a territory. And in Deleuze's ontology, "the process through which a refrain is deterritorialized is essentially one of becoming" (Bogue, 2003, p. 23).

The philosophy of becoming in Deleuze's ontology is a powerful conceptual tool to study and better understand phenomena like complexity, emergence and nonlinearity as well as similarly ambiguous, ethereal and heterogeneous phenomena of music, sound and the aesthetic experience of art. It addresses the process of individuation in which actual phenomena is produced from infinite embryonic ("virtual") expressions and in which existence is constantly created from the repetitions of differences (and differences of differences recursively to an indefinite order) without need for anything transcendental or immutable[11]. "The real is a continuous process of being born out of difference, i.e. becoming" (Weinbaum, 2015, p. 8). In contrast to the Platonist and Aristotelian systems of thought which offer static transcendent essences and identities, unity and uniformity and idealised representations of phenomena, Deleuze's philosophy of becoming provides "a coherent and plausible path towards a worldview that accommodates difference, variety, heterogeneity and process of change at its ontological level. This worldview brings both the creative process and the observer back into existence. Embracing the philosophy of becoming, we rediscover the idea as a creative element immanent in matter and not as the transcendent immutable element it is

[9] 'New' in relation to my own body of work. Nothing is really new, simply a modification of something else.
[10] Félix Guattari (1930-1992), a French psychotherapist, philosopher, semiologist, and activist.
[11] Difference replaces identity as the primary ontological element in Deleuze's philosophy. It is a unilateral distinction 'between' two things. For more detailed description of this key concept, see e.g. David R. Weinbaum: 'Complexity and the Philosophy of Becoming' (2015), pp. 12-16.

according to classical philosophy" (Weinbaum, 2015, p. 44). It could be said that becoming "exists" in the space between things (individuals, identities, objects, phenomena etc.), never fully defined nor formed but always charged with random and probabilistic potential and being conducive to novel creative expressions. "A becoming is always in the middle…A becoming is neither one or two, nor the relation of the two; it is the in-between" (Deleuze & Guattari, 2004, p. 323). And it is these kind of liminal, indeterminate spaces of possibilities, along with the continual process of change, that interest me artistically and intellectually and drive my creative work. They are also part of the inspiration and the subject matter behind Future Forest Space: hence Deleuze and becoming as the theoretical framework in this thesis.

A contrasting note should be made here, however. The philosopher Timothy Morton, whose concept of "dark ecology" has partially informed Future Forest Space, argues strongly against this idea of "liminal spaces", of something existing in between. He dismisses it as fashionable "ambient rhetoric" and "ambient poetics" that serve no useful function in discussing and constructing the world – according to him such thinking simply obfuscates our political and ethical decisions and responsibilities further, all the while we hope for something "better" to emerge from these endless variations of possibilities and nuances (2007). He criticises Deleuze and Guattari's idea of the "rhizome"[12] as one of the "magical forms of differentiation…poststructuralist fantasies that seek to do away with the strange, bumpy divisions between things" (2007, p. 52). This rhizomatic thinking, according to Morton, has become "very popular in fashionable sound art circles, in part because of the popularization of Deleuze and Guattari in techno music by DJ Spooky (the author of a 'rhizomic' study, Rhythm Science), and others such as David Toop, an ambient composer and writer of books on ambient music and sound art" (2007, pp. 52-53). Moreover, Morton continues, "there is an aesthetic politics of the rhizome, which promotes rhizome for rhizome's sake. Thinking that you are doing something new by mixing different sounds together from different sources, or inventing new ways of mimicking real or imaginary sounds, is the very form of modern music production, and has been so at least since the emergence of capitalist demands for fresh product" (2007, p. 53). While I understand the urgency in his criticism (he is pressing for an updated environmental thinking and action in regards to the ecological catastrophe in which we are living) and partially agree with him – and not least in regards to the "fashionable sound art circles" which I am trying to avoid attaching myself here to, and the thought of making or inventing something new here – I find myself occupying the space in between his thinking and that of Deleuze. And Morton's proposed alternative of *re-mark*, a quantum-like differentiating gesture within ambience[13], is rather similar to the "repetition of difference" in Deleuze's ontology, although while Morton argues for clear perceivable distinctions between hierarchies such as inside/outside, space/place, sound/noise, harmony/dissonance, background/foreground, beginning/end (all qualities of Future Forest Space), Deleuze is more relative and fine-tuned about them, considering the world and its entities more in terms of changing relations than fixed structures, identities. Furthermore, with concepts like becoming Deleuze is not trying to suggest any unquantifiable, amorphous worldview where "anything goes" and where everything merely forms some relative "ambient rhetoric", but to construct a dynamic empirical toolset that allows space and connections for novel expressions to emerge – no matter how liminal.

[12] A heterogeneous, non-hierarchical and nonlinear conception of knowledge, as opposed to hierarchic, dualist one.
[13] See Timothy Morton: 'Ecology without Nature: Rethinking Environmental Aesthetics' (2007), p. 47.

2.1 Becoming in Future Forest Space

Future Forest Space is the realisation of a long-held dream of mine: to create a musical composition for an actual natural environment. It has allowed me to bring my interests in ecology, environment and long-term thinking into a single piece of musical work, along with the purely aesthetic considerations, and to contemplate art's function in relation to these themes. It has also enabled me to explore musical properties of found natural sounds and to experiment with musical systems whose rhythms, tonalities and behaviours are informed and shaped by their immediate physical environment more than any pre-existing, "static and idealised" conventions of music. Music has always submitted its forms and motifs to temporal transformations, augmentations or diminutions, slowdowns or accelerations, which do no occur solely according to laws of organization or even of development (Deleuze & Guattari, 2004). In the case of Future Forest Space, this exploration has led to extended notions of space and environment as well as music and sound, both in the realisation of the installation and in my sonic art practice in general.

Interestingly, it is in music where Deleuze finds the key to an understanding of art's relation to the natural world, with music making evident the connection between artistic sensation and creation in the natural world. Through reflection on the elements connecting human music and birdsong (such as refrain, territorialization, deterritorialization), "he develops a general theory of animal behaviour and evolutionary biology as forms of thematic rhythmic patterning, ultimately extending the musical model to describe the interactions of the natural world as an extended symphony of contrapuntal refrains" (Bogue, 2003, p. 2). Deleuze identifies music's object as the "deterritorialization of the refrain", his contention being that "the refrain is any rhythmic motif that may help structure an organism's milieu, territory, or social field, and that composers encounter and transform refrains when they create music" (Bogue, 2003, p. 3). When including also the non-biological organisms in this definition, the refrains in the case of Future Forest Space are those created by the building the installation is housed in (the Radio Forest pavilion) and by the surrounding forest (Klankenbos), which itself contains further refrains from its various species of birds and some of the sound installations, the most notable being the nearby Kanarienstudio by Paul Panhuysen – a large birdhouse occupied by canaries (together these refrains form a complex assemblage of milieus and submilieus, rhythms and territories[14]). By taking these refrains as its content, the music of Future Forest Space deterritorializes them, making their contours, characters and rhythms less distinct and established, or more expressive, introducing novel variations within and between them. Furthermore, the refrains are also those suggested by established musical conventions – e.g. the rules of harmony, the aesthetics of a genre, the distribution models of music – which the piece unsettles and transforms through its generative and site-specific realisation, and by bringing the natural world into the insular domain of music. All these acts of deterritorialization happen through the processes of becoming, which I will examine in the following subsections. I will consider these becomings in relation to sound, composition and environment.

A note of omission. In Deleuze's philosophy, music, as a form of becoming, is inseparable from three specific forms of becoming: a becoming-woman, a becoming-child and a becoming-animal; music is traversed by a becoming-woman and a becoming-child while instrumentation and orchestration are permeated by becomings-animal (Deleuze & Guattari, 2004). This is because becoming is molecular and minoritarian, and in its operations it necessarily deterritorializes any asymmetrical binary oppositions espoused by social coding (e.g. male over female, adult over child, rational over animal, white over coloured) and engages the underprivileged term of each of these

[14] A territory is in fact an act that 'territorializes' milieus and rhythms, stabilising them and making their contours more distinct and definite.

binary oppositions (Bogue, 2003). And in Deleuze's view, it is the aim of the arts to "unleash these becomings" (2004, p. 300). However, I have omitted the use of these three forms of becoming, and instead used becoming-molecular only, which is implicit in all three since all becomings are already molecular (Bogue, 2003; Deleuze & Guattari, 2004). This is because I am also using concepts from systems theory and applications of becoming in relation to them, and becoming-molecular has best fitted both of these two lines of thought, humanist and computational if you will, creating a bridge between them and resulting in a more coherent expression overall. Becoming-woman, becoming-child and becoming-animal are always present in Future Forest Space, e.g. in its search for a new sensitivity and sensuousness; embrace of vulnerability and ingenuousness; and liberation of movements. Then again, it is also the somewhat stereotypical connotations and outdated social codes which these individuations draw from, that have made me avoid them (Deleuze was, after all, drawing from the society of his time). Molecules and particles, on the other hand, are freer and more ubiquitous, able to move between the natural and artificial systems, and beyond the social codes and the weight of history.

2.2 Sound

The sounds used in the Future Forest Space composition are made entirely of sounds found in the Klankenbos forest. These samples from the field recordings that I had conducted in the forest have been transformed through audio processes such as granular synthesis, pitch shifting, time stretching, ring modulation, filtering and equalisation, and effects like convolution reverb and granular delay. The purpose of these electronic treatments has been to make the original natural sounds more musical and bring out a certain musicality "hidden" in others, and in general to add a quality of unfamiliarity, newness and artificiality to the sounds occurring in the forest. The found natural sounds have thus become something else, deterritorialized, and these various audio processes and transformations represent the various 'becomings' of those sounds. In the Deleuzian view, it could be said that the forest and the field recordings of it represent the virtual dimension of the sounds of the composition, the realm of their infinite embryonic[15] expressions and their "concrete (and inexhaustible) potential of becoming – a source of indefinite novelty that goes beyond any specific individuation process and any specific actual product" (Weinbaum, 2015, p. 11). It is through differentiation, discrimination and individuation of parts and qualities that these virtual patterns are incarnated in the actual, in the process of becoming-sound.

When using field recordings (in this case, natural sounds) as the source material for constructing electronic sounds, one of the fascinations is to see what kind of musical sounds (that is, tonal and percussive – or simply sounds that could function in a given composition) could be "sculpted" from this seemingly unmusical material; creating them often feels as if one was discovering a previously non-existent connection between the living world and music, between the nature and art. Often these new electronic sounds exhibit unexpected and novel characteristics not found in those constructed purely through electronic sound synthesis because of the initial complexity of the field recordings, which has been further amplified, expanded and rearranged in this electronic process of becoming. One could say that the field recordings contain a greater number of virtual multiplicities, patterns of becoming (Weinbaum, 2015), than purely synthetic sounds, and this virtual potential has been actualised in the process of "sculpting", of becoming-sound. This process often involves breaking the sonic matter into micro-fragments and generating

[15] According to Weinbaum, embryonic is used here to make clear that the virtual is not populated by possible or potential existences that are fully formed and just need to be 'realised'. Embryonic comes to mean a not yet formed expression. Yet even this metaphor captures only approximately the meaning of a virtual expression (2015, p. 9).

new textures from these “seeds” (granular synthesis), expanding the duration of a sample from few milliseconds to several seconds long (time stretching), or removing bands of frequencies to unmask others (filtering and equalisation), and so forth. “Music molecularizes sonic matter and thereby becomes capable of harnessing nonsonorous forces such as Duration, Intensity” (Deleuze & Guattari, 2004, p. 378). Or as Bogue summarises, the task of modern music is to render audible forces that are inaudible, to make audible that which is not audible (2003, p. 44). Similarly, the sounds used in Future Forest Space have made audible what was previously inaudible in the sounds of the forest, harnessing the forces inherent in them; the audio processing has actualised certain patterns of becoming immanent in the natural sounds, and these becomings-molecular and becomings-particles of the field recordings have enabled the unexpected and novel musical sounds to emerge. Of course, these forces (or patterns of becoming) exist not as predetermined qualities or ideal essences simply waiting to be ‘realised’, but are only formed in the construction of the sounds, in the process of becoming; they are immanent in the actual sounds and derive their specifications from the sensible (given to the senses i.e. empirical) observations of them, since whatever can be known about the process of becoming is only implicit in actual forms (Weinbaum, 2015, p. 28). For example, a recording of a creaking tree, when pitch-shifted, granularized and ring-modulated, can turn into a sound resembling a bird, but the patterns of becoming, the inaudible forces that makes the tree sound like a bird emerge only in the actual process of the audio transformation – the bird-like sound is not a predetermined, a priori quality of the tree; however, the sound of the tree has virtual potential that can be actualised as the sound resembling the bird. At the same time, these actual sounds are also inseparable from the inaudible forces in them, with the process of making them audible being immanent in the characteristics of the sounds; our bird-like sound contains also the sound (traces) of *these* particular operations of pitch shifting, granular synthesis and ring modulation, and because of this it has become the sound that it is. “The individual, be it a phenomenon, a quality, a concept, a person or a species is inseparable from individuation – the process of its becoming and from its pre-individual dimension – the virtual field of immanent differences.” (Weinbaum, 2015, p. 28).

What this implies here is a more evolutionary approach to sound design and aesthetic consideration of sound, one that draws more from life than any idealised representations of art or commercial audio design: since each sound is being an individuation of its virtual differences, which themselves, as multiplicities, are inexhaustible in their manners of actual expression and dynamically shaped by actual phenomena, each sound could be described as harnessing a lot of unrealised potential and thus being still incomplete, unfinished, existing in a state of continuous becoming. This is in contrast to the classical view which regards artworks and elements that constitute them as complete, immutable, the ultimate and ideal realisation of the artist’s vision; or to the audio industry’s standards which expect the highest and the most “professional” outcome only, the ultimate and ideal realisation of the market’s vision. The sounds in Future Forest Space are just one set of possible variations, the result of a complex set of variables caused by the audio treatment processes, which in turn have been shaped by the inaudible qualities of the source material, the virtual patterns of their becoming. These variations may not even be the “ideal” or the most “professional” realisation of their virtual potential; however, they function well in their given, site-specific setting, where their unfinished quality enables increased connectivity with their environment (as we will see later). It could be said that the sounds of the composition have (been) adapted to their environmental condition.

What really interests me is the liminal quality and state of these sounds. The original, natural sounds of the forest have been recorded, transformed electronically and relocated to the site of the installation; they have been deterritorialized. At the same time, they have been transformed to

resemble musical sounds, yet never exactly sounding purely musical like those produced by musical instruments; they are almost "failed" sounds, existing in the state of incompleteness and dislocation, non-musicality and non-naturalness. This is similar to the identity of a becoming, which is molecular rather than molar, minoritarian rather than majoritarian. This is because becoming is not to imitate or identify with something or someone, nor to proportion formal relations; it is more like a zone of proximity or copresence of a particle, the movement into which any particle that enters the zone is drawn (Deleuze & Guattari, 2004). The sounds of Future Forest Space operate alongside natural and musical sounds with varying proximity to them, as molecularised particles, in a metamorphic zone between the sounds of the forest and musical instruments which are molar – "subjects, objects, or form that we know from the outside and recognize from experience, through science, or by habit" (Deleuze & Guattari, 2004, p. 303). For example, the rattling percussive instrument ('Rattle') in the composition is made of a sound of a creaking tree branch, but it is not trying to imitate the sound of a creaking tree branch no more than that of an existing percussion, ratchet (cog rattle) being the closest; in fact, it resembles a hybrid between some unfamiliar bird, a tree-like structure, a wind on leaves and a mechanic, pitched percussion instrument. When the sound occurs in the lower register, it acquires sonic characteristics associated with forests, trunks, machines, earth; when in the higher register, those of birds, branches, synthesizers, air. Through the audio processing, the creaking tree branch has formed a block of becoming with the ratchet (or any similar percussion instrument); this becoming-molecular, becoming-percussion and becoming-sound of the tree branch has created a novel instrument which has qualities and intensities of both the branch and the percussion but does not identify with either of them. The audio processing has deterritorialized the sounds of both the tree branch and the percussion instrument, their refrains, opening their qualities to the outside: music (in the case of the tree branch) and the forest (in the case of the percussion). "The molecular has the capacity to make the *elementary* communicate with the *cosmic*: precisely because it effects a dissolution of form that connects the most diverse longitudes and latitudes, the most varied speeds and slownesses, which guarantees a continuum by stretching variation far beyond its formal limits." (Deleuze & Guattari, 2004, p. 340). And this applies similarly to all the other sounds in the composition: the becoming-molecular, the becoming-instrument and the becoming-forest of the original forest sounds and field recordings have resulted in novel instruments which have qualities of the surrounding forest and those of formal musical instruments but without imitating or identifying with any of them. They exhibit more ambiguous individuations, "a specific configuration of relative movements and affective intensities that infuses and in a sense dissolves the heterogeneous common-sense entities that compose it" (Bogue, 2003, p. 34). Deleuze and Guattari refer to this condition – and to the nature of a becoming in general – as *haecceity*[16] (from Latin *haecceitas*): an individuation and identity similar to an atmosphere, a time of day, or a season.

In essence, it is this kind of haecceity – an amorphous, shifting yet particular condition – that is the overall idea behind Future Forest Space. The sound in general could be regarded as a haecceity: how do you define or describe a sound? In Future Forest Space, the machining of the natural sounds have resulted in unfamiliar, new and artificial sounds – as if sounds from a future forest that happens to overlap with the forest in the present, creating a new, immaterial sonic space, territory. According to Deleuze, however, deterritorialization is always double, because it implies the coexistence of a major variable and a minor variable in simultaneous becoming (with the two forms of becoming drawn into an asymmetrical block in which both change to the same extent, and which constitutes their zone of proximity). "Becoming is always double, that which one becomes becomes no less than the one that becomes – block is formed, essentially mobile, never in equilibrium."

[16] A non-qualitative property of a substance or thing, "thisness" (after Duns Scotus).

(Deleuze & Guattari, 2004, p. 336). When the sounds of Future Forest Space deterritorialize the forest and its sounds, in their becoming-molecular and becoming-instrument, the instruments they become are themselves deterritorialized, becoming-forest: resembling the characteristics of the forest more than those of the musical instruments. The forest and the sounds of the installation have formed a block, moving in a continuum, along their unique zone of proximity. The process has thus transformed the existing forest, creating a more unfamiliar, novel *and* unfinished variation of it – a future forest space. This is further emphasised by the composition and the installation, which will be examined in the following subsections.

2.3 Composition

Deleuze and Guattari call for a music that puts all its components in continuous variation, that forms "a rhizome instead of a tree, and enters the service of a virtual cosmic continuum, in which even the holes, silences, ruptures and cuts[17] have a part" (Deleuze & Guattari, 1980, as cited in Bogue, 2003, p. 24). They argue that music is an open structure that permeates and is permeated by the world, and offer a reading of the relationship between the cosmos and music not as mechanical and mathematical but as machinic and rhythmical (Deleuze & Guattari, 1980, as cited in Bogue, 2003). These two propositions of music could be used to describe the composition of Future Forest Space as well. It is a generative, "machinic and rhythmical" composition where all its components are in continuous variation, and in which silences, holes, ruptures and breaks have a part: the sounds of the surrounding forest are equally part of the composition, permeating the open structure of the music which itself permeates the surrounding forest through its site-specific installation. It is also rhizomatic in that it is non-hierarchical in structure, with no preconceived beginning, middle or end, and where any part could be combined with any other and accessed and exited at any point. One could say it is almost half-music, *becoming-music*, meant to exist between the forest and music, between sound art and music.

The composition is made of 64 samples which have been divided into six groups according to the six primary sounds used, with each group containing variations of its root sound (e.g. one of the sounds has 36 variations while the aforementioned 'Rattle' has 14). The composition emerges from these six different layers of samples played back in an indeterminate, unlocked manner and pace. As a system that generates the music – as opposed to being a pre-recorded piece of music – the composition exists in a state of *pure becoming*, i.e. it is determinable but not yet determined (Weinbaum, 2015). The behavioural model for this generative system could be described partially as *stochastic* in that it results from a collection of random variables occurring within a defined probability space (Farnell, 2007), *a rule-determined transformation process* with the composition unfolding from a clearly defined initial material and a set of transformation rules (Christensen, 2004), *creative/procedural*, meaning the composition is generated by processes that are designed and/or initiated by the composer (Wooller, Brown, Miranda, Berry, & Diederich, 2005); and *emergent* in that the overall complex behaviour of the piece arises from the collective behaviour of smaller elements. However, while all these models apply to the generative behaviour of the composition to an extent (and are therefore worth mentioning), the main process is more straightforward and rudimentary, if not crudely mechanical: the music is generated from the six sample groups playing in a randomised "shuffle" mode, independently of one another, with varying and randomised lengths of silences between each sample (I will detail the system in the next chapter). This is quite similar to the generative systems used by Brian Eno in his site-specific sound

[17] The 2004 English edition of *A Thousand Plateaus* uses the word 'breaks' instead which I prefer.

installations: e.g. in *Music for White Cube*, four CD players with eight speakers have been installed along the four walls within the gallery, and unique disks with eight distinct tracks have been set to play in a random sequence (Scoates, 2013, p. 136). With each CD player randomly selecting and simultaneously playing these tracks, the result is a constantly changing sonic landscape that keeps introducing unique combinations of the audio tracks, remaking itself as it goes on. All these models, both elaborate and rudimentary ones, can be understood as spontaneous computational processes that produce information, similar to becoming (Weinbaum, 2015).

In this generative nature, the composition arises from the repetitions of differences (cf. Deleuze, 1994) where each sample playback represents a singular event or encounter – a repetition of a difference, an individuation – by which both the composition and its sensible observation are constructed. It is inseparable from its individuation – the process of its becoming – and from its pre-individual dimension (the virtual field of immanent differences). While the same sample might be repeated in succession, it is always accompanied by the novelty, difference, of the surrounding forest soundscape and the combination of the other samples occurring at the same time: hence it becomes also different with each repetition. Each sample group represents a multiplicity[18] where its selection of samples and range of random values (probability space) for the playback intervals and the duration of silences form a pattern of becoming that gives rise to the actual phenomena. These patterns of becoming are not determined at once but remain indeterministic until the point of individuation where the random values for each playback are actualised and other possible differences cancelled; in the next playback the multiplicity will then produce another individuation, a variation of the previous outcome, from the same pattern of becoming; and so forth. In this way, the virtual elements of the composition – the multiplicities of the sample groups, the possible combinations and permutations of samples being played simultaneously – become progressively determined and form trajectories, and by that are being actualised as distinct phenomena, i.e. the music. This progressive determination of trajectories guided by multiplicities is what becoming is largely[19] about (Weinbaum, 2015). The determination of trajectories does not take place all at once but in a succession of determining events, the playback of the samples in this case. Every such event is selective in the sense that subsequent paths and events are indeterminate before the event takes place, and this applies to the function of generative music in general, where the composition often proceeds through the stages of indeterminate selections. This inherently indeterministic individuation means that becoming and a generative composition such as Future Forest Space, though being processes that follow necessary lawful determinations at any given instance, can produce multiple developments from the same initial conditions. This is what makes becoming both productive and creative: "every actual trajectory is a novel expression of a virtual multiplicity" (Weinbaum, 2015, p. 33). And that is what makes generative music productive and creative as well (not to mention interesting for the composer): a small set of rules designed by the composer can produce complex and novel, ever-changing results unforeseen by the composer. Of course, in the case of Future Forest Space these novel expressions of virtual multiplicities are limited by the aforementioned rudimentary design of the system, where the limited number of samples being continuously shuffled will always produce a sonically and thematically recognisable composition, one that has no capacity to evolve musically into something completely unexpected or change according to external conditions like weather or time of the day (one could even argue this planned reduction in the degrees of freedom of the system and increase in the limits of its diversity are a form of self-imposed self-organization). However, this limited behaviour and character has been desired in the

[18] Multiplicity is an abstract topography of change underlying the dynamics of actual phenomena (Weinbaum, 2015).
[19] I have used 'largely' instead of 'all', since Weinbaum also adds the concept of 'intensive differences' to this which is not directly applicable to the process here (and the examination of which would be beyond the scope of this thesis).

context of the installation (as explained in the next chapter): the surrounding forest soundscape forms equally part of the composition, and it is in the symbiosis and the block of becoming with its indeterminate behaviour and character that the composition of Future Forest Space becomes finally fully realised.

Unlike an arborescent[20] molar system where a line progresses from one point to another – e.g. from beginning to end, from verse to chorus – and remains submissive to the points, the composition of Future Forest Space is rhizomatic and molecular: like a line of becoming, it has neither beginning nor end, departure nor arrival, origin nor destination – it has only a middle (Deleuze & Guattari, 2004, p. 323). As a generative piece occurring in random intervals and with randomised sequences of sounds, it passes *between* points and propels itself by its own non-localizable middle. It unfolds in multilinear fashion as opposed to the punctual system, moving in transversal lines between the horizontal and vertical coordinates, or preconceived concepts and organized representations, of music and nature, harmony and noise, rhythm and chaos; it frees itself from these coordinates and renders them indiscernible (or at least attempts to), and forms a block – a zone of proximity, a nonlocalizable relation – with the forest rather than with music. It gravitates towards the opposite of "the transcendent, organizational plane of Western music" and what Deleuze and Guattari call "the immanent plane of consistency of Eastern music" (2004, p. 298): on this immanent sound plane, composed by becomings, a process prevails against all structure and genesis, a floating time against pulsed time or tempo, experimentation over interpretation, and "in which silence as sonorous rest also marks the absolute state of movement" (Deleuze & Guattari, 2004, p. 295). Similar to this plane, the composition has no preconceived structure and exhibits no development of forms nor subjects, yet movements, affects and haecceities emerge and form temporary assemblages depending on their speed, slowness and rest; its unfolding becomes not one of evolution but that of involution, in which the form is constantly being shuffled and dissolved, freeing times and speeds; there is also no distinction between the natural and artificial, since the natural sounds have been made artificial while the forest permeates the composition freely. I say "gravitate towards", since it still retains minimal harmonic and melodic functions of the transcendent plane of organization – the harmonic textures and melodic motifs of certain samples – although it subjects them to a kind of molecular lapping of differential speeds and dissolution of form, making their contours less distinct by deterritorializing them into new temporary assemblages with other sounds of the composition and those of the forest (and towards the plane of consistency). It has also a rhythm but it is in non-pulsed time, regenerated constantly within indeterminate values, and the kind which Deleuze refers to as "a deterritorialized rhythmic block that has abandoned points, coordinates, and measure" (2004, p. 327). Here, the most fitting description of rhythm that applies to Future Forest Space is one given by the composer Olivier Messiaen: rhythmic music, he states, "is music that scorns repetition, straightforwardness and equal divisions. In short, it's music inspired by the movements of nature, movements of free and unequal durations" (Samuel, 1976, as cited in Bogue, 2003, p. 25). From these relative speeds and slownesses Future Forest Space emerges haecceity-like, entering into lines and blocks of becoming with the speeds and slownesses of the surrounding forest.

The characteristics of the composition – the lack of vertical (harmonic) and horizontal (melodic) development, the progressive determination (indeterministic individuation) of the material, the involution of the structure, the non-musical and non-natural sounds, the non-pulsed rhythms as well as the holes and silences – are all intentional, in order for the piece to work as an unintrusive site-specific experience that blends with its environment and becomes a natural part of

[20] The term Deleuze and Guattari use as the opposite of 'rhizomatic'.

the soundscape of the forest. For the composition to achieve this condition, it needs to fail as a piece of music and become something else (otherwise it would be simply an organized, formal piece of music playing in the forest): hence its movement away from the plane of organization and towards the plane of consistency, where the failures are an integral part of the plane "precisely because it is not a plan(e) of organization, development, or formation, but of nonvoluntary transmutation" (Deleuze & Guattari, 2004, p. 297). This failure becomes *a line of flight* of the composition, opening its qualities and refrain to the outside and the cosmic, and enabling the music to escape a highly individuated state into a less identified and more fluid state, away from an overt actualisation and closer to the virtual dimension. According to Weinbaum, such escape processes, which designate disintegration of order and identity, are part of the process of becoming. While reaching less organized, de-territorialized phases, systems may form contingent assemblages with other systems and transform entirely their actual behaviour (2015). Here, Future Forest Space forms such assemblages with the forest and the refrains, territories and milieus that constitute it[21], and while it may not transform their actual behaviour, it deterritorializes them sonically, making their expressive sonic qualities become part of the composition. For example, the subdued and tonally ambiguous synthetic layers of the composition emanating to the environment are accompanied by the lively and melodic singing of real canaries in the nearby Kanarienstudio[22], and because of these sonic qualities of both the synthetic and natural layers, the singing of the canaries appears as if it were part of the composition, forming vertical (harmonic) and horizontal (melodic) coordinates and completing the sonic spectrum and musical content of the composition for its part; the aforementioned molecular characteristics of the composition are creating a space that allows the songs of the canaries to permeate the composition and enter into a block of becoming with it, forming a new musical haecceity or zone. The territory created by the canaries through their singing (refrains) has thus become intertwined with the territory of the composition, i.e. deterritorialized. And a similar process happens with other refrains and sounds of the forest, each completing a different part of the sonic spectrum and musical content with varying degrees of proximity and intensity (the composition is truly 3-dimensional). And as we have seen previously in the case of the sounds, deterritorialization and becoming are always double: while the forest is deterritorialized in its becoming-music, the music it becomes is itself deterritorialized in its becoming-forest. The forest absorbs the music, haecceity-like, enabling the molecular forms and movements of the composition to dissolve between the molar components of the forest, to acquire qualities of an environment; its movements of free and unequal durations blend with those of the music, making the transformed natural sounds, however artificial or futuristic, appear as if they were part of the original soundscape. But this formed block, or line, of becoming does not link the forest to the composition any more than it conjugates or mixes them, it merely passes between them, "carrying them away in a shared proximity in which the discernibility of points disappears" (Deleuze & Guattari, 2004, p. 324). There is no actual object or phenomenon of forest-composition, nor is one subordinated to another: there is only a shared deterritorialization and line of flight along a zone of proximity. And it is here, along this line of becoming where the forest breaks away from its arborescence and the music from its molarity and both enter into a coexistence of two asymmetrical movements, where the composition of Future Forest Space is realised, becoming complete. Indeterminate rhythms and sounds from the forest and the composition continue emerging simultaneously in a shared proximity and forming ephemeral, transversal relations, amid which novel textures, patterns, melodies and affects momentarily arise (as haecceities) before being dissolved and carried away into new becomings – like repetitions of differences (and differences of differences), or "a multiplicity of

[21] For more detailed definitions of these concepts, see Bogues: 'Deleuze on Music, Painting, and the Arts' (2003), pp. 16-24.
[22] A large birdhouse installation by Paul Panhuysen.

elements that somehow cohere without entering into a regular, fixed pattern of organization" (Bogue, 2003, p. 34). The composition is completed only through these patterns of becoming, existing as a continuous process of being born out of difference; its identity exists not as a precomposed molar entity that gives rise to the difference as in the Aristotelian view, but it is formed through this process, becoming the product, an effect of the difference (Weinbaum, 2015). This is the closest that Future Forest Space gets to the idea of ecology and nature, where the interactions and networks of smaller components and their collective behaviour give rise to larger organisms, which in turn affect the condition of the smaller components.

2.4 Architecture, Space and Environment

One of the key ideas for the concept of Future Forest Space has been what I have termed "outside in/inside out". This means that the sounds of the forest audible from outside form part of the music playing inside the pavilion, while the music playing inside is diffused outside into the surrounding environment. The idea behind this has been to make the boundary between the pavilion and the environment appear more porous and indistinct, as reflected in the layer of glass extending throughout the building, giving a 360 degrees' view outside and making the exterior appear as part of the interior and vice versa; another has been to treat the pavilion as a sort of sonic sculpture in which the building and the sound would form a more unified yet ambiguous character and existence, extending beyond the physical borders of the building (as if blending) into the environment. The question, after all, has been to ponder a new kind of space – a space of the future, a future forest space – through the immateriality, intensity and ephemerality of sound. As LaBelle points out, "sound installation seeks the acoustical conversation so as to chart out new spatial coordinates, to stage relational intensities that often threaten architecture and bodies, and to network spaces with other locations, proximate and distant" (2006, p. 150).

How does the sound chart out new spatial coordinates and "threaten" the architecture here then? According to LaBelle, attempts to stage the integration of the sonic with the built and to nurture mutuality between sound and space could lead to relations that might be regarded as oppositional or dichotomous, even though this integration and nurture ought to be heard also as argumentative, antagonistic and problematic at times (2006). With this in mind, my approach with Future Forest Space has been somewhere between nurturing mutuality and being argumentative (and slightly problematic) while avoiding any intentionally dichotomous outcome. This has been crucial for the installation to function as a non-intrusive and immersive experience while still inviting attention to the difference between artificial and natural (and through that, hopefully, to the contemplation of possible futures). The artificial sounds of the composition create a continuum, a correspondence, with the natural sounds of the forest, because the former are made of the recordings of the latter, actualised as transformed samples that still show the characteristics, the patterns of becoming, of their natural origin; the differences between them are what in turn create the 'future forest space'. But the sounds for the composition have also been transformed and selected depending on how they correspond with the aesthetic and acoustic properties of the pavilion and the large metal sculpture attached to its exterior (as examined in the next chapter). The minoritarian, molecular and rhizomatic qualities of the composition and its sounds are a reflection on those of the architecture, reached through an empirical process of testing, observing and adjusting – e.g. the ruptured, subdued, woody and tonally ambiguous sounds have produced a particularly interesting resonance with the materials as well as the spatial perception of the pavilion and have thus been included, while overtly musical, synthetic, harmonious or polished sounds have felt oppositional, disconnecting the work from the space and the forest. The architecture and the

composition could be said to form an assemblage, affecting each other's individuation, where the trajectory (a series of differences belonging to the virtual multiplicity) of the architecture is connected with the trajectory of the composition through corresponding or mutually entrained differences (Weinbaum, 2015); these differences might consist of properties such as pitch (frequency), loudness (amplitude), tone (timbre or complexity), texture (density and width), duration and location – or absorption, reflection, hardness and softness – which activate novel, serendipitous and inexact individuations, becomings (or haecceities) between the building and the music. The two multiplicities are said to communicate, forming a virtual continuum which results in new joint tendencies and affordances between the architecture and the composition, leading to the becoming-composition of the former and the becoming-architecture of the latter in the actual dimension; the initial incompatibility between the domain of architecture and that of music – between the function of the building and that of music – brings forth intensities that drive these processes of individuation further (as we have seen, similar assemblages and individuations are at play between the composition and the forest, and the sounds and the forest). Weinbaum argues that such assemblages, when actualised, give rise to "emergent capacities and interactions that are a major source of unpredictable novelty" (2015, p. 26). Here the unpredictable novelty is vastly limited due to the immanent constraints and limited virtual capacities of the building and the aforementioned design of the generative music system. However, a novel block of becoming of architecture-composition does emerge, and together with the natural sounds outside they form an intra-assemblage[23], where the emerging 'assembled' function of the architecture-composition becomes an element of passage to a new assemblage with the forest outside, drawing its soundscape into a movement with the composition and the spatial experience inside. Moving along this non-localizable middle, a zone of proximity, the building, the composition and the forest attain a slightly ambiguous presence and character (a "future forest space"). For example, when spending some time inside the pavilion, listening and observing or simply relaxing, one begins to feel as if it were the structure and the materials of the pavilion that are producing the artificial sounds and the subdued music, while with each indeterminate silence the natural sounds from outside are starting to become interwoven with the composition as well as the architectural space, sometimes sounding as if they were being artificialised by the building; and a similar effect happens when one moves outside the pavilion around which a certain zone or space keeps extending and contracting (depending on the sounds), blending the trajectories of the composition, the forest and the building. This perception – and the non-localizable middle, shared deterritorialization – is further augmented by having the sound of the composition reproduced through the walls of the pavilion and the body of the metal sculpture instead of any conventional, visible loudspeakers (for when we see loudspeakers in a space, we tend to dissociate the reproduced sound from the space itself): the sound is literally diffused through the structures and their materials, transforming the pavilion into a resonant sonic body, an assemblage of sound and architecture.

According to LaBelle, to bring sound into play as an architectural material or experience partially counters the inherent dynamic of building, lending to space and the architectural imagination an element of the experiential and sensual immediacy. This is because sound "operates according to a different notion of borders and perspective – it is unfixed, ethereal, evanescent, and vibratory; whereas architecture is fixed, drawn, charted out, and built" (2006, p. 150). The composition deterritorializes the architecture here by drawing its spatial coordinates and molar forms into a line of becoming with the transversal and molecular movement of the sound, altering the ambience and one's sensation of the space. And the architecture deterritorializes the

[23] See Deleuze & Guattari: 'A Thousand Plateaus – Capitalism and Schizophrenia' (2004), p. 356.

composition by subjecting its speeds and slownesses partially to those of its own; absorbing the molecular and more fluid state of the sounds into the molar and more organized state of the structure; and transforming the initial properties of the sounds through the acoustic properties of the building's materials. One could argue that the composition has acquired some of the characteristics of the pavilion and vice versa. Together they have created both a space that is different to the space of the pavilion and a composition that is different to the composition of music – they could not exist without one another without becoming different again: they are *site-specific*. This novel individuation, becoming, of both the pavilion and the music has opened up a new plane, a haecceity-like artform, that traverses between fixed and unfixed, ethereal and drawn, vibratory and built. It captures the core idea and objective behind Future Forest Space: to create a transient *space of sound* and *music of architecture*, a sonorous environment in counterpoint to an actual environment (and its virtual potential and patterns of becoming). The site-specificity is extended to the immediate environment around the pavilion through the intra-assemblage formed between the forest and the pavilion-composition, in which the borderless movement of sound (i.e. the diffused sound from the building and the deterritorialized sound from the forest-composition) becomes a passage between the two milieus, the exterior and the interior, enabling their respective coded elements and actions (or melodies in counterpoint, each serving as a motif for another[24]) to pass into one another (Deleuze & Guattari, 2004). The installation territorializes these milieus by harnessing their components and qualities; and by enabling them to become dimensional instead of directional, and expressive instead of functional, it creates a new territory – Future Forest Space. But this is not a static territory but one whose refrains are similarly subjected to the deterritorializing forces from the forest as well as the visitors and the everyday usage of the pavilion. It is a constant and – due to assemblages having different forces and speeds – an asymmetrical process of deterritorialization and reterritorialization, a "reorganization of functions" and a "regrouping of forces" (Deleuze & Guattari, 2004, p. 353); a porous exchange and coexistence, a block of becoming between the installation and its environment. Through this ongoing process the installation becomes embedded in its locality and its everyday rhythms and movements. As LaBelle observes, sound installation "leads a listener toward the everyday, not by staging a happening but by insinuating itself into the found, so as to heighten spatial perception, bridging music/aurality with questions of site-specificity" (2006, p. 151). Future Forest Space operates similarly, not by staging some futuristic audio-visual spectacle but by becoming part of the everyday function and found elements of its site. Whether its heightened spatial and environmental condition – dimensional and expressive milieus – invites the audience to contemplate any future forest is subjective, but at least it offers them the space to do so.

[24] From biologist Jakob von Uexküll.

Chapter 3

Practical Application: the Musical Composition and Installation

"Program the machine so that each time a tape is played on it, it produces different time characteristics" – Pierre Boulez

In this chapter I will describe the installation of Future Forest Space in detail. Since the installation was site-specific, incorporating the existing environmental, spatial and sonic conditions of the site into its aesthetic and function, I will start by describing the context of the site briefly: the location of the work, the architecture and the function of the space, and the soundscape of the surrounding environment. These have all informed the nature and the realisation of the work to a great extent. I will then examine the installation through its constituting parts and processes: the concept, the technical setup, the sound design and composition, mixing, and the generative system and behaviour.

3.1 Location

3.1.1 Klankenbos and Radio Forest

Future Forest Space was made for the Radio Forest pavilion, located in the Klankenbos "sound art forest"[25]. Klankenbos is a public forest and park in Neerpelt, Belgium, and it operates as an open-air sound art museum, consisting currently of 23 permanent, physical and virtual installations by internationally renowned sound artists. It is the largest collection of its kind in Europe, open around the clock throughout the year, with most of the works enduring the changing conditions of weather and occasional vandalism. It is managed by Musica, an arts institute adjacent to the park which functions as an academy for music, sound art and new media, an arts education centre for children, a cultural research facility, and a residence for artists and researchers. The forest is situated at the edge of the town of Neerpelt and surrounded by a residential area to the east, a highway to the south, a motorway to the west and a canal and farmland to the north.

One of the features of Klankenbos is the Radio Forest pavilion. Designed by architect-artists Amy Franceschini and Stijn Schiffeleers in 2005, it is a small wooden building consisting of two interior spaces: a larger visitors' room housing a digital information stand and educational material, and a smaller control and storage room housing audio technical equipment. Each of the four walls of the visitors' room has an audio transducer[26] fitted inside the wall, which enables the walls to be used

[25] Klankenbos translates literally as 'sound forest'.

[26] A device that converts electrical energy (in this case audio signal) into mechanical energy (in this case vibration of the speaker cone), making the audio signal audible through the material the device is attached to.

as “invisible” loudspeakers (visitors can access a soundscape archive from the information stand and play the sound back into the room); the control room has also a subwoofer installed, enabling low bass frequencies to be reproduced into the adjoining visitors’ room. In 2009 artist Koen Deprez transformed the building by slicing it in two and placing a layer of glass between the two halves: his source of inspiration for this intervention was the fairy tale of the Town Musicians of Bremen by Brothers Grimm, as well as a desire to make the surrounding environment more visible to the visitors inside the pavilion. He also placed a large staircase-looking metal sculpture next to the pavilion, again inspired by the fairy tale. The pavilion was initially developed as a radio station to broadcast the sounds and sonic atmospheres of the forest, but nowadays the radio station is gone, and the building functions as the main information hub, meeting point for guided tours, and workshop space for school groups.

3.1.2 Existing Soundscape

The term *soundscape* refers to the totality of sounds that can be heard at any moment in any given place (Rudi, 2011) as well as one’s subjective, selective perception of sounds heard as an environment and "how that environment is understood by those living within it" (Truax, 1984, p. 9), and the definition of it was first propagated by R. Murray Schafer in his book The Tuning of the World, published in 1977. Here I will describe the soundscape of Klankenbos as experienced by me, and specifically as heard from inside and around the Radio Forest pavilion, since my work was a reaction to *that* specific soundscape.

There’s lively chirping and chattering of birds constantly in the air: near the pavilion stands a large birdhouse occupied by canary birds (an installation titled Kanariestudio by Paul Panhuysen). The installation has a number of microphones recording random fragments of the birdsongs and the ambient sounds that are then digitally transformed through various effects and played back subtly into the environment, and this adds a layer of slightly unfamiliar “natural” sounds to the soundscape. Then there are various other species of birds inhabiting the forest, each producing their own vocalisation. There is rustling of leaves; occasional, slowly rising and falling rhythmic rumble of wooden boxes rattling and wobbling on springs (an installation titled Springtime in a Small Town by Peter Bosch & Simone Simons which is activated when a visitor approaches it); infrequently appearing faint electronic bleeps and voice fragments (Konversation by Erwin Stache, plant-like sound boxes that are also activated by visitors passing by); few bees and flies buzzing; casual footsteps and chatter of visitors; occasional shrieks and laughter of excited and bored schoolchildren running around the forest (daytime) and those of excited and drunk local youths gathering in a playground on the other side of the forest (late evening); planes crossing the sky frequently; car engines on the nearby highway, trucks travelling on a distant motorway. And various sounds of indeterminate nature, echoing through the forest. All in all, after the initial impression of quietness (especially if one has just arrived from a bigger city), the soundscape appears lively and multi-layered, a mixture of natural and man-made sounds, balanced slightly toward the natural.

3.2 Future Forest Space

Future Forest Space is a site-specific, generative sound installation and musical composition, created for the Radio Forest pavilion in the Klankenbos sound art forest in Neerpelt, Belgium. It is made of sounds recorded in the Klankenbos forest and transformed into an abstract environmental music – or musical environment. The composition is played through the audio transducers installed inside the walls of the pavilion which turn the building into a large “invisible” speaker, as well as on a big

metal sculpture outside which softly emits the sounds into the environment. The piece is self-organizing in nature (and basically infinite), with the sonic events occurring and combining in random and probabilistic manner. It has also silent passages of variable lengths, allowing sounds from the environment to come into focus and appear as part of the composition.

The installation was made for the Pfeifen im Wald summer exhibition in July 2017, and it ran from 21st July to 23rd September 2017. For the exhibition six students from the HBKsaar university1[27] developed temporal sound art installations, each choosing a suitable location and medium for their ideas and reacting to their surroundings in their own way. We had visited Klankenbos for two days in the preceding June, and after some preliminary work at HBKsaar, the installations were realised during a 1-week residency at Musica leading up to the exhibition. I chose the Radio Forest as my location because it best fitted the idea for the installation I wanted to realise: I had been planning to work with transducers and artificial structures since our initial visit to the forest, and having such setup already in place, constructed by professional architects and builders, seemed the most straightforward option considering the one week time limit for the overall realisation of the work. Also, my work required electricity for its use of electronics, and this was available only in few locations around the forest in addition to the pavilion; the pavilion also provided the electronics with the most ideal shelter against the weather.

3.2.1 Concept

The title *Future Forest Space* refers to the two main elements that were the initial sources of inspiration for the work: the forest and the architectural space the piece was installed in. It is also a reference to curator Hans-Ulrich Obrist's comment about how art and architecture should focus on creating "spaces of the future" – spaces that do not necessarily make sense in the current economic and political climate but which nevertheless provide us with experiences to imagine a possible, better world – which acted as an additional catalyst for the concept. As a play of imagination, I was also interested in contemplating the idea of forests in the future, and for that the concept of "dark ecology" by philosopher Timothy Morton, which examines our paradoxical relationship to nature and our future coexistence within it, came in to inform the work (and the title) as well.

When making an artwork for a public space, especially one that is going to occupy the space for longer than a day or two, my interest and feeling is always to make the work site-specific, to relate to its surroundings in aesthetically and functionally meaningful ways. This comes from my interest in art functioning and being treated as a constructive agent to the social and cultural progress – even if this is in some abstract, seemingly non-functional way, like enabling situations and offering spaces for a different kind of existence and another way of being than those of the day-to-day reality. This site-specificity was also the guiding principle in developing Future Forest Space. This meant creating an artwork which would blend sonically with the existing sounds of the forest and appear as a natural part of the soundscape, yet introduce layers of newness, unfamiliarity and artificiality to it: these qualities were in keeping with the aforementioned ideas of "spaces of the future" and "dark ecology". The sonic behaviour of the piece, e.g. its loudness, evolution and tempo, would also need to correspond to that of the surrounding soundscape. Additionally, the piece should work with the architecture of the pavilion and ideally enhance the experience of it, both inside and outside, and take into consideration the everyday function of the space: the pavilion is used by visitors to access information about Klankenbos, to meet for guided tours, and to relax and observe the forest outside, and by school groups to conduct their meetings and workshops there; therefore

[27] The host school of my exchange studies.

the piece should be non-intrusive enough to accommodate these activities. Furthermore, I wanted to acknowledge the other sound installations in the forest by incorporating some of their sonic qualities in the work, to the degree that was aesthetically interesting and within the limits of my own preferred expression and "style".

The underlying model for approaching this concept became what I called "outside in/inside out" (see figure 3.1): the existing sounds heard from outside would form part of my composition playing inside while my composition playing inside would be projected outside into the surrounding forest. This would reflect the architecture with the layer of glass running throughout the pavilion, which makes the exterior appear as part of the interior and vice versa (besides, the sounds coming from outside were so audible inside that it would have been impossible to block or ignore them without raising the sound level of the composition to overtly loud). I wanted to treat the pavilion as a sort of sonic sculpture in which the building and the sound would form a unified character and existence, extending beyond the physical borders of the building (as if blending) into the environment. After some consideration of whether the sonic content should consist solely of non-musical sounds or incorporate musicality to it, I chose the latter approach since I felt the experience of the place already suggested some musical undertones (like in the case of the adjacent metal sculpture by Koen Deprez, inspired by the Town Musicians of Bremen); this also gave me an opportunity to finally create a musical composition for an actual natural environment – a long-held dream of mine.

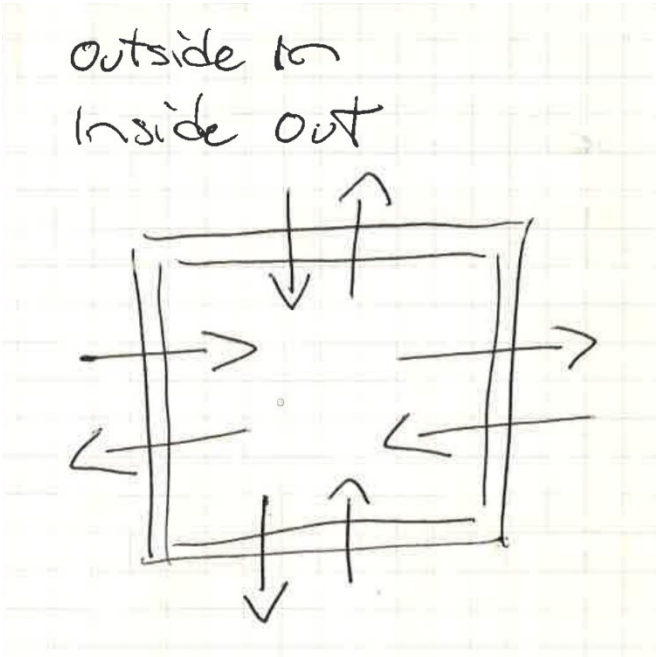

Figure 3.1. Outside in/inside out.

3.2.2 Technical Setup and Sound Reproduction

The technical setup of the installation consisted of five audio sound transducers, a subwoofer, a soundcard, two amplifiers, a graphic equaliser and a Raspberry Pi 3 running Pure Data software. All the technology, apart from the Raspberry Pi and one of the transducers, were already installed in the Radio Forest building and part of its permanent fixture. I installed the extra transducer on the metal sculpture outside the building – this hadn't been done before so it required drilling a hole in one of the walls, pulling an audio cable outside, and sealing the transducer with a small weather-proof metal box; this is now a permanent feature of Radio Forest for the future installations.

Since four of the transducers were fitted inside the walls and the fifth placed discreetly on the top of the sculpture outside, and the rest of the equipment stored in the control/storage room, this meant that all the sound reproduction technology was hidden from the public view. This was very important to me in regard to the architectural and environmental experience and the everyday function of both the space and my piece. When sound reproduction devices like loudspeakers are absent from the space but you still hear the sound, your experience and appreciation of the sound *and* the space become often more immersive and attentive: you are free to listen to the sounds themselves as they appear and react with the space, and to observe the environment and the

atmosphere in their “natural” condition, without the imposing interface of technology denoting the source of your experience. In terms of the everyday functionality, having equipment-free space enabled the uninterrupted, diverse usage of the premises and ensured that my installation was safe from potential vandalism.

The sound of the installation was reproduced by using the outside metal sculpture and the four walls of the visitors’ room as loudspeakers, through the application of the transducers. The wooden walls would reproduce the sound inside the pavilion and to some extent outside (audible approximately to 3-7 metres from the wall, depending on the sounds) while the resonating properties of the metal sculpture would ensure the sound spread outside further into the environment (on a quiet night some of the passages would be audible on the other side of the forest, despite the relatively low playback volume). For the playback device I chose the Raspberry Pi 3 computer with an additional soundcard fitted in (HiFiBerry) since I knew I wanted to build the playback system in Pure Data, and I had previous experience of creating sound installations with Pure Data running on Raspberry Pis. Having one Raspberry Pi and a soundcard with two RCA/phono outputs (L/R) only was sufficient, for the Radio Forest audio routing enabled only one stereo signal to be sent to each transducer and the subwoofer simultaneously: my initial plan had been to set up a multichannel playback system where different groups of sound would be sent to different transducers, thus creating a more surround-like sound reproduction.

3.2.3 Sound Design and Composition

The sonic content of Future Forest Space is made entirely of sounds recorded in the Klankenbos forest. I wanted to limit my options for potentially infinite possibilities of sound-creation (further expanded by digital technology) to these local existing sounds in order to emphasise the site-specificity as described above, as well as challenge myself as a composer and sound designer to work with a more limited pool of material. I would do several field recordings around the forest, capturing both the “original” soundscape and sounds from some of the installations, and then go through the recordings to find the most potential passages – short segments which I felt could be turned into interesting samples, both musical and non-musical, that would sound well within the space and fit the overall concept. The segments were subjected to various electronic treatments, using audio processes such as granular synthesis, pitch shifting, time stretching, ring modulation, filtering and equalisation, and effects like convolution reverb and granular delay; for this I would use the Cubase Pro 9 DAW (digital audio workstation) and the Absynth 5 software synthesizer, my most trusted tools that I had in the mobile laptop studio I was working with. The purpose of these electronic treatments was to bring out the musicality “hidden” in some of the field recordings (or to transform these recordings into more musical ones), and add a quality of unfamiliarity, newness and artificiality to others, reflecting the underlying theme of contemplating the forests of the future – or the “dark ecology”.

The process of creating the sound design and the musical composition was realised entirely in situ at the Radio Forest pavilion, using the walls and the metal sculpture as “studio monitors” (via the transducers). This way I could ensure that each treatment, sound, texture and musical note would work well in that particular space and through those particular physical structures. It would also enable me to observe how different treatments, sounds, textures and musical notes affected my aural and visual perception of the space and the environment, how they blended with the existing soundscape, and to find the most interesting aesthetic direction through this process. Initially I generated close to two hundred samples and musical motifs, and it would take me three

days to whittle down to the most resonant ones and settle on the final direction. The musical motifs were created using treated field recordings which would produce a recognisable pitch when played on a keyboard tuned to the equal tempered scale[28]. To compose these and to find the right behaviour for the algorithmic audio playback I would sit with my mobile laptop studio at the pavilion, often at night, sometimes during the day with visitors walking in and out, and play and program until I found myself simply listening and *surrendering* – in a state of pure enjoyment and contemplation – to the overall spatial and sonic experience. The overall aesthetic of the sound design tended toward qualities like "dark", "broody", "woody" and "subdued" as I found these created the most immersive sonic atmosphere and the most interesting addition to the architecture and the soundscape (remember those lively canaries tweeting next door); the music leaned toward what could be labelled as ambient or minimalism, styles which I felt best provided an enhancing and non-intrusive environmental experience.

Another important aspect was that of introducing silent passages to the composition: this allowed the environmental sounds to come into focus from time to time and thus appear as part of the composition, and lent the composition (and the installation in general) a more porous and indeterminate character, closer to being a natural part of the forest. This porosity contributed also to the "non-intrusive" quality of the work which was desired in regards to the everyday function of the pavilion (e.g. the classes and workshops). These passages were of variable lengths, set randomly for each sample playback and controlled from the generative playback engine of the composition (as detailed later).

The finished composition is made of 64 samples in total. These were divided into six sample groups/banks according to their content, each bank containing variations of its designated sample(s). This was done in order to enable the indeterminate, generative organization of the composition which I will describe in a later subsection. Here I will detail the content of each bank, since this will help illustrate the finished sound design and the organization of the samples that was needed in order to achieve the desired character and generative behaviour of the composition. The labels 'Root', 'Rattle' etc. are arbitrary and for clarification only. I have summarised the content of these banks and their players in a diagram at the end of this chapter (see figure 3.4).

Sample Bank 1 – Root

This contains 31 samples and is the foundation of the composition. These samples are made of 26 variations of five initial samples (which I will refer to as 'root samples'), plus the root samples which in turn are variations of one sonic phenomenon from one of my field recordings: that of a slowly and indeterminately modulating sine wave resonating through a metal shed (an installation titled Houses of Sound by Pierre Berthet), mixed with the sound of birds and a nearby creek. I had time-stretched (expanded) these root samples without pitch correction, a process akin to slowing down a reel-to-reel audio tape and resulting in a sort of "darker" and "deeper" sound, and after some testing came to realise that they formed the most suitable thematic backbone for the composition.

To avoid repetition of these five root samples yet retain their characteristic throughout the installation's existence, I made four further versions of each sample by dividing them into four different frequency bandwidths: 27 Hz-263 Hz (with a low shelf cut at 100 Hz), 263 Hz-959 Hz (with a slight cut at 575 Hz), 959 Hz-5.01 kHz, and 5.01 kHz-20 kHz, using always 96 dB slope for the low and high pass filters; the root samples with the 100 Hz-631.1 Hz bandwidth had a gentler slope of 12 dB.

[28] A common musical scale used for the tuning of pianos and other instruments of relatively fixed scale.

These values weren't arbitrary but a result of monitoring and listening to the samples in the space. Next, I created different combinations of all of the four versions (the root samples would always play alone), which gave me the total of 16 possible combinations per sample: with five samples this meant 80 combinations in total. Added to these the five root samples, the resulting composition sounded too restless and cluttered due to too many variations. So, I set out to select only the combinations and versions that sounded most interesting through the structure of the pavilion and produced a coherent yet varied enough sonic landscape.

Sample Bank 2 – Root (extra)

This contains five samples and they are from the aforementioned combinations that were omitted from the selection for the sample bank 1. They consist of versions with the higher bandwidths only, excluding the lowest one 27 Hz-263 Hz in order to avoid any potential clash of low frequencies with the samples in the first bank. Having these five samples play independently and in different pace from those in the sample bank 1 produced further textural variation to the sonic landscape which I found interesting.

Sample Bank 3 – Rattle

This contains 14 samples. They are basically 14 variations of one musical motif, which have been composed with a transformed sound of a creaking tree branch: the sound has been subjected to granular synthesis in which a tiny segment (grain) of the original sound has been expanded to a sustained rattling tone, with the pitch made further distinguishable by a granular delay (Aetherizer[29]) and a resonant filter. Due to the characteristic of the sound, these samples function as a layer between the non-musical and musical elements in the composition; between soundscape, sound art and music.

Sample Bank 4 – Percussion

This contains four samples and forms a sort of "percussion section" of the composition. The samples are slight variations of one another, and made of a contact microphone recording of tapping a small, fallen tree trunk. The recording has been fed through a low frequency ring modulation to give it a more dynamic, rhythmic envelope, and then through a granular delay (Aetherizer) for further percussive complexity and richness. Similar to the samples in the bank 3, these also function as elements traversing the gap between the non-musicality and musicality.

Sample Bank 5 – Mist / Shimmer

This contains eight samples and produces the main melodic theme and layer. The eight samples represent eight variations of the theme (or motif), and the sound used is made of a short sonic phenomenon appearing in one of my field recordings and resembling a mallet percussion instrument like a marimba or a metallophone being hit (the origin of the sound is unknown to me). A segment of this sound has been expanded through a granular synthesis and refined through an all-pass filter,

[29] A granular delay effect in Absynth 5 software synthesizer.

and sent to a granular delay (Aetherizer) with the pitch shifted an octave higher to produce a texturally rich, shimmer-like sound[30]. When played in the lower registers without pitch correction, I found the resulting notes sound lush, misty, both earthly and unearthly – as if an evocation of an abstracted forest.

Sample Bank 6 – Granule

This contains two samples which are again variations of one sound. The sound is that of small marble balls rolling in a small wooden box and hitting a few metal bars placed inside: this was a feature of a self-made instrument that I discovered in the storage space of the Radio Forest pavilion. The instrument resembled a zither or a Finnish harp (kantele), albeit with a longer body, and with the added features of a miniature African thumb piano (mbira) installed at the other end and the marble balls inside the body. The recording has been slightly slowed down and modulated with granular synthesis, with a bit of granular delay (Aetherizer) added, and the resulting dense and intricate, texturally shifting sound appears as if it were a recording of an artificial natural environment with slight musical undertones: hence it occupies again that space between musicality and non-musicality, between music, soundscape and sound art – or between 'futurity' and 'now'.

3.2.4 Mixing

I took a particular care with the mixing of the sound levels of the final composition. For the concept of the soundscape being part of the composition, it was important that the exterior environmental sounds were audible inside while the piece was playing, and that the piece was audible yet not too intrusive outside. Using the walls and the metal sculpture as "studio monitors", I balanced each sample and output of the sample banks according to how they resonated through the physical structures of the pavilion and the sculpture, and how they blended with the existing environmental sounds. The mixing of the sample banks was done with a mixer patch that I built in Pure Data (see figure 3.2), and the stereo signal of the Raspberry Pi was then sent to the external amplifier and graphic equaliser (for further fine-tuning), for the reproduction through the transducers and the subwoofer inside; for the transducer outside I had a separate amplifier that allowed me to control the gain and the equalisation – low, middle and high frequencies – independently, and this was important since the resonant qualities of the wooden walls and those of the metal sculpture outside were very different, requiring different settings for the gain and the frequency response.

3.2.5 Generative Engine and Behaviour

The behavioural model for the generative system in Future Forest Space could be described as *stochastic* in that it results from a collection of random variables occurring within a defined probability space (Farnell, 2007), *a rule-determined transformation process* with the composition unfolding from a clearly defined initial material and a set of transformation rules (Christensen, 2004, p. 97), *creative/procedural*, meaning the composition is generated by processes that are designed and/or initiated by the composer (Wooller et al., 2005); and *emergent* in that the overall complex behaviour of the piece arises from the collective behaviour of smaller elements. In practice,

[30] The famous 'shimmer sound' developed by Brian Eno and Daniel Lanois and first employed on their album Apollo: Atmospheres and Soundtracks (1983).

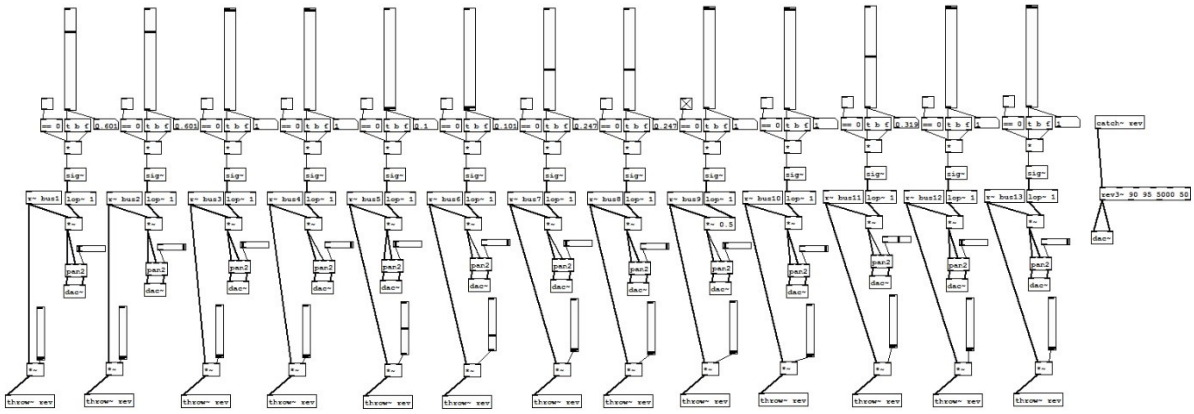

Figure 3.2. The mixer for the sample banks/players. Each bank has its own left and right channels.

however, the system is rather straightforward and rudimentary, if not crudely mechanical: it is made of six sample banks/players, each with randomised values for the playback intervals, playing in shuffle mode independently of one another, and with varying lengths of silences between each sample. This results in six different layers of sonic elements unfolding in an indeterminate, unlocked manner and pace, and the composition "emerges" and is being "generated" from this process. For the purposes of the installation and given the limited assembly time of one week, I found this system to be sufficiently 'elaborate' however.

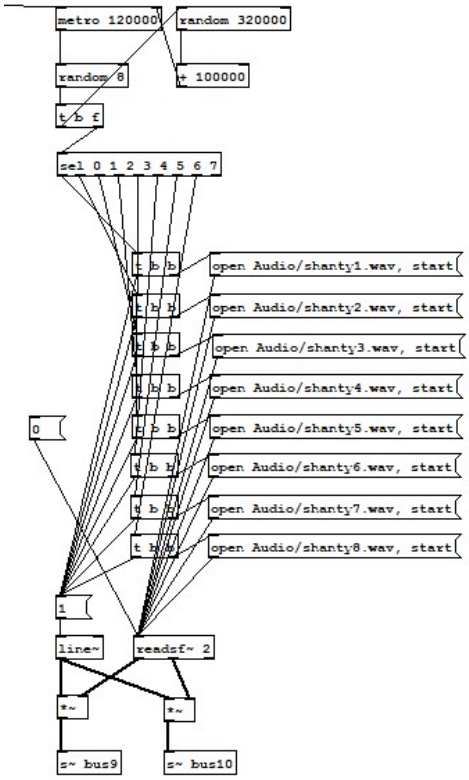

Figure 3.3. One of the sample players.

The system was constructed in Pure Data, and in addition to the sample banks and players it also consists of the aforementioned 13-channel mixer (see figure 3.2). The structure is the same for every player (see figure 3.3): a metronome, a sample selector, a sample bank and a playback engine, a high-pass filter, and two audio sends (L and R) to the mixer where each player has two dedicated input channels. The mixer also includes an auxiliary effect bus with a reverb. The metronome tempo for triggering the sample playback is randomised after each play, and each player has its own specified range of random tempo values – I had arrived at these values after hours and days of adjusting and listening to the piece in the space. The samples for the playback are in turn selected randomly each time, playing in shuffle mode. To generate these random values and selections I used the [random] object in Pure Data: I felt there was no need for more advanced behaviour or algorithmic programming in this context since the composition was based on a selection of predefined samples, and the complementary content and qualities between the samples ensured the piece retained coherence despite their random selection. It was also my desire that the piece sustained its character throughout the two-month exhibition, without a too unpredictable evolution. It should be noted, however, that Pure Data's [random] object is a pseudorandom number generator, meaning that although the output

seems random, it is actually being generated by a deterministic algorithm the results of which resemble a uniform distribution – an approximation of the properties of true random numbers (and the reason why they seem random); if I were to restart the Pd and play the patch again, I would get exactly the same random tempo values and sequence of samples as before. This could be avoided by sending a different "seed" to the number generator each time (e.g. using the CPU time to create a unique seed), which would then produce different random numbers from this seed at each initialisation. But since the composition and its Pd patch would need to be initialised only once and left to play in solitude, this one randomised trajectory was sufficient for the intended behaviour of the installation.

I will now detail the settings and behaviours of each sample player to illustrate the numbers and decisions behind the system that generated the composition. The time values are expressed in seconds for the sake of uniformity, and the numbering of the sample players corresponds to that of the sample banks as described earlier. I have summarised the content of these banks and players in a diagram at the end of this chapter (see figure 3.4).

Sample Player 1 – Root

This generates the foundation of the composition. Unlike the other sample players, however, this one isn't controlled by a metronome. The samples are instead triggered (played back) whenever a previous sample has stopped playing and a random time of delay has passed. The reason for this is that some of the samples in this bank are much longer in duration than others, and assigning random playback times with the metronome while ensuring each sample gets played in their entirety would produce too lengthy silences between most of the samples (this is due to the 'readsf~' object in Pure Data, which I'm using as the playback engine, cutting the previous audio file abruptly off if a new one is triggered). Once a sample has stopped playing, a delay time between 1-20 seconds is generated before one of the 31 samples starts. The audio signal passes through a high-pass filter with a cut-off frequency of 150 Hz, to avoid potential overdrive (and unpleasant rumbling) in the transducers inside the wooden walls.

Sample Player 2 – Root (extra)

The metronome is set to tick (trigger a sample) every 90 seconds, but after each tick the tempo is randomised anywhere between 1 and 180 seconds + 60 seconds for the next sample; the 60 seconds are added to every random value to ensure that enough silence has passed before one of the five samples is played again. Therefore, the potential playback for each sample is always between 61 and 240 seconds. The audio signal is sent through a high-pass filter with a cut-off frequency of 100 Hz, and uniquely from the other sample players, it is then also routed to a tape-delay with a 100 seconds delay and a 70% feedback, resulting in the outcoming audio repeating every 100 seconds with 30 % decrease in volume each time: this produces a gradually diminishing and shifting texture of sound fragments overlapping – a textural effect and a compositional technique akin to the one Brian Eno used as a basis for Discreet Music (Dayal, 2009). Given the samples in this bank were designated as textural enhancers, I found the tape-delay to be a fitting process for increasing the complexity of their interaction.

Sample Player 3 – Rattle

The initial rate of the metronome is set to tick every 480 seconds, and after each tick a new rate between 1 and 640 seconds + 240 extra seconds is generated. The values have again been chosen according to what I considered was the most interesting behaviour (frequency of appearance) of the samples in the overall composition. Here the high-pass filter has a cut-off frequency of 3000 Hz. In the mixer, a long reverb is applied to the audio signal, giving the "sustained rattling tone" of the granulated creaking of a tree branch a more diffusive quality.

Sample Player 4 – Percussion

The "percussion" samples are set to be triggered in random succession every 180 seconds, with the next playback shifted anywhere between 1 and 320 seconds + 120 seconds after each trigger. A high-pass filter with the cut-off frequency of 100 Hz is applied to the audio signal.

Sample Player 5 – Mist / Shimmer

With the initial metronome rate of 120 seconds, the next playback of one of the eight variations of the main melodic theme occurs anywhere between 1 and 320 seconds + 100 seconds after the previous one has started.

Sample Player 6 – Granule

The two long samples of an "artificial natural environment" are set to occur in random order every 300 seconds, but with each playback the interval is shifted anywhere between 1 and 420 seconds + 180 seconds. A high-pass filter with the cut-off frequency of 100 Hz is applied to the signal path.

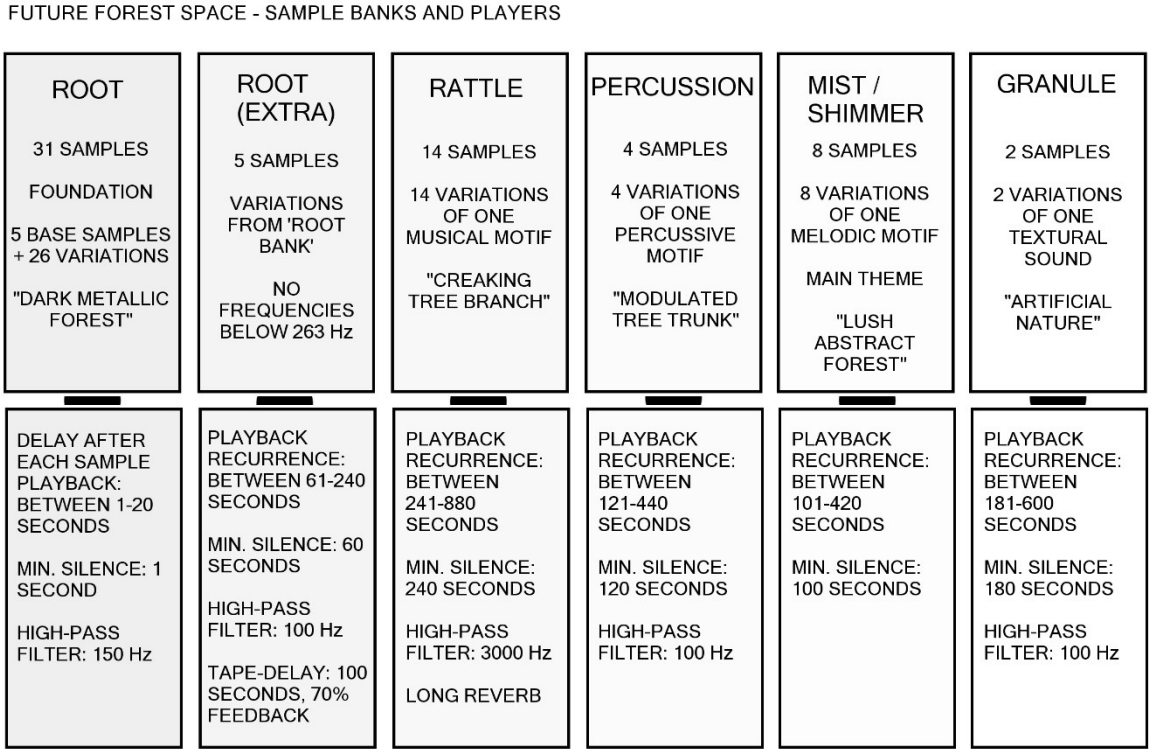

Figure 3.4. The summary of the sample banks and their players. The playback recurrence refers to the probability of time passed before the next randomly selected sample plays.

Conclusion

"Once the search is in progress, something will be found" – an Oblique Strategy (from Brian Eno & Peter Schmidt)

In this thesis I have examined the Future Forest Space installation in terms of its practical realisation, and proposed an ontological perspective on the key elements of the work: the sound, the composition and the site-specificity. Through the philosophical concept of becoming I have analysed the complex, liminal and ambiguous conditions and processes that occur behind the phenomena of sound and generative music and in their interaction with architecture and space; my intention has been to understand these conditions and processes from a more creative and novel perspective than those offered by acoustics and psychoacoustics, and through that to demonstrate some of their dynamic, on-going creative possibilities as well as generating possible new ideas, insights and concepts for future use. In employing the ontology of becoming, my aim has been to understand the more fundamental nature and identity (existence) as well as creative potential of such a liminal and heterogeneous work, operating in between music, sound art, installation and environmental art. One could think of these liminal spaces as ruptures in concrete, through which new vegetation emerges – or as the silence between two notes, which gives the notes their vitality and expressiveness – and the function of the installation (as well as this thesis) to continue establishing those openings for a new life to take over. I will now conclude this examination by reflecting briefly on the outcome of the actual installation, and then considering further implications of the concept of becoming and that of the installation.

Future Forest Space was a success in its concept and realisation, given that it was created within the period of one week. During its opening weekend when I was present at the exhibition, I received a lot of positive feedback from visitors and staff alike, with comments on how well the music and sounds seemed to fit the architecture and space of the pavilion as well as the surrounding soundscape, and how it created a feeling of “space” and “another kind of forest”. The generative behaviour of the piece proved to be interesting (and a new experience) to many as well, with visitors sitting and wandering inside and outside the pavilion for long periods of time and listening to the music evolve and blend with the environment. The installation functioned well without any disruptions for the entirety of its two-month run, and at the end I was asked by Musica to provide a fixed recording of the composition, between 5 and 10 minutes, for their permanent soundscape collection that is accessible to the visitors at Radio Forest throughout the year. Had I had more time to develop the original composition, however, I would have made its generative behaviour more elaborate and lifelike, a kind where it would have had the capacity to change according to external conditions like weather or time of the day, and gradually evolve sonically and musically over the course of its two-month duration; this will be a feature of the next edition of the work, Future Forest Space II.

But what of the becoming of Future Forest Space? In this thesis I have explored Deleuze’s philosophy of becoming through the three main elements of the installation – the sound, the composition and the site-specificity (architecture and environment) – while at the same time analysed these elements through the processes of various becomings: e.g. the becoming-instrument

and becoming-forest of the sound; the becoming-forest and becoming-architecture of the composition; and the becoming-music of the architecture and the environment – with becoming-molecular (and indirectly: becoming-woman, becoming-child and becoming-animal) being implicit in all of them. But what are they all becoming toward? According to Deleuze, the immanent end of becoming, its cosmic formula, is toward becoming-imperceptible: imperceptible, indiscernible and impersonal (Deleuze & Guattari, 2004, p. 308). In short, this means becoming "like" everybody/everything else; to move from the molarity of everybody/everything toward the molecular *becoming everybody/everything*, to make a world or worlds by reducing oneself to an abstract line, a trait, in order to find one's zone of indiscernibility with other lines and traits and enter into conjugation and haecceity with them. "To be present at the dawn of the world", to make the world a becoming (Deleuze & Guattari, 2004, p. 309). It is similarly the goal of Future Forest Space to become "like" everything else: the forest, the environment, the pavilion – but not in any imitative or structural, but cosmic sense (for becoming is never imitating). The installation attempts to saturate its sounds, movements, melodies and rhythms with those of the forest and the pavilion, and eliminate resemblances to existing molar forms and organizations of music, in order to find its zone of indiscernibility with the environment; however, it still retains some of the essential lines and traits of these molarities, and by prolonging them and overlaying them with the lines and traits of the environment, it creates a space, a zone of proximity, between music and the environment, resulting in a new sonorous landscape; "*a* world in which it is *the* world that becomes" (Deleuze & Guattari, 2004, p. 309). In this landscape the differences between the forest and the composition, and the architecture and the composition, keep moving along a line between becoming-imperceptible and becoming-perceptible, in both directions at the same time, as do the differences between artificial and natural, inside and outside, sound and noise, harmony and dissonance, background and foreground. This creative involution of forms and structures enables ruptures, holes and liminal spaces to appear, through which the composition grows and new forests and pavilions and impressions continue appearing and dissolving. One should not, however, confuse this molecular, "unfinished" and indeterminate quality of the installation with laziness, negligence or indeterminacy of ideas, for in order to make a site-specific work that is able to blend with its surroundings on different levels – to make a world, become "like" everything – as well as arriving artistically somewhere new, it is necessary to eliminate all that is excess and to "put everything into it" (Deleuze & Guattari, 2004, p. 309). One might start with a wide palette and a maximum of ideas, drawing from the plane of organization, but has to gradually eliminate all that is superfluous, derivative and molar, mere resemblance or showmanship, and put in everything that is left – including attention, reflection, consideration and skill – and sharpen *its* direction, fully embracing the molecular plane of immanence if necessary. It is only by leaving the most essential, the abstract lines and movements, that the piece can find its zone of indiscernibility, conjugation and continuity, with its surroundings and produce a world, becoming-everything; or arrive at "the dawn of the world", creating an unfamiliar new haecceity. By continuing to emerge from the indeterministic individuation of elements and unfold toward becoming-imperceptible, Future Forest Space attempts to transcend the personal and subjective as well as the cultural, and become cosmic: to open to the outside world, diffuse the distinctions between art and life, music and nature, and form a living space, a continuum that could extend from a larger here to a longer now, toward the future.

Future Forest Space and becoming could both be described as what Weinbaum calls an "on-going creative expression of difference" (2015, p.28) – individuated actualisations of infinite and embryonic virtual expressions that I have explored throughout this thesis. I have attempted to emphasise this similarity between the processes of the installation and those of becoming – their mechanisms, operations and aesthetics – and through that sought to understand the concept of

becoming in Deleuze's ontology and highlight its versatility and potential for discussing interdisciplinary and generative works of art as well as music and sound. As a novel kind of realism examining how both subjects and objects can be produced out of a field of differences that does not assume either, the philosophy of becoming is capable of addressing not only the lawful behaviour of actual phenomena but also their inherent heterogeneity, incompleteness and unpredictable creative potential; difference, variety, heterogeneity and process of change are at the core of its worldview (Weinbaum, 2015). I have applied this capability to analyse the often complex and liminal conditions and processes immanent in the phenomena of sound and music and in their interaction with architecture and space; the creative and novel perspective afforded by this ontology has enabled me to map some of the dynamic, on-going creative possibilities of these conditions and processes, and generate further ideas, insights and concepts from them. What makes the ontology of becoming a dynamic tool for artistic and scientific thinking furthermore is that, as an empirical paradigm, it makes the case for a dimension of existence which is intrinsically hidden and implicit and where the processes driving the individuation of phenomena will always have an obscure aspect; in claiming that the ontological elements of existence are ungraspable differences, Deleuze's ontology is *presenting* existence instead of dealing with *representations* of existence (unlike the Platonist and Aristotelian ontologies); thus it is capable of addressing highly reflexive and novelty producing systems that are otherwise difficult to model, e.g. evolutionary systems, developmental systems, cognition, economic and social systems, and many others (Weinbaum, 2015). I would include art, sound and (generative) music to these complex phenomena and "systems", considering the heterogeneous, ambiguous and emergent nature of the processes and goals behind them and the outcomes and aesthetic experiences they produce. From this onset I have used the concept of becoming as a tool to examine the liminal, indeterminate and ambiguous conditions that characterise Future Forest Space, and to explore their creative potential to an extent. The underlying implication (or conclusion) of becoming is that "there must be more to it" – be it life, a phenomenon, an object, the world etc. – and this is also true for generative works of art, in which the composer relinquishes their control in order to surrender to a greater complexity than envisioned, and for interdisciplinary and site-specific works, which try to expand a medium's range and potential by opening its refrains to the milieus and territories outside.

As a site-specific installation and "space of the future", Future Forest Space engages in one of the key functions and potentialities of art and music (as well as architecture), which is to create spaces and experiences that allow us to imagine and "inhabit" possible worlds and futures; immaterial and material situations that provide other, often new ways of being and thinking than those assumed and promoted (or even imposed) by the society at large. Especially now, in the age of neoliberalism and capitalism, these spaces offer critique of and present an alternative to the ever-multiplying and ever-homogenising spaces of consumerism and their univocal, market-serving functions that are permeating the society; they propose possible worlds and futures whose designs and visions enable a far more heterogeneous variety of life's expressions and possibilities than the ever-homogenising expressions and possibilities afforded by the demands of the neoliberal dogmatism (which exists to serve the capitalist system more than the society that supports it). In our market-dominated society, all life, human and natural, is increasingly being measured and valued in economic terms only – terms which are based on the rather unilateral and unsustainable model of infinite material growth through finite resources as well as maximisation of profits before social investments – and to maximise this economic potential, the existence needs to be made quantitative, hierarchical, accountable, competitive, and brandable; the spheres of existence that are too complex, amorphous or indeterminate for such efficiency and productivity are quantised, divided, *represented*, repackaged, or simply discarded as valueless: there is no room for liminal

spaces or conditions, or too much diversity and variation, in such high-performing existence. A work like Future Forest Space, for example, has very little value or function from the market's perspective: as a site-specific and interdisciplinary piece it resists commodification, while its indeterminate and rhizomatic character, minoritarian and molecular behaviour, is too ambiguous and weak for the majoritarian and molar standards, the brandable and refined products, of the industry. Yet the work does have a function, several of them, and it continues to produce value outside and between the measures understood by the market (and increasingly, the society). And one could argue that what makes life valuable and feel *life* in general, something worth exploring and remembering, are those unquantifiable, unmeasurable and serendipitous, non-hierarchical qualities, lines of flight escaping outside; it is the aim of the arts to enable these lines to form, to unleash the minoritarian and molecular becomings, according to Deleuze. While there is a clear utilitarian benefit and importance of having uniform, highly quantitative systems in many areas of the society (e.g. infrastructure), it becomes highly problematic when all of the human and natural condition are subjugated to the operations of one unilateral, reductionist paradigm, a single-purpose machine, resulting in outcomes which have become well-known: ecocide, climate breakdown, inequality, poverty, conflicts, wars, waste of human and natural resources, and so on. The world is more complex, heterogeneous and ambiguous – and potential – than what neoliberalism, or any such ideology and representative model, can properly address; and as with becoming and all the other areas of life, there must be more to the economic thinking and design and their possibilities than what the current doctrine of neoliberal capitalism insists, focusing solely on economic growth, and treating the world as a mere resource and human beings as mere consumers. The economy exists to serve the society, not the other way around, and if we are to thrive in the long term, we need to redesign our economic, political and societal systems to become capable of responding more dynamically to the complexities of the world, accommodating greater individuation and difference, and enabling more of the different, creative potential to be actualised. In this design process art as well as philosophy have a catalysing and constructive role to play, in continuing to provide toolboxes for imagination and new thinking, as well as creating concepts and spaces that draw us (more efficiently and productively) to the future.

In its processes and outcomes Future Forest Space suggests an unfinished, open world in a continuous process of coming into existence, of drifting and changing; emerging from unpromising and uncertain beginnings, and through smaller and diverse interactions forming a greater, amorphous whole. The liminal spaces, indeterminate structures and incomplete forms enable spontaneous and unexpected (and sometimes serendipitous) connections to occur, a new life to express itself and be accommodated within the borders of the piece; its movement away from the domain of control (the plane of organization) toward the field of surrender (the plane of consistency) similarly allows varying degrees of uncertainty, unpredictability and relativity to continue composing as well as permeating its existence and worldview. Its perspective of time is not limited to a minute, a day or a quarter, but includes the notion of infinity, a sense of becoming a part of a longer continuum; it continues to extend toward the future while also sustaining the balance between the natural and the artificial. In contrasting the artificial and inanimate natural sounds with actual and living natural sounds, however, the piece returns to the present, and enables a simple contemplation of these two different systems, natural and artificial, operating side by side. In its porous and open-ended condition the installation offers no specific message or conclusion, and instead leaves the space open to a question: How might the forests of the future be?

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Appendix I: Future Forest Space 44’33” (USB flash drive)

This is a 45-minute recording of the theoretically infinite and continuously changing composition. It is not meant to be listened to in its entirety, since as a rhizomatic piece it has no beginning, middle or end: it can be accessed and exited at any point. There is, however, an arbitrary beginning on this recording, where all the six layers of the sounds start by playing at the same time: this happens when the Pure Data patch that runs the composition is opened, and it is right after this first “bar” that the arrangement settles down and acquires its intended indeterminate behaviour. Naturally this beginning is not part of the experience of the installation in situ, but I have included it here to demonstrate the full sonic spectrum of the electronic composition. The duration of the recording has been chosen arbitrarily, partly to reflect the typical length of a music album, but I have also observed that the effectiveness of the piece increases when it is left playing in the background for longer periods of time – or blending into the background as in its original site-specific function. Furthermore, the sequences of the sounds and the durations of the silences here represent just one of the numerous variations that the piece can have on different repeats. This is, however, the “original” version which occurs when Pure Data is initialised and the patch opened the first time; this exact repeatability of a seemingly random process is due to the pseudorandom setup of the patch, as explained in chapter 3.

What is absent from this recording are the actual natural sounds of the Klankenbos forest, which formed part (or even the second half) of the composition in its site-specific context; despite having been created for this specific environmental condition, the composition is nevertheless intended to work as a standalone, albeit more minimal piece as well, or even applicable to another environmental setting. In the installation the sound of the composition was also adjusted through an external graphic equaliser, and then diffused through the structures and materials of the pavilion and the adjacent sculpture, all of which resulted in a slightly different and more site-specific sound than the original “raw” one heard on this recording; again, despite having been created for this specific architectural condition, this standalone version sounds also as intended, and should work well in most speaker systems.