Storytelling with sound and vocal improvisation:

A portfolio of electroacoustic compositions

by

Evangelia Alexaki

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Abstract

The purpose of this document is to serve as commentary that accompanies the portfolio of electroacoustic compositions, produced during research carried out between the years 2013-2019. It provides information about my artistic vision, focus, and creative process. The portfolio and the commentary together form my thesis submitted for an MA by Research in Music Composition.

The focus of this research is on vocal improvisation as the foundation of the compositional approach. It is rooted in my background as a composer as well as a singer and improviser. This research is also informed by my interest in storytelling and technological tools that can enhance and facilitate the creative process.

Dedication

To my family and to those who choose hope

List of Portfolio Works

Title	Year	Duration	Type
libellule (dragonfly)	2017-2019	~5'21"	Acousmatic
mould	2013	~18'12"	Live Electronics (Collaborative Composition/Prepared Improvisation)
laughing matter	2017-2019	~5'02"	Acousmatic
voix céramique (ceramic voice)	2016-2019	~7'25"	Acousmatic
do cyborgs feel sad when they're lonely?	2017-2019	~5'-15'	Virtual Interactive Installation (Soundwalking Simulator)
souffle de l'océan (breath of the ocean)	2019	~8'-16'	Virtual Interactive Installation (Live Electronics)

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Preface

When I was a child, I was imbued with a drive to experiment freely and to improvise with any musical instrument in my possession. This impulse I trusted and followed, often at the expense of studying the assigned pieces for my piano lessons. Yet, this freedom provided me with the opportunity to explore and develop my creative talent and love for musical composition. In my mind, improvisation and composition became interchangeable concepts. My relationship with technology began when I was seven years old. My first contact with electronically produced sound was via a Belton electric organ, that a few years later when my parents bought me an upright piano, we exchanged for a Casio keyboard and a classical guitar. Having these limited sound processing means at my disposal, I contented myself using microphones to record my ideas to cassette tape, and a dual deck to splice these ideas together. Much later, at seventeen, I got an electric guitar and various pedal effects, and a vast field of ideas and experimentation unfolded before me. At eighteen, I acquired a synthesizer, and finally, my first computer at twenty, which at last opened up an infinite realm of possibilities.

During these formative years, I also became fascinated by the abilities of the human voice, both in speech and song. Curious to learn as much about the human voice as possible, I took lessons in classical and jazz singing and began investigating various singing schools and methods, such as musical, pop, rock, overtone and extended vocal techniques. I studied accents and the skills and techniques required by voice actors. I also followed up on the current scientific

research regarding voice, speech, singing, and linguistics (more specifically phonetics).

The following compositional research project is a result of the amalgamation of my experiences with improvisation, technology and voice that affected my musical thinking.

Acknowledgements

Create new file...

It begins with a blank canvas; a blank page or an empty project.

When I first looked into this void it had no form nor substance. But as I kept gazing long enough it started to acquire shape.

So, thank you to everyone that bore with me throughout this shape-acquiring process.

Thank you:

To my supervisor Dr. Scott Wilson, for his guidance, support, and invaluable advice;

To my friends, colleagues, professors, students, and collaborators, for the many inspirational conversations, and especially to Iliana Karaliga, Christos Karadais, Alexis Pogrevnois, Manuela Gallina, and Rania Rossopoulou, for offering their talents to my vision;

To my mother and brother, for their love, encouragement, and endless patience, and for proof-reading this document;

To Stilve, for being my harshest critic as well as a bundle of joy that always puts a smile on my face, especially when I need it most;

To Kostas, for caring, believing in me, and listening to my endless rants, for being my person and my best friend.

All of you made this possible.

Save file...

1. Introduction

Composition is a never-ending decision-making process of choosing one sound over an infinity of others. As a practice, it is a lifelong process, while as an act of creating a single piece of music, it needs a beginning, a middle and an end. In the following chapters, I discuss how these processes take place in my work and how I make choices while engaged within these processes.

The following commentary accompanies the portfolio of musical compositions I created during my postgraduate research at the University of Birmingham. It reflects upon my creative workflow, describes the nature[1] and scope of my research, and provides a non-exhaustive analysis of the outcomes of my explorations.

The objective of this research was the production of compositions using vocal sounds as primary source material.[2] Why use vocal sounds? As an easily recognisable sound, the voice can feel more personal and give the listener "something to hold on to" (Landy, 1994). The methods of creating the pieces are primarily improvisational. Contrary to the traditional view on the distinction between composition and improvisation (Foss, 1962) and more in agreement with their modern definitions (Larson, 2005; Horne, Maxwell and Coessens, 2017), I have observed through my practice that improvisationally produced sonic material can provide a limitless source of ideas. Also, the

[1] Which is that of creative practice as research.

[2] In 2013 I was accepted at the University of Birmingham for a PhD in Music Composition. I began my PhD research with a focus on notation in Mixed Music Composition and Laptop Ensembles. After experiencing life-changing distress caused by illness and getting diagnosed with a chronic condition, I downgraded to a Master of Arts by Research (MA by Research). Consequently, I revisited and modified the scope of my research to that of exploring vocal improvisation as the foundation of my compositional approach.

process of filtering and organising this source material constitutes a combination of the two activities.[3]

The portfolio contains six pieces thematically related as parts of a single concept.[4] As shown in Table 1, three of the compositions are acousmatic, and the rest are a collaborative live electronics improvisation work and two pieces comprising a virtual interactive installation (for which I coined the term 'soundwalking simulator'), one of which has been partly created with live electronics improvisation.

The commentary is divided into three chapters. In chapter one, I introduce my topic and provide an overview of my background, my artistic project and research methods. In chapter two, I examine my compositional approach, framework and methodology. Finally, in chapter three, I outline the content of my compositions and analyse them, focusing on how they relate to the topic of my research.

1.1 Background

I showed musical interest at a very young age and started taking piano lessons at four. At the age of nine, I enrolled at the Contemporary Conservatory of Thessaloniki, Greece, to continue my piano studies. After finishing school, I studied audio engineering at Pythagoras Institute of Vocational Training. Meanwhile, at the conservatory, I took courses of classical singing and acquired diplomas in harmony, counterpoint, jazz singing and electronic

[3] The blurring of the boundary between improvisation and composition is sometimes referred to as real-time composition and others as comprovisation (a term possibly coined by free improvisation trombonist Paul Rutherford in the '70s and used by several composers thereafter).

[4] See section 2.1.4 Storytelling with sound: Worldbuilding & narrative aspects, Overall narrative structure.

music. I was a keyboardist in various rock bands for a few years, and later I graduated[5] from the Department of Music Studies of Ionian University, Corfu. There, I studied both classical and electroacoustic composition, with professors and mentors Joseph Papadatos, Andreas Mniestris, Dimitra Trypani and Theodoros Lotis. During the final year of my studies, we formed the live electronics duo InGrains[6] together with my fellow student Iliana Karaliga.

My interest in improvisation also began at a very young age. I had the aptitude and inclination to sit at my piano and put together notes to form coherent melodies, often with simple accompaniment. These first attempts at improvisation using piano and voice became my favourite activity and were reinforced when I was trained in musical notation and became able to put my ideas on paper.

[5] Valedictorian, with a first-class honours degree (Integrated 5-Year BMus/MMus).

[6] Live Electronics duo 'InGrains' consists of Iliana Karaliga and Evangelia Alexaki, author of this commentary. We have performed in Corfu and Kefalonia, Greece. We had both been members of the Live Electronics ensemble of the Ionian University under the guidance and supervision of our professors and mentors Tim Ward and Theodoros Lotis. The duo was established after a successful performance during Iliana Karaliga's ensemble performance exam, when we got invited by Apostolos Loufopoulos to perform at the Days of Electroacoustic Music Festival 2012 at Kefalonia, Greece.
Acting as both composers and performers, we aim to create sonic mazes, intertwining syllables and phonemes with familiar and otherworldly sounds, through associative passages that unfold mysterious places and dreamy fragments. Collaborating in various degrees, we have composed the pieces *Vox Aeterna*, *Pianody* and *mould*, for which we collaborated with clarinettist Alexis Pogrevnois and poet Manuela Gallina. The usage of the voice is a primary focal point in all of our compositions. *Vox Aeterna* consists of sonic events that create a world of voices. The pre-recorded samples interact with the natural sound of the voice, and all together, they connect as one single, eternal, archetypal choir. *Pianody* is constructed with pre-recorded piano sound samples and a 'live' voice. A peculiar incantation for voice and piano, it features an unconventional use of the individual parts that comprise it. The voice sings but also utters, whispers and mumbles, the sounds of the piano are produced not only by its keys but also by its strings, by impacts, scratches and electronic processing. *mould* will be analysed in chapter 3.2 of this commentary.

My fascination with the human voice compelled me to study opera for six years. However, feeling limited by the strict classical approach, I sought expressive outlets elsewhere. This quest brought me to jazz. While jazz was a freeing path for me, the most significant revelation happened later, during my studies at the Ionian University, when my professors introduced me to electroacoustic music, particularly musique concrète. As a surrealism enthusiast since my teenage years, I connected almost instantly with this genre; I recognised in its aesthetics, the somewhat delayed manifestation of the surrealism movement in music.[7] At university, I was also taught contemporary classical compositional techniques, including extended vocal techniques, in which I became especially interested.

1.2 Influences

While evolving as a composer, I have been developing a language uniquely mine; an amalgam of various influences: stylistic, thematic, aesthetic, and technical. In the following paragraphs, I describe the impact of these influences in more detail.

Several questions occupying my thoughts during the development of this research project were the result of self-observation and self-examination: What are my sources of influence? Do I have a foundation in some pre-existing tradition? Do I deviate from it, and if so, how much and towards what? How diverse are my influences? What has been my method in developing my stylistic language as a composer? Have I imitated, borrowed, combined?

[7] An observation made by several authors, notably Schaeffer (1952/2012), Wishart (1986), Landy (1994), Young (1996), Smalley (1997), Emmerson (1998), and Landy (2019).

Where do I position myself? Am I part of a tradition, a new wave, an independent? Where do I see myself in relation to my fellow artists?

I consider myself perhaps an outlier who has combined various disparate elements into a unique blend. I have explored many schools of musical thought, but I have not found myself entirely belonging to any of them. I started my musical journey at a very young age but soon grew weary of a rigidity seemingly permeating the educational environment, and sought a renewed freedom in the embrace of rock and electronic music and later jazz. When I began my studies at the Ionian University in Corfu, my goal was to study jazz composition. However, it was the combination of classical and electroacoustic music, also referred to as mixed music, which won over my curiosity and exploratory nature. Jazz and free improvisation classes with Dimos Dimitriadis, my participation in the Live Electronics ensemble of EPHMEE[8] and the Ionian Early Music Ensemble, influenced my further interest in combining these seemingly disparate genres.

As a teenager and young adult, I listened to progressive rock and metal music, and it infused me with a sense of adventurousness. My keen interest in video-game and movie soundtracks and video games overall inspired me to reflect upon atmosphere building and narrative underscoring, new methods of storytelling, the importance of immersion, passive versus active involvement, and interactivity. My studies in audio engineering and professional work as an audio editor influenced me profoundly. They deepened my love for not just musically structured sound (that usually included the tonal music of the

[8] Electroacoustic Music Research and Applications Laboratory of the Music Department of Ionian University.

Common Practice Period as well as the post-tonal music that made free use of dissonance), but what Edgard Varèse called “organised sound” to include sounds previously regarded as ‘noise’ (Varèse & Wenchung, 1966).

I separate my various influences in three categories: Those that have influenced how I approach musical creation, the ones that have influenced me stylistically and aesthetically, and others that have affected how I use the sound of the voice in my works. The compositions of this portfolio have been influenced to a lesser or greater degree by the following:

Compositional influences	**Aesthetic and stylistic influences**
● The writings of Pierre Schaeffer, Simon Emmerson, and Trevor Wishart ● The ideas of John Cage on sound, noise, as well as silence ● The soundscapes of Hildegard Westerkamp and the practice of soundwalking	● George Crumb’s use of extended techniques, timbral language, and invocation of the natural and the primordial ● Simon Emmerson’s acousmatic piece *Frictions* (1999) ● Jonty Harrison’s album *Évidence matérielle* (2000) ● Theodoros Lotis’ album *Époque de l’eau* (2008) (particularly the piece *Underwater Theories* (2002)) ● The Nordic and especially the Icelandic school of music, artists like Björk and groups like Múm and Sigur Rós (who blend folk with pop and electronic glitch effects with characteristic ethereal sound qualities) ● The aesthetics of ambient, glitch, abstract and IDM musical genres (especially in combination)

Table 2. Influences

Voice in Electroacoustic and Electronic Music

It is beyond the scope of this thesis to offer a historical overview of all the people who have used vocal sounds in electroacoustic and electronic music. Below I list a few people and works that have influenced me in creating this portfolio:

- Luciano Berio's works with mezzo-soprano Cathy Berberian: *Thema (Omaggio a Joyce)* (1958) and *Visage* (1961)
- Trevor Wishart's *Red Bird (A Political Prisoner's Dream)* (1978) and *Vox Cycle* (1980-1988)
- Simon Emmerson's *Sentences* (1991), for soprano and live electronics
- Kaija Saariaho's *Lonh,* for Soprano and Electronics (1996)
- John Young's acousmatic piece *Sju* (1999)
- Björk's album *Medúlla* (2004)
- Bora Yoon's album (((PHONATION))) (2008)
- Dimitris Savva's acousmatic pieces *Erevos* (2012) and *Telchines* (2012)
- Pamela Z's works for solo voice and electronics (involving extended vocal techniques, live looping, real-time processing, and use of sensors, for example, *Quatre Couches* (2015))

1.3 Artistic focus

During the creation of this portfolio, I focused on composing electroacoustic pieces using vocal sounds as my primary source material. Furthermore, I explored how improvisation - particularly vocal - can inform the compositional narrative and the invention of an imaginary sonic world. To facilitate my

workflow, I devised a theoretical model of aesthetics that describes the properties of sounds I find preferable.

The six compositions are parts of an overarching narrative. *libellule (dragonfly)*, *laughing matter* and *voix céramique (ceramic voice)* are acousmatic works. *mould*, *do cyborgs feel sad when they're lonely?* (which for the sake of brevity I will refer to as *do cyborgs*) and *souffle de l'océan (breath of the ocean)* feature live electronics and collaboration in various degrees. In the last two pieces, I additionally used software intended for game development and game audio.[9]

1.4 Research methods and theories

The nature of my research is mostly empirical rather than hypothesis-based. To define and narrow the scope of my research, I formulated a research question:[10] How to create Electroacoustic Music combined with vocal performance, using the voice as the primary source material and improvisation as the main structural guideline.

The primary tool of my creative artistic research is using reflection as a method for understanding subconscious functions and integrated processes of creativity. Therefore, I used the following methods to help me during my research:

[9] More specifically the Unreal Engine 4 and FMOD.

[10] When I created my research proposal for a PhD, I focused on Mixed Music Composition, notational issues and laptop ensembles. When I revisited my research topic after downgrading to a Master of Arts by Research, I narrowed my focus further.

Creative research methods	
Usage of technological tools for ● Data gathering ● Analysis/reflection ● Creation	Practising skills such as ● Intuition and imagination (which may be called inspiration) ● Critical thinking ● Refinement, modifications and fine-tuning (until achieving a satisfactory end-result)
Data gathering by ● Keeping a journal ● Creating various audio collage sketches of ideas ● Analysing the symbolism integral to a selection of extra-musical themes	Literature review of ● Current research ● Peer creative practice
Reflection upon ● Life experiences ● Listening habits and preferences ● Influences from both musical as well as other artistic fields	Literature review through ● Books ● Encyclopaedias ● Journals ● Articles ● Websites ● Music streaming platforms
Brainstorming with ● Mind-maps ● Experimental audio projects	Play and experimentation with ● Acoustic and electronic instruments ● Audio editing and DAW software ● Vocalisations

Table 3. Creative research methods

By reviewing relevant work (studies, music, methodology, creative approach), synthesising my findings, and differentiating my practice from that of my peers, I developed a conceptual framework and a methodology that I analyse in the upcoming chapters.

1.5 Recurring concepts

Here I catalogue a few recurring concepts, themes and ideas that inform my current work as sources of inspiration. Many are extramusical.

Habits

- Creating collections of compositions based on a central theme, narrative, or topic, similar to concept albums
- Noting down favourite words, based primarily on their sonic properties, and secondarily on their meaning
- Using the above collection of words to generate ideas, titles, and subjects

Aspirations

- To approach composition as world-building, similar to how video game and film sound designers approach it
- To evoke sound-images, such as that of a swing, a cradle or a rocking chair
- To use sound to conjure abstract imagery, symbols, metaphors, impressions, and emotions, things open to the listener's interpretation: concepts like infinity, space-time, light, emptiness, isolation, serenity
- To utilise sounds of nature, and the classical natural elements of ancient cultures, air, water, fire, earth, wood, metal, (also to try to conceptualise and to imagine how aether, void, and space would sound if this were possible)
- To utilise techniques inspired by surrealism: automatism, associations, inspiration from dreams, tapping into the subconscious.

Themes

- Existentialism
    - Existence precedes essence
    - Alienation or estrangement
    - Absurdity
    - Death
    - Fear, Dread, Anxiety
    - Nothingness and the Void
    - Freedom
- Zen philosophy and meditation
- Fantasy and science fiction
- Ancient mythology

Sources of inspiration

- Paintings, sculptures
- Poetry
- Memories

Recurrent musical and sonic elements

- Grainy textures (grain)
- Short harmonic bell-like sounds (plink): e.g. the music box, the array mbira, wind chimes, Gamelan instruments
- The human voice
- Water and cricket sounds
- Improvisation (sometimes prepared)
- Ambient music and its hybrids with other electronic genres (ambient-IDM, ambient-glitch) or derivatives (post-rock)

2. Theoretical Framework & Methodology

The theoretical framework and methodology I develop and use to compose music are a constant work in progress, evolving as I am evolving, as an artist and as a person.

The stylistic elements and the creative objectives (the research questions) I develop during a project's creation are the compositional issues that constitute this framework. Firstly, I examine them by discussing how I approach my source material and the influence interpretation, improvisation and interaction have over my workflow. Next, I expand upon the usage of vocal improvisation as a basis for composition in my practice. Lastly, I analyse the narrative aspects of my works and provide a model for my aesthetic approach. In the methodology section, I describe my creative process and each stage of my workflow and analyse the various steps I take during each phase. I also introduce the various tools and (processing) techniques I use more frequently.[11]

[11] A complete list of these tools are listed separately for each composition in Appendix IV: Processing Tools & Techniques.

2.1 Compositional issues

Stylistic elements	**Creative objectives**
The main characteristics of my compositional technique: • Sound and timbre are as significant as melody[12] and rhythm. • Harmony can be the result of my process but does not act as a starting point, nor is it the main focus of my approach. • I am interested in contrasts and achieving balance (and coherence) among contrasting elements. • I select sonic material of a particular aesthetic quality.[13]	*Vocal improvisation as the foundation of the compositional approach:* • How do I use voice, and specifically vocal improvisation as my primary source material? • What types of vocal sounds and vocal improvisation are useful for my work? • How do I use vocal improvisations as the blueprints upon which I structure a piece? • How and with what do I combine voice and recordings of vocal improvisations in ways that satisfy my creative goals, and also form a cohesive result?
Additional characteristics: • A linguistic rather than mathematical approach to music • Sound poetry: the use of words for their sonic quality and characteristics and not their meaning • Repetition, patterns, and motifs that provide coherence, continuity, and internal reference when arranging sound objects across a timeline (Seddon, 2007) • Negative space: the evocative potential of silence[14] and rests	*Research scope (objects of study):* • The role of voice in electroacoustic music (acousmatic and live electronics) • Usage of soundscape elements • ASMR-triggering sounds • Narrative • Game development software in music composition

Table 4. Compositional issues

[12] Not in the conventional sense of the word as in classical music, but as an expanded concept of exploring pitch, phrasing and harmonic relationships among sounds.
[13] See section 2.1.5 Aesthetics of Sound.
[14] I view silence, not as the total absence of sound that approaches -inf. dB, but as lack of significant activity, as quiet ambience or room tone. This view also connects to the application of background-foreground spatialisation.

2.1.1 Compositional approach

My primary source of sonic material is the human voice, either recorded or as a live source during a performance. I prefer to use improvisation, rather than fixed predefined material. The types of vocal sounds I use are extended vocal techniques, melodic,[15] ASMR-inspired, and sound poetry.

Technology has influenced the way I think about the sound of the voice and how I improvise and interact with my source material. In my profession as an audio editor and engineer, I work every day with audio restoration tools such as de-noise, de-click and de-crackle. I like exploring the use of these tools for my compositions by using them in the opposite way they were intended. For example, instead of removing the noise and artefacts, I keep or enhance them. This method brings in mind the aesthetics of glitch and noise music, but I approach it in combination with an ambient aesthetic, with 'softer' sonic textures, slow pacing and development, and an emphasis on atmosphere (as, perhaps, do practitioners of the ambient-glitch sub-genre).

To me, the joy of exploring, discovery, and play are essential factors; this results in my approach being of an intuitive nature and non-formalistic. That said, after having created a rough draft of a composition based on this intuitive compositional approach, I enjoy revising it and focusing on improving the syntax.

When composing, I try to adhere to the "something to hold on to factor" introduced by Landy (1994). In his article, Landy provides a list of parameters as a framework that can assist the composer in creating works intended to be

[15] As in using traditional elements of pitch and rhythm, tonality.

more accessible to the uninitiated listener. I favour among them the homogeneity of sound and especially the usage of homogeneous textures (sounds that have similar timbral characteristics) and the voice. I developed the Plink & Grain grid[16] to help me categorise these sounds. I use sounds of specific quality characteristics, such as airflow-emitted and friction-emitted, juxtaposed with impact-emitted sounds and emphasising the timbral contrasts between them. I also use programmes, real and imaginary, another parameter listed in Landy's article (1994). Narrative is a fundamental aspect of my music, as well as several techniques and characteristic elements of surrealism, such as free association and dream imagery. I often use nature as programme. I use field recordings, soundscapes, as well as sounds of a different source that after extensive processing evoke an image of nature. For example:

- During the third section of *laughing matter*, the 'water dream,' all sounds are extensively processed sounds of laughter.
- In *libellule,* 'crunchy' sounds processed to sound like insects, are mixed with recordings of real insects (cicadas).

Similarly to indeterminacy, I incorporate chance and randomness as creative techniques both in composition for fixed media (while composing, sound recording (often with improvising sounds), sound designing and arranging) and in live electronics performance. However, unlike John Cage and the New York School, I do not reject self-expression, but I consider it inevitable. I embrace it and utilise it as part of improvisatory processes where the idiosyncrasies of the performers are not simply taken under consideration but

[16] See section 2.1.5 Aesthetics of Sound, Plink & Grain: A model for categorising sounds.

are given prominent roles. I employ elements of chance music as a compositional technique, using random procedures, the results of which often go through a process of selection-elimination-alteration, and elements of aleatory music by encouraging the subjective performer's interpretation. Also, interpretation, as I approach it in my work, is never 'fixed,' like David Tudor's realisations of John Cage's work. I instruct my (co)performers as vaguely or as explicitly as needed to produce a subjectively satisfying result. I encourage them to experiment, and I provide feedback (with non-verbal communication during a performance) when we arrive at successful results or unexpected happy surprises.

I make my creative decisions using my intuition, and I require the same from performers. However, contrary to Stockhausen (1971), I do not try to dissociate from pre-established stylistic elements. I consider improvisation as never disconnected from one's internalised and assimilated musical knowledge and experiences.[17] One can either allow them to emerge or do the opposite of what they dictate. I often make use of a performer's particular musical style (e.g. for the performance of *mould* I asked Alexis Pogrevnois, the clarinettist, to improvise in the style of Greek folk music of Epirus).

I seek to express and evoke emotion in my compositions, as an improvisational element, as interaction with the material from the performance perspective, and as artistic intention. Examples can be found in my pieces, such as *voix céramique* that features the use of voice, cries and forced laughter, to evoke

[17] Similarly, one could argue that intuition is connected to one's internalisation, assimilation, perception and understanding of one's knowledge and experience. Therefore, the broader a collection and comprehension of knowledge and experiences are, the more diverse the breadth of insights one can access.

feelings of suffering but also hope. In *do cyborgs*, the use of whispers, mad laughter, and fast nonsense talking evoke feelings of despair and agony. Later in the same piece, I use long fermatas to create an atmosphere of calm and anticipation. In *laughing matter*, various laughing sounds evoke feelings of amusement and fun, but later they become deranged, before they acquire a more aquatic dream-like nature, as a form of a redemption arc, and return to their original cheerful state, that is creepily enhanced to unnerving by the previous encounters. In *mould*, the machine's dissonance overshadows nature's calmness, but then, with the aid of the 'light',[18] the heterogeneous elements learn to coexist in harmony, and serenity (tranquillity) regains its prominent position.

2.1.2 The 3 Is: Interpretation - Improvisation - Interaction

I have integrated the following three fundamental concepts into my compositional approach:

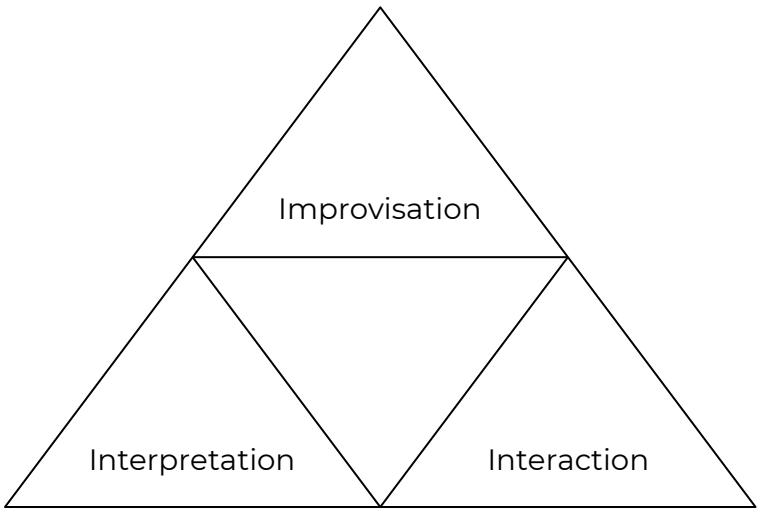

Figure 1. The triangle illustrates the interconnection of the 3 Is, with improvisation on top, interpretation left and interaction right.

[18] By use of a bright, crystal-like tonal percussive sound; it acts as a symbol of enlightenment.

IMPROVISATION:

- Live electronics has a long tradition of improvised performance. In my approach it is closer to spontaneous compositional activity than live performance (Emmerson, 1994).
- Influenced by jazz and free improvisation techniques, I utilise motifs, phrases, and improvisation over predefined structures, whether improvising with live electronics or composing in the studio. The result of improvisation becomes my source material, acts as a blueprint for structure, or both.
- Often, I implement improvisation as a storytelling technique (and by extension, storytelling as an improvisational technique).[19]

INTERPRETATION:

- In acoustic (classical) music, there are different performance versions of a specific work. Different performers, thus different renditions, different instruments as well as places, rooms, concert halls or studios where the performance is being held offer different qualities in sonic experiences. Personal taste often dictates preference. Sound diffusion as the standard acousmatic works' performance practice allows for similar flexibility.
- Acousmatic works are not set in stone. We can go back to the studio at any point to revise and create a reinterpretation of our original idea.
- Ambiguity, as an inherent aspect of music, invites a multitude of interpretations. I welcome a performer's agency, individuality and

[19] See 2.1.4 Storytelling with sound.

rendition of my instructions during a recording session or a live electronics performance.

INTERACTION:[20]

Between:

- Performer and composer in the context of performance-composition[21]
- Performer and composition as established by the composer[22]
- Performer and the instrument or piece created with live-electronics or sound installation (the computer acts as a new instrument or as an extension to the current one)
- Performer or piece and audience[23]
- Performers

[20] According to Jordà, S. (2007) "'interaction' involves the existence of a mutual or reciprocal action or influence between two or more systems."

[21] The performer becomes the composer, and the composer becomes the performer; this creates a two-way relationship where these two roles affect each other and influence the outcome. As stated by Åse (2012): "the electronic manipulation of sound presents...a possibility for expanding, or even re-defining the voice as an instrument – and therefore also a vocalist's role in the musical interaction."

[22] In the form of guidelines or something more concrete, like sheet music.

[23] The audience can be a group of people in an auditorium or a single person, like a radio listener. I perceive three types of interaction between performer or piece and audience, active, passive and reactive engagement: The concepts of 'performer' and 'audience' can become fused and result in the 'participant' (active); the audience can become part of the composition (passive); or, the performer can make decisions based on the audience's reactions (reactive). While initially intended for *do cyborgs,* the reactive engagement has not been explored in this portfolio.

The above concepts have been explored in various degrees within my six compositions as follows:

Title	Interpretation	Improvisation	Interaction
voix céramique (ceramic voice)	Revisions Sound diffusion	Source material Structure blueprint	Performer and composer
libellule (dragonfly)	Revisions Sound diffusion	Structure blueprint	Performer and composer
laughing matter	Revisions Sound diffusion	Structure blueprint	Performer and composer Piece and audience
do cyborgs feel sad when they're lonely?	Adaptive audio (result of interactive choices)	Source material	Performer and instrument-piece Performer and composition Performer and audience
souffle de l'océan (breath of the ocean)	Adaptive audio (result of interactive choices) Performers' renditions of instructions	Source material Structure blueprint	Performer and composer Performers Performer and composition Performer and instrument-piece Performer and audience
mould	Performers' renditions of instructions	Source material Structure blueprint	Performer and composition Performers Performer and instrument

Table 5. Application of the 3 Is in my compositions

2.1.3 Vocal improvisation as a basis for composition

We live in Varèse's paradise.[24] We have technological means at our disposal that can transform almost any sound into anything we imagine. For this reason, I prefer the immediacy of working directly with sound and recording performers during improvisatory play, rather than writing traditionally notated music for acoustic instruments.

There are methods of musical creation where the boundaries of composition and improvisation are blended, even challenged, like real-time composition and comprovisation. Specifically, vocal improvisation can inform the compositional process as follows:

- It provides source material.
- It allows for quick sketching of ideas.
- It can be applied as a through-composing technique, the results of which can subsequently be revised and refined.
- By mimicking gestures characteristic of the language of electroacoustic practice (stereotypes), its result can act as a blueprint for transformations of other sound sources.
- When faced with writer's block, a composer can use the technique of micro-improvisations to come up with new ideas.
- Micro-improvisations can add embellishments to a composition, or become puzzle pieces that can be randomly arranged.

[24] Varèse famously said: "I dream of instruments obedient to my thought and which with their contribution of a whole new world of unsuspected sounds, will lend themselves to the exigencies of my inner rhythm." (Varèse & Wenchung, 1966)

- By combining it with play, especially role-playing with a strong focus on the narrative aspect, it can excite the imagination, provide inspiration, and enhance a performance.

2.1.4 Storytelling with sound: Worldbuilding & narrative aspects

Stories have always fascinated me. From a very young age, I began consuming stories in various mediums: books, graphic novels, films, television shows, and video games. I felt the urge to explore storytelling from a creator's perspective. However, I never felt as comfortable with words as I did with music and sounds. Electroacoustic music enabled me to explore narrative and worldbuilding[25] from the familiar mindset of a composer. Thus, I began exploring how I could tell a story using sounds.

Music (and more specifically, composition), being a temporal art form, can have a close relationship with narrative. Narrative in my compositional practice presupposes the existence of a setting, meaning the environment in which the piece unfolds. In my settings, I usually include information about the place and its surroundings, such as the physical location, real or imaginary, but often also about the time (day, night, future, past, fictional) and the weather (windy, rainy, calm). Thus, narrative is the way of telling the story, while worldbuilding is the creation of the world where the story takes place. I find it helpful to establish an immersive environment, even merely as a mental image, before I begin either improvising, composing, or comprovising.

[25] Worldbuilding (world-building) is a term borrowed from the fields of literary, film and game studies that refers to the process of creating a fictional world (Merriam-Webster, 2016; YourDictionary.com, n.d.).

To construct this imaginary world in my compositions, I borrow from the ideas of Landy, Wishart, Emmerson, Harrison, Truax, and Moore. Landy (1994) referred to "imaginary landscapes and abstract narratives" that can evoke "surrealistic and abstract images" as one factor that the listener can "hold on to" in an electroacoustic piece. Wishart (1996) redefined landscape as a "virtual acoustic space" that offers "new creative possibilities" with the implementation of "sonic architecture," now that, thanks to technology, composers and performers can control the acoustic space.[26] In 1998, Emmerson observed that "sound has the power to create its own visual response in humans (...) a sense of place, of aural landscape." Harrison (2000) noted that the manipulation of space "has the power to transport us - quite literally, at the speed of sound - into other places, other situations and even, because of its interactions with our personal memories and histories, other times. Ultimately, therefore, it can reach deep into the most fascinating space of all: our imagination."

Truax (2012) suggested that an aspect of the practice of soundscape composition can be the creation of virtual soundscapes that can invoke memories, metaphors, symbols, and even create "hyper-real" irrational worlds. Moore (2016) remarked that "this real/unreal/surreal intersection has been used by many composers as a means of transporting listeners between worlds."

[26] He also discussed positioning our sound-objects within this imaginary landscape in three combinations: as unreal objects within a real space, real objects within an unreal space, and even real objects within a real, but seemingly foreign space. The latter he compared to the surrealist painters' technique. I reckon we could achieve similar sound-images by putting unreal objects within unreal spaces, since unreal sounds still carry the potential of meaning due to connotations, which can create varied and personal interpretations.

According to Roine (2016), worldbuilding is “a distinct practice of emphasising ideas and enabling different uses of imagination to come together” and “a way of turning abstract and general thought experiments (or ideas) into a particular and therefore communicable form.” On that account, I employ worldbuilding for two reasons:

- To establish an imaginary space that is also part of a constructed world and features sound-objects, images and textures with distinct qualities and behaviour
- To communicate this construct to the performers with whom I collaborate

In my experience, I find that this immersion combined with improvisation has the potential to result in a fascinating and noteworthy performance; the performers themselves find the process enjoyable.

It is not an essential requirement of my approach to convey an accurate impression of the constructed world to the audience. The meaning that I, the composer, have encoded within my creative work will be decoded and interpreted by each listener by filtering through, most likely, a different (and diverse) collection of experiences and cultural backgrounds. Thus, I am open to an alternative reception and reading from what I intended, although a convergence of views is always satisfying.

After constructing the imaginary world, I transfer my sound-characters into it and let them interact with it and with each other. Moore and Moore (2012) noted that “in addition to setting the scene, laying out a number of characters and injecting energy into the system, composition becomes an animation

process, attributing behaviours to sounds so that they react in potentially fruitful and musical ways with each other and with their landscape."

The main character/sound event can comprise various micro-events or sound units (Blackburn, 2009) of the same or similar source material with transformations that do not differentiate it too much from its predetermined original state. This way, as listeners, we can maintain our focus and hold on to it while other sound events unfold around it. Furthermore, re-contextualisation or re-purposing of sonic elements (sound objects and sound events) can act as a worldbuilding bridge, providing thematic cohesion between sections within a single piece, as well as among different compositions.

What gives life to the sound-characters is sonic symbolism, which can be subjective and personal, but may also carry universal appeal. Meaning is not provided through words, as in literature or film, but via sound objects evoking certain images or symbols, and by using specific sound events for their symbolic significance.

I offer some examples from my pieces below:

- The 'wing-flutter' sound object representing the dragonfly in *libellule*
- The raw laughing sounds in *laughing matter*, where each one stands for a different character
- The 'double reverse reverb' drone-creating technique I utilise in several pieces (as a metaphor for the lemniscate ∞, the infinity symbol)
- Swing-squeak-like harmonics, as in *libellule*, as a sound-image of the swing or the cradle
- A metaphor of the 'light' and 'enlightenment' (e.g. in *mould*)

- Grainy noise textures that may evoke a sensation similar to touching a velvety textile, as a metaphor for comfort

Improvisation can be seen as a form of play. Chase (2007) considers "improvisation as a compositional device for producing a finished piece" to be a subcategory of "play-centred improvisation." He likens this activity to the methods used by filmmakers such as Robert Altman and Mike Leigh, who urged actors to be spontaneous and apply improvisation on set, often using outlines rather than scripts. Vocal improvisation facilitates the creation of both the sound-characters and the sonic-world; this happens either in solo or group situations. An element of play permeates the process, similar to a role-playing game. As the composer, I may take on the role of the game master; the performers become the players. This method presupposes familiarity with the context and material with which we would be working. We establish a setting, a plot, characters (including their arcs) and scenes. The composer-performer interplay and communication become vital elements of both the worldbuilding and the compositional framework. Next comes the process of filtering the results (often recorded) of the interaction and deciding what works well and what does not, and selecting the most suitable outcomes to use in a piece.

Acousmatic music presents a composer with the opportunity to create musical narratives based on the following:

- Surrealism concepts, such as dream sequences (*laughing matter*)
- Existential fears (*do cyborgs*)
- Real-life experiences transformed and transcended into sonic sculpture (*voix céramique*)

Sometimes narrative pre-exists and gives rise to improvisation. For example, in *voix céramique*, I had a clear idea of a story I wanted to narrate: a specific life experience was the focal point. Other times we begin with improvisation, and this invokes the narrative. For example, in *do cyborgs*, I inserted a long reverb on the recording track and asked the vocalist to mimic wind sounds and produce long sustained pitches, which he approached with a faint recollection of Byzantine chant. Afterwards, to record something more dynamic, I reduced the reverb decay time and asked him to use mumbling and whispering sounds over tongue twister texts, but do so quickly and incoherently. He interpreted my suggestion by producing raving, delirious talk. The result became the focal point of the composition.

This technique can be considered to resemble certain types of theatre improvisation. It does not require singing notes from a finished score, nor scat singing over chord progressions, nor practising extended techniques, though it may involve the latter two and especially the last one. It is related to play, where the performers embody a role not as actors but as singers, as voices, and perform according to an imaginary setting and a narrative that brings them to a particular state of mind.

Overall narrative structure

The compositions that comprise this portfolio belong thematically to an overarching story (like music tracks in an instrumental concept album) and are narratively connected. Below I provide a synopsis: Like a hero's journey, the narrative begins with a call to adventure.

The hero is childlike and innocent, connected with nature and free-spirited *(*libellule*)*.

Suddenly, opposing forces emerge, bringing forth trials and obstacles, and creating a need for gaining strength, balance and maturity *(mould)*.

A transformation begins, but the forces grow stronger *(laughing matter)*.

The hero 'dies' and is reborn *(voix céramique)*.

The hero, faced with an existential question and a choice between hope or dread, serenity or despair *(do cyborgs feel sad when they're lonely?)*, will either embrace infinity and eternity or be swallowed by them *(souffle de l'océan)*.

2.1.5 Aesthetics of Sound

The analysis of my creative process would be incomplete if I did not refer to my sonic material selection methods.[27] The selection process is based on subjective taste in sonic qualities. It results in the creation of a palette of sounds, which constitutes my personal vocabulary.

Plink & Grain: A model for categorising sounds

There exist several methods of analysing music and the listening experience post-creation, the most prominent being Typo-Morphology (Schaeffer, 1966), Spectromorphology (Smalley, 1986), and the Language Grid (Emmerson, 1986). Blackburn (2009) has proposed a method of applying spectromorphological concepts for the creation of sound objects, events, and, by extension, whole sections of music. These tools have been immensely helpful to me. However, I found myself often overwhelmed by the number and complexity of some definitions. Therefore, I sought a simplified system that would facilitate my workflow, and specifically the selection process. My compositional practice being intuitive-based, I felt confident knowing these (rational-based) tools

[27] I am referring not only to the raw material but also to audio processing results.

exist if I need them. However, I could also rely upon a framework characterised by the simplicity, usability, and usefulness of its terms, and its capacity to depict my working process.

I started by analysing my favourite electronic music (mostly ambient, IDM, glitch, post-rock and similar genres) and later electroacoustic compositions, to distinguish the aspects that make me prefer one sound or piece of music over another. My preference for certain sounds can perhaps be explained as a form of auditory-tactile synaesthesia.[28] By taking that into account, I came up with a straightforward system to analyse and categorise sounds, and by extension, musical compositions and sound art, that I find aesthetically pleasing.

[28] Synaesthesia (from the Greek words σύν=with + αἴσθησις=sensation) is a perceptual phenomenon where information that stimulates one sense triggers a neurological response in another. The person who experiences auditory-tactile synaesthesia upon hearing sound can feel tactile sensations anywhere on the body. They can vary from pleasurable to discomforting, such as tingling, pressure, tension, or having the perception of touching certain textures. According to Ro, Ellmore, & Beauchamp (2013), the "genetically and evolutionary common origins for hearing and touch may also be why our senses are so well integrated with one another and why certain sounds, such as nails screeching down a chalkboard, may evoke strong bodily sensations."

I use a four-factor-based principle, to analyse the timbre of sounds and place it on a grid. The four factors are:

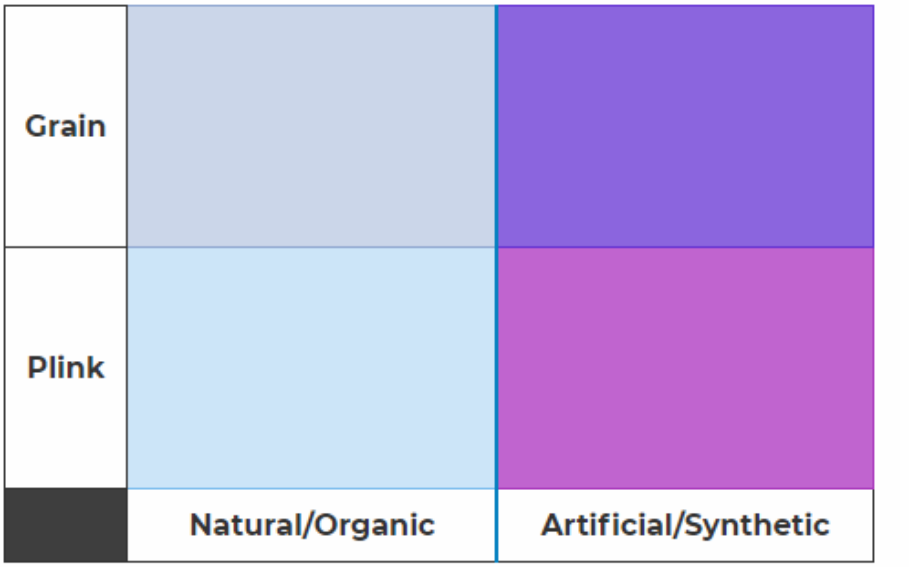

Figure 2. The Plink & Grain grid

Those factors are arranged on a four-tile grid, and a sound falls somewhere on that grid, based on which of these sonic qualities are most prevalent.

Plink: According to Lexico.com (2020), the word “plink” as a noun means “a short, sharp, metallic or ringing sound.” Plink can be either harmonic or inharmonic (tiny bell sounds), organic or synthetic. For example, violin pizzicato sounds (real or sampled) are organic plink, whereas arpeggios using a short Moog synthesiser sound are synthetic plink.

Grain: We can have a scale from sounds lacking grain, being very smooth and ‘shiny,’ very ‘clear,’ to sounds having a grainy, almost ‘uneven’ quality, like tiny

acoustic particles. They are more 'noisy'[29] and 'rough' but can also be more pleasing to the ear. They can also be either organic or synthetic.

In short, Plink and Grain describe the quality of the spectrum; what is more prevalent, the harmonics or the noise that exists between them.

Sounds can have neither plink nor grain quality (e.g. sounds that are very 'clear' or 'glassy' and at the same time continuous and prolonged). These are not very pleasing to my ears; I avoid and use them sparingly, or as part of the background, blended with grain.

Organic/Natural/Real: Sounds real or sampled that remind us of 'natural' real-life sounds. We can have plink (pizzicato strings, metallophones) and grain (arco strings, woodwinds) organic sounds. Anything environmental is organic; so is free-form material and natural shapes.

Synthetic/Artificial/Manufactured: Sounds with a more electronic, 'space' quality (often, the result of simple FM synthesis programming). They can be phaser-like, manipulated more unnaturally, mechanically designed. They sound processed, futuristic.

However, while electronic-made sounds can be synthetic in quality, depending on how intricately they are manufactured and their level of complexity, they can sound organic. In general, the amount of complexity,

[29] Smalley (1997) defines noise as "qualitative – non-pitched roughness, granularity or grit." He also adds the following that I find particularly interesting: "Extrinsically we associate granular noise with the sea, with water textures, wind, static interference, granular friction between rubbed and scraped materials, fracturing materials (e.g. stone), unvoiced vocal consonants, and certain types of breathing and fluid congestion. Therefore a wide range of source bonding is involved, ranging from human utterance, to play with objects, to the environment. This is a rich reservoir for electroacoustic exploration. Granular noise is textured impulses, and need not be dominant in a spectromorphology. For example, it can be a decorative or subordinate strand or trace, or a pocket of added intensity."

variance (variability), is what influences our perception of natural versus synthetic.

Electronic organs (theremin, synthesisers) simulate the natural sound production and envelope (ADSR), but they can also create (thanks to electricity) 'unnatural' envelopes, such as a plucking onset with an endless sustain.

Sources of sound emission - an unpolished categorisation

A second method I use to classify sounds is by focusing on the fundamental way of sound production, borrowing terms from acoustics, phonetics, and singing voice research.

In my works, I primarily use the sound of the human voice. As in phonetics, I separate vocal sounds into vowels and consonants, voiced and voiceless phonations (such as several consonants and the glottal stop). I complement human-produced vocalisations with sounds produced by other creatures of nature, such as birds (via aspiration) and insects (via stridulation[30]). Thus, I created a sonic palette with 'airflow-generated' and 'friction-generated' sounds, and, as a contrast, sounds with a distinct percussive quality ('impact-generated').[31] In 'airflow-generated' sounds, I include wind instruments, especially woodwinds, as they are close in sonic quality to the human voice.

[30] According to Dumortier (as cited in Tschuch & Brothers, 1999) "stridulation is defined as sound emission by friction of two specialised surfaces against one another."

[31] The terms 'from breath,' 'from friction' and 'from impact' may alternatively be used. 'Impact' is defined as a forceful contact, a collision of one object against another. Percussive consonants, although human-made, belong in this category, as they are produced without the airstream mechanism, but by the striking of lips, teeth or tongue in various combinations.

I associate the spectrum and envelope of the complementary sounds to the three types of onsets in singing technique: simultaneous, aspirate, and glottal (Kayes, 2015). The Hornbostel-Sachs classification system of musical instruments (von Hornbostel & Sachs, 1961) uses the terms friction (as I do with friction-generated) to differentiate between types of idiophones and membranophones, and has a category for aerophones (airflow-generated). Struck idiophones and membranophones as classifications are also similar to my view of impact-generated sounds.

The element of air is featured prominently in my compositions. When I created their soundscapes, I focused on sounds produced by the wind blowing, either through leaves, across the water creating waves, or other mediums such as windows and ceramic tubes. I also used vocal sounds that mimic the sound of the wind blowing, and wind sounds that resemble a voice, naturally and via sonic manipulation.

ASMR

According to Barratt and Davis (2015), "Autonomous Sensory Meridian Response (ASMR) is a previously unstudied sensory phenomenon, in which individuals experience a tingling, static-like sensation across the scalp, back of the neck and at times further areas in response to specific triggering audio and visual stimuli."

I have been experiencing this phenomenon since childhood. This perception has often been explained as a form of auditory-tactile synaesthesia.

I often explore and work with sounds that trigger the ASMR response, which is a tingling sensation accompanied by euphoria and calmness, upon hearing certain sounds. These can be airflow-generated (vocally, such as whispers)

friction-generated (scratching, rubbing, crunching, all softly) or impact-generated (soft tapping).

Possible usage and limits of the above models

The intention of these models is not to exhaust and cover all possible sonic properties, but to offer a basic foundational blueprint that other composers, as well as I, can adjust and develop. It offers potential for expanding the personal vocabulary when taste naturally evolves and can act as a framework during a composer's selection process. As an example, we could perhaps extend the Plink and Grain grid to include and differentiate between sounds produced naturally, mechanically and electrically. Likewise, plucked sounds may be added to the sound emission categorisation.

2.2 Creative Process

My creative process is divided into three distinct stages: the idea conception, the production and the evaluation - revision.

2.2.1 Idea conception

I often begin with a specific, extra-musical idea, a concept or a theme already formed in my mind. It can be an image, a word or more often a story. Sometimes it is a title or a specific sound. I then explore sounds and their combinations that fit or evoke the particular atmosphere I intend to create.

The first step, the inception of an idea raises the question: How does an idea form within the mind? Inspiration is a primary aspect, and I mention some of my sources of inspiration in section 1.5 Recurring concepts. The integration of habits, aspirations and themes I find of interest offer material for brainstorming sessions. Often, identifying through pattern recognition the common thread or elements that define the results of these sessions, is what provides me with the most interesting ideas to work with. The next step is the implementation of these ideas, a synthesis or fusion of often seemingly unrelated and disparate elements and concepts into one overarching theme.

2.2.2 Production

At the stage of production, I use a combination of rational and intuitive processes.[32]

The first step of the production is to choose the material that resonates more closely with the pre-selected theme, according to the criteria I analysed in

[32] Dingwall studies the two types of compositional processes in her 2008 thesis.

section 2.1.5 Aesthetics of sound. I work mostly with samples and less often with sound synthesis techniques. I either record or choose from my library of recordings. If I do not have the opportunity to record a specific sound myself, I visit websites like freesounds.org, a database of audio recordings under Creative Commons licenses.

Some basic editing and cleaning follows the selection process, and often further processing with sound editing software. I explore both conventional and unconventional[33] ways of using the various digital audio processing tools at my disposal.

My approach is mainly non-destructive, and I usually only clean up my sounds and do most of the processing within a DAW. However, I find the use of other software (such as iZotope RX) very creative. In these cases, I keep the multiple versions of sounds generated during or as a result of each processing step. I often use several of these outcomes.

After I choose my material and perhaps process the sounds with a sound editor, I proceed to sculpt them within a DAW, using various effects and other sonic manipulations, such as automation; all this happens with the context of my objective under consideration. I play with sounds using improvisation, experimenting with various processing tools, methods and plug-ins, choosing from an array of results, and, after laying down a draft, I focus more on the details and start refining them.

[33] Examples of unconventional ways of applying audio effects are, e.g. using a reverb plug-in not for creating the sense of space but for designing drones, or using a de-noise module not for removing the noise from a recording but for enhancing certain aspects of the audio signal and keeping only the 'errors,' the unwanted artefacts (as in glitch music).

An essential aspect of the production stage, which is closely related to my worldbuilding approach, is the question of how I can begin with the macro and then move by zooming-in to the micro. Firstly, I start with the background, establishing the space (texture), and later I create the foreground, by focusing on the details, gestural objects, interactivity, relationships between them, causality, etc. Also, at that point, I begin to become aware of the relationship and interaction between background and foreground.

Structural elements

The following are the main components that assist me in shaping my compositions:

- I use a pre-established set of rules for determining the piece's and each section's approximate length before starting to compose. My motivation in establishing those rules is to find a balance between managing the more and more shortened attention span of the audience as well as keeping spaces of light activity, slow pacing, and quietness that satisfy my artistic vision, imagination and curiosity.
- I create a sonic environment by exploring spatialisation. I place my sounds in space focusing on achieving interplay and balance between the background (the scenery) and the foreground (the action). The background can be an "intact/raw" sound environment, as in the finale of *voix céramique* or a "devised/coined" sonic environment built with a variety of source material, as in *libellule*. To establish the foreground I focus on a single sound source or object as the 'protagonist/soloist,' as in the first section of *laughing matter* or establish a counterpoint of

more than one (up to around four[34]), as in the 'deformed' canon in *souffle de l'océan*.

- I select sounds for their textural properties as well as their connotation potential, even in my most abstract works. I use Smalley's structural functions (1986) to create my sound events (Blackburn, 2009) and let them unfold through time and space via narrative techniques I borrow from film, as in the practice of "cinema for the ear,"[35] and from video games (particularly in my non-linear compositions).
- I employ improvisation in the following ways:
    - Vocal improvisation provides me with source material as well as structural blueprints. The combination of and interaction between vocal improvisation and thematic narrative - such as a pre-existing concept or an idea of extra-musical origin - dictates the form.
    - Improvisation as a through-composing technique allows me to sketch a draft narrative[36] through automatism (a surrealist technique that constitutes an intuitive rather than rational and

[34] Keeping in mind the "something to hold on to" factor (Landy, 1994), and aiming to maintain the listener's interest without overwhelming them with too much sonic information.

[35] Normandeau (1993) refers to a compositional approach in acousmatic music that he himself utilises, which shares similarities with the language of the cinematographic art, as "cinema for the ear" ("cinéma pour l'oreille"). In this approach, embraced by the Montréal school, "the meaning is as important as the sound," one can use sounds to tell a story or at the very least "generate meaning in the listeners' imagination" (Normandeau, 2008).

[36] For example, brief vocal improvisations act as structural building blocks, featuring the element of mimesis of the electroacoustic gestural and textural language strongly (like beat-boxing imitates the sound of drum beats).

systematic decision-making process) and to apply processing effects “ad libitum,” as during a live electronics performance.

- Improvisation as spontaneous creation with or without some form of preparation[37] grants the choice of interpretation to the performer and allows me to incorporate chance elements in the creative process itself.

2.2.3 Evaluation - revision

After I have completed a composition’s first draft, I go through a period of two stages: evaluation and revision. The evaluation stage includes two processes:

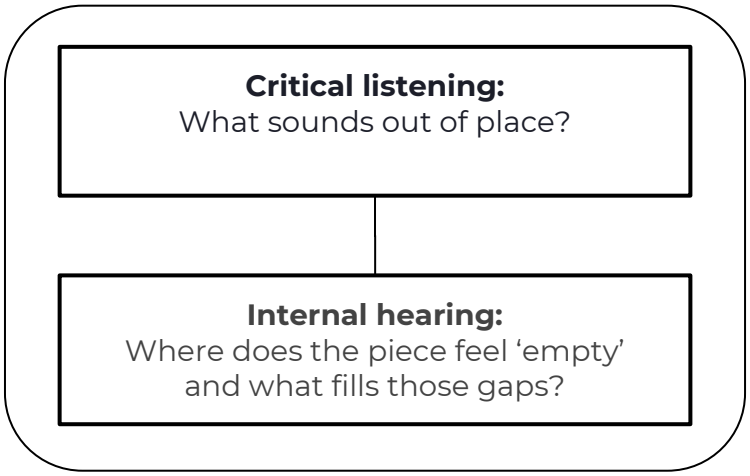

Figure 3. Critical listening and Internal hearing

During the process of critical listening, which can take up to months on particular creations, I listen to the draft attentively and actively as well as peripherally. The peripheral mode is one I would associate closer to Schaeffer’s “ouïr mode,”[38] where I do not focus on or pay special attention to the piece. I merely perceive, receive the sounds as they appear. This way if something

[37] I discuss forms of preparation as planning and collaboration in the analysis of *mould*, section 3.2.
[38] The Four Listening Modes (Schaeffer et al., 2017).

does negatively capture my attention, it means I should remove or change it. The active mode resembles somewhat Schaeffer's "entendre mode," where I try to deconstruct the aspects of sound, without relating them to their physical sources (reduced listening), but consciously noticing and identifying things I do not particularly like.

The process of internal hearing is something that comes to me intuitively since I was a child. Occasionally upon listening to a piece of music, my imagination fills perceived gaps with melodies, sounds, instrumentation that do not exist in the composition already. I have nurtured this ability and have enabled myself to call upon it willingly. I use this process during the active mode, sometimes simultaneously with critical listening, other times afterwards.

When the evaluation stage is concluded, the revision stage begins. During this stage, I apply what critical listening and internal hearing have urged me to. A single piece can go through one, or multiple cycles of evaluation-revision.

In the end, I submit to the realisation expressed by the adage that "a work of art is never finished, merely abandoned."[39]

[39] Origin unknown, though attributed to many.

3. Commentary on Portfolio Works

3.1 *libellule (dragonfly)*

libellule is an acousmatic stereo piece, composed of various 'crunchy' sounds and based structurally upon vocal improvisation.

Conception

Before I began composing this piece, my appreciation for 'crunchy' sounds had recently been rekindled by a newfound interest in sounds that trigger ASMR[40].

According to Merriam-Webster (2020), the word 'crunch' means: "1. to chew or press with a crushing noise; 2. to make one's way with a crushing noise." I was curious to see what I could create by using these two definitions as suggestions for choosing my primary sonic material as well as guiding the narrative structure. Consequently, I endeavoured to record sounds of chewing and crunching various objects that can produce sounds of this quality. Afterwards, I intended to use these sounds to create a narrative where the 'main character/sound event' would travel through a sonic environment interacting with it and producing crushing noises.

At first, I used the title *Crunchy*, a hint at the texture of the source material. Later, I changed it to *Insect*, implying the sound object - the main character of the narrative that makes its way throughout a journey travelling and interacting with an artificially created sonic environment. I ended up choosing

[40] See section 2.1.5 Aesthetics of Sound, ASMR.

the title *libellule (dragonfly)*, as a reference to the beautiful insect with robust, transparent wings, as a dedication to two of my best friends who admire it.

The gestures of flying and wing flutter, so important to this composition, were first introduced to me in two acousmatic compositions by Apostolos Loufopoulos: *Icarus* (2006) and *Bee* (2010). In *libellule* the fundamental sound that is presented as the very first sound event is a wing flutter that represents the main character of the flying insect. The various transformations that occur throughout are evolutions of this fluttering sound-shape.

Form

The structure of this piece is based on multiple mini vocal improvisations that act as guidelines, as a blueprint, for creating the textures, gestures, motion and growth of the sound events. The recordings of these improvisations were laid out on audio tracks in a DAW and arranged intuitively, but in a way that made narrative sense: beginning with low spectral and spatial density, followed by a climax, release, dissipation, and transition to a new cycle. When this process was finished, I began sculpting the 'crunchy' sounds to match the blueprint I had outlined with the improvisations. When designing the motion and growth of the composition, I focused on subtly influencing the cause and effect between movement and interactions, while maintaining a level of spontaneity and randomness. I informed this structure with revisions. As a third step, improvised experimentation combined with additional vocal improvisation offered further material and structural suggestions. As a result of this process, the piece is through-composed and has five sections (quinary form) with no structural similarities among them. The structural cohesion is retained with the help of rhythmic motifs (such as the wing flutter sound

object) that are repeated in variations (spectral transformations) throughout the composition.

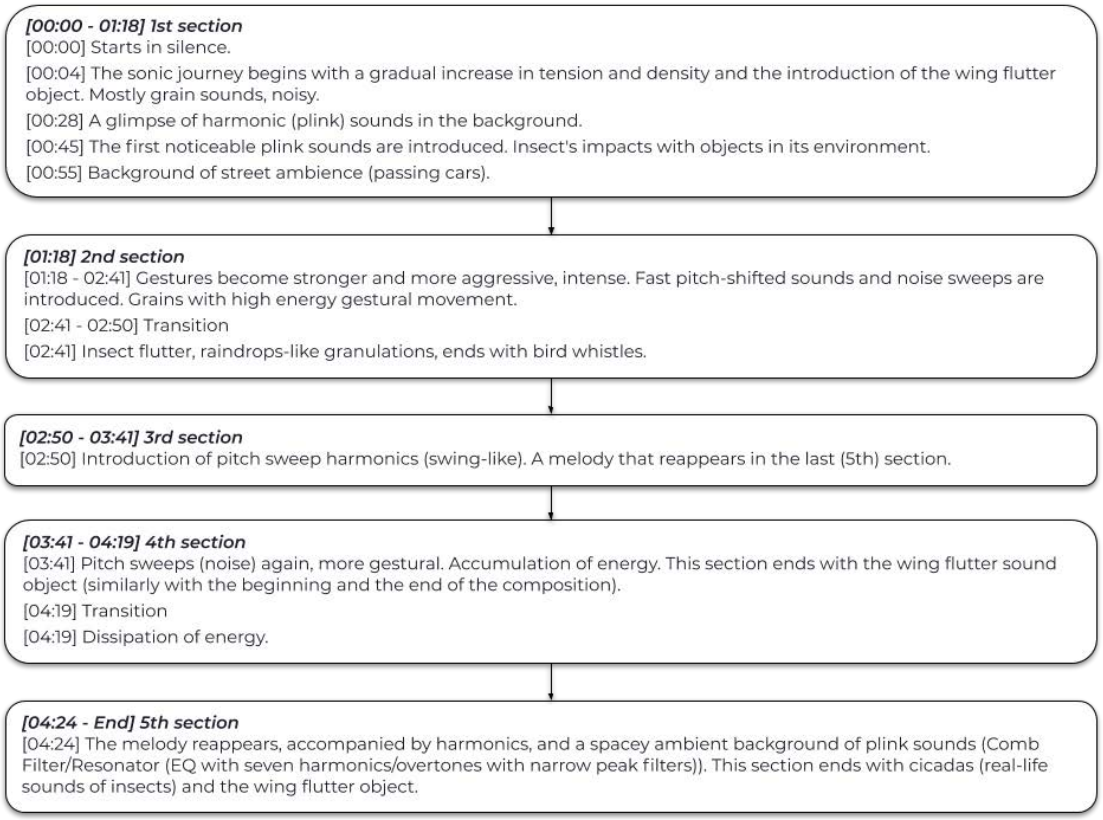

Figure 4. Structure outline of *libellule (dragonfly)*

Narrative

The piece follows the tradition of "cinema for the ear."[41] It aims to sonically describe the journey of an insect. It begins and ends in a cycle, with the insect-wing-flutter as the primary sound unit. Throughout its travels, the insect interacts with its environment by hitting various objects. We hear the sonic result of those impacts. While traversing through it, the background

[41] See footnote 34, section 2.2.2 Production, p, 33.

environment (recordings of street sounds and cicadas), changes from narrow to wide and back.

Sonic Palette

The sounds (source material) I used in this composition are various objects having a distinctive 'crunchy' sound quality, and a grainy, noisy, predominantly high-pitched spectrum. Associatively, they remind us of the sounds insects make. My primary areas of focus while creating this piece were the following:

- Exploration of crunchy sounds and their in-between relationships
- Cause and effect, the causality of gestures and textures
- Spectral transformations from one sound object to the next

In this piece, the vocal improvisation acts not as source material (a few sounds of mouth clicks being the only exception) but as a map.

In terms of spectrum, I blended and layered sounds with impact gestures and plink quality with sounds of noisy grain texture. I explored the interplay between grainy and plink sounds both by juxtaposition (montage) and superimposition (layering).

Studio recordings: sounds produced by human interaction with objects (impact-produced)	Field recordings: environmental sounds
• Rusks • Tinfoil • Paper and plastic bags • Plastic water bottles • Lettuce • Vocal mouth clicks (from iZotope RX's process mouth de-click, processed afterwards with 'deconstruct,' variable pitch (Wobble down preset) and time (Glitches preset))	• Industrial sounds (passing cars) • Cicadas (summer in the city)

Table 6. Sound sources

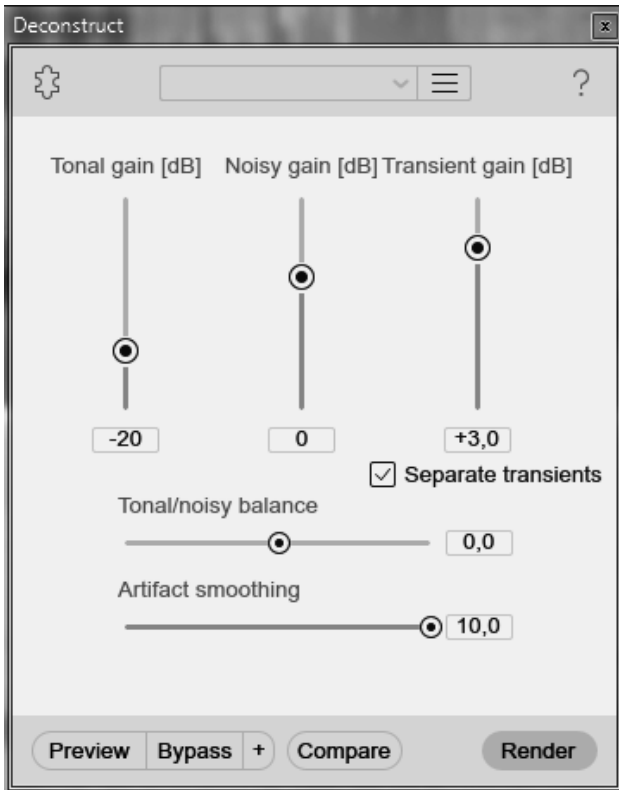

Figure 5. iZotope Rx Deconstruct settings used in designing sounds for *libellule (dragonfly)*

3.2 *mould*

I have been a founding member of the live electronics duo InGrains,[42] since 2011. We use improvisation as the primary tool in our performances. *mould* was conceived as a sketch for a live electronics performance of InGrains that took place at Polytechno on December 8, 2013, during the Electroacoustic Music Festival in Corfu. The piece is the result of a collaborative compositional process.

Conception

This piece was born from a simple idea I had, to base a whole composition upon the multiple meanings of the single word 'mould.' It features poetry, written by Manuela Gallina, based on this simple concept. As a noun, 'mould' can mean "a hollow container used to give shape to molten or hot liquid material when it cools and hardens" (Lexico.com, 2020, Definition 1) as well as "a furry growth of minute fungi occurring typically in moist warm conditions, especially on food or other organic matter" (Lexico.com, 2020, Definition 2). As a verb, it can mean to conjure up, to shape, to form. The hollow container refers to something artificial, human-made. The fungal growth is a part of nature. During the performance of the piece, while the improvisation evolves and we give shape to nature and machine sounds, a mysterious and dark sonic world is being formed, highlighting the juxtaposition of nature-machine, natural-artificial, authentic-elaborate.

Manuela Gallina, after I familiarised her with the project, penned a poem akin to our topic. She agreed to write a short poem choosing words based on their

[42] For further details about InGrains, see footnote 9, section 1.1 Background, p. 3.

sonic properties (phonetically). Her research at the time was on multilingual poetry, so I suggested she use two or three languages. She chose English, Italian and Greek. The performance was in turn based on the poem, using its words as starting blocks to create sonic images.

Using Improvisation and Narrative to facilitate and enrich the Music Composition process

In the next paragraphs, I elaborate on the creative process of improvisation, and specifically vocal improvisation, during the sketching of this composition. I drafted this piece in collaboration with Iliana Karaliga, with improvisation in its core. As InGrains, we use prepared improvisation,[43] a process extending on Jazz and free improvisation techniques that we had the opportunity to familiarise ourselves with during our Ionian University studies. During our performances, we utilise a technical setup of electronic devices such as laptops, microphones and controllers along with digital tools such as DAWs and plug-ins. We do not use live coding.

There are two main key points in our prepared improvisation: It requires **planning** and **collaboration**.

During the stage of planning, we decide upon the thematic elements, the sonic material, the overall structure, the transitional points and the digital processing we will apply during our performance. This list is hierarchical:

[43] Spigins (2017) offers a comprehensive definition of the term "prepared improvisation" as it applies in the context of musical education. I found in my experience that it applies equally well in the context of improvised music created and performed by professional musicians in collaboration. The term also brings in mind John Cage's prepared piano pieces, and we have created a live-electronics composition titled *Pianody* that features recordings of prepared piano sounds, as a tribute to his work.

- The thematic elements indicate what sonic material we will use.
- The theme and sounds inform and guide the structure.
- The structure specifies where the transitional points will be.
- These elements dictate the processing and sonic transformations to use during a performance and what to prepare beforehand.

During the stage of planning, we also decide upon what degree of interaction we will have during a live performance and how much freedom each one of the participants will have (and how meaningful these degrees of freedom will be).

For collaboration and coordination during the performance, we use non-verbal communication processes:

- Active listening (observing our co-performers and anticipating feedback)
- Responding to their actions (a process that originates from thought and requires pre-planning)
- Reacting to their actions (a quick, sudden, more intuitive-based process that takes spontaneous inspiration into account)

Form

We created a rough sketch with predefined components. We separated the piece into sections, and each had a core thematic concept. For the live performance, we used Ableton Live to arrange our sounds into tracks, and create groups of plug-ins to facilitate real-time sound sculpting. Ableton Live's clip feature allowed us to arrange our sounds both vertically and horizontally. We used the vertical arrangement as a timeline, to create sections of sound clips that we would trigger simultaneously, and the horizontal to create

groups of live processing that would be shared among different sound clips. We defined clear points of departure and resolution (that may include transitions), in the form of aural cues.

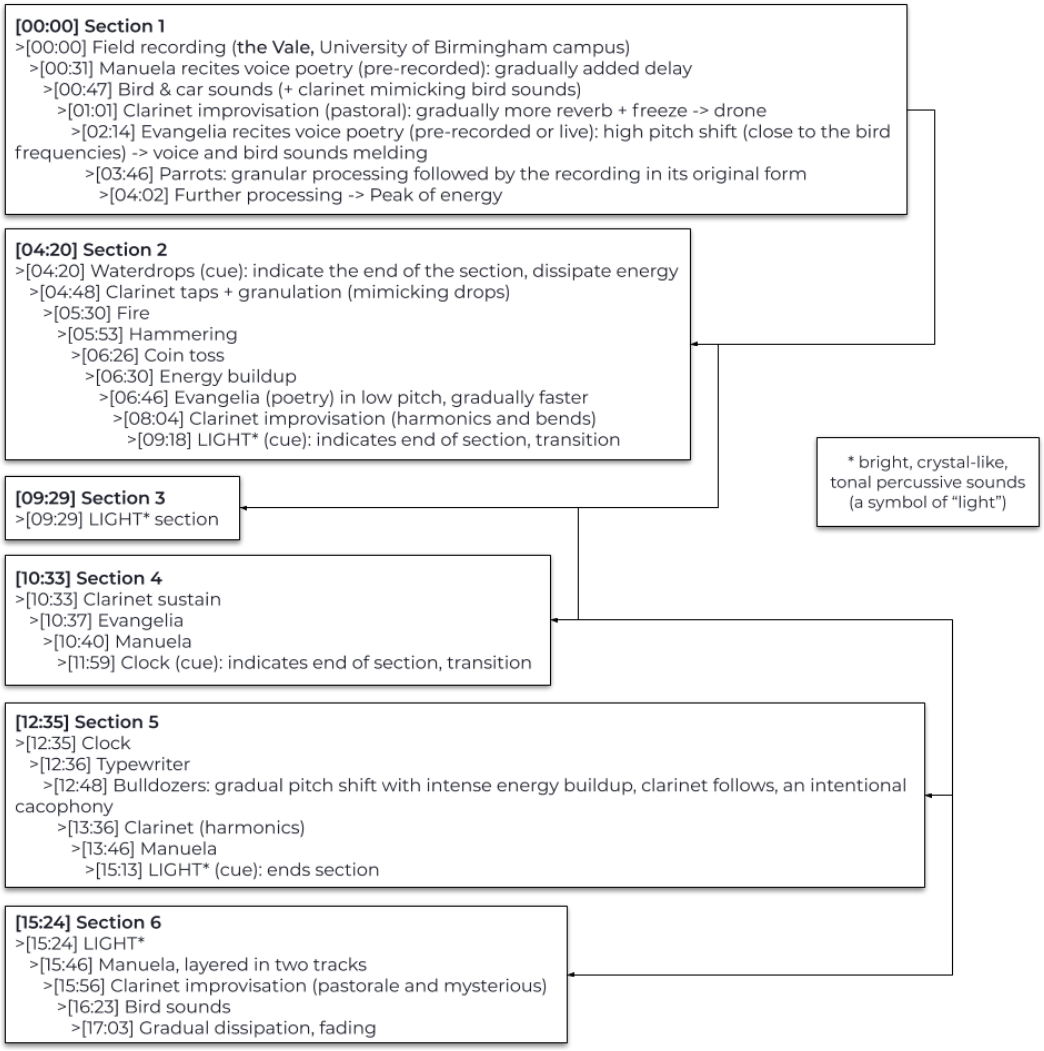

Figure 6. Structure outline of *mould*

Narrative

In *mould*, the calmness of nature gives way to the cacophony of the machine. However, with the help of the 'light,'[44] it subsides to let serenity and peace

[44] The subject of 'enlightenment' as it belongs to the existential cycle is a recurrent theme in my work and is listed in section 1.5 Recurring concepts.

retake prominent places after the diverse elements have learned to coexist in balance. The descriptive nature of the extra-musical theme of the composition supplied us with a clear understanding of its narrative. We use narrative in a non-traditional sense, so the piece is not programmatic, nor does it follow a conventional storytelling path. The progression of the composition is that of a non-linear, fragmented narrative, but it retains thematic consistency.

Manuela Gallina (personal communication, November 28, 2013) describes the content of the poem as follows:

> I wanted to see if I could tell a story (more or less) by using only words rather than sentences.
> The first stanza is about deforestation (technology over nature).
> The second stanza in Italian is about the evolution of man from Adam and Paradise, to discovering fire, the wheel, to grain, to money, to the rich and the slaves, to the starvation of the poor. (So again, we have technology over nature and the consequences this has over humankind).
> The third stanza is about a tsunami taking an entire town away; this is the revenge of nature against technology.
> The fourth stanza is about the power of nature in creating life and light out of a single seed that becomes fruit that becomes wood again, so again something positive about nature.
> The last two stanzas are about humankind as the main focus and technology and nature as two ways of managing day-to-day activities and living one's life.
> The fifth stanza is like Chaplin in Modern Times, with the arms imitating a machine while moulding steel (technology taking possession of humankind).
> The last stanza is about the job being given up, to get a blue mind and a green mould, as if to say two elements of nature. Mould (to play with the concept we have from before) in this case is the woods, and blue is both sky and sea, some outdoor situation in general and metaphorically as a state of mind. In this stanza, the final verse is fundamental, as the former technological night dream, which was so blind, blew (up), and the 'I,' the 'Self,' regains meaning as a creature of nature.

Interaction

The interaction between the performers is an important element of this composition. A key question we posed during its conception was how each of us would respond to the others' decisions or improvisation. The following are the most critical components that influence the outcome of the improvisation:

- Emphasising the interactive relationship and interplay between performers and the significance of developing trust
- Employing an intuitive decision-making approach
- Adhering to a model of 'build-up towards peak' - dissipation of energy for creating structures in real-time
- Staying alert for feedback, listening for sound elements that can act as triggers for other sound events, in a cause-and-effect or call-and-response method
- Noting the importance of clearly predefining the transitional points (as sonic elements/cues)

Sonic Palette

The sounds used are recordings of nature, machines, the voices of Gallina and myself (reciting), and a clarinet (live performance).

The only instruction I gave Gallina was to record an improvised narration of her poem, using soft utterances (such as whispering), as well as louder and more intense ones (like being in agony or out of breath). She based the rhythm of the poem on a simple four-beat measure, 1-2-3-4, using short, one or two-syllable words (Gallina, 2013).

In our improvisation, we play with multiple rhythmic and pitch elements by

- Increasing/decreasing their rhythmic density
- Raising/lowering their pitch

The vocal fragments with applied pitch shift and slow-to-fast or fast-to-slow pacing changes create a variety of rhythmic patterns mimicking those of the singing of birds. The 'machine' sounds feature similar rhythmic patterns.

Alexis Pogrevnois is the clarinettist who performs live during the recording of this improvisation. He had a clear picture of the narrative and cues we would be using. His mandate was to enrich the piece with textural and gestural elements in service of the narrative. Within this framework, he was otherwise free to improvise. Although he descends from Thrace, Greece, he has an interest in folk music from the whole country as well as the Balkans, and these diverse influences informed his performance. During his pastoral improvisations, he approximates the intervallic (pentatonic) and stylistic language of the traditional music of Epirus (Greece) combined with folk lament and shepherd's songs elements. As a classically trained musician, Pogrevnois is familiar with the extended techniques of the clarinet, so we asked him to perform a variety of them in specified sections of the improvisation. He used multiphonics, key clicks, air notes, and slap tongue.

3.3 *laughing matter*

laughing matter is composed for pre-recorded sound and optional spontaneous audience participation.[45]

Conception

The inspiration for the creation of this composition came to me one afternoon while strolling the streets of Corfu, the town of the Greek island where I spent my undergraduate years. The sudden spontaneity of male laughter sounding out of nowhere, echoing around the park near the seaport, and the amusement it evoked, gave me the idea to create a piece of sound art, composed primarily of a variety of laughing sounds.

Form

The piece comprises three distinct sections (ABC), with transition points between them and a clear narrative concept. Section A is separated into A, and its variation A'. So the overall structure is AA'BC.

[45] I thought of experimenting with the possibility of audience participation: Listeners might react upon hearing the waves of laughter by bursting into laughter themselves, or at the very least, by giggling shyly in the dark. As the piece remains currently unperformed, the results of this (future) experiment remain to be seen.

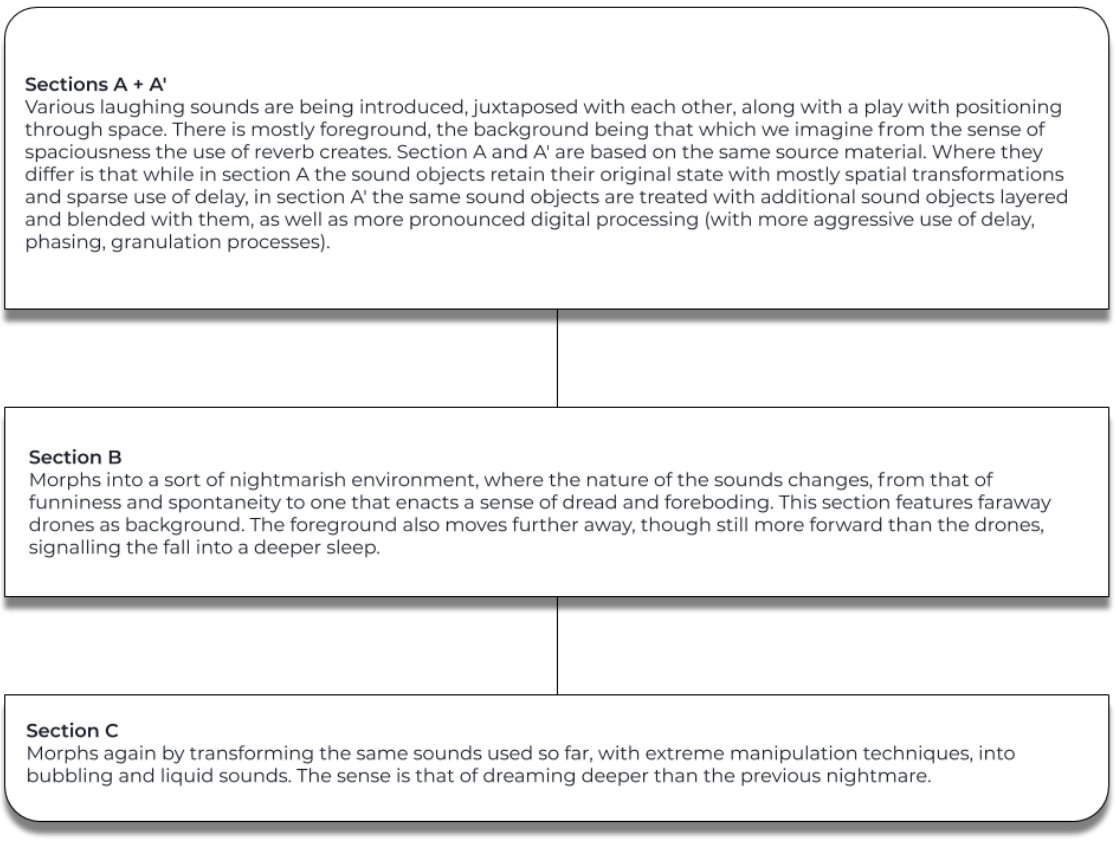

Figure 7. Structure outline of *laughing matter*

Narrative

The piece concludes in a circle, coming back to the very first sound of the beginning, the female laugh that started it all. It may be interpreted as realising it was all just a dream, or even as awakening to the real sounds around the protagonist, the listener. It is a journey from the known to the unknown and back. Long pauses and use of silence and single sounds contribute to an overall sense of emptiness.

To add an element of foreshadowing (narrative technique), I treat my sounds as characters in a play. Foreshadowing in storytelling is usually created by planting hints and clues that anticipate what is to follow. In music and sound art, those clues can only arise from the sonic material itself. I wanted my hints

to be subtle, as the purpose of the piece is not to build suspense, but rather to invoke an environment of mystery. There is foreboding, but not fear, awe but not anxiety. I sought to achieve this by adding pieces of sonic material from each following part to its previous one.

Sonic Palette

All sounds used are several recordings of people laughing, solo or in groups. Some of them are being used in their raw state, while many others go through various processing and sonic manipulation techniques.

I emphasised the fricative quality of many of the vocal sounds, and used spacious reverb and delay, blending and layering sounds.

While sorting out my sounds along the timeline of my DAW, I concentrated on their rhythmic properties. I sought to respect the natural rhythm of the various laughing recordings and juxtapose them in a way that builds patterns and motifs. Some of these patterns are repeated throughout the composition.

The use of delay throughout the piece has been based on the same idea of natural patterns of laughing sounds and attempts to emphasise their rhythmic qualities.

Each laughing sound has its own harmonic quality, and the process of joining them into motifs creates subtle melodic lines.

3.4 *voix céramique (ceramic voice)*

voix céramique is an acousmatic stereo composition, based structurally upon a vocal improvisation. The vocal sounds are supplemented by recordings of flute improvisations performed by flautist Rania Rossopoulou.

Conception

The source material of *voix céramique* is a recorded vocal improvisation I performed in my home studio while recuperating from a severe complication of an autoimmune condition of the connective tissue. My symptoms were sclerotic, and I felt my body as if encapsulated within a solid substance. So thematically, I focused on narrating the distress of experiencing this affliction by emphasising deliberately forced utterances of crying (lamenting) and laughing. From a technical point of view, with this composition, I explored the potential of fragmenting the recording into sound objects and incorporating their various transformations into an arrangement of sequences and sound-shapes. I used a fluidity of associations that create an analogy between the sound-shapes, their motions' causality, and my experience of suffering.

Form

voix céramique is in AA'BB' form, divided into two main sections (AB), with two subsections each. The first section has a constant low sustained note throughout, which is released during the second section.

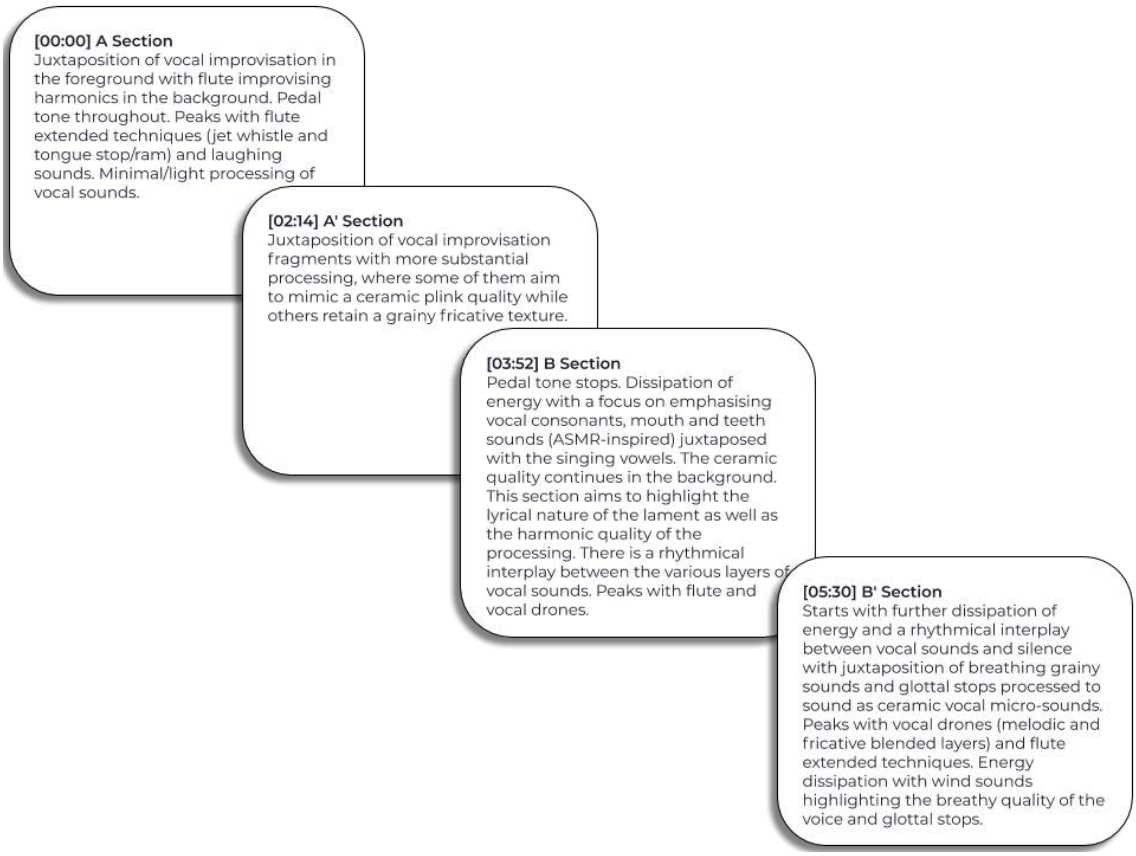

Figure 8. Structure outline of *voix céramique (ceramic voice)*

Narrative

The unifying features of this work's sections include the constant use of certain repeated words as an element of coherence. The resulting atmosphere resembles an invocation to Rhea, who, according to Greek mythology, was the mother of the Olympian gods and goddesses, while being the Titaness daughter of Gaia, goddess of the earth and Uranus, the god of the sky.

Sonic Palette

I chose the timbre of the voice, as the sound best suited to express human emotion, "the most familiar and most versatile instrument there is, [...] an instrument made more versatile through electroacoustic manipulation" (Landy, 1994).

Additional sonic material were the sounds of a sustained pedal tone, flute extended techniques, and nature sounds of crackling branches and the wind. In my creative approach, I integrated the juxtaposition of the contrasting spectral density of note and noise, both dominant characteristics of the human voice. Texture and gesture are essential structural elements; however, the key focus is on texture, rather than gesture.

3.5 *do cyborgs feel sad when they're lonely?*

> *By far you have more power, more capability, than the President of the United States had 30 years ago. If you have an internet link you have an article of wisdom, you can communicate to millions of people, you can communicate to the rest of Earth instantly. I mean, these are magical powers that didn't exist, not that long ago. So everyone is already superhuman, and a cyborg.*
>
> (Elon Musk, during the Beneficial AI 2017 Conference)

When I began working on this composition, I wanted to create an interactive live electronics piece that would include the participation of the audience. However, due to difficulties caused by my health issues, I withdrew from performing in front of a live audience. Therefore, I needed to embrace alternative approaches: Inspired by my love for video games and Ricardo Climent's work,[46] I decided to work with the Unreal Engine and FMOD to create an interactive virtual sound installation. *do cyborgs* is the result of this effort.

A soundwalking simulator

For this work, I blended ideas from video game and soundscape studies. I combined the terms 'walking simulator' and 'soundwalk,' as they best encapsulate my intentions.

Walking simulators (video games like *Dear Esther* (The Chinese Room, 2012) and *The Vanishing of Ethan Carter* (The Astronauts, 2014)) - also called environmental narrative games - are essentially storytelling multimedia interactive installation artworks. When creating one myself, I leaned heavily on the aural aspect of the experience. I intended to create a soundwalk, in a

[46] Ricardo Climent has worked extensively with Unreal Engine to create what he calls "Live Interactive Music with game-audio for immersive experiences."

way predetermined, but with branching path options. I was inspired both by the term "listening paths" (Tzedaki, 2011) as well as branching story-lines often used in adventure and role-playing video games[47]. The project features adaptive audio (the result of interactive choices) to create a unique experience for each participant.

Video game development tools have been used by artists for the creation of audio games and as performance tools. In this case, I have used a game engine (Unreal Engine) to design an imaginary (unreal) space, with surreal elements, both visual and sonic.

Compared to other composers of interactive music[48] whose work is mainly performance-based, I focused on the listeners' direct experience by giving them agency via interactivity: the roles of the listener-audience and the performer blend into one, that of the participant, as in Climent's "sonically-driven expeditions."[49] Consequently, the soundwalking simulator experience becomes the performance itself, and its outcome is dependent upon the participant-player's decisions.

By using specialised technological tools (game engines) we can have a user interface people already are or can easily become familiar with. This can help us incorporate the element of improvisation and flexibility (even limited indeterminacy) in a work that features a new kind of interaction borrowed

[47] Branching story-lines were the primary characteristic of the Choose Your Own Adventure books I used to read as a child in the 80s.

[48] Notably: Ricardo Climent and Marko Ciciliani, project leader of 'GAPPP: Gamified Audiovisual Performance and Performance Practice.'

[49] In *[5]: City as game,* Climent creates a "game-audio experience interactive work" that begins "with a virtual soundwalk inspired by real events" and takes the player to visit places that have "iconic sound features." He also encourages a "sound-based navigation" by applying a technique ("sonicpathfinder") that intends to overturn the emphasis we usually put on our sense of sight over that of hearing.

from games: that of a participant and a piece. In this kind of work, the instrumentalist/vocalist, who traditionally held the role of the performer, is diverted from having a traditional relationship with an audience to active participation in the compositional process itself (from the 'auditorium' to the 'studio').

Conception

The inspiration for the creation of this composition was the combination of various existential themes and tropes in literature. Some examples are the theme of "dream-walking," as presented in Lovecraft's short story *Hypnos* (1923/2009), the "descent into madness" trope, prevalent throughout his writings, the "cosmic horror" and the insanity it can bring forth when we confront it.[50]

The title is a tribute to Philip K. Dick's novel *Do Androids Dream of Electric Sheep?* The author ponders a question of an existential nature with many philosophical implications: are androids capable of dreaming as humans are, and if so is the nature of their dreams artificial? I will not analyse the title or the content of the book further, as it has already been discussed extensively by many. In my title, pondering over Musk's quote above and phrasing the question in the style of Philip K. Dick, I wonder if we have indeed become

[50] In some of my early journal comments, I wrote down my thoughts on creating a narrative, where the protagonist, a writer, gets lost within a cave and slowly loses their mind. Among vocal sounds, I thought of using typewriter recordings, but I rejected the idea, due to the complexity in designing a level of this magnitude in Unreal Engine. I retained my idea of using vocal sounds and incoherent mumbling, changed the caves to corridors, and added recordings of piano hits. Another early idea was to leave the ending open to interpretation and have a different one according to some environmental (e.g. audience reactions) parameters, ending either on a hopeful note or a dreadful one. These endings resulted in the next composition, *souffle de l'océan,* that I will discuss in the next section (3.6).

cyborgs. Have we embraced technology too much? Are we merging with it or merely enhancing ourselves and what is the cost for our human nature? Are we gradually losing parts of our humanity? Are we losing the connection to our feelings and each other? How do we perceive loneliness in a 24/7 connected world, and do we feel sad when we are lonely?

Form

The piece consists of four parts or regions, and two different endings (finales), which, when combined, constitute the last piece of this portfolio, *souffle de l'océan*. The four regions take place in the first level of the soundwalking simulator, which I have named NewWorld. These regions have sound events created with FMOD that start playing by walking through triggers placed in the environment. Interactive objects, such as boxes, pianos and candles, that play sound when the player clicks on them with the mouse button, are placed sparingly throughout the corridors.[51]

[51] When designing the piece for live improvisation, I wanted the singer to interact with several piano hit impact sounds. Since it was difficult to predict the timing of his vocal accents, I concluded that it was better to trigger the sound events himself, using his own controller (a wireless computer keyboard). As part of the theatrical elements of the performance, he would pretend to be writing on the keyboard slowly at first then more frantically. As the piece developed into an interactive virtual installation, I had to adapt my plan. Thus, I migrated the singer's performance to an interaction by the player/participant with various environmental elements.

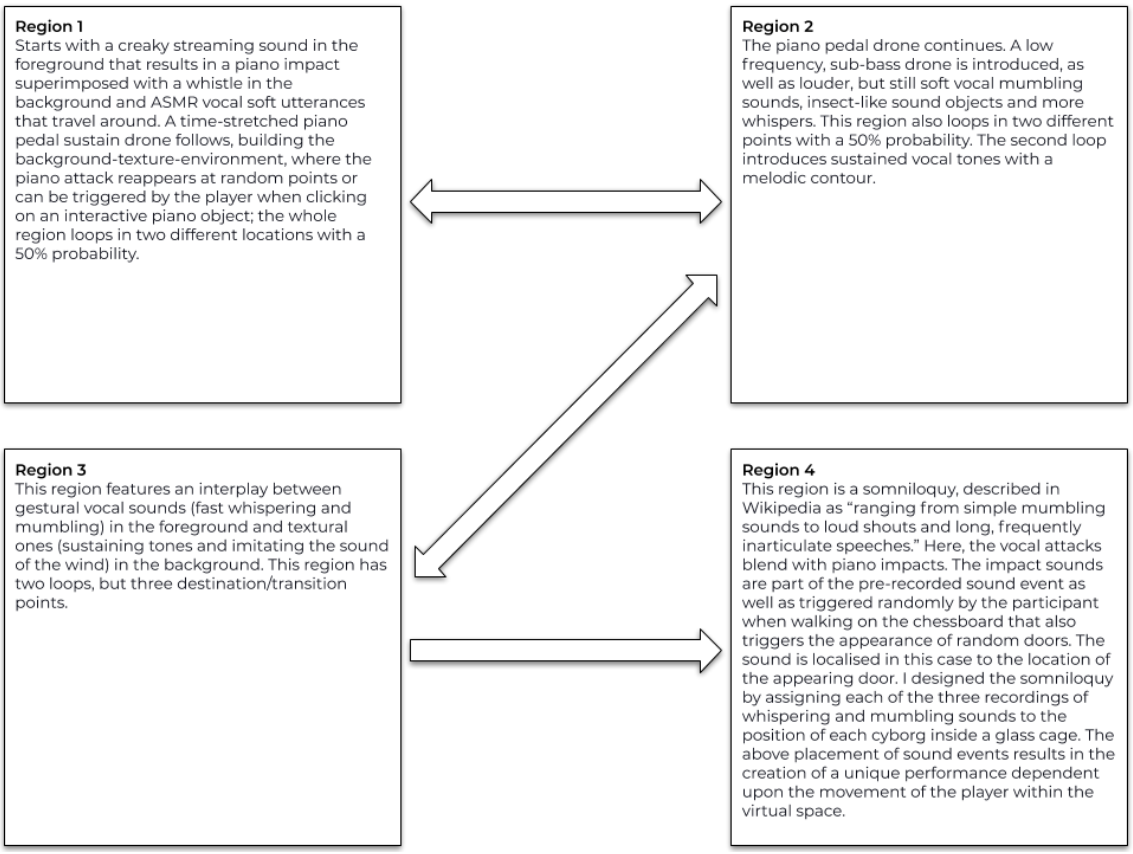

Figure 9. Structure outline of *do cyborgs feel sad when they're lonely?* The arrows indicate the non-linear nature of the first three regions and the point of no return of the fourth.

Narrative

I explore narrative modes through the point of view of

- Space
- Player-participant

Space is part of the broadest concept of worldbuilding; in this case, both sonically and visually. As I discussed in section 2.2.2 Production, I create the background (space-world) first, and later I add the elements that inhabit this space-world and move about (foreground). For this piece, I composed the music first, and, based on its concept and narrative, I designed the virtual environments and objects.

This space is a soundwalk environment where you are free to roam. What if you choose to change direction and go back to the beginning? What if you decide to stand still? What happens to the sound then? Virtual environments offer different opportunities and pose exciting new challenges to the composer. One must overcome linear thinking. In the words of Hugill & Amelides (2016) electroacoustic music and its creators have "much to learn from an analytical understanding of how gaming goes about enabling the user to construct a narrative path."

I designed the Unreal Engine levels using freely available assets from the UE4 Marketplace and building some of them from scratch. I was inspired partly by outrun/vaporwave aesthetics, partly by nostalgia for video game graphics of the '90s, like Cyan's adventure puzzle games *Myst* (1993) and *Riven* (1997). For creating the cinematic animations and fixing some of the static meshes, I employed the help of my brother and 3D animator, George Alexakis.

The glass cages one can see throughout NewWorld are acting as a symbol of isolation. The glass represents the screen (computer, smartphone) that both connects and separates us, and the fragility of this system. The cyborg animations inside the cages represent, metaphorically, the existential fear of isolation.

What is interesting is how the participant experiences the narrative. The immediacy of the experience, as well as the accessibility offered by the virtual environment, are significant advantages. People can experience the composition from their own space. By assigning the role of performer to the individual player, the listener acquires agency and is not a passive receiver of sonic information. Each participant is a performer, and each instance of

performance is an exclusive experience. The first-person perspective and the interactivity add to the immersion.

The player can choose to go up or down the corridors.[52] The two paths result either in freedom or meaninglessness and death. Conceptually, this branching option describes the choice of how we stand before infinity and eternity. Are we overcome by existential dread, or filled with immense hope? Loneliness, which allows for introspection, is the time when gazing at the horizon, we become aware of these thoughts. Will the AI (cyborgs) develop the awareness we possess?

The scenes are also influenced by surrealism's defiance of logic. The initial and apparent normalcy of the corridor with the pianos and the burning candles is juxtaposed by hovering glass cages with confined cyborgs, by enigmatic boxes and unusually large candles, and superseded by a chessboard with mumbling cyborgs and mysteriously appearing and disappearing doors. Once the player chooses between the two paths and arrives at the chessboard area, they reach a point of no return,[53] and one of the two endings becomes available. Once the event on the chessboard ends, which is inspired by final boss battles, the player is transported either to an escape (Hope Island) or to space, a starlit area that will then lead them to dread, isolation and despair in the interior of the cage they encountered at the very beginning.

[52] The choice of up or down was informed by the spiritual connotation of ascent versus descent. We associate 'up' with the heavens while 'down' represents the underworld, the abyss, and death.

[53] A term frequently used by video game players to refer to points in the narrative of a game where it becomes impossible to return to any previous areas.

Interaction

The interaction between the participant-player and the sound events is achieved by combining the following methods:

- Video game development software, to design the virtual environment
- Blueprint visual scripting in Unreal Engine, to program events that get triggered, either by passing over certain areas or touching objects
- FMOD Studio, to create a combination of linear and non-linear -mostly circular (loops)- random sound events

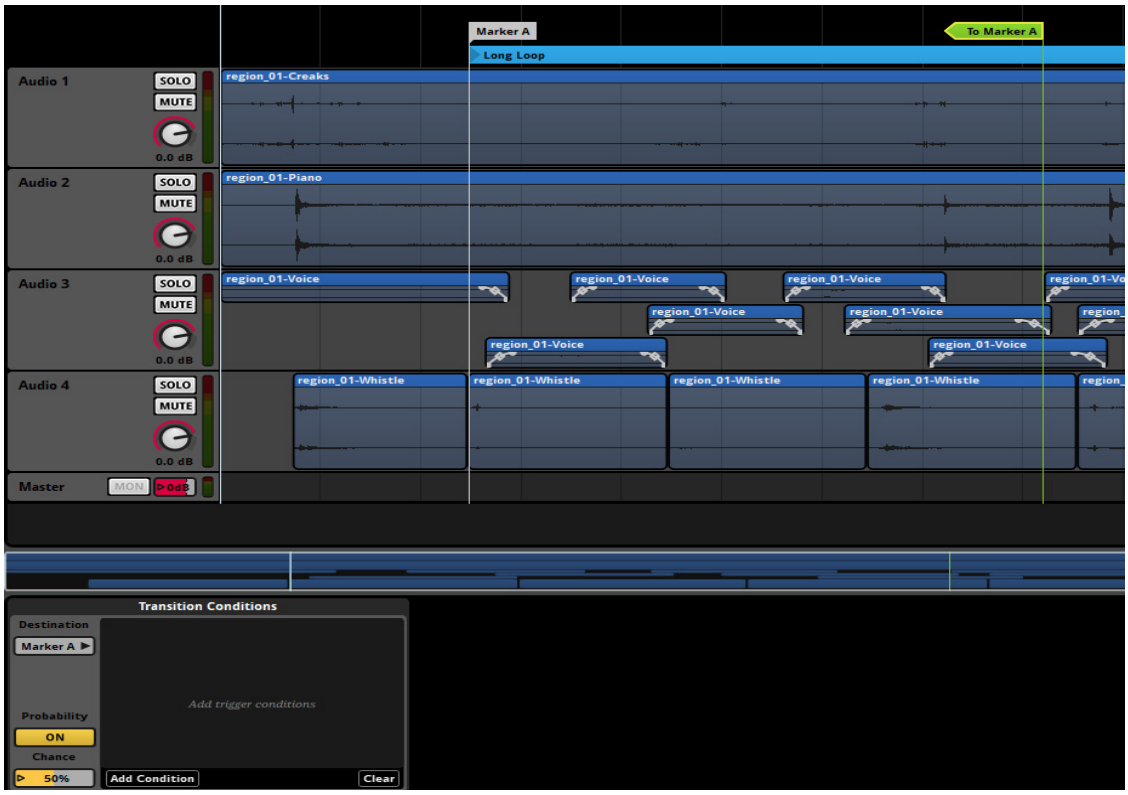

Figure 10. Example of an FMOD sound event with loops and transition points with probability percentages

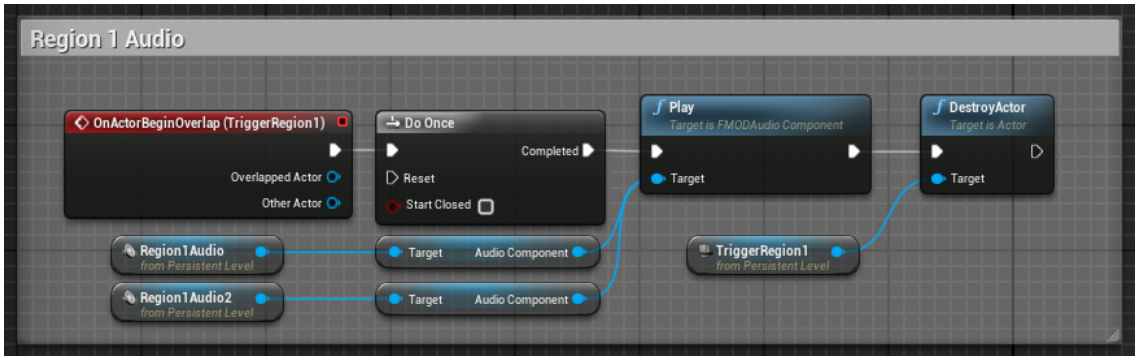

Figure 11. Unreal Engine Level Blueprint nodes for triggering the audio for region 1

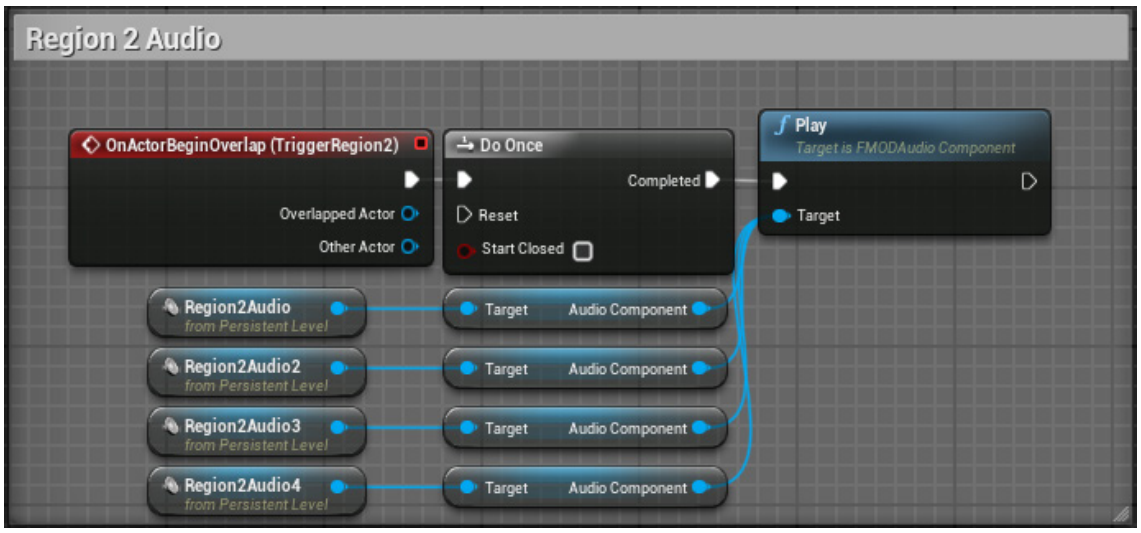

Figure 12. Unreal Engine Level Blueprint nodes for triggering the audio for region 2

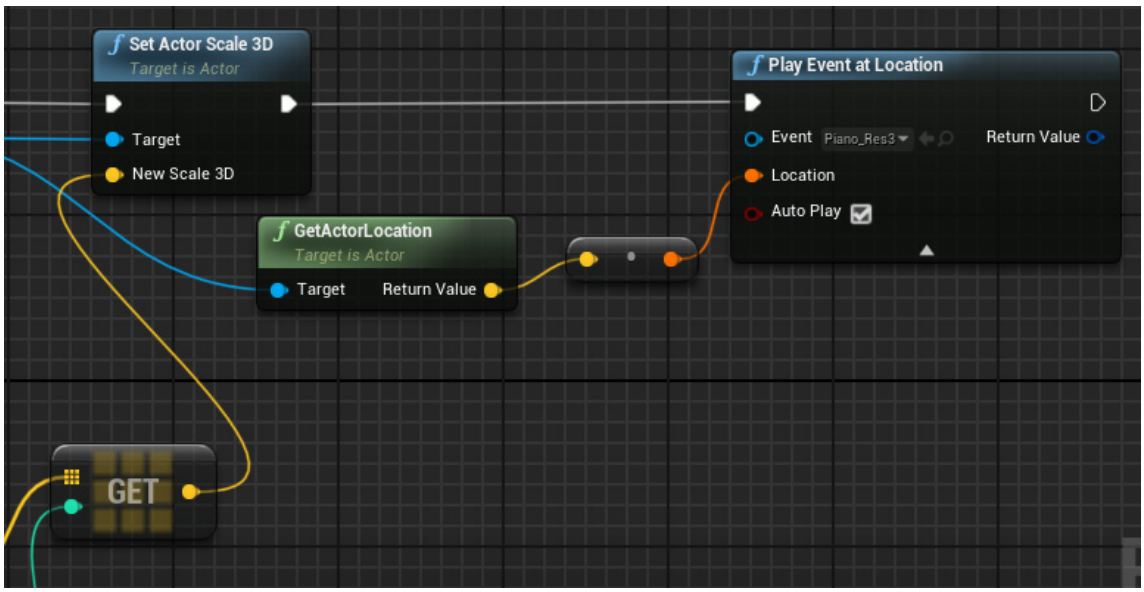

Figure 13. Part of RandomDoors blueprint that triggers the appearance and sound of random doors

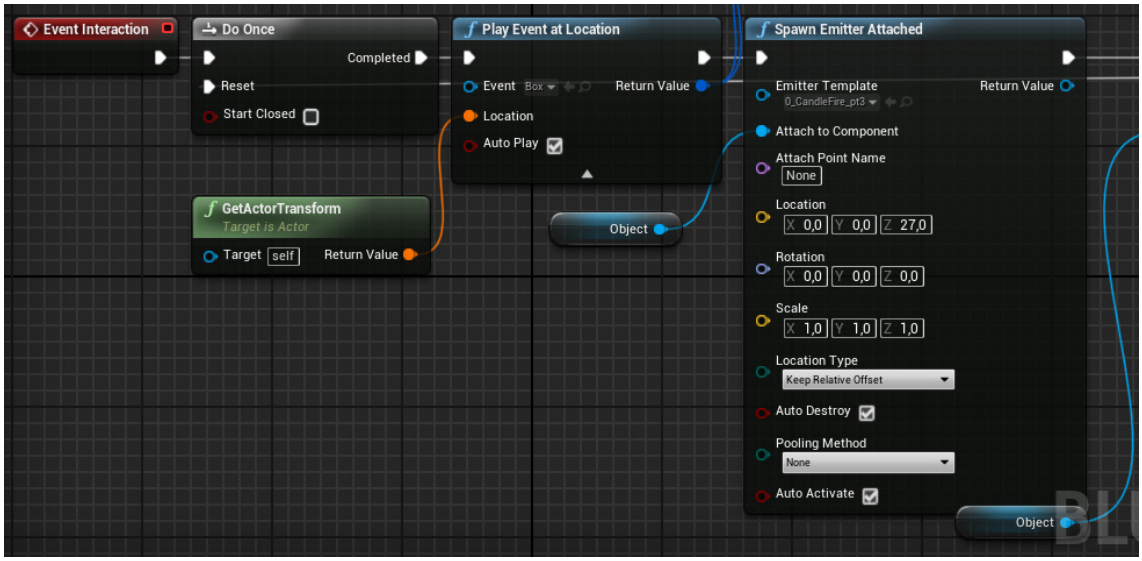

Figure 14. Part of the blueprint for the interactive candles

Sonic Palette

The sounds used are primarily recorded vocal improvisations by vocalist Christos Karadais and myself. As forms of preparation for the improvisations, I used both narrative-based instructions as well as randomness and feedback for Christos Karadais's performance and ASMR-based sounds for mine. I also used samples of piano sounds such as hits and scrapes I downloaded from freesound.org.[54]

I juxtaposed and superimposed the vocal sounds and the percussive piano hits, as airflow and impact generated sounds (described in section 2.1.5 Aesthetics of Sound). I also layered and blended the piano and vocal sounds to create a sonic mass.

[54] See Appendix IV: Audio sample sources.

Conclusion

I find the creation of virtual spaces, real and unreal, with the use of game engines, a fascinating new field in which a range of possibilities emerge for visual artists, composers and sound designers alike.

It is highly probable that soon we will see a gradually more frequent adoption of this technology, both for creating imaginary, unreal environments as well as representations of real ones. On Google Arts & Culture, an online visitor of the website can explore museums, galleries and landmarks, thanks to the panoramic photographs and Google's Street View technology. What is perhaps missing is a true 3D representation of the places, as well as experiencing the sonic aspect; this can be remedied by creating a simulation with 3D software such as game engines in combination with field recordings (perhaps even in 3D audio).

Additionally, "social gaming enables the possibility of ensemble" (Hugill & Amelides, 2016) and with ever-increasing internet speeds and dedicated game servers, perhaps now we can also take advantage of online multiplayer systems for hosting music concert performances in immersive virtual spaces.

3.6 *souffle de l'océan (breath of the ocean)*

souffle de l'océan is a textural mixed music piece (for fixed media ('tape') and live vocal processing), with pre-recorded and pre-processed sounds of sea waves, water, rain, and live-processed breathing sounds, sustained pitched vocalisations and percussive consonants. It consists of two parts that are actually two versions, two variations of a single composition: I re-use and re-contextualise the same sonic material, applying different transformations, so that one piece's atmosphere is the inverse of the other.

Conception

I constructed the second part using the first as a blueprint and re-used most of the same sounds. However, I performed transformations intending to create opposite sound-shapes (e.g. grainy textures instead of tonal, dissipation versus accumulation of energy and density, crescendo versus diminuendo, textural drones or gestural micro-sounds); this produced a contrasting result that brings to mind the negative images used in photography. The composition has two functions:

- As a stand-alone acousmatic piece,[55] that comes in two parts
- As two versions of the finale of *do cyborgs feel sad when they're lonely?*[56]

[55] Recording an improvisation is a way to preserve it for posterity. It can be argued that this transforms a live electronics piece into an acousmatic one.
[56] It is possible to experience each as a whole eight-minute piece, or non-linearly as crossfaded fragments, going back in time (while in the "space" area) or moving around in a place ("island" area).

Form

The two variations look almost like the reverse of each other, as can be seen from the following figure. Both are slow pacing. The first variation seeks to evoke a sense of serenity, of oneness with nature and space, with a focus on the environmental sounds in the first part with slow vocal tones and breathing, and the chanting in the second part. The ending focuses on ASMR sounds, which create a sense of calmness and anticipation. The second variation begins with an eerie atmosphere, slow, but with quick micro-gestures building to an otherworldly sonic image. The final part is a gradual accumulation of noise, reaching a distorted state of hopelessness before dissipating into static and digital-artefact-sounding fragments.

Figure 15. Blue markers refer to first variation (blue), yellow markers to second variation (yellow), and green markers to both.

	Var.1	Var.2
1 [00:00]	Water stream sounds with high energy in gestural activity, breathing sounds in the background	Processed breathing 'emerging' and 'dissipating' sounds in the foreground, gestural sounds of noisy grains
2 [00:27]	Vocal tonal drones	
3 [00:51]		Whispers blend in
4 [01:19]		Vocal tonal drones, occasionally blending with vocalisations, vocal grains (processed mouth sounds) and whispery sounds
5 [01:43]	The wind turns to breath turns to wind, dissipation, sea waves become quieter and quieter, like disappearing gradually into the distance	
6 [03:13]	A distorted vocal 'announcement' (descending major 3rd) marks the beginning of the 'deformed' canon	
7 [04:00]		Energy dissipation moving towards vocal grains
8 [04:27]		Fluttering vocal grain sounds
9 [05:08]	Small, noisy artefacts make their appearance and gradually become more prominent	The beginning of the gradually louder distorted noisy drone, random anxious vocalisations in the distance
10 [06:37]	Dissipation of energy, tonal artefacts (time-stretched) appear here, getting gradually more prominent	Peak of distortion and vocalisations, dissipation, gradually quieter, more and more static sounding, narrowing spectrum until the end
11 [07:21]	ASMR vocal sounds, words with an emphasis on the consonant sound, not the meaning of the words	
12 [07:44]	Sudden dissipation of energy, background sounds remain only, like room tone	Constant static turns to random rhythmic patterns to constant hiss

Figure 16. Structure outline of *souffle de l'océan (breath of the ocean)*

Narrative

The composition is conceptually a meditation on hope and dread; the existential concerns analysed in the previous section (3.5).

Sonic Palette

The sonic palette consists of environmental and vocal sounds. The environmental sounds are field recordings of sea waves, water, and rain;[57] the vocal sounds are recordings of improvisations of three people. Iliana Karaliga provided an improvisation based on the Ujjayi breathing technique employed by yoga practitioners, as well as percussive vocalisations based on extended vocal techniques. Christos Karadais's singing, influenced by byzantine chant, was a leftover recording from *do cyborgs*. I performed supplemental vocalisations, breathing sounds, sustained tones and percussive consonants influenced by ASMR in combination with real-time processing.

The environmental sounds establish the background; the vocal sounds alternate between acting as foreground or background elements. Overall, the positioning of sound objects and the luscious reverb evoke a sense of spaciousness, the slow pacing and lengthiness leave an impression of timelessness.

Part 1 includes a primaeval-sounding prayer, a melodic contour created with the influence of byzantine chants, polyphonic choral music, yoga breathing, and nature sounds used in meditation, where random cross-fades and

[57] See Appendix III: Audio sample sources.

crossovers between vocal drones create a 'deformed'[58] canon.

Part 2 consists of monophonic melodic contours, reverse reverb sounds emerging from breathing sounds, disappearing or releasing into percussive vocalisations processed with granular effects.

[58] I layered the vocal melody in several tracks creating a canon. Afterwards, I fragmented it in random places and shifted it around. Consequently, my canon became 'deformed,' symbolising the fragmentation of the linear perception of time within dreams, where a succession of images seems to shift abruptly from one sequence to the next.

4. Conclusion

In this commentary, I discussed the thoughts and processes that influenced me to create this portfolio, both from an aesthetic and a technical point of view. Firstly, I examined my background and main influences and how those guided my artistic focus towards composing electroacoustic music, using the voice as the primary sound source and improvisation as an essential component. I also introduced the objective of my research and gave a brief overview of my research methods.

I began this research by asking the following questions:

- How to use the voice as primary source material?
- What types of vocal sounds to choose?
- How to combine them with other sources?
- How to use vocal improvisation as a foundation upon which I structure my work?

I have developed further questions along the way:

- How to create a workflow both intuitive and meaningful to me?
- How to integrate several established concepts (such as spectromorphology) developed by experts in my field and widely applied and researched by my peers, within my personal compositional language, while still retaining my mainly intuitive and playful approach?

Subsequently, I analysed my compositional language and the various aesthetic and technical tools I have developed to facilitate my creative process. I described the importance the concepts of interpretation, improvisation, and interaction have in my approach, and how I apply vocal

improvisation, narrative and worldbuilding techniques as structural elements. As an answer to my research questions, I developed my aesthetic style, by recognising the spectral qualities I found most pleasing, establishing a set of criteria, which I described in this text, for selecting sonic material, and building my palette of sounds around them. Next, I recounted the stages of my creative process. I based my workflow on improvisational, intuitive techniques and on engaging in role-playing and narrative-based activities, both while creating alone as well as in collaborative situations.

Finally, I sought to offer insight into each composition and examined their context, but also their conceptual connection with the overall framework.

Through the development of this portfolio, I broadened my musical thinking by including non-linear techniques and integrating tools borrowed from other fields, such as literature and particularly video games. I am interested in delving deeper into the narrative aspects of non-linear composition by expanding my use of middleware tools such as FMOD and Wwise (working with loops and transition points with probability percentages) and procedural music techniques.

In the future, and given enough time, I would like to explore the combination of microcontrollers such as the Arduino and Raspberry Pi with the Unreal Engine for a more immersive experience in performance.

Furthermore, I am interested in exploring the visual and aural 3D representation of both fictional and real places using game engines' tools for 3D sound and interactivity (like newly incorporated tools for convolution reverb and soundfield ambisonics (full-sphere surround sound) rendering and the sonic potential of new research on emerging technologies like directional

sound, focused audio, and personalised HRTFs). I am also fascinated by how augmented and virtual reality combined with 3D audio as well as hosting live performances in virtual spaces using online multiplayer systems can offer new ways to experience as well as create music.

From an aesthetic perspective, I am interested in exploring more ASMR-triggering sounds and their artistic potential.

Going forwards, worldbuilding, storytelling, as well as game-play concepts, will be significant to my approach as I believe I have merely scratched the surface of how I can adopt them as musical composition techniques. Lastly, I can always rely on the sound of the voice and its immense expressivity.

Appendices

Appendix I: Contents of the portfolio

Compositions

1. *01 libellule (dragonfly)*
2. *02 mould*
3. *03 laughing matter*
4. *04 voix céramique (ceramic voice)*
5. *05 do cyborgs feel sad when they're lonely (main part)*
6. *06 souffle de l'océan (breath of the ocean) (part 1) [do cyborgs feel sad when they're lonely (finale v1)]*
7. *07 souffle de l'océan (breath of the ocean) (part 2) [do cyborgs feel sad when they're lonely (finale v2)]*

DoCyborgsFeelSad_Video_of_Playthrough.mp4

A video recording of a playthrough of the soundwalking simulator

DoCyborgsFeelSad

A folder that includes *DoCyborgsFeelSad.exe* (the packaged executable program of the soundwalking simulator) and all files needed to run it on Windows

Appendix II: Poetry by Manuela Gallina

(Featured in mould)

one two three four
man mad God world
wood saw bare sight
would day bear night

cinque sei sette otto
Eden male mela grotta
fuoco ruota grano rame
soldo ricco servo fame

one two three four
sea mad God world
town waves bare sight
down lies no light

cinque sei sette otto
nera terra seme pioggia
gemma fiore frutto voce
saggio verde vita luce

one two three four
arms blind mould steel
still hearts clock weak
steal clocks hard week

ένα δύο τρία τέσσερα
Χώμα Σκόνη Ομίχλη Λήθη
πέντε έξι επτά οκτώ
Όχθη Λίκνο Κλαδί Κλειδί

one two three four
tie off job gone
blue mind mould green
blew blind I mean

Appendix III: Audio sample sources

Following is a list of freesound.org users from whom I downloaded several audio samples that I used in the included compositions:

laughing matter:

Robinhood76

ondrosik

(Other sounds by 99sounds.org)

do cyborgs:

patchen

Daphne_in_Wonderland

beskhu

souffle de l'océan:

Benboncan

suonho

jakeharries

pulswelle

voix céramique:

blaukreuz (Tom Chapman)

juskiddink

mould:

acclivity

Dynamicell

reinsamba

WIM

UncleSigmund

roubignolle

lonemonk

vibe_crc

Spleencast

Appendix IV: Processing Tools & Techniques

General

I observe that, as composers, based on the results we aim to achieve, we adopt specific technological resources that become part of our tool-set. Often, though, these tools determine the outcome. After experimenting with various sound processing tools, we eventually select those that better support our aesthetic vision, and are practical and efficient for our workflow. Mine are the following:

- Spectral editing
- Time-stretching
- Pitch-shifting
- De-noise and de-click (often for keeping the 'noisy' parts)
- Reverse (often combined with reverb)
- Reverb and delay effects (for positioning sound in space and for creating textures such as drones)
- Granulators
- Resonators
- Filters and equalisers
- Distortion
- Amplitude modulation (tremolo)
- Automation (of volume, panning, plug-in parameters)

Piece 1 (2017-2019): *libellule (dragonfly)*

- I applied digital processing techniques on multiple sounds.
- I used iZotope RX denoise and restoration processes, with the reverse purpose than is intended (e.g. keeping only noises and artefacts).
- Plugins:
    - EQ/filters/modulation
    - Limiter/compressor
    - Pan-tremolo
    - Reverb
    - Grains-pitch
    - Distortion/saturation
    - Frequency shifter

- Phaser (for creating metallic, ceramic etc. sounds)

No synthesized sounds have been used in the making of this composition.

Piece 2 (2013): *mould*

Our setup consists of two laptop computers, the Ableton Live DAW, a variety of plug-in effects and a microphone for the clarinet.

We use the text of the poem in the following ways:

1. In its original natural state (recitation): the listener can understand the words and focus on their meaning
2. Pitch-shifted up and down: mimicking other sounds used such as birds or machine sounds
3. With variations of speed: building-up or dissipating energy

With pitch-shifting granular reverse echo (we used SoundToys Crystallizer to achieve this effect): adding spatial and spectral density to create granular 'clouds' of sound

Piece 3 (2017-2019): *laughing matter*

During the first section, the processing of sounds remains minimalistic. In each part, the processing becomes gradually more pronounced. The vocal sounds heard during the first section retain their identity. In subsequent parts, the transformations create a very different and unrecognisable character. In the beginning, no symbolism exists; the laughing sounds are what they are. The listeners might perceive them as such, and might themselves join with a laugh or a giggle, or might focus instead on the spatial play that takes place, where the various laughing sounds appear from multiple locations within a room, or different spaces altogether, creating a mobile and evolving environment. The listeners might turn their attention to the pitch contour or spectral qualities of laughing sounds, produced by different people, of varied genders and age groups. Is it a burst of laughter by a single person or by a group of people? They might concentrate on the internal rhythm of the laughing sounds, or on the way they are arranged in time and the overall rhythmic effect this arrangement produces.

Piece 4 (2016-2019): *voix céramique (ceramic voice)*

I constructed the sequences by juxtaposing the sonically manipulated sound objects with their surrounding silences, aiming to abstractly imitate the image of a ceramic sculpture, by use of phaser plugins, granulators, and tremolo.

Piece 5 (2017-2019): *do cyborgs feel sad when they're lonely?*

All sounds used have minimal processing. I have used different reverb settings on several sounds creatively, either to colour a sound or to prolong it.

The somniloquy section has minimal processing on the singer's voice, almost non-existent. There are no particular spectral transformations. I separated the recordings into fragments of syllables, reversed some of them and randomised their order, thus enhancing the incoherence of the 'madness-talking' performance.

Piece 6 (2019): *souffle de l'océan (breath of the ocean)*

- Vocalisations with live processing in Ableton Live, grain delay, corpus resonator, randomised auto-panning, and long reverb
- A variety of reverb settings with long decay times combined with modulation and granular processing
- Transient shaping for enhancing transients in sounds processed with granulators
- Subtle use of distortion

Appendix V: Extra-musical concepts

The following are the primary extra-musical concepts that influenced the creation of these pieces:

1. *libellule (dragonfly)*: nature, freedom, innocence and playfulness (a primarily gestural composition)
2. *mould*: nature versus machine, a quest for balance and maturity
3. *laughing matter*: facing social anxieties, participating in social laughter versus feeling being laughed at, dream states, falling within and coming out of a liquid element
4. *voix céramique (ceramic voice)*: from illness to healing, rigidity, the opposite of liquidity and flexibility, the importance of reconnecting with nature, when faced with mortality
5. *do cyborgs feel sad when they're lonely?*: existential dread or existential hope in the face of infinity/eternity, the embrace of technological enhancements and the philosophical questions that arise from these enhancements
    a. escape
    b. seascape
    c. starscape
6. *souffle de l'océan (breath of the ocean)*: infinity/eternity metaphor, does existence precede essence? (a primarily textural composition)
    a. seascape: ocean
    b. starscape: breath

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