

PORTFOLIO OF ORIGINAL COMPOSITIONS

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SCHOOL OF ARTS, LANGUAGES AND CULTURES

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Final Word Count: 12881

Portfolio of Musical Works

Stereo Acousmatic Works

- | | | | |
|----|-------------------------------|--------|-------|
| 1. | <i>Icarus</i> | (2014) | 7'52 |
| 2. | <i>Hydrotrilogy</i> | (2015) | 16'08 |
| | i. <i>Water Dreamcity</i> | 3'54 | |
| | ii. <i>Bell Universe</i> | 6'45 | |
| | iii. <i>Harbour Nostalgia</i> | 5'24 | |
| 3. | <i>Chromatocosmos</i> | (2015) | 17'37 |
| 4. | <i>Time Travel</i> | (2016) | 18'32 |
| 5. | <i>Land of the Sirens</i> | (2017) | 27'00 |
| 6. | <i>ElectroSantouri</i> | (2017) | 14'12 |

Contents of the Audio CDs and USB Flash Drive

AUDIO CD 1

1. *Icarus*
2. *Hydrotrilogy*
3. *Chromatocosmos*

AUDIO CD 2

1. *Time Travel*
2. *Land of the Sirens*

AUDIO CD 3

1. *ElectroSantouri*

USB Flash Drive

Audio Files

All files are in stereo format. They are supplied in 96 KHz, 24 bit, interleaved, WAV format. They are provided in a single 16 GB USB Flash Drive.

1. *Icarus*
2. *Hydrotrilogy*
3. *Chromatocosmos*
4. *Time Travel*
5. *Land of the Sirens*
6. *ElectroSantouri*

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ABSTRACT

My research investigated the practicability of diverse electroacoustic music compositional approaches which were applied in a series of works that explored specific relationships between real-world and abstracted sound materials, through the strategic use of pitched, melodic and non-pitched materials (and specific characters and behaviours of those materials) as integral elements in the compositional process. All compositions were related to Greece at many different levels, in direct or symbolic ways. My main aim was to explore all of these different levels in a musical way via electroacoustic music and to present transformed aspects of Greece. In addition, I attempted to explore new electroacoustic music territories by undertaking a journey from real-world instrumental and concrete soundworlds based on aspects of Greek culture (history, music, mythology and legends), towards abstract soundworlds. This could be summarized as: “How does one ‘perform’ the Greek coasts as a re-imagined Greek orchestra to expand the field of pan- and cross-cultural original music?”

Real-world soundworlds consist of sounds, spaces and places that can potentially communicate human experiences: familiar impressions, aural images and evocations for the listener. Abstract soundworlds that emerge from real-world ones through various transformation processes also consist of particular sounds, spaces and places which can be very different compared to the ones emerging from real-world soundworlds. Developing innovative techniques and processes that explore the intersections, contrasts, connections and discourse between the two was my main overall aim.

DECLARATION

I hereby declare that no portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or any other institute of learning.

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I. Introduction

My research explores how different electroacoustic music compositional methods could be implemented in six acousmatic compositions which are related to aspects of Greek culture: mythology, religion and traditional Greek instruments.

In Table 1, a list of what is considered to be Greek culture in sound (S) and imagery (I) as used in my portfolio, is presented.

	Title of Work	Greek culture reference (S) = Sound (I) = Imagery	Time indication example
1.	<i>Icarus</i>	The utilization of human-breathing soundworlds symbolize Icarus' reaction as he was falling from the sky into the sea, towards his death. (I)	(5:33 – 6:07)
2.	<i>Chromatocosmos</i>	The use of a transformed baglamas melody that continuously utilizes the characteristic augmented 2 nd interval between the submediant and the leading tone in a harmonic minor scale. (S)	(3:44 – 4:00)
3.	<i>ElectroSantouri</i>	Repetition of the same series of santouri pitches as originally performed during the recording process, but in very rapid motion, and with their original timbre maintained. As a result of the transformation procedures, the series of pitches are heard in a very rapid tempo; something that would not be possible to do so in the real-world. (S)	(6:36 – 6:50)
4.	<i>ElectroSantouri</i>	The transformations themselves create melodic contours which have a direct	(9:35 – 9:42)

		reference to the way the santouri is traditionally performed, but with totally different timbral and gestural attributes. (S)	
5.	<i>Land of the Sirens</i>	A double significance is present, regarding the utilization of transformed floghera soundworlds: 1. Indication of mythological space/place through the bird-type transformed soundworlds. The bird-type soundworlds emerge from the original floghera recordings (S). Through their presence, information regarding the mythological place is also provided (I). 2. Presence of mythological action attributed to Homer (Sirens' voices) (I).	(19:00 – 20:00)
6.	<i>Time Travel</i>	The superimposition of a harmonious drone (sustained sound event) textural layer of deep spectral space occupancy over the Orthodox priest's voice who was singing Byzantine Greek music psalms – which are monophonic – results in the perception of the priest's voice as polyphonic. (S)	(9:27 – 10:21)
7.	<i>Hydrotrilogy – Water Dreamcity</i>	References to Greek coastal landscapes are made through the utilization of multilayered microsoundworlds which are emerging from water and stones soundworlds (I), as well as soundworlds consisting of pressured onsets (throw/flip) emerging from the effect	(0:00 – 1:00)

		the water has when impacting on a stone surface (splashing) (I). Emphasis is given on microsounds focusing on the interaction between water and stones, rather than soundworlds referring to coastal textures at a more macroscopic level (e.g. waves soundworlds), which are absent from the miniature.	
8.	<i>Hydrotrilogy</i> – <i>Bell Universe</i>	<p>The exploration of the sounds of the hydrophone on a glass led to the creation of two different types of soundworlds, both of which are referenced as ‘ding’ or ‘dinging’ sound objects¹:</p> <p>1) Non-percussive harmonic and inharmonic pointillistic collectives in multidirectional motion, interchanging between rapid and slow motion. A commutation between intervallic and relative pitch of these microelements can be observed. In other words, ‘bell-type’ ‘dinging’ sound objects in rapid motion were created. These sound objects are an indirect reference to bells soundworlds present in Orthodox Churches. (I)</p> <p>2) A sound object – characterized by a brief throw onset/attack, a smooth resonance and a possible delay – whose texture resembles the one emerging</p>	(5:40 – 6:40) (6:50)

¹ See page 35 for the definition of the sound object.

		from a bell sound (ding). (I)	
9.	<i>Hydrotrilogy</i> <i>Harbour</i> <i>Nostalgia</i>	– The dry non-pointillistic prolonged soundworlds in reciprocal motion; in other words, the ‘swish’ and ‘crackling’ soundworlds emerging from the underwater recordings of abandoned boats sounds, are a reference to my origin from the Greek islands of Corfu and Paros. (I)	(12:38 – 12:40), (12:43 – 12:44), (12:53 – 13:00), (13:01 – 13:03), (13:36 – 13:41), (13:51 – 13:52), (14:11 – 14:27).

Table 1: A list of what is considered to be Greek culture in sound (S) and imagery (I) as used in my portfolio.

The first compositional work, *Icarus*, was a notion to Greek mythology and the myth of Daedalus and Icarus. It includes soundworlds of airplane sounds recorded at Manchester Airport, as well as stone sounds recorded in the studio. The second compositional work, *Hydrotrilogy*, was related to my origin from the Greek islands of Corfu and Paros. Thus, a direct link was made to the dominant presence of water, stones, boats and small island chapels. *Hydrotrilogy* consists of three miniatures, all generated with sounds recorded with a hydrophone: *Water Dreamcity* was an exploration of the textures of water, *Bell Universe* was an exploration of the sounds of the hydrophone on a glass and *Harbour Nostalgia* was an exploration of the ‘swish’ and ‘crackling’ sounds produced by abandoned boats in Liverpool Harbour. During the development process of *Bell Universe*, I started considering the possibility of creating a work including soundworlds captured in a Greek Orthodox Church, as part of my PhD portfolio. *Chromatocosmos* undertakes an exploration of the sounds of a traditional Greek instrument called baglamas. *Time Travel* includes sounds captured in the interior and the exterior of a Greek Orthodox Church. *Land of the Sirens* is based on the mythological adventures of Ulysses in the Land of the Sirens, as described by Homer in *The Odyssey*. Sound samples from a traditional Greek instrument called floghera were also recorded and used throughout the work. Finally, *ElectroSantouri* explored the soundworlds of a traditional Greek instrument called santouri.

The composition of these works addressed the following research questions, within the contexts outlined above:

1. How can real-world source sound materials be transformed variations into new identities?
2. How can the combination of different aspects of textural attributes – which are present in different overlapped textural layers – lead to the perception of new aspects of gestural motion² or new ways of identifying specific soundworlds? What impact could this perception have on soundworlds which are related to specific aspects of Greek culture?
3. In which ways can the concept of “cultural identity” be expanded within an acousmatic work?
4. These aspects can be summarized as, “How does one ‘perform’ the Greek coasts as a re-imagined Greek orchestra to expand the field of pan- and cross-cultural original music?”

The portfolio works are further related to each other as follows:

1. The presence of water and/or stone soundworlds in five of the portfolio compositions (*Icarus*, *Hydrotrilogy*, *Time Travel*, *Land of the Sirens* and *ElectroSantouri*), which is an indirect reference to the dominant presence of these two elements in the geographical area of Greece, was the main unification aspect of these works which could be considered as a pentalogy, yet, each work maintains its own features. In *Icarus* and *Time Travel*, stone soundworlds were used among other sounds, but water sounds were not utilized. In *ElectroSantouri*, water soundworlds were present among other soundworlds, but stones soundworlds were not. In *Hydrotrilogy* and *Land of the Sirens*, both water and stones soundworlds were present, among other sound materials.

² Denis Smalley, "Spectromorphology: explaining sound-shapes.", *Organised Sound*, vol. 2, no. 2, (1997), pp. 107 – 126; here, p. 114. Many other terms by Smalley from this 1997 article are used throughout the Commentary.

2. The utilization of a traditional Greek instrument is the main link between *Chromatocosmos*, *ElectroSantouri* and *Land of the Sirens*. In *Chromatocosmos*, the baglamas was used. In *ElectroSantouri*, the santouri was utilized. For *Land of the Sirens*, original sound materials from the floghera were captured.

3. The use of themes from Greek mythology links *Icarus* and *Land of the Sirens*.

The works also investigated specific connections between real-world and abstracted soundworlds, through the planned utilization of pitched, melodic and non-pitched materials as fundamental elements in the compositional process.

Water soundworlds were generated in contrasting ways in *Hydrotrilogy*, *Land of the Sirens* and *ElectroSantouri*. It is worth mentioning that in *Hydrotrilogy* the water soundworlds of all miniatures emerge from recorded material generated with a hydrophone (e.g. *Water Dreamcity*, 0:00 – 0:20; *Bell Universe*, 4:33 – 4:50; and *Harbour Nostalgia*, 13:54 – 14:00). In *Land of the Sirens*, specific water soundworlds were recorded from Entwistle Reservoir in North Manchester (e.g. 12:03 – 12:14), and certain water soundworlds were actually transformed sounds of different source materials such as fallen tree branches being broken in real time during the recording (e.g. 1:18 – 1:23). In *ElectroSantouri*, all the water-type sounds were transformed sounds captured from the santouri itself and no original water soundworlds were present (e.g. 3:45 – 4:20).

‘Swish’ and ‘crackling’ sounds are generated in *Hydrotrilogy: Harbour Nostalgia* and *Land of the Sirens*. The swish and crackling sounds which are dominant in *Harbour Nostalgia* all emerge from underwater hydrophone recordings in Liverpool Harbour (e.g. 13:05 – 13:15 and 13:50 – 13:54). The hydrophone was placed under abandoned boats that I was gently pushing in order to cause a pitching action. On the other hand, in *Land of the Sirens*, wood-type crackling sounds of fallen tree branches were produced during the recording process in Entwistle Reservoir (e.g. 22:14 – 22:22).

Bell-like sounds were present in the *Hydrotrilogy: Bell Universe, Time Travel* and *Land of the Sirens*. In *Bell Universe*, bell sounds emerged as a result of the tapping of the hydrophone on a glass (e.g. 7:04 – 7:24). In *Time Travel* the bell sounds emerged from original bell recordings in the Hagia Sophia Church, Athens, Greece (e.g. 3:36 – 3:38). Finally, in *Land of the Sirens*, the bell sounds were captured from a small bell which is situated in the main entrance hall of my accommodation in Manchester, later subjected to pitch transformations and addition of smooth resonance (e.g. 3:03).

Piano-like soundworlds are depicted in all six works of my portfolio. In *Icarus*, *Hydrotrilogy* and *Land of the Sirens*, original piano sounds were recorded and were heavily transformed. In *ElectroSantouri*, *Chromatocosmos* and *Time Travel*, different sound materials were transformed and had a resemblance to piano soundworlds. In *Icarus*, piano sounds were captured through a binaural microphone, which was also used for the airplane recordings at Manchester Airport. I decided to use the binaural microphone in a non-traditional way to capture piano sounds as well. What I learned from this process was the fact that binaural microphones are very sensitive in capturing sounds from objects in close proximity and, for this reason, I had to produce piano sounds very softly and with very low volume. These piano sounds were then time stretched and a selection of the resulting sounds were utilized in *Icarus* as a stable harmonic background layer which contrasted the aggressive and high spectral occupancy airplane soundworlds (e.g. 1:06 – 1:19). For *Hydrotrilogy: Bell Universe*, I placed the hydrophone in a glass filled with different types of liquids and utilized it to create piano-like sounds.

What I observed was the fact that the volume level of the recorded sounds was very low and after transforming them through GRM Shuffling³ in Avid Pro Tools⁴ I elected to utilize these sounds in combination with bell-like sounds which emerge from the tapping of the hydrophone on the glass surface.

³ INA. GRM Tools. [online]. Available from: <https://inagrm.com/en/store> [Accessed: 4 Jan. 2017].

⁴ Avid Technology. Pro Tools. [online]. Available from: <http://www.avid.com/Pro Tools> [Accessed: 4 Jan. 2017].

The main benefit I gained from this experiment was my discovery that once the hydrophone was placed in liquids (other than water) of different density and concentration, it could act like a transformation tool producing pitch-bend⁵ sound materials. In *Land of the Sirens*, I utilized a pair of condenser microphones for the recordings of actual piano sources. These sounds were mainly utilized as follows: pitch transformation was implemented, followed by onset – attack and termination removals and applications of fade-ins and fade-outs, leading to the creation of graduated continuants which I then superimposed over each other to create a sense of continuity at a larger scale. These sounds were used as a background harmonic layer in D minor, towards the end of the work (e.g. 24:41 – 25:18). On the other hand, in *ElectroSantouri* I used the BEAST Tools⁶ Clatter Patch to transform a selection of santouri soundworlds and with the help of a wide number of combined Logic Pro resonance application and transformation tools, I produced the single-tap piano-type soundworlds (resembling a single non-sustained piano key press sound event) (e.g. 8:07) as well as the piano-type soundworlds in rapid-motion, followed by a deceleration (e.g. 8:14 – 8:28). In *Chromatocosmos* I utilized the same BEAST Tools Patch over a selection of original baghlamas sounds in order to produce the low-pitch repetitive piano-type soundworlds in accelerating gestural motion (e.g. 0:23 – 0:33). Finally, in *Time Travel*, I used Logic Pro to apply resonance on bell soundworlds which then underwent pitch transformations followed by superimpositions. This resulted in the appearance of resonant piano-type soundworlds in this composition (e.g. 5:43 – 5:47, 12:44 and 12:55).

⁵ Rapid inharmonic transition between two different pitches. The onset/attack has a higher volume level than the transition that follows and it is characterized by smooth resonance and harmonicity/approximate harmonicity/inharmonicity, depending on the sound source. The higher volume level results in the onset being audible during the transition as well. The transition can either lead to a higher or to a lower frequency pitch. The target pitch (termination) is not necessarily audible, as the transition can fade out prior to the termination. In *Chromatocosmos* where the baghlamas is utilized, the onset is characterized by harmonicity (e.g. 1:34 – A \sharp). In *Hydrotrilogy – Bell Universe*, the onset is either characterized by approximate harmonicity (e.g. 7:07 – approximating A \sharp) or inharmonicity (e.g. 6:47 – 6:49), depending on the percussion speed of the hydrophone on the glass surface, the quantity of liquid contained in the glass and the liquid type.

⁶ University of Birmingham. Electroacoustic Music Studios. BEAST Tools. Clatter Module. (unpublished music software). Provided by: University of Birmingham. BEAST Tools Software information available online from: <https://www.birmingham.ac.uk/facilities/ea-studios/research/beasttools.aspx> [Accessed: 10 Jan. 2017].

Stone soundworlds were depicted in *Icarus*, *Hydrotrilogy*, *Time Travel* and *Land of the Sirens* in a variety of ways. In *Icarus* and *Time Travel* the stone sounds were captured in the studio with a pair of condenser microphones (e.g. *Icarus* 2:15 – 2:30 and *Time Travel* 3:08 – 3:23). In *Hydrotrilogy* the stone sounds were produced in my house in Athens, with the use of a hydrophone placed in a washing basin filled with water (e.g. 0:00 – 0:27). In *Land of the Sirens*, the stone sounds were partly captured in Entwistle Reservoir, (e.g. 3:10 – 3:18, low-frequency ‘dragging textural motion’ stones sound textures) and partly captured in the studio with a pair of condenser microphones (e.g. 3:19 – 3:27, flocking).

It is worth mentioning that in *Icarus* and *Hydrotrilogy* pencil sounds were also present but always mixed with stones soundworlds. In *Icarus* they were captured in a studio environment with the same equipment used for the stone sources. In *Hydrotrilogy*, the pencils were inserted in the washing basin, along with the stones and other objects, and their ‘crackling’ sound was captured by the hydrophone. See Fig. 1.

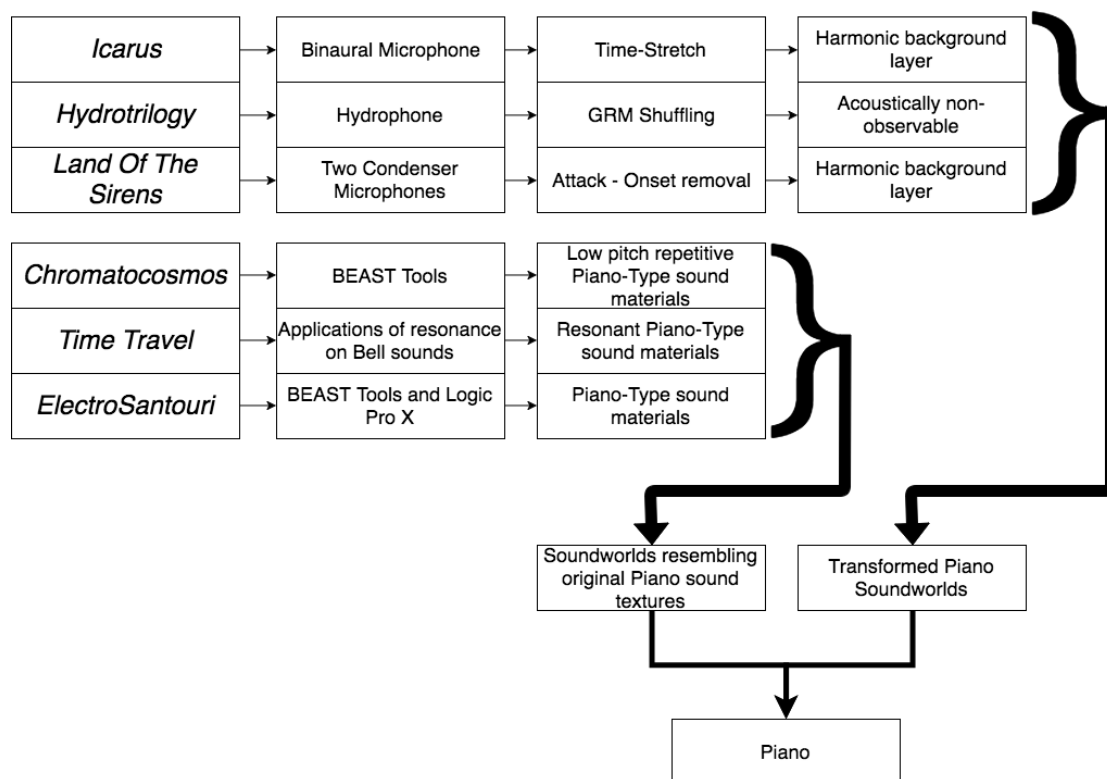


Figure 1: The different ways in which piano soundworlds, or soundworlds resembling original piano sound textures, were generated in all six works of my PhD portfolio.

I chose to limit my recorded sources to airplanes, stones, water, wood, chanting and Greek instruments for two reasons:

- 1) It allowed me to explore a wide range of different possibilities through the implementation of sound transformation techniques on my recorded sounds, with the separate and combinatory utilization of thirteen different software programs.
- 2) It allowed me to generate three distinct categories of soundworlds: dry (airplanes, stones, wood), pitched (chanting, Greek instruments) and water sound textures. These categories would then define the identity of each one of my works and the links of each one of my works to specific aspects of Greek culture, but they would also pose as a unification factor for my portfolio works as a whole.

My compositional approach for all my portfolio works was bottom up⁷. In relation to culture, my sounds are organised as follows.

Greek Instruments	Religion	Location elements related to Greece	Mythology
baglamas	chanting	water	water
floghera	stones	stones	wood
santouri		wood	floghera
			stones
			airplanes

Table 2: The organization of my sounds in relation to culture.

Certain sounds are used in order to refer to a real-world element in its primitive status, at a real-world or fictional location. The same types of sounds, are also utilized in a different work with a primary focus on their inherent properties, totally detached from any location references. For example, in *Land of the Sirens* (e.g. 12:06 – 12:14), rivulet flowing water soundworlds (primitive status, as found in nature) are used in order to provide information on an entirely mythological location (the Land of the Sirens). In *Hydrotrilogy – Harbour Nostalgia* (e.g. 12:56 – 12:58, 13:02 – 13:04, 13:07 – 13:09 and 13:12 – 13:14), water sounds (primitive status, as observed in a harbour) accompany the boat’s smooth sideways plunging soundworlds. In this case,

⁷ See Figure 3 on page 40.

information about an actual location is provided (harbour), in contrast to *Land of the Sirens*, where water soundworlds refer to a mythological location. On the other hand, no location information is provided regarding the use of water sounds in *Hydrotrilogy – Water Dreamcity* and *Hydrotrilogy – Bell Universe*. In *Hydrotrilogy – Water Dreamcity* (e.g. 0:00 – 0:12), strong emphasis is given in intense gestural multidirectional motions regarding the water soundworlds throughout the miniature. In *Hydrotrilogy – Bell Universe* (e.g. 4:36 – 5:14), emphasis is given to an internal dialogue formulated between low-frequency water sounds and soundworlds emerging from the tapping of the hydrophone on a glass surface. So, in this miniature, the water sounds are merely related to their intrinsic properties as well as to sounds produced by the hydrophone, and no other types of connections were made, as opposed to the use of water sounds in *Land of the Sirens*, *Hydrotrilogy – Water Dreamcity* and *Hydrotrilogy – Harbour Nostalgia*. The stones soundworlds are only used for their inherent properties in *Icarus* (e.g. 1:53 – 2:19). In addition, within the work, the stones are a key contrasting element to the continuous airplane soundworlds (e.g. *Icarus* 0:38 – 0:56). In *Hydrotrilogy – Water Dreamcity* (e.g. 0:11 – 0:13, 0:15 – 0:27 and 0:44 – 0:48), the stones are also used for their inherent properties and as they are utilised in combination with the water soundworlds, the emerging multidirectional motions are intensified dramatically. In *Land of the Sirens* (e.g. 1:47 – 1:57), the stones are inherently used as a smooth contrasting element within subsections of the first section of the work, as it will be explained in Chapter 5. In *Time Travel* (e.g. 3:05 – 3:23, 5:04 – 5:06, 5:08 – 5:10 and 5:16 – 5:18), the stones soundworlds have an external reference; they are elements utilised for the construction of the Church. This provides location information in the work, in an indirect way. In addition, here the stones are part of a building construction, so they are not in their primitive status, as opposed to the use of water in *Land of the Sirens*, where references are made to water, as found in nature. Moreover, the chanting sounds of *Time Travel* (e.g. 9:15 – 10:10) were a direct reference to the Orthodox priest's psalms in the real-world Church. Wood soundworlds are used in *Land of the Sirens* (e.g. 1:17 – 1:26) for metaphorical purposes; in order to describe a mythological construction; Ulysses' raft sailing on a rough sea. In *Hydrotrilogy – Harbour Nostalgia* (e.g. 12:40 – 13:00), actual boats constructed of wood were

recorded as they were shifting from right to left and vice versa. This provided real-world information in this miniature, so in this case, the connection was obvious and direct. The airplane soundworlds in *Icarus* (e.g. 4:49 – 4:57) are linked to real-world airplane sounds as a metaphor for the mythological Icarus. They also obtain intrinsic attributes throughout the work, as a result of the various transformational processes implemented on them (e.g. *Icarus* 4:25 – 4:42). These will be furtherly analysed in Chapter 1. Finally, in *Chromatocosmos* and *ElectroSantouri*, the baglamas and santouri soundworlds were either smoothly transformed, which led to sections where direct references to real-world instruments were made (e.g. *Chromatocosmos* 1:07 – 1:25), (e.g. *ElectroSantouri* 9:35 – 9:42), or they were heavily transformed, which led to the creations of soundworlds which will be furtherly explained in Chapter 3 (e.g. *Chromatocosmos* 0:00 – 0:22, 3:44 – 3:52 and 12:32 – 12:57), (e.g. *ElectroSantouri* 1:14 – 1:27, 3:45 – 4:20 and 12:50 – 13:17). On the other hand, the floghera soundworlds in *Land of the Sirens* (e.g. 19:00 – 20:17) were merely used as heavily transformed sound objects, so utter focus was given in the intrinsic characteristics of the instrument's sound, as it will be furtherly explained in Chapter 5.

1. *Icarus*

Icarus (7 minutes 52 seconds duration, stereo fixed media) is an electroacoustic acousmatic composition mainly created with recordings of airplane sounds. The intention was to create an acousmatic work relating to the myth of Daedalus and Icarus. It is not clear to whom the myth of Daedalus and Icarus is attributed to, but the name Daedalus was most likely accredited to one hero through the accomplishments of many different people through the years, till it was firstly noted by Homer⁸ (750 BC – 650 BC) and Ancient Greek Tragedian Euripides⁹ (480 BC – 406 BC). Later on, references to Daedalus were made by a Greek scholar, grammarian and historian called Apollodorus of Athens¹⁰ (180 BC – 120 BC), a historian from Greece called Diodorus of Sicily¹¹ (1st century BC), two Roman poets called Virgil¹² (70 BC – 19 BC) and Ovid¹³ (43 BC – 17 AD), as well as a Greek traveler called Pausanias¹⁴ (2nd century AD). According to the myth, Daedalus was an excellent inventor, working for King Minos of Crete in Knossos' Palace. He was the designer of the Palace's labyrinth where the Minotaur was kept, and he was the only one who knew how to escape. He infuriated King Minos. Eager to abandon the island, Daedalus utilized wax to create wings for himself and his son Icarus, who, disobeying his father, flies close to the sun which results in his wings melting and his falling into the sea and dying¹⁵.

⁸ Kim Williams and Michael J. Ostwald, *Architecture and Mathematics from Antiquity to the Future – Volume I: Antiquity to the 1500s*. (Basel – Switzerland: Birkhäuser Verlag, 2015), p. 38.

⁹ Ibid.

¹⁰ Charles Martindale, *Ovid Renewed: Ovidian Influences on Literature and Art from the Middle Ages to the Twentieth Century*. (Cambridge – United Kingdom: Cambridge University Press, 2009), p. 21.

¹¹ George Booth, *The Historical Library of Diodorus the Sicilian: In Fifteen Books. To which are Added the Fragments of Diodorus, and Those Published by H. Valesius, I. Rhodomannus, and F. Ursinus, Vol 1*. (London – United Kingdom: W. Mc Dowall, 1814), pp. (286 – 289).

¹² Michael C. J. Putnam, *Virgil's Aeneid: Interpretation and Influence*. (Chapel Hill, North Carolina – United States: University of North Carolina Press, 1995), p. 91.

¹³ Williams and Ostwald, *Architecture and Mathematics from Antiquity to the Future – Volume I: Antiquity to the 1500s*, p. 38.

¹⁴ James George Frazer, *Pausanias' s Description of Greece. Vol. V: Commentary on Books IX, X. Addenda*. (New York – United States: The Macmillan Company, 1898), p. 19.

¹⁵ William Smith, *Dictionary of Greek and Roman Biography and Mythology: Abaeus-Dysponteus. Vol. 1*. (London – United Kingdom: Taylor and Walton, 1844), pp. (926 – 929).

In my work I attempted to focus on this myth in a symbolic way, using airplane sounds as a metaphor for Icarus (a characteristic excerpt of an airplane seemingly falling down symbolizes the death of Icarus, 0:57 – 1:03). The stone sounds throughout the work provided information about the actual place before the escape – the stone-built labyrinth. The escape itself was depicted through the gradual metamorphosis of stone sounds to sped-up airplane sounds (2:35 – 4:40). The breathing textures section (5:15 – 6:42) was related to Icarus' reaction towards falling in the sea. At the same time, I aimed to maintain some of the original soundworlds of the actual airplane recordings, in order to attribute a stronger sense of reality to the work. For this work, apart from using the binaural microphone in order to record the airplane sounds, I also aimed to explore this microphone as a tool for recording piano sounds. The stone sounds were captured later, with a pair of condenser microphones in the studio. The work also addresses a key research question: How can real-world source sound materials be transformed variations into new identities?

François Bayle's *Toupie Dans Le Ciel*¹⁶ (1979) is an important point of reference for my work. Bayle used recorded sounds of a spinning top and electronic fluxes (through tape manipulation) that formulate micromelodies characterized by intervallic pitch relationships, as well as drone landscapes (dronescares). Although Bayle did not use recordings of real airplane sounds¹⁷ for the creation of this work, as I did so for my work *Icarus*, Bayle's sound manipulation techniques resulted in the creation of airplane-type ascending or descending contour¹⁸ spectromorphologies.

¹⁶ Bayle, F. (2002). *Toupie Dans Le Ciel*. Paris: Magison.

¹⁷ In the booklet (livret) of the Compact Disc: *François Bayle – 50 Ans D' Acousmatique* (2012), Paris: INA – GRM, the booklet authors Renouard Larivière and Thomas Baumgartner present the original sound sources utilised by Bayle for the creation of his work *Toupie Dans Le Ciel*. No reference is made to original airplane sound recordings. The French text provided by Larivière and Baumgartner, as well as the English translation provided by Valérie Vivancos and David Vaughn are presented: "La substance de cette musique extraordinaire a été élaborée à partir d'un réel son de toupie, d'un pattern mélodicythmique simple et de flux électroniques. [...]" (Larivière and Baumgartner, 2012). "The substance of this extraordinary piece of music was developed from the actual sound of a spinning top, a melodic-rhythmic pattern, and simple electronic fluxes. [...]" (Vivancos and Vaughn, 2012).

¹⁸ The opposite to ascending contour (downward motion).

Toupie Dans Le Ciel includes three different types of airplane-type soundworlds:

A1. Almost realistic airplane-type sound textures (second order surrogacy). (e.g.: 22:50 – 23:41)

A2. Less realistic airplane soundworlds than A1 (third order surrogacy). (e.g. 0:16 – 0:23 and 0:35 – 0:42 and 0:50 – 0:53)

A3. More abstract airplane-type soundworlds, in comparison to A1 and A2 (remote surrogacy). (e.g. 12:33 – 13:22 and 21:25 – 21:46)

In contrast to *Toupie Dans Le Ciel*, I utilized my actual airplane sounds in a different way. The work starts with totally abstract airplane sounds as background elements (0:00 – 0:20) (remote surrogacy). Here, certain frequencies were isolated from the frequency spectrum of the original airplane sounds, through the use of IRCAM's AudioSculpt. I then utilized original airplane sounds (0:19 – 0:57) (second order surrogacy), followed by less realistic airplane sounds during the 'imitation' of the 'falling' plane sound texture (0:57 – 1:02) (third order surrogacy). Superimposed original airplane sounds follow (1:20 – 1:39) (second order surrogacy). A GRM Tools filter was used for the creation of the downwards motion of the transformation (1:40) (remote surrogacy). From 1:44 – 1:56, an original airplane sound is heard in the background (second order surrogacy). Afterwards, the airplane sounds become very abstract, when heard in fast-forward, gradually replacing the pointillistic¹⁹ stone sounds. This is observable from 3:48, although it cannot be determined at which exact point these soundworlds emerge. This was a deliberate compositional decision, in order to create a smooth transition between the pointillistic stones soundworlds and the abstract airplane sounds in fast forward motion (3:48 – 4:43) (remote surrogacy). An original airplane sound (4:45 – 4:58) (second order surrogacy) links the fast-forward motion airplane sounds with the next section, which is the most abstract section including airplane sounds within the entire work, as the 'breathing sound textures' are omnipresent (4:58 – 6:41) (remote surrogacy). Finally, a sixth original airplane sound in slight fast-forward motion is heard (6:41 –

¹⁹ "In pointillism, the line disintegrates into a sequence of pitches separated by large skips [...]. This allows each tone to emerge with a unique, pristine character. [...]" (Pearsall, 2012).

6:49) (second order surrogacy), leading to the last section of the work which includes superimposed slightly less realistic airplane sounds in fast-forward motion (6:52 – 7:50) (third order surrogacy), but not as rapidly as in (3:48 – 4:43).

In his work *Toupie Dans Le Ciel*, Bayle utilized the spinning-top sounds in order to create the more realistic and more abstract airplane-type soundworlds. In my work *Icarus* I followed the opposite process. Starting from realistic airplane soundworlds (real – world soundworlds) (e.g. 0:50 – 0:57), I then developed less-realistic airplane soundworlds, which still retain the spectromorphological properties of airplane sounds but have gone through transformation processes such as filtering or implementation of pitched reverberation to non-pitched airplane soundworlds (e.g. 0:20 – 0:49). Finally, I utilized the recording of a taxiing airplane in combination with the use of the GRM Bandpass filter in order to generate the ‘human – breathing’ soundworlds, which is the most abstract section of the work (e.g. 5:33 – 5:45). *Icarus*’ reaction towards falling in the sea is symbolized by the ‘human – breathing’ soundworld section and this is a characteristic example of how the work is related to the Myth of Daedalus and Icarus. The above information refers to sections of *Icarus* and *Toupie Dans Le Ciel* which concern treatments of original airplane sounds / airplane-type soundworlds, and to compositional approaches corresponding to these specific sections. This information can be summarized in Figure 2.

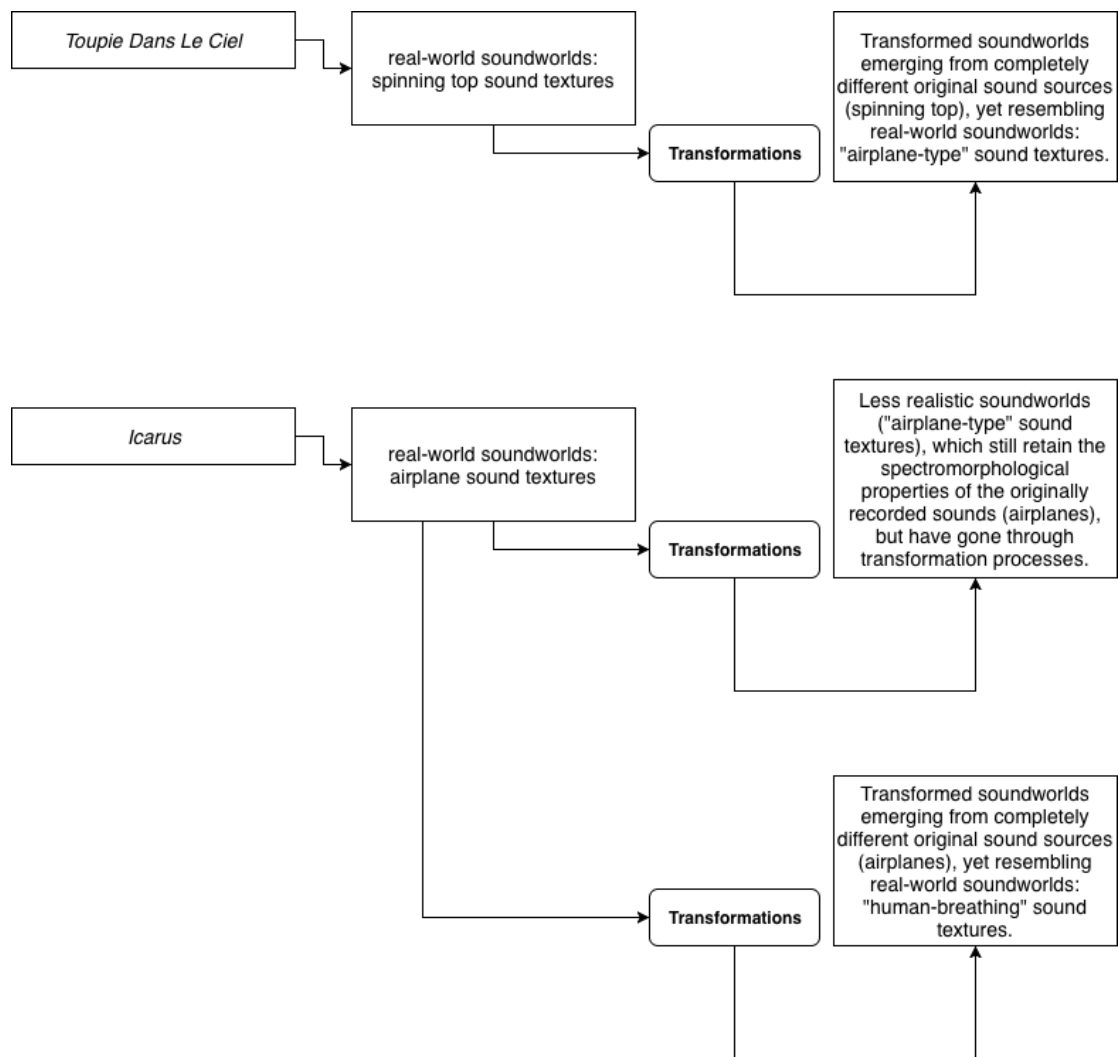


Figure 2: Representation of the different ways that original airplane sounds/airplane-type soundworlds were treated in *Icarus* and *Toupie Dans Le Ciel*.

In terms of spectral density and occupancy, there is a similarity in the sections of Bayle's work which include the electronic flux micromelodies and the sections of my work which include the stone soundworlds (e.g. 2:15 – 2:21). On the other hand, the transformed background piano soundworlds of *Icarus* (e.g. 1:06 – 1:20) have more dynamic and flexible contour energy of motion through spectral space than the dronescapes of Bayle's work. Furthermore, I superimposed stone sounds over abstract background piano soundworlds (e.g. 1:06 – 1:19) with the difference that a gradual contraction occurs in the stone soundworlds' spectromorphologies (e.g. 1:10 – 1:19).

The re-identification of the airplane sounds as 'human-breathing' soundworlds answers the key research question: How can real-world source sound materials be transformed variations into new identities?

Icarus's reaction towards falling in the sea is symbolized by the 'human-breathing' soundworld section and this is a characteristic example of how the work is related to the myth of Daedalus and Icarus.

2. Hydrotrilogy

Hydrotrilogy (16 minutes 8 seconds duration, stereo fixed media) consists of three miniatures. The hydrophone was used as the sole recording device. Since all the recordings were in mono format, two different techniques were implemented in order to produce sounds in stereo image.

First of all, application of high-pass and low-pass filters were implemented in all the recordings, in order to cut-off unwanted low and high frequencies respectively and in order to detail the clarity of the sounds. Secondly, two additional approaches were put into practice.

Duplication of the selected mono sounds in Pro Tools involved left panning of the original mono sound layer and right panning of the duplicate mono sound layer. Afterwards, a slight relocation of either the original or the duplicate mono sound layer was applied. This allowed the creation of a virtual 'stereo-image'. The final step was to group these two waveforms into a single waveform file and re-bounce it as a solid 'stereo-like' file. I also used selected mono sounds as input in the GRM Shuffling tool within Pro Tools. Shuffling allows the creation of stereophonic, granulated and delay transformations depending on the type of the sound input and the type of the selected preset. In addition, I could apply pitch transformations as well as alterations in the spectral density of the inputted sound. This latter approach allowed for a better spatialisation of the sounds within the stereo spectral space but a lack of clarity could also be observed in comparison to the original sound input source due to the sound fragmentation algorithms applied by GRM. The work also addresses a key research question: How can real-world source sound materials be transformed variations into new identities?

Hydrotrilogy – Water Dreamcity (0:00 – 3:55) is an exploration of the natural world of a wide range of flowing multidirectional water soundworlds. I was fascinated by

Parmegiani's use of water-drop textures in *Aquatisme*²⁰ (1986) as well as his use of dry pointillistic watery²¹ textures in continuous motion at various speeds). For the *Water Dreamcity* miniature I utilized watery textures that were captured by the hydrophone, resulting in the production of sounds that explored the watery textures 'from within' and soundworlds like 'morphing²² gelatin²³' (e.g. 0:00 – 0:09). The hydrophone was placed in a washing basin and in a bathtub. In addition, during the recording process, beach stones, wooden small toys, metallic objects and pencils were thrown in the washing basin which was filled with water. Sounds of emptying the washing basin were also recorded, resulting in the creation of 'swallowing²⁴ water' and flowing water textures. A detailed selection of materials generated through Sapling²⁵ was utilized as a compositional tool for a large part of this miniature. Each of the non-water recorded sound textures was inserted in Sapling which generated randomized sound results through mixing four separate input channels. The water soundworlds were superimposed at a later stage during the production of the miniature (e.g. 0:00 – 0:30).

A degree of ambiguity was created in the work by the superimposition of solid sound objects (stones) over the 'morphing gelatin' soundworlds. The spectromorphologies emerging as a result of this sonic ambiguity in *Water Dreamcity* are characterized by 'gelatinous flocking²⁶' (e.g. 0:13 – 0:19). Moreover, I was intrigued by the fact that in *Aquatisme* Parmegiani utilized pitched non-watery soundworlds to mimic the movement of water drops, either in high-volume short phrases which are characterized by non-continuous motion as well as very brief continuous motion

²⁰ Parmegiani, B. (2000). *La Création Du Monde*. Paris: INA-GRM.

²¹ In my commentary, I utilize the term 'watery' for transformed sound textures that resemble water soundworlds. (Paraphrased from Smalley, 1997).

²² Constantly changing.

²³ Non-continuous collective rapid motion of dense dry microelements. The onsets/attacks and terminations are aggressive and the aspect of collective motion is brought into surface. The dry microelements are seemingly thrown onto a semi solid gummy surface. The gummy surface is characterized by continuous motion and fluctuations in spectral space occupancy. (Paraphrased from Smalley, 1997).

²⁴ The exact opposite of throw/fling. A synonym of 'swallowing' could be 'absorption of water sound textures from within'.

²⁵ Sinecube. Sapling | Audio File Remixing. [online]. Available from: <http://sinecube.com/blog/software/sapling-audio-file-remixing/> [Accessed: 15 Feb. 2015].

²⁶ Collective motion of semi-solid microelements.

sections or low-volume rapid-motion beeping²⁷ textures of longer time duration. In *Water Dreamcity* there are sections where pitch content appears through the use of the water textures themselves (e.g. 1:24 – 1:39 and 1:52 – 1:59) and sections where pitch resonance was applied on the watery textures (e.g. 3:03 – 3:43). All the pitch information emerges from the use of transformed or non-transformed water textures.

Hydrotrilogy – Bell Universe (4:00 – 10:42) is an exploration of the interior soundworld of bell-type sounds which all emerged from the hydrophone itself. In effect, the hydrophone was used as a musical instrument. It was inserted in a glass which contained water and alcoholic or non-alcoholic drinks of different density, such as cola or whiskey. The soundworlds in this miniature all emerge from the tapping of the hydrophone onto the glass surface, from both the inside and the outside of the glass. When water was inserted in the glass, the ‘dinging’ sound created by the tapping of the hydrophone on the glass surface had a stable pitch. On the other hand, once a liquid of different density than water was inserted in the glass (e.g. cola), the resulting ‘dinging’ sound was characterized by spectromorphological ascending contour with a prolonged continuant; sounding like a pitch-bend harmonically ascending scale without any intervals, whose continuant was ‘stretched’ upwards during the spectromorphological ascension. Depending on the density of the liquid, the frequency of the ascending bell-type soundworld varied.

In addition, the hydrophone was inserted into mud in a small flower pot. The sounds of the hydrophone moving within the mud at different speeds as well as sounds of the hydrophone gently hitting the bottom of the pot with mud on its overall surface were captured and used. As part of the experimentation during the recording process, the hydrophone was also placed within a glass of drinks of various densities that was then placed on a piano. Once piano keys were pressed, the hydrophone captured these pitches but depending on the density of the liquid, pitch

²⁷ A very brief resonant sound characterized by a throw and harmonicity.

transformations were automatically caused on the sounds produced by the piano keys.

Relating to this, I studied Smalley's timbral exploration of sounds in *Base Metals* (2000)²⁸. Smalley utilized a variety of recorded sounds generated by metallic objects and in this work, he mainly focused on manipulating the metal soundworlds by creating prolonged continuants which he further 'sculpted' either through dramatic volume level augmentations and diminutions or through ascending and descending contours or through rapid-motion spectromorphological endogeny or counter-endogeny, creating a mysterious, dark and evocative atmosphere characterized by continuous spectromorphological expectation.

Hydrotrilogy – Harbour Nostalgia (10: 43 – 16: 08) is place-specific (harbour) and it features an amalgam of real-world soundworlds and abstract soundworlds, with smooth transitions between them. Pitched material was also present in the abstract soundworlds sections, but it was generated through the application of pitched resonance to the hydrophone generated non-pitched sounds, leading to the emergence of new soundworlds. These new soundworlds underwent supplementary pitch transformations and this led to the creation of the abstract atmospheric soundscape at the beginning of the work.

In *Harbour Nostalgia* I created wood-like squeaking soundworlds, comparable to those in Annette Vande Gorne's *Bois*²⁹ (1986), from the artificial crackling caused by the boat during the recording procedure. I decided to take this one step further by adding pitched resonance to the generated soundworlds and by applying pitch transformations to the resulting soundworlds. This led to the harmonic introductory section (10:43 – 13:08) and ending section of the work (14:00 – 16:05). I also aimed to examine how a dry wood squeaking sound (e.g. 13:08 – 13:59) would behave when pitched resonance and transpositions are applied. I found that the transformed sounds behaved like wood squeaking sounds which were seemingly

²⁸ Smalley, D. (2000). *Sources / scènes*. Montréal: empreintes DIGITales.

²⁹ Vande Gorne, A. (1993). *Tao*. Montréal: empreintes DIGITales.

producing sound textures of pitched content through their internal motion (e.g. 10:43 – 13:08). In a way, the wooden soundworlds seemingly became ‘live’ entities producing their own pitched soundworlds. The re-identification of the original dry wood squeaking soundworlds to these newly-formed resonant wooden soundworlds answers the key research question: How can real-world source sound materials be transformed variations into new identities? Micromelodies also emerged (e.g. 11:19 – 11:22 and 15:12 – 15:15) in the form of smooth fling textural motion, due to the imposition of the pitched resonance onto the non-pitched boat sounds. Gentle background gelatinous and bubbling water textures³⁰ were also present (e.g. 10:46 – 10:48, 10:55 and 11:06). I decided, however, to focus on the crackling sounds produced by the boat and, for specific sections of the miniature, explore the application of pitched resonance on a selection of these recorded sounds.

³⁰ Semi-solid watery sound textures which emerged as a result of pitch transformations. The original water soundworlds were captured by the hydrophone which was placed on the stones surface. The hydrophone captured the effect the water sound had as it was falling on the stones surface.

3. *Chromatocosmos* and *ElectroSantouri*

This chapter explores the relationship between *Chromatocosmos* (2015), *ElectroSantouri* (2017) and my research aims. The methodological approaches taken and the arising musical and sonic language will also be discussed. The work is in stereo format and fixed media/acousmatic. The works also address a key research question: In which ways can the concept of “cultural identity” be expanded within an acousmatic work?

*Acousmatics*³¹ (*Acousmatikoi* – Ακουσματικοί) were the disciples of Pythagoras of Samos³² (580 B.C. – 496 B.C.), who required them to listen to his teachings while he was hidden behind a curtain, without being seen. Only his voice was audible. Thus, emphasis was given on the contents of his words and not on his physical presence. This is where the term ‘acousmatic music’ actually comes from. The term *acousmatic* “refers to the apprehension of a sound without relation to its source.³³”

A sound object (*objet sonore*) is a concept founded by Pierre Schaeffer (1910 – 1995). A sound object is “the coming together of an acoustic action and a listening intention.³⁴” A broader approach was taken by Curtis Roads, who defined the sound object as “any sound within stipulated temporal limits³⁵”.

³¹ Brian Kane, *Sound Unseen: Acousmatic Sound in Theory and Practice* (Oxford – United Kingdom: Oxford University Press Inc., 2014), p. 48

³² Richard D. McKirahan, *Philosophy Before Socrates (Second Edition) An Introduction with Texts and Commentary* (Indianapolis, Indiana – United States: Hackett Publishing Co, Inc., 2011), pp. (79 – 111).

³³ Trevor Wishart and Simon Emmerson, *On Sonic Art (Contemporary Music Studies)* (London – United Kingdom: Routledge – Taylor & Francis Group, 1996), p. 130.

³⁴ Pierre Schaeffer, *Treatise on Musical Objects: An Essay across Disciplines* (Berkeley, California – United States: University of California Press, 2017), p. 213. Schaeffer gave this definition to the *sound object* in 1966, in his book: *Traité des Objets Musicaux: Essai Interdisciplines*. In 2017, the book was published in English for the very first time, under the title: *Treatise on Musical Objects: An Essay across Disciplines*.

³⁵ Curtis Roads, *Microsound* (Cambridge, Massachusetts – United States: The MIT Press, 2001), p. 17.

A concept emerging from the sound object is *reduced listening* “which concentrates on the sound for its own sake, as *sound object*, independently of its causes or its meaning.³⁶”.

“*Source bonding* is the natural tendency to relate sounds to supposed sources and causes [...].³⁷” The *intrinsic* characteristics of a sound object examine its function within the piece. The *extrinsic* features are related to a range of concepts surrounding the work, i.e. cultural references. The intrinsic and extrinsic features are linked via source bonding.

When recorded sounds are directly related to musical or environmental sources that depict a specific cultural aspect of a country, this leads to the creation of *Cultural Sound Objects*.³⁸

Chromatocosmos (17 minutes 37 seconds duration, stereo fixed media) is an electroacoustic piece which is based on original baglamas recordings. Baglamas is a traditional Greek Instrument which has its roots in an ancient Greek instrument called pandoura. Thanks to its touchette (angular shape), it provided great potential to the instrumentalist to perform phonetic and organic passages which accompanied single pitches, which led to the creation of plural *melismata*³⁹, and in spite of the fact that it only consisted of three strings, a greater number of pitches could be produced by the pandoura, in comparison to other Greek chordophones with more strings, such as the lyre⁴⁰. In my work I made an attempt to explore the characteristics of the instrument and its relation to history and Hellenic culture via acousmatic music. The

³⁶ Simon Emmerson, *Living Electronic Music* (Farnham – United Kingdom: Ashgate Publishing Limited, 2007), p. 5. Michel Chion originally gave this definition in 1983, in his book: *Guide des objets sonores: Pierre Schaeffer et la recherche musicale*. (p. 18). The English translation of Chion’s definition on *reduced listening* used in my commentary, has been made by Emmerson in 2007, in his book: *Living Electronic Music*. In 2009, Chion’s book was translated in English for the first time by John Dack and Christine North, under the title: *Guide to sound objects*. This downloadable version is available online: https://monoskop.org/images/0/01/Chion_Michel_Guide_To_Sound_Objects_Pierre_Schaeffer_and_Musical_Research.pdf [Accessed: 24 Mar. 2015].

³⁷ Denis Smalley, “Space-form and the acousmatic image.”, *Organised Sound*, vol. 12, no. 1, (2007), pp. 35 – 58; here, p. 37.

³⁸ Blackburn, M. (2010). Electroacoustic Music Incorporating Latin American Influences: A consideration of implications, reception and borrowing. [online]. Available from: https://econtact.ca/12_4/blackburn_influences.html [Accessed: 22 May 2017].

³⁹ Ornamental phrases of several notes.

⁴⁰ Thomas J. Mathiesen, *Apollo’s Lyre: Greek Music and Music Theory in Antiquity and the Middle Ages* (Lincoln, Nebraska – United States: University of Nebraska Press, 1999), pp. (284 – 285).

work has references to melodic lines widely used by baglamas performers but is mainly an attempt to recreate a new sonic world. I also aimed to use the instrument in innovative ways, from the recording process (using sounds emerging from the chording of the instrument) to the development process (applying a wide range of transformations which would push the sound in new directions). The addition of background sounds emerging from the baglamas through various transformations creates a constant dialogue with the foreground sounds. The various sonic colours observed as the piece evolves justify its title.

ElectroSantouri (14 minutes 12 seconds duration, stereo fixed media) is an acousmatic work including transformed soundworlds emerging from a traditional Greek instrument called santouri. The santouri sound samples and melodic phrases that I recorded were generated by professional Greek santouri performer Panayiotis Vergos in his studio in Athens, Greece. Proper permission has been given by the performer in order for me to utilize any of the recorded materials for the composition of my work. The santouri is mainly used for traditional ceremonies such as weddings or Hellenic island feasts. I decided to make use of this instrument in a totally different way, by exploring its pitch and gestural possibilities and by using its idiomatic sound as a basis for transformed soundworlds. Greek composer Orestis Karamanlis created a live electronics work in 2008 called *Χάος!*⁴¹ (*Chaos!*) where he utilized the santouri through live performance as well as soundworlds emerging from stones and other materialistic sounds he produced and recorded in a cave, transformed in real time using SuperCollider. In *Χάος!* the santouri was used as a live instrument and heavy sound transformations also occurred in real time. Original santouri sounds were also present. In opposition to Karamanlis' work, *ElectroSantouri* is a work for fixed-media which only features fully transformed sound textures emerging from the santouri instrument. No other original sound sources were used, as opposed to *Χάος!*.

⁴¹ Karamanlis, O. (2013). Orestis Karamanlis' stream on BandCamp. [online]. Available from: <https://orestiskaramanlis.bandcamp.com/track/>- [Accessed: 12 Dec. 2015].

In his work *Concerto para Computador e Orquestra*⁴² (2000) the Brazilian composer Rodolfo Nogueira Coelho de Souza made use of traditional local instruments and created, through the use of modern technologies, a wide range of transformations emerging from these instruments. In addition, he made reference to aspects of Brazilian culture, including religion and martial arts, and he transferred specific melodic schemes and traditional rhythmic patterns from traditional Brazilian instruments to other orchestral instruments. In my works *Chromatocosmos* and *ElectroSantouri* I attempt to create links to the ways the baglamas and santouri are related to aspects of Greek culture. The transformations themselves create melodic contours which have a direct reference to the way these instruments are performed, but with totally different timbral and gestural attributes (e.g. *Chromatocosmos*: 3:45 – 4:20, example 1 and *ElectroSantouri*: 9:35 – 9:42, example 2). In addition, I also made an attempt to re-identify original baglamas and santouri soundworlds with other identifiable or abstract soundworlds which led to the creation of soundworlds which are totally detached from the original concepts of tradition, either in terms of melody (e.g. *Chromatocosmos*: 5:05 – 5:40, resonant melody in C minor, example 3; and *ElectroSantouri*: 7:44 – 7:57, resonant melody in F# major, example 4), or in terms of innovative textural and gestural soundworlds, such as the bubbling water sound textures in *ElectroSantouri* (e.g. 3:45 – 4:20, example 5), or the dinging textures in rapid motion in *ElectroSantouri* (e.g. 1:09 – 1:20, example 6), or the harmonic dinging resonant textures in C minor in *Chromatocosmos* (e.g. 6:00 – 6:30, example 7) and the harmonic resonant pinches⁴³ in *Chromatocosmos* (e.g. 12:37 – 12:57, example 8). The significance of the expansion of the “cultural identity” concept, as far as the works *Chromatocosmos* and *ElectroSantouri* were concerned, was the fact that traditional concepts concerning the performance of the santouri and the baglamas got interpreted in inventive ways, such as examples 1 and 2, but at the same time, a link to the Greek tradition was maintained through this reinterpretation, as described above. In addition, the expansion of the “cultural identity” concept took the works *Chromatocosmos* and *ElectroSantouri* to new

⁴² Coelho de Souza, R.N. (2000). *Concerto para Computador e Orquestra*. Provided by Rodolfo Nogueira Coelho de Souza: rcoelho@usp.br on: [4 Feb. 2018].

⁴³ Tweaks; similar to the gestural movements of a pizzicato.

boundaries by producing new soundworlds, such as examples 3, 4, 5, 6, 7 and 8, which were totally detached from any sort of link to Greek tradition. This could be considered as part of an altered “cultural identity” where re-identified real-world and abstract sounds emerged as a result of the heavy transformational procedures.

Chromatocosmos and *ElectroSantouri* do not include sections consisting of original instrumental sounds. Structurally, the works feature repetitive *leit motifs* forming melodies or rapid motion micromelodies: (e.g. *Chromatocosmos*: 0:36 – 0:47, 3:04 – 3:19 and 3:24 – 3:33; and *ElectroSantouri*: 9:16 – 9:22 and 9:35 – 9:42). Furthermore, *Chromatocosmos* explores the textural and gestural characteristics of the baglamas instrument (e.g. 1:16 – 1:20, resonant pitch-bend). For this work I followed a *bottom-up* compositional approach, that allowed me “to engage in improvisation and experimentation with the machine and store promising musical materials. Then at a later stage, these materials are developed into larger passages, musical structures and so forth. This is the *bottom-up* approach because these smaller sections, created by or with the Computer, function as the foundation for building larger musical sections. Higher level musical sections are composed (with or without the aid of the Computer) by extending these smaller segments to form the entire piece.”⁴⁴ See Fig. 3.

⁴⁴ Eduardo Reck Miranda, *Composing Music with Computers (Music Technology)* (Waltham, Massachusetts – United States: Focal Press – Routledge – Taylor & Francis Group, 2001), pp. (9 – 10).

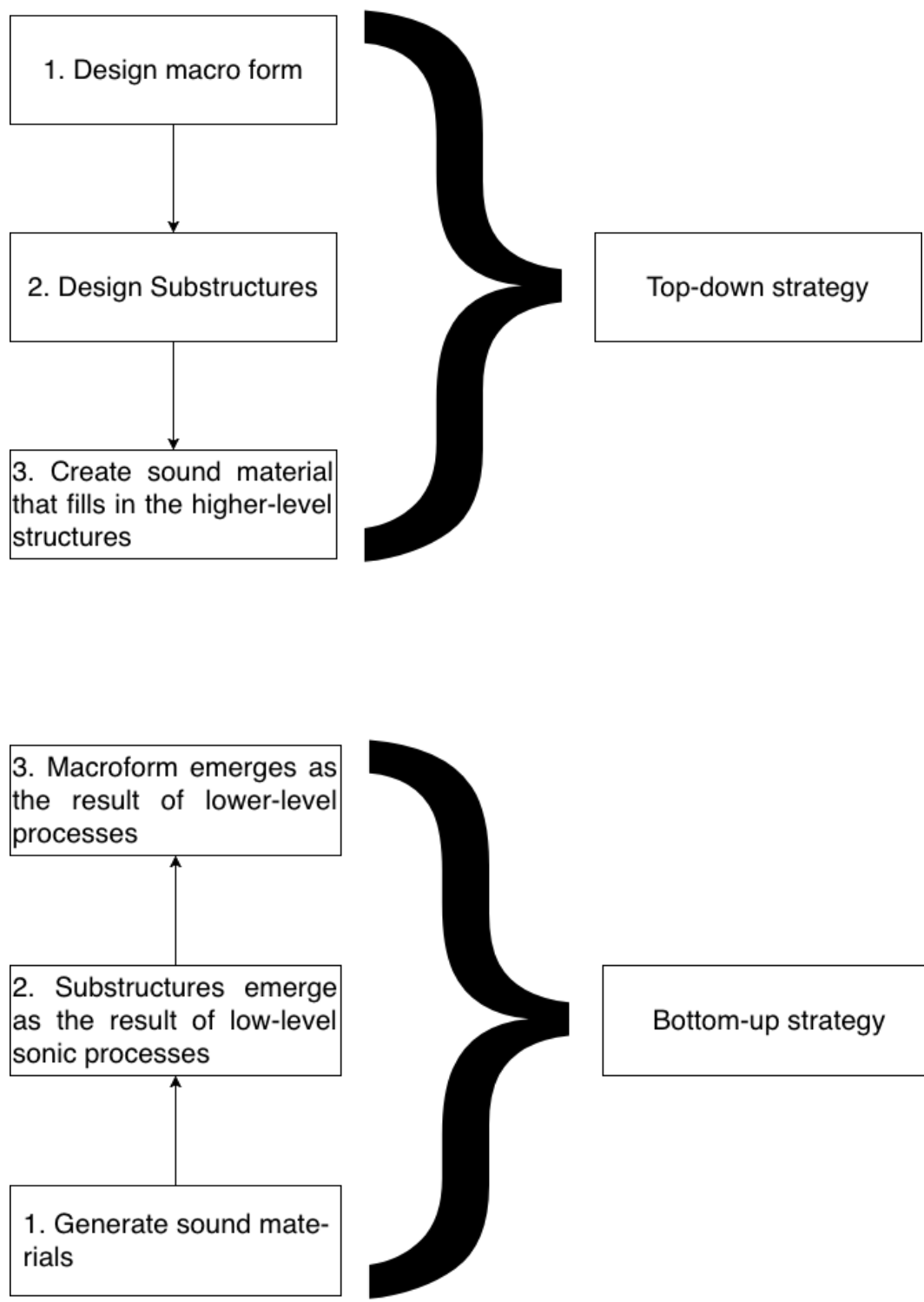


Figure 3: Top-down and bottom-up strategies⁴⁵

⁴⁵ Curtis Roads, *Composing Electronic Music. A New Aesthetic*. (Oxford – United Kingdom: Oxford University Press Inc., 2015), p. 291.

In addition to that, a melodic line appears in *Chromatocosmos* (e.g. 3:45 – 4:20). I used this line as a direct reference to the traditional way in which the instrument is performed – extensive use of the augmented 2nd sequence is characteristic in traditional Greek instrument performance – but although the sound texture itself emerges from the instrument, its timbral and pitch characteristics are totally transformed.

The mambo elements in Rajmil Fischman's electroacoustic piece *Alma Latina*⁴⁶ (1996) function as references to Latin American dance forms. The uses of these interpositions led to the formation of a strong cultural identity within the work⁴⁷. In contrast, Argentinian composer Mario Verandi used sounds from Brazilian traditional percussion instruments for his work *Evil Fruit*⁴⁸ (2000). He utilized these instruments merely for their *spectral components* as he was not familiar with the Brazilian cultural background. In his words, these sounds were used as “a point of departure to develop something different”⁴⁹. Similarly, in *Chromatocosmos*, I used the baglamas as a point of departure to develop something different, either by creating rapid-motion gestural transformations by retaining the timbral characteristics of the instrument (e.g. 0:33 – 0:37), or by creating a melodic line based on traditional performances but with a heavily transported sound texture (e.g. 3:45 – 4:20). In *ElectroSantouri* I used the santouri as a point of departure to develop something different⁵⁰ by creating the bubbling textures (e.g. 3:45 – 4:20), by creating the rapid-motion ‘flocking’ soundworlds (e.g. 1:00 – 1:20) or by creating the ‘violin-style’ textures (e.g. 0:33 – 0:41).

To sum up, *Chromatocosmos* and *ElectroSantouri* led to the creation of heavily transformed soundworlds that maintain the Greek cultural identity through their attributes such as the creation of the transformed baglamas melodic contour with

⁴⁶ Fischman, R. (1996). *Alma Latina*. London: Lorelt – Lontano Records Ltd.

⁴⁷ Blackburn, M. (2010). Electroacoustic Music Incorporating Latin American Influences: A consideration of implications, reception and borrowing. [online]. Available from: https://econtact.ca/12_4/blackburn_influences.html [Accessed: 22 May 2017].

⁴⁸ Verandi, M. (2001). *Orillas Distantes / Distant Shores*. New York: Electronic Music Foundation

⁴⁹ Blackburn, M. (2010). Electroacoustic Music Incorporating Latin American Influences: A consideration of implications, reception and borrowing. [online]. Available from: https://econtact.ca/12_4/blackburn_influences.html [Accessed: 22 May 2017].

⁵⁰ Ibid.

the characteristic use of the augmented 2nd movement (e.g. *Chromatocosmos* 3:45 – 4:20) and the creation of melodic lines that are linked to the original traditional way of performance of the instrument but with totally different timbral and gestural attributes (e.g. *ElectroSantouri* 9:35 – 9:42). At the same time, the real-world source materials re-identify with another sound which can either be very abstract (e.g. *Chromatocosmos*: 5:05 – 5:40) or have a high resemblance with a real-world object such as water (e.g. *ElectroSantouri* 3:45 – 4:20) or violin (e.g. *ElectroSantouri* 0:33 – 0:41). The above answer the key research question: In which ways can the concept of “cultural identity” be expanded within an acousmatic work?

4. *Time Travel*

Time Travel (18 minutes 32 seconds duration, stereo fixed media) is an acousmatic composition based on recordings of a priest's voice and a male choir in the Greek Orthodox Church of Haghia Sophia, in Athens. Proper permission has been given by the priest in Haghia Sophia Orthodox Church in Athens, prior to the recordings process. It is my personal interpretation of the experience of being in an Orthodox Liturgy, through an internal experience of seeking for salvation. Information about the actual space where the liturgy takes place is suggested throughout the piece as well. I consider this work as a 'travel' between the actual place and my own internal perception of the psalms and the mystery of the holy liturgy; using the priest's voice as a reference point. In addition, I regard this composition as a travel back in time, to where Byzantine hymns first appeared: The Church of Haghia Sophia in Constantinople.

The work is a religious-oriented piece; it uses religious references and it uses these as a departure point towards different abstract and non-abstract soundworlds, which are relevant to the specific place - The Church - either in literal ways, through the priest's voices (e.g. 9:12), or in metaphorical ways, such as the presence of beeping sounds (e.g. 7:58) which represent the omnipresence and survival of the Orthodox Church in Greece through the decades. In this work, every entity takes on a new role: the stone soundworlds which were used in order to symbolize the construction of the Church itself, were depicted in 'dragging' motion (e.g. 4:49, 4:53, 5:01 and 5:03). Two characteristic ways in which the priest's voice were presented in *Time Travel* were: (1) Emerging from a broader set of soundworlds which follow various types of textural motion (e.g. 6:41) and (2) as a central stable axis around which the different soundworlds are following various orbits of textural motion types (e.g. 6:00 – 6:14 and 12:43). The frequent use of sound 'blocks' (e.g. 1:56) represents the presence of obstacles against the transformed religious sounds (and as a metaphor in life). In other words, the sound 'blocks' pose as moments of sound which try to resist religious orthodoxy. At the same time, the use of sound blocks

contributes to the formulation of highly contrasting sections within the work, as the various types of textural motion suddenly obtain a less prominent presence as a sound block is superimposed over them (e.g. 1:56 and 3:15). The stable harmonic drone soundworlds represent salvation itself throughout the work (e.g. 3:23 and 15:20). The last section of the work (15:52 – 18:32) represents the presence of ‘evil’ and this compositional decision was made in order to create a contrasting section. In this section only, the ‘scratching⁵¹ - textured’ drones represent the ‘evil’ threat instead of salvation (e.g. 16:30 – 16:50). The work ends with spinning-motion soundworlds in rapid motion (17:05 – 18:32) which gradually fade out, symbolising the ‘extermination’ of evil. The work also addresses a key research question: How can the combination of different aspects of textural attributes – which are present in different overlapped textural layers – lead to the perception of new aspects of gestural motion or new ways of identifying specific soundworlds? What impact could this perception have on soundworlds which are related to specific aspects of Greek culture?

4.1 Characteristic key-elements, sound types, textural/gestural motions and spectromorphological concepts

Robert Normandeau's *Chorus: To the Victims of September 11th, 2001*⁵² (2002) includes characteristic soundworlds emerging from fundamental aspects of the three monotheistic religions: Judaism is denoted by the sounds generated by the shofar musical instrument, Christianity is symbolized by bell sounds and Islam is signified by the call to prayer by the muezzin. On the contrary, my work merely focusses on the Orthodox Christian religion. I used sounds from the priest in the Orthodox Christian Church in a way which could formulate a link towards Byzantine music (e.g. 9:12). However, there are also parts where the priest’s voice is heavily transformed and completely detached from its original attributes (e.g. 15:52). In

⁵¹ Soundworlds characterized by harmonicity as well as continuous push and drag textural motion and fluctuations in spectral space occupancy.

⁵² Normandeau, R. (2006). *The Art Of The Virtual Rhythmicon*. Saint Paul – Minnesota: Innova Recordings

addition, my work is also place-specific as stone soundworlds, symbolising the Church construction, were used (e.g. 3:08 – 3:23, rubbing and throwing stones soundworlds with implemented pitched resonance).

In *Time Travel*, the presence of a sound textural layer including a harmonious drone under the priest's voice in (9:12 – 10:48) creates the perception of polyphony in the priest's voice textural layer, when what actually happens is that the spectral space occupancy of the harmonious drone textural layer is wider and denser than the one of the priest's voice textural layer, and the tonality centre of the two layers is the same (C minor). In addition, the spectral space occupancy alterations occurring in the harmonious drone textural layer (e.g. 10:09 – 10:17) make this polyphony perception more effective. The perception of polyphony gives the priest's voice a hyper-real dimension and a more dominant presence and this has an impact in two levels: in terms of cultural context, it enhances the pivotal role of the priest and in terms of the work itself, it provides this section with polyphonic harmonicity; something missing from Byzantine music. This answers the key research question: How can the combination of different aspects of textural attributes – which are present in different overlapped textural layers – lead to the perception of new aspects of gestural motion or new ways of identifying specific soundworlds? What impact could this perception have on soundworlds which are related to specific aspects of Greek culture?

In *Time Travel*, the presence of sound-blocks functions in two ways: If they are examined externally, they have a static form due to their solid presence and use of high-volume sounds. If the sound blocks are examined internally, they are characterized by fluidity which is attributed to the rapid motion of the microelements that formulate them (e.g. 1:56 – 2:01). In addition, in *Time Travel*, the sound blocks are always superimposed over already existing soundworlds, but the presence of the already existing soundworlds becomes less obvious when the sound blocks are present, and at the same time this formulates a vertical concept of contrast between the presence of the sound block with its entirely different textural and gestural attributes, and the already existing soundworlds. This exists

simultaneously with the concept of contrast which is perceived horizontally and sequentially through time. The vertical contrast concerns the differences in the textural and gestural properties of the sound blocks and the already existing soundworlds. The horizontal contrast concerns the way the appearance of the sound blocks is perceived by the listener through time.

In *Chorus: To the Victims of September 11th, 2001*, the present and the past are interrelated in three different ways: 1) The use of the traditional instrument shofar (past time) informs Normandeau's compositional approach: a wide range of heavy transformations (present time); 2) For the creation of his work (present time) Normandeau was inspired by Lessing's *Nathan the Wise*⁵³ (past time) and Sophocles' *Antigone*⁵⁴ (past time) and was motivated (present time) by the concept of potential acceptance of all religions (Lessing) and destructive rationalization of violence (Sophocles); 3) the composer's rage in response to the terrorist attack of September 11th, 2001 (past time) and his hope for a unified world freed from religious conflicts and encouraged by mutual respect between different religions (present time) played a significant role for the creation of his work. In my work *Time Travel*, the present and past are interrelated through the use of the priest's voice in various transformations (present time) but the Byzantine cultural elements through the priest's psalms can still be noticed (past time). In addition, my intention to use the Byzantine hymns (past time) in order to create a work with broader religious context (present time) is another interrelation between present and past. This also answers the key research question: In which ways can the concept of "cultural identity" be expanded within an acousmatic work?

⁵³ Van Hage, K. R. A. (2014). A tool of remembrance: the shofar in modern music, literature and art. [online]. Available from: https://pure.uva.nl/ws/files/2215077/149910_11.pdf [Accessed: 23 Jul. 2017].

⁵⁴ Sophocles (2012). *Antigone*. Indianapolis – United States: Hackett Publishing.

5. Land of the Sirens

Land of the Sirens (27 minutes' duration, stereo fixed media) concerns *The Odyssey*, one of the two Epics, along with *The Iliad*, attributed to Homer. It refers to the adventures of Ulysses (Odysseus), the King of Ithaca, after the mythological Trojan War. My work focuses on the adventure of Ulysses and his men on his raft, on the island of the Sirens; the mythical island of Anthemoessa in the Tyrrhenian Sea. The work includes sound objects which mimic sounds in the original narrative (crackling boat sounds, water sounds and pointillistic micromelodies that suggest the presence of the Sirens' chants). The work also addresses a key research question: How can real-world source sound materials be transformed variations into new identities?

Two electroacoustic works in the repertoire that directly relate to *The Odyssey* are: *Escape Route – Scylla & Charybdis*⁵⁵ (2014), a live-electronic music improvisation piece (Freeman, Styring and Conway) exploring the adventures of Ulysses in Scylla & Charybdis and Cook's *Siren Song*⁵⁶ (2012) for live Soprano voice (representing the Sirens' chants) and Electronics. In contrast to these works, my work is for fixed-media and the Sirens' songs are represented through more abstract pitched resonant sound objects. Other acousmatic works also use Greek mythology as a reference point in order to focus on the concept of transfiguration: Carman's *Metamorphosis I*⁵⁷ (2008-2009) focuses on the metamorphosis of Pygmalion's statue to a female figure and Stavropoulos' *Atropos* (2003)⁵⁸ uses the mythological Atropos – which was to superintend fate instead of designating it – as a main structural element of the piece: “[...] the direction of energy [...] is supervised [...] by the

⁵⁵ Freeman, Alan. Freeman, Steve. Conway Chris. Styring, Simon. (2014). *Escape Route – Scylla & Charybdis*. Leicester (UK): Auricle

⁵⁶ Cook, C. (2012). Christopher Cook's stream on Longleaf Music (BMI). *Longleaf Music*. [online]. Available from: <http://www.longleafmusic.com/scores.html> [Accessed: 17 Apr. 2017].

⁵⁷ Carman, O. (2008-2009). *Metamorphosis I*. (unpublished music work). Provided by Oliver Carman: Oliver.Carman@liverpool.ac.uk on: [6 Jul. 2017].

⁵⁸ Stavropoulos, N. (2011). Nikos Stavropoulos stream on SoundCloud – *Atropos* (stereo reduction). Sound-Cloud. [online]. Available from: <https://soundcloud.com/nikos-stavropoulos/atropos-stereo-reduction> [Accessed: 7 May 2017].

intrinsic morphology of the sounds.”⁵⁹ The latter overtly transfigures the mythological aspect into a compositional methodology. In contrast, my work corresponds more directly to symbolising the themes and characters specifically of Homer.

Land of the Sirens takes the form of two interconnected main sections that are largely contrasted by the distinctiveness of soundworld. Section 1 from 0:00 – 11:50 and Section 2 from 11:50 – 27:00).

5.1 Section 1: Overview of structure and sound types

The first section of the work is divided in eight subsections. Subsection 1 (0:00 – 1:00) is the introductory part where chaotic drones as well as pointillistic sound objects are present. Subsections 2 (1:00 – 3:03), 4 (4:36 – 6:05), 6 (7:42 – 9:20) and 8 (10:52 – 11:50) are mainly characterized by the presence of original recorded and transformed forest wood sounds. Subsections 3 (3:03 – 4:36), 5 (6:05 – 7:42) and 7 (9:20 – 10:52) sonically contrast with subsections 2, 4, 6 and 8: more abstract and gesturally active sound materials are present in subsections 3, 5 and 7 and these are overlapped by discrete proximate and distant rhythmic schemes (e.g. 3:30). In addition, transitional passages are also present, in order to achieve a smoother change between two consecutive subsections. For instance, low-frequency continuous dragging motion characterized by smooth fluctuations in spectral space

⁵⁹ "In Greek mythology, Atropos was one of the three Moirae (the Fates): female deities who supervised fate rather than determining it. Atropos was the fate who cut the thread or web of life. She was known as the 'inflexible' or 'inevitable' and cut this thread with the 'abhorred shears'. Although the title is not directly related to the content of the work it was chosen to reflect compositional processes and their relation to sound materials. Here, the direction of energy, and the movement and positioning in time and in more general structural relationships, is supervised and characterized by the intrinsic morphology of the sounds, as opposed to being deterministically formulated. In this respect, the choice of a Moira name metaphorically indicates the acousmatic processes involved in the work's composition. Atropos is a highly abstract work and does not refer to anything outside of itself. Original recordings are not traceable in the work's sound world and although most of the material has been synthetically generated it exhibits physicality in content, character and behaviour." See: Stavropoulos, N. (2011). Nikos Stavropoulos stream on SoundCloud - Atropos (Stereo Reduction). Sound-Cloud. [online]. Available from: <https://soundcloud.com/nikos-stavropoulos/atropos-stereo-reduction> [Accessed: 7 May 2017].

occupancy (5:50 – 5:57), facilitates the transition from subsection 4 towards subsection 5.

In subsections 2, 4, 6 and 8 of *The Land of the Sirens*, I made use of real-world tree branch sounds which led to the creation of continuous heavy crackling pointillistic textures. The cracking sounds of the wooden boat are depicted by using the sounds of fallen tree branches being broken, recorded at Entwistle Reservoir (North Manchester). Some of the dry tree branch sounds were transformed to aggressive water sound textures, through the utilization of a Logic Pro delay filter called “wet splinters”, which gave a watery ambiance to the source sound material and caused an utter alteration to its original texture. By using branch sounds transformed into water soundworlds, I emphasized on the effect of sea water contact with a wooden surface – Ulysses’ raft – and tried to depict this in a hyper-realistic way. This answers the key research question: How can real-world source sound materials be transformed variations into new identities? The presence of pitched materials enhances the contrast between the recorded tree branch sounds sections and the sections that intervene between them.

5.2 Compositional methodology and analysis

The recorded tree branch sounds underwent gradual transformation processes: the application of a low-pass filter in Avid Pro Tools EQ3 (7 Band) in order to eliminate the outdoor environmental sounds and focus on the attributes of the sound-object; the imposition of pitched resonance onto non-pitched sounds with the use of Cecilia; the use of sound objects in many different transpositions in order to expand the intrinsic properties and to reveal natural internal gestures of the sound; the creation of new complex gestures using Batchelor’s Clatter; and the creation of repetitive dry pointillistic textures in rapid motion using Gersic’s Atomic Cloud – Grain Cloud Generator⁶⁰. These techniques sonically enhanced the idea of the crackling sounds

⁶⁰ Atomic Cloud. Grain Cloud Generator by Tom Gersic. [online]. Available from: <http://atomiccloud.gersic.com/> [Accessed: 4 Apr. 2017].

of the wooden boat and created *multidirectionality*⁶¹ in gestural motion. *Dilation* (becoming wider or larger) in the multidirectional gestural motion is created when many different layers of transformed wooden sounds gradually and causally create an enhanced filled-up spectral space surrounding the originally recorded sound objects (e.g. 1:15). The higher the frequency of a sound is in space, the higher its pitch is perceived by the ear. The superimposition of sounds of a wide range of frequencies (from lower to higher) over each other led to the creation of a filled spectral space. The use of predominantly low-frequency sounds led to the creation of less-occupied spectral spaces.

A sense of intrinsic aggressiveness (corresponding to the character of the narrative scene) of sound motion is created by using the original branch sounds (e.g. 1:00 – 1:12). This is a result of the real-time gestures applied to the branches during the recording process in combination with the way these gestures were shaped afterwards during the compositional process. This sense of aggressive behaviour is also suggested by the transformed versions of these sounds, including the ‘watery’ sound textures (e.g. 1:37 – 1:38, 1:39 and 2:06). A hyper-realistic dimension is thus given to the watery sounds as the water texture seems original but the gestures are attributed by a totally different entity (tree sounds).

Subsection 1, which includes structural units of harmonicity (e.g. 0:50 – 1:10), is re-elaborated as a background layer over subsections 2, 4, 6 and 8. This contributes to a sense of coherency across the work. Formal contrasts, however, are created by differences in activity levels between subsections: 1 and 3 (with incidences of soft drag motion, e.g. 4:22 – 4:25); 5 (containing compacted multidirectional discontinuous motion with causal appearance and disappearance, e.g. 7:13 – 7:33, and onsets followed by smooth low-frequency growling prolongations⁶² which fade out, e.g. 7:01 – 7:02 and 7:03 – 7:06); 7 (less activity); 2 and 4 (featuring smooth spiral texture motion, e.g. 4:41 – 4:43); and 6 and 8 (increased activity through

⁶¹ “Bi/multidirectional motions create expectations, and most have a sense of directed motion. They can be regarded as having both gestural and textural tendencies, and could be large structures in themselves.” (Smalley, 1997).

⁶² Streaming of low-frequency repetitive dry sound elements in semi-rapid dragging motion.

onsets followed by decelerated prolongations which vanish gradually, e.g. 10:52 – 10:54 and 10:55 – 10:56).

This provides the piece the opportunity to move gently between filled-up spectral spaces (subsections 2, 4, 6, 8) and less-occupied spectral spaces (subsections 1, 3, 5, 7), although a sense of continuity throughout the entire part is also present in order for it to maintain its identity. In addition, the contrast between subsections allows the work to breathe as the activity and tension built dissolves into slower gestural motions and this results in a rising/falling flood-tide textural movement as tension is built and released.

5.3 Section 2

Dhomont's use of instrumental soundworlds in his work *Citadelle Intérieure*⁶³ (1981) is an important point of reference for the approach I took in Section 2. The soundworlds Dhomont uses are sometimes characterized by harmonicity, slow motion and continuity and they provide a mysterious atmosphere – the use of ascension and descension in textural motion contributes to this – and a sense of expectation. In addition, his use of distinct soundworlds in the work create strong contrasts, e.g. where dry rapid-motion spectromorphologies are balanced by intervals of silence or anacrusis, is observed in spectromorphologies consisting of 'human voice' (attack – impulse) onsets.

Normandeau's *Erinyes*⁶⁴ (2001) utilized male and female actor's voices together with tape delay as well as amplification techniques, in order to depict a mythological entity: The Erinyes. According to Greek mythology, the Erinyes were protecting human subsistence and penalized evildoers.⁶⁵

⁶³ Dhomont, F. (1996). *Sous le regard d'un soleil noir*. Montréal: empreintes DIGITales.

⁶⁴ Normandeau, R. (2001). *Claire De Terre*. Montréal: empreintes DIGITales.

⁶⁵ Talfourd Ely, *The Gods of Greece and Rome* (Mineola, New York – United States: Dover Publications, 2003), p. 208.

The textural motion in this work is mainly characterized by slow pace and prolonged continuants but at the same time, the voices are ‘explored from within’⁶⁶. In contrast to Normandeau’s work, apart from using a traditional Greek instrument to represent the voices of the Sirens (instead of recording human voices), in my own work there is also a double significance regarding the presence of the transformed floghera soundworlds in subsection 9 of section 2: the transformed floghera soundworlds could either be perceived as ‘bird’ resembling soundworlds (indication of space/place), or as the Sirens’ voices (presentation of mythological action).

5.3.1 Overview of sound types and behaviours in Section 2

Section 2 of *Land of the Sirens* reinterprets aspects of section 1 through the evocation of new soundworlds and soundworlds which reappear as leit-motifs, bringing to the work a sense of identity within each section and coherency as a whole. The primary sound types are: floghera textures, slippery/dinging micro-elements, elements of water, unprocessed dry wood crackling sounds, bell sounds, pitched drops, beeping sounds, transformed church organ sounds, and repetitive dry pointillistic ticking⁶⁷ sound textures in rapid motion. Of note, original water sounds that I recorded in Entwistle Reservoir play a more significant role in section 2 and a highly contrasting part contains transformed sounds of a traditional Greek instrument called floghera (a traditional wind instrument that belongs to the Hellenic pastoral music instruments and has its origin in an ancient Greek instrument called syrighx, which originates back to the classical period). The floghera material was developed using the BEAST Tools Clatter module – followed by a stereo down-

⁶⁶ “The principal sound treatment was designed to bring out the primitive nature of the voice — the interior resonance that is so deeply rooted in the human unconscious. This treatment is called “freeze.” At first glance this may seem absurd, given that music is something that exists in time, but the computer allows the composer to stop time. Voices can be ‘frozen’ and thoroughly explored from within. *Erinyes* is the fourth piece in the Onomatopœia cycle (the three preceding pieces being *Éclats de voix*, *Spleen*, and *Le renard et la rose*.” See: Normandeau, R. (2001). Robert Normandeau’s commentary on *Erinyes* in ElectroCD. [online]. Available from: https://www.electrocd.com/en/oeuvre/13832/Robert_Normandeau/Erinyes [Accessed: 7 May 2017].

⁶⁷ Semi-rapid motion of dry microelements characterized by brief and semi-aggressive throw onset/attacks.

mix in REAPER⁶⁸ – and was subsequently transposed in wide ranges of pitch using MAGIX Sound Forge.

In contrast to section 1, section 2 did not follow the [A – B – A] repetitive structure (where [A] was formed of transformed watery/branch sound subsections, repetitively fading in/out among abstract reverberant subsections [B]). Section 2 was developed in a non-repetitive way, where materials from each subsection were rarely reused in different subsections, and even if they were utilized, they didn't make their appearance/disappearance in regular time intervals, as opposed to section 1. The beeping – sounds were reused for the epilogue of the work.

The characteristic behaviours of sonic and musical materials in section 2 are detailed (with examples) as follows:

1. Dissipation (disintegrating/dilution/dispersing) 17:08 and 22:56 – 23:01.
2. Harmonicity (harmonic sound textures) 24:53 – 25:20. Background piano sound textures in A minor.
3. Endogeny (smooth growing from the inside) 26:14 – 26:22. Transformed church organ textures using delay effects resulting in 3rd order surrogacy.
4. Flocking (collective motion of 'slippery/dinging' microelements) 16:54 – 17:00 and 23:32 – 23:50.
5. Emptiness (spectral gaps) 18:07 – 18:20.
6. Plenitude (filled spectral space) 25:47 – 26:12.
7. Insertion of smooth pointillistic background sound objects 24:44 – 24:50.
8. Pressured Onsets 15:38 – 15:46, 15:53, 15:59, 16:01 and 24:12 – 24:28 (tree branches).
9. Flow (Emergence as if the motion has always existed) 12:04 – 12:12 and 24:54 – 25:22.
10. Contraction (becoming smaller) 11:53 – 12:07.
11. Pointillistic textures 15:11 – 15:29, 15:47 – 15:58 (dry wood) and 25:37 – 25:42
12. Cyclic motion 15:29 – 15:36 (dry wood branches) and 24:51 – 25:00

⁶⁸ Cockos Incorporated. REAPER | Audio Production Without Limits. [online]. Available from: <http://reaper.fm/> [Accessed: 17 May 2017].

5.3.2 Structural analysis of Section 2

Section 2 consists of fifteen subsections, several of which overlap. In the discussion that follows, when a new subsection (N) has already begun whilst the previous subsection (P) comes to an end, the letter 'o' (overlap) is used next to the subsection (P) end time indication, in order to clarify that a new subsection has already started. At the same time, when a new subsection (N) begins before a previous subsection (P) comes to an end, the letter 'ω' (omega) is placed next to the subsection (N) start time indication, in order to clarify that even though a new subsection has started, the previous subsection is still audible. When the sound event of a new subsection (N) is a continuation of the sound event of the previous subsection (P), with no observed overlapping, the letter 'c' is placed next to the subsection (N) start time indication. The abbreviation 'σ' (meaning: to be continued) is placed next to the subsection (P) end time indication respectively.

The transformed floghera textures in the second section are of four types: 1. static drones superimposed by birds' soundworlds attacks – onsets (high-pitched sounds/fast-speed movement); 2. static drones superimposed by birds' soundworlds attacks – onsets (low-pitched sounds/slow-speed movement); 3. static drones superimposed by birds' soundworlds attacks – onsets (high-pitched sounds/slower-speed movement); and 4. static drones superimposed by birds' soundworlds attacks – onsets (high-pitched sounds/moderate-speed movement).

<p><u>Subsection 1</u> (11:50 – 11:56). Transitional between sections 1 and 2; spectral emptiness; static movement; allows the work to breathe and proceed to section 2. It also allows the gradual introduction of a totally new soundworld environment.</p>

<p><u>Subsection 2</u> (11:56 – 12:08). Transformed floghera bird-like textures.</p>
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<p><u>Subsection 3</u> (12:03ω – 12:14). Water textures.</p>
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<p><u>Subsection 4</u> (12:14 – 12:41). Rain falling on dry leaves (foreground) / subtle continuous floghera sound with superimpositions of transformed bird textures (background).</p>

<p><u>Subsection 5</u> (12:41 – 13:03σ). Church organ upbeat steps, transformed sound textures (smooth anacrusis) leading to whistling-sound shapes emerging from transformed church</p>
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organ textures, that gradually fade-out whilst subsection 6 has already started. The transformed floghera textures are still present and gradually make their presence more prominent (from 12:43 onwards) as they form the fundamental material for subsection 6: (12:49 – 12:56) and (12:58 – 13:01). Owl-like sound textures⁶⁹.

Subsection 6 (13:03c – 15:57o). Transformed floghera sounds which mostly contain low-frequency material: (13:09 – 13:14). Low frequency owl-like sound textures in slow motion. Spectromorphological emptiness is mainly present, with occasional smooth high-pitched floghera soundworlds layer additions observed. Spectromorphological plenitude is not achieved in this section though, as the smooth high-pitched floghera layer additions revert back to spectromorphological emptiness instead. These gradual transitions between spectromorphologically empty and slightly more filled-up spectral spaces are defined as smooth spectral fluctuations, and their duration varies from one second (instant) to few seconds (continuous): The use of smooth spectral fluctuations (e.g. 13:29 (instant) and 14:19 – 14:25 and 14:50 – 14:55 (continuous)) adds an element of suspense/expectation to this subsection. In addition, low-pitched sounds are mainly present. This subsection was created as a contrast to a subsequent subsection (9) which contains higher-pitched transformed floghera sound textures, characterized by spectromorphological plenitude.

Subsection 7 (15:10ω – 16:07). Dry wood crackling sounds (natural/unprocessed) and floghera fadeout. This subsection reintroduces the wood crackling sounds of Section 1 in their natural form, with no implemented transformations. This subsection is characterized by structural stasis (created by the repetitive wood crackling sounds of similar volume level and occupancy in spectral space) whilst intensity is built each time a wood crackling sound event is presented. Cyclic motion through repetition is observed in the introductory part of subsection 7 (15:27 – 15:36). For this part, during the recording process in Entwistle Reservoir, the sound of a dry branch hitting a group of dry branches in equal time intervals was captured, to imply inherent energy.

Subsection 8 (16:07 – 18:24σ). This is the only subsection in the entire work which consists of micro-chaotic spectromorphologies:

Scratching⁷⁰ (16:11 – 16:55).

Crackling in gelatin presented in parallel with the scratching sounds. The word “gelatin”

⁶⁹ Rhythmic sound textures consisting of a repetitive inharmonic sound element of brief duration. Each element is characterized by dragging textural motion. These textures have a high resemblance to soundworlds produced by owls.

⁷⁰ Soundworlds characterized by reciprocal motion. These soundworlds are perceived as being dragged onto a dry surface.

is used to highlight that the sounds are seemingly moving within a space filled with a dense liquid (16:27, 16:33, 16:37 – 16:40).

Crackling from the inside (16:44 – 16:49).

Slippery⁷¹/dinging microelements (rapid motion) (16:54 – 17:02).

Divergence/Convergence and simultaneous linear ascent/descent (17:02 – 17:07).

Smooth Anacrusis (16:50 – 16:54) leading to the rapid motion of the slippery/dinging microelements (16:54 – 17:02).

Smooth water drop texture (17:20 and 18:00).

Pointillistic ticking sound events in non-rapid motion (17:18 – 17:19).

Friction/Resistance (mutually rubbing spectromorphologies) (17:32 – 18:00). These spectromorphologies are present in concurrence with other layers.

Ascending contour (17:44 – 17:50 and 23:59 – 24:07).

Descending contour⁷² (17:15 and 17:24, 17:46 – 17:47⁷³ and 23:50 – 23:56).

Ascending bubbling spectromorphologies. These do not sound like water bubbles, so this term merely refers to their motion (17:49).

Pitched drops (17:54).

Static smooth background pitched layer (18:05 – 18:08 and 18:12 – 18:20).

High frequency resonant throw/flip (18:22).

Subsection 9 (18:24c – 23:37o). A major subsection of section 2 and the richest in spectral space occupancy. The transformed floghera material partly sounds like birds and partly sounds like mysterious voices. In addition, it provides the listener with information about the location (place/space) via the bird-like textures, and represents the mythological action (Sirens' voices). The floghera textures are characterized by high spectral density and prolonged continuants. The superimposition of higher frequency fading in and fading out in rapid motion over the high spectral density floghera spectromorphologies of prolonged continuants creates an aspect of resistance as well as the bird-like textures/Sirens voices. The superimposition of higher frequency floghera textures in rapid motion leads to spectral growth by adding to the exterior, thus exogeny (e.g. 19:35 – 19:56).

Subsection 10 (20:15ω – 20:37σ). Gradual appearance of water textures of rapid motion, leading to subsection 11. This sets the ground for the reappearance, in subsection 11, of rapid motion spectromorphologies from section 1.

Subsection 11 (20:37c – 23:03σ). Reappearance of rapid motion spectromorphologies from

⁷¹ Flocking with a small amount of resonance.

⁷² The opposite to ascending contour (downward motion).

⁷³ Present concurrently with the ascending contour (17:44 – 17:50).

section 1. These spectromorphologies are a result of a number of superimpositions of different layers from section 1. This unifies the piece as a whole, due to the direct reference to material used in section 1. In addition, floghera soundworlds from subsection 9 are still present but gradually fade out (dissolving). Contrast is created between the rapid motion spectromorphologies of section 1 and the floghera soundworlds. The spectromorphologies from section 1 become significantly sparser towards the last few seconds of this subsection, whilst they are superimposed over high frequency floghera spectromorphologies. This creates a counter-endogeny (deflation) in the textural motion (22:55 – 23:03).

Subsection 12 (23:03c – 23:33). The last appearance of floghera sound textures in the work. The characteristics are the same as in subsection 10, although the volume level in this subsection is lower.

Subsection 13 (23:33 – 25:27σ). This subsection starts with the use of the characteristic slippery/dinging spectromorphologies (23:32 – 23:50) which were previously presented (16:54 – 17:02). Micro-textures from previous subsections of sections 1 and 2 can be observed: (24:06) repetitive dry pointillistic ticking sound textures in rapid motion from section 1 and (24:07) pointillistic ticking sound events in non-rapid motion from section 2. Ascending and descending textural motion is characteristic in this subsection (e.g. descending 23:50 – 23:55 and ascending 23:59 – 24:06). From 24:11 – 24:28 dry unprocessed crackling wood sounds are present. Smooth background textures from section 1 are also explored and transformed background piano soundworlds with no attack – onset (e.g. 25:03) create a feeling of release.

Subsection 14 (25:27c – 25:38). A short subsection characterized by spectromorphological emptiness with soundworlds from section 1 heard at a distance in the background. This subsection leads to Subsection 15 which is highly contrasting.

Subsection 15 (25:38 – 27:00). The ending of the work utilized superimposed material from the entire piece. This subsection is characterized by the use of processed church organ intervallic pitches (25:40 – 25:50) creating dilation (becoming wider or larger) and contraction (becoming smaller, 26:05 – 27:00). The beeping sounds which appeared at the beginning of section 1 make a brief appearance towards the end of the work (26:39 – 26:47).

Table 3: Structure of *Land of the Sirens* – Section 2

In terms of structure, both sections 1 and 2 have the following sound objects in common: water soundworlds (e.g. section 1: (1:37 – 1:38), 1:39 and 2:06 and section 2: 12:04 – 12:14), bell sounds (e.g. section 1: 3:03 and section 2: 26:00), beeping

sounds (e.g. section 1: 0:19 – 0:56 and section 2: 26:39 – 26:47), dry crackling wood soundworlds (e.g. section 1: 4:36 – 6:05 and section 2: 24:11 – 24:28) and repetitive dry pointillistic ticking sound textures in rapid motion (e.g. section 1: 1:22 – 1:27 and section 2: 24:06). On the other hand, the following sound objects are only present in section 2: floghera textures (18:30 – 23:30), pitched drops (17:54), transformed church organ soundworlds (25:40 – 25:50) and slippery/dinging microelements (23:32 – 23:50). In addition, in section 1 only, stone soundworlds are present (e.g. 3:18 – 3:27), as well as guitar sound objects (e.g. 3:46) and dry wood sound objects with pitched resonance applied through Cecilia's Harmonizer Module (e.g. 0:50 – 1:07).

6. Conclusion

Through my PhD portfolio I investigated how different electroacoustic music compositional methods could be applied in six acousmatic compositions which were all related to aspects of Greek culture: mythology, religion and traditional Greek instruments.

Time Travel addressed how the combination of different aspects of textural attributes – which are present in different overlapped textural layers – leads to the perception of new aspects of gestural motion or new ways of identifying specific soundworlds.

In *Time Travel*, the presence of a sound textural layer including a harmonious drone under the priest's voice (9:12 – 10:48) creates the perception of polyphony in the priest's voice sound textural layer, when what actually happens is that the spectral space occupancy of the harmonious drone textural layer is wider and denser than the one of the priest's voice textural layer and the tonality centre of the two layers is the same (C minor). In addition, the spectral space occupancy alterations occurring in the harmonious drone textural layer (e.g. 10:09 – 10:17) make this polyphony perception more effective. The perception of polyphony results in the priest's voice obtaining a more dominant presence and this has an impact in two levels: In terms of cultural context, it enhances the pivotal role of the priest. In terms of the work itself, it provides this section with harmonicity at a polyphonic level; something missing from Byzantine music which is purely monophonic.

Chromatocosmos and *ElectroSantouri* examined the ways that concepts of cultural identity could be spread out within an acousmatic work. In these two works, I attempted to show how the baglamas and santouri are related to aspects of Greek culture. The transformations themselves create melodic contours which directly refer to the way these instruments are performed, but with completely different attributes in terms of timbre and gesture. In addition, I also made an attempt to

expand the concept of “cultural identity” to broader boundaries by creating soundworlds which are totally detached from the original concepts of tradition, either in terms of melody, or in terms of innovative textural and gestural soundworlds, such as the bubbling water sound textures or the dinging textures in rapid motion in *ElectroSantouri*, and the harmonic dinging resonant textures or the harmonic resonant pinches in *Chromatocosmos*. The significance of the expansion of the “cultural identity” concept, was the fact that traditional concepts concerning the performance of the santouri and the baglamas got interpreted in innovative ways, but at the same time, this new interpretation preserved the link to the Greek tradition.

In addition, the expansion of the “cultural identity” concept has set new boundaries to the works *Chromatocosmos* and *ElectroSantouri*, by producing new soundworlds, completely isolated from any sort of link to the Greek tradition.

As the portfolio work evolved, the concepts of Smalley's spectromorphology were an increasingly important informer upon the creation of my works, with specific emphasis given to textural and gestural motion and the use of multiple sounds or sonic characteristics of sound objects as single entities or organized in groups or layers. Having acknowledged that, I used these concepts as reference points for the development of my own soundworlds. In addition, I discovered that Smalley's concepts allowed me a framework in which to explore the terminologies. My main implementation was to use textural and gestural motion either in combination with adjectives which are somehow connected to real world objects or attributes of objects, in realistic or metaphorical ways, or by presenting new descriptive adjectives which are not present in Smalley's concept but are undoubtedly emerging from my understanding of Smalley's concept and the impact it had on me. In both cases, my intention was to target a clearer description of my musical language. An example can be found in Chapter 5, where I refer to crackling in gelatin presented in parallel with the scratching sounds. The word ‘gelatin’ is used to highlight that they are seemingly moving within a space filled with a dense liquid.”⁷⁴

⁷⁴ See page 55.

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Appendix: Programme Notes and Performances

Icarus

Icarus (2014): A stereo electroacoustic composition with recordings of airplanes made with the use of binaural microphones. In addition, the same type of microphones was used for recording additional sound material used for the piece, including piano, and stones sounds. This work was characterized by transitions from the real world to the abstracted and vice versa. Both pitched and non-pitched materials were used. The airplane sounds were treated in two different ways: I. They provided an actual real-world airplane soundscape. II. They were transformed and used as background sonic elements, combined with transformed piano sounds. At the same time, the stone sounds were also used as real-world soundworlds as well as abstract structures. The relationship between the actual airplane sounds and the actual stone sounds was gradually built via the smooth transitions with use of abstracted soundworlds (with use of transformations and airplane sound speed-ups) but also via sudden transitions. Consequently, abstract sounds were used as a communication bridge for two real-world sounds of different origin. Stone sounds were chosen to create contrasting textures which oppose the continuously flowing airplane sounds. The relationship between real-world and abstracted mediums was built through an internal dialogue between abstract background transformed airplane and piano sounds – which are present throughout the whole piece – and foreground real-world airplane and stone sounds. Pitched sounds were also applied to both real-world and abstracted sounds at certain sections of the work. Moreover, the transition between real-world airplane sounds and abstract sounds was also achieved by the application of filters, which led to the creation of ‘human breathing’ effects, with the proper manipulation of the sound. Finally, pitched and non-pitched materials were also used as a medium of interaction for real-world and abstract soundworlds.

Performances

- MANTIS Festival, Martin Harris Centre, Manchester, February 28th 2015

Hydrotrilogy

Hydrotrilogy (2015): In this set of three miniatures, the hydrophone was used as the sole recording device.

I. *Water Dreamcity*: An exploration to the natural world of a wide range of flowing multidirectional water textures. Only real-world soundworlds were present in this work.

II. *Bell Universe*: An exploration of the interior sound world of bell sounds (“spatial”), which all emerged from the hydrophone itself (used as a sort of musical instrument). What was hopefully achieved in this miniature, was the creation of a soundscape which was a crossover between real-world and abstract sounds.

III. *Harbour Nostalgia*: This miniature was place-specific (harbour) and it included an amalgam of real-world soundworlds and abstract soundworlds, with smooth transitions between them. Pitched material was also present in the abstract soundworlds sections.

Performances

- MANTIS Festival, Martin Harris Centre, Manchester, October 18th 2015

Chromatocosmos

Chromatocosmos (2015): An electroacoustic piece which is based on baglamas’ original recordings. Baglamas is a traditional Greek instrument which has its roots to an Ancient Greek instrument called pandoura. In my work I made an attempt to explore the characteristics of the instrument and its relation to history and Hellenic Culture via acousmatic music. The work has references to melodic lines widely used by baglamas’ performers but is mainly an attempt to recreate a new sonic world. I also aimed to use the instrument in innovative ways, from the recording process

(use of sounds emerging from the chording of the instrument) to the development process (application of a wide range of transformations which would lead the sound in new boundaries). The addition of background cinematic-style sounds emerging from the baglamas through various transformations, creates a constant dialogue with the foreground sounds. The various sonic colours observed as the piece evolves justify its title.

Performances

- MANTIS Festival, Martin Harris Centre, Manchester, March 5th 2016
- MANTIS Festival, Martin Harris Centre, Manchester, March 5th 2017
- MA/IN Festival, Duni Conservatory, Matera, December 5th 2017
- EASTN-DC: European Art-Science-Technology Network for Digital Creativity, Cosmo Rodewald Concert Hall, Manchester, June 28th 2018
- MISE-EN_PLACE Bushwick: Bushwick Open Studio Festival of New Electro-Acoustic Works, Brooklyn NY, September 30th 2018
- Ecos Urbanos Electroacoustic Music Festival, Escuela Superior de Música, Mexico City, November 22nd 2018
- WOCMAT 2018 Conference: Electroacoustic Music Concert, National Chiao Tung University - Guangfu Campus, Hsinchu city of Taiwan, December 7th 2018
- MUSICA NOVA 2018: Electroacoustic Music Competition (First Prize in Category A), Divadlo Inspirace, Prague, December 14th 2018
- DIALOGUES FESTIVAL, Saint Cecilia's Hall – The University of Edinburgh (Sound Diffusion by Professor Pete Stollery), Edinburgh, February 19th 2019
- DIFFRAZIONI Multimedia Festival, Le Murate PAC | Progetti arte contemporanea, Firenze, March 26th 2019 - March 31st 2019

Time Travel

Time Travel (2016): *Time Travel* is an acousmatic composition based on recordings of a priest's voice and a male choir in the Greek Orthodox Church of Hagia Sophia, in Athens. It is my personal interpretation of the experience of being in an Orthodox

Liturgy. Information about the actual space where the liturgy takes place is given throughout the piece as well. I consider this work as a 'travel' between the actual place and my own internal perception of the psalms and the mystery of the holy liturgy; using the priest's voice as a reference point. In addition, I regard this composition as a "travel" back to where *Byzantine* hymns first appeared: In the Church of Hagia Sophia in Constantinople.

Performances

- MANTIS Festival, Martin Harris Centre, Manchester, October 29th 2016

Land of the Sirens

Land of the Sirens (2016): *Land of the Sirens* concerns *The Odyssey*, one of the two Epics, along with *The Iliad*, attributed to Homer. It refers to the adventures of Ulysses (Odysseus), the King of Ithaca, after the mythological Trojan War. My work focuses on the adventure of Ulysses and his men on the island of the Sirens. The work includes sound objects which mimic sounds in the original narrative (crackling boat sounds, water sounds and pointillistic micromelodies that suggest the presence of the Sirens' s chants). Soundworlds emerging from a traditional Greek woodwind instrument called floghera were also utilized throughout the work.

Performances

- MANTIS Festival, Martin Harris Centre, Manchester, October 29th 2017
- DIFFRAZIONI Multimedia Festival, Le Murate PAC | Progetti arte contemporanea, Firenze, March 26th 2019 - March 31st 2019

ElectroSantouri

ElectroSantouri (2017): *ElectroSantouri* is an acousmatic work which includes transformed soundworlds emerging from a traditional Greek instrument called

santouri. The santouri is mainly used for traditional ceremonies such as weddings or Hellenic islands' local feasts. I decided to make use of this instrument in a totally different way; by exploring its pitch and gestural possibilities and by using its idiomatic sound as a basis for transformed soundworlds. A number of electronic works featuring the santouri have been composed but through detailed research I found out that in these works, the instrument was used in its natural form whereas other electronic sounds were added in the background. In opposition to these works, my work features new sound textures emerging from the instrument itself as the main compositional tool.

Performances

- MANTIS Sonification Festival and Symposium 2018, Martin Harris Centre, Manchester, March 4th 2018
- MANTIS Festival, Beer Nouveau, October 28th 2018
- DIFFRAZIONI Multimedia Festival, Le Murate PAC | Progetti arte contemporanea, Firenze, March 26th 2019 - March 31st 2019