

LIGNUM VITAE:

AN INTERACTIVE ORGANISM DESIGN OF CYBERSPACE AND
SONIC ARTS

A Master's Thesis

by

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Ankara

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To my grandmother Melahat Engin,
who will always be remembered.

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ARTS

The Graduate School of Economics and Social Sciences
of
İhsan Doğramacı Bilkent University

by
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ABSTRACT

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June 2020

This thesis aims to investigate the nature of artworks created in the scope of cyberspace and sonic art in analysis of the case artwork *Lignum Vitae*, a multimedia artwork designed to be conducted in gallery space through sonic interactivity. In light of Moholy-Nagy's *Theater of Totality* (Moholy-Nagy, 1924), the depiction of artwork as organism is closely observed and represented through the multi-disciplinary aspects of *Lignum Vitae*, along which the responsiveness of the artwork towards human interaction is explored.

Keywords: Generative Art, Interactivity, Immersion, Multi-disciplinary, Organism.

ÖZET

LIGNUM VITAE:

SİBER ALAN VE SONİK SANAT İLE ETKİLEŞİMLİ ORGANİZMA TASARIMI

ERÇEVİK, ECE

M.F.A, İletişim ve Tasarım Bölümü

Tez Danışmanı: Dr. Öğr. Üyesi Andreas Treske

Haziran 2020

Bu tez, siber alan ve sonik sanat pratiği altında çalışılan sanatsal çalışmaların araştırmasını, sonik etkileşim ile yönetilen çoğul-medya bazlı tez projesi olan *Lignum Vitae*'nin vaka incelemesi üzerinden tahkik etmektedir. Moholy-Nagy'nin Bütünlük Tiyatrosu (*Theather of Totality*) (Moholy-Nagy, 1924) ışığında, sanat eserinin organizmalaştırılması olgusu yakından incelenmekte, *Lignum Vitae* vakasının çoklu-disipliner yapısı üzerinden temsilciliği meydana getirilmekte, ve sanat eserinin insan etkileşimi karşısındaki cevap-verebilir yapısı keşfedilmektedir.

Anahtar Kelimeler: Çoklu Disiplin, Etkileşim, Organizma, Sarmalanma, Üretken Sanat.

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professionalism, discipline, work ethic, confidence, respect, resilience but she is also the person from whom I've learned how to love what I do, trust my gut and always create with a pure heart. I couldn't repay her in a million years, all I can do is to humbly try and hope to be worthy of her efforts in raising me.

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TABLE OF CONTENTS

ABSTRACT.....	ii
ÖZET.....	iii
ACKNOWLEDGEMENTS.....	iv
TABLE OF CONTENTS.....	vi
LIST OF FIGURES.....	viii
CHAPTER 1: INTRODUCTION.....	1
CHAPTER 2: YGGDRASIL TO LIGNUM VITAE: Central Harmony of Computational Living; An Ancient Monument of Cosmic Existence VS. Computational Existence of Human Species.....	7
2.1 History of Yggdrasil.....	7
2.2 Relation of <i>Lignum Vitae</i> (Tree of Life) and Yggdrasil.....	12
2.3 <i>Lignum Vitae</i> 's Central Network and Human-Computer Symbiosis.....	14
CHAPTER 3: MULTIMEDIA ART, CYBERNETIC SPACE AND ARTWORK AS ORGANISM.....	19

3.1 Computer-based Multimedia Artwork and Cyberspace.....	19
3.2 Artwork As Organism: From <i>The Total Work of Art</i> To <i>The Theater of Totality</i>	28
3.3 <i>Lignum Vitae</i> (Tree of Life) and the Theater of Totality.....	33
 CHAPTER 4: SONIC ARTS AND SONIC INTERACTION IN <i>LIGNUM</i>	
<i>VITAE</i>	37
4.1 Evolution of Sonic Arts.....	37
4.2 Sonic Interactivity & <i>Lignum Vitae</i>	50
 CHAPTER 5: THE PROCESS OF <i>LIGNUM VITAE</i>	56
5.1 <i>Lignum Vitae</i> Analysis.....	56
5.2 Documentation.....	58
5.2.1 Prototype Evolution and Torso Design Phase.....	58
5.2.2 Visual Art.....	71
5.2.3 Sound Art.....	77
5.2.4 Final Work	89
5.2.4.1 Actual Process.....	89
5.2.4.2 Virtual Process.....	102
 CHAPTER 6: CONCLUSION	107
 BIBLIOGRAPHY	110
 APPENDICES	115

LIST OF FIGURES

1. Historical depiction of Yggdrasil in Norse Mythology, Creator unknown.....	7
2. Illustration of Ursa Major, taken from <i>skyguide.org.uk</i>	9
3. Location of Ursa Major in Northern Hemisphere, Sky & Telescope Magazine, 2003.....	10
4. The Rune Table that is mentioned in the <i>Eddas</i> , Historical Linguist Channel, 2018.	10
5. Captured image from the visual art of <i>Lignum Vitae</i> , 2020.....	12
6. Illustration of Moholy-Nagy's description of artwork as organism, drawn by the author, 2020.....	31
7. Performance by William Marx of John Cage's 4'33, McCallum Theatre, CA, 2010.....	40
8. Pierre Schaeffer in his studio, 1954.	42
9. Figure 9: The Artwork <i>Osmose</i> by Char Davies, 1994.....	45
10. Performance of the sensor based interactive sound exhibition called LINES, by Anders Lind, Västerbottens Museum, Umeå, 2016.....	46
11. Performance of the sensor based interactive sound garden created by Mileece Abson, Los Angeles, California, 2014.....	47
12. Interactive light & sound exhibition called AURA, by Studio Nick Verstand, Dutch Design Week, Eindhoven, 2017.	48

13. Interactive light & sound exhibition called AURA, by Studio Nick Verstand, Dutch Design Week, Eindhoven, 2017.	48
14. Performance of the electronic musician Chagall <i>Ivory/Wintana</i> , Eindhoven, Netherlands, 2020.....	51
15. Performance of the electronic musician Chagall <i>Ivory/Wintana</i> , Eindhoven, Netherlands, 2020.....	52
16. Performance of the electronic musician and sensor designer Imogen Heap, NPR Music Tiny Desk Concert, Washington D.C., 2019.	52
17. Performance of the electronic musician and sensor designer Imogen Heap, NPR Music Tiny Desk Concert, Washington D.C., 2019.	53
18. Performance of the electronic musician and sonic artist Fedde ten Berge, <i>The Egg</i> , 2017.....	53
19. Initial drawings of <i>Lignum Vitae</i> torso and projection, drawn by the author, 2019.....	58
20. Initial torso figure for the project <i>Lignum Vitae</i> , created in 3ds MAX, 2019.....	59
21. 1st 3D prototype of the project <i>Lignum Vitae</i> , created in Lumion, 2019.....	59
22. 1st placement plan in gallery space for the project <i>Lignum Vitae</i> , 2019.....	60
23. 2nd placement plan in gallery space for the project <i>Lignum Vitae</i> , 2019.....	62
24. 1st measurements of torso cloth for the project <i>Lignum Vitae</i> , 2019.....	63

25. Laser cutting of torso skeleton for the model of <i>Lignum Vitae</i> in Bilkent University, 2019.....	63
26. Material for the model of <i>Lignum Vitae</i>, 2019.....	64
27. Tailoring of the model of <i>Lignum Vitae</i>, 2019.....	64
28. Skeleton construction of the model inside Bilkent University carpenter atelier, 2019.....	65
29. Model of <i>Lignum Vitae</i>, 2019.....	65
30. 1st interaction experiment of the artwork <i>Lignum Vitae</i>, 2019, Photographed: Volkan Acun.....	66
31. Physical model of <i>Lignum Vitae</i>, 2019.....	67
32. Illustration of the torso re-design for the 2nd placement plan in gallery space for the artwork <i>Lignum Vitae</i>, drawn by Author, 2020.	68
33. Virtual skeleton construction of the torso inside 3ds Max Software, front view & birdseye view, 2020.....	69
34. Virtual torso placement in gallery space, inside 3ds Max Software, 2020.....	69
35. Up view of virtual torso placement in gallery space, inside 3ds Max Software, 2020.....	70
36. Visual art placement onto artwork torso in gallery space, inside 3ds Max Software, 2020.....	70
37. Screen-capture from State 1 of the visual art of the artwork <i>Lignum Vitae</i>, 2020	71
38. Screen-capture from State 2 of the visual art of the artwork <i>Lignum Vitae</i>, 2020.....	72

39. Screen-capture from State 3 of the visual art of the artwork <i>Lignum Vitae</i> , 2020.....	73
40. Screen-captures from State 3 of the visual art of the artwork <i>Lignum Vitae</i> , 2020.	73
41. Screen-captures from State 3 of the visual art of the artwork <i>Lignum Vitae</i> , 2020.	73
42. Screen-captures from State 4 of the visual art of the artwork <i>Lignum Vitae</i> , 2020.	74
43. Screen-captures from State 4 of the visual art of the artwork <i>Lignum Vitae</i> , 2020.	74
44. Screen-captures from State 4 of the visual art of the artwork <i>Lignum Vitae</i> , 2020.	75
45. Screen-captures from State 4 of the visual art of the artwork <i>Lignum Vitae</i> , 2020.	75
46. Screen-captures from State 5 of the visual art of the artwork <i>Lignum Vitae</i> , 2020.	75
47. Screen-captures from State 5 of the visual art of the artwork <i>Lignum Vitae</i> , 2020.	76
48. Screen-capture from State 6 of the visual art of the artwork <i>Lignum Vitae</i> , 2020.	76
49. Screenshot of the workspace of <i>Lignum Vitae</i> in AbletonLive10.	77
50. Midi sequence of the 1st <i>Aurora Pad</i> sub-channel inside AbletonLive10.....	78
51. Plugin Table of the 1st <i>Aurora Pad</i> sub-channel inside AbletonLive1.....	79

52. Part of the Plugin Table of the 2nd and 3rd <i>Aurora Pad</i> sub-channels inside AbletonLive10.	80
53. Part of the Plugin Table of the 4th and 5th <i>Aurora Pad</i> sub-channels inside AbletonLive10.	80
54. Part of the Plugin Table of the <i>Generative Synthesizer</i> sub-channel inside AbletonLive10.	81
55. Part of the Plugin Table of the <i>Generative Synthesizer</i> sub-channel inside AbletonLive10.	81
56. Valhalla Reverb Plugin in the <i>Generative Synthesizer</i> sub-channel inside AbletonLive10.	82
57. Midi sequence of the Glitch sub-channel inside AbletonLive10.....	82
58. The Plugin Table of the Glitch sub-channel inside AbletonLive10.....	83
59. First audio sequence of the Paper Shred sub-channel inside AbletonLive10.....	84
60. The Plugin Table of the 3rd Paper Shred sub-channel before consolidation, inside AbletonLive10.	84
61. Stereo audio sequence of the Paper Shred sub-channel inside AbletonLive10.....	84
62. The Plugin Table of the Paper Shred-2 channel inside AbletonLive10.....	85
63. Audio graph of Gong sample, inside AbletonLive10.....	86
64. Audio graph of Kick sample, inside AbletonLive10.....	86
65. Audio graph of Kick sample, inside AbletonLive10.....	86
66. Audio graph of Orchestral Ambient sample, inside AbletonLive10.....	87
67. The Plugin Table of the Breathing channel inside AbletonLive10.....	88

68. The zoomed sample of NASA recording in the Plugin Table of the Breathing channel inside AbletonLive10.....	88
69. Illustration of the main principle of chain reaction in the artwork <i>Lignum Vitae</i> , drawn by Author, 2020.	89
70. Illustration of the working principle of HC-SR04 Ultrasonic Sensors, taken from <i>howtomechatronics.com</i> , 2015.	91
71. Illustration of the sensor placement plan in gallery space for the artwork <i>Lignum Vitae</i> , drawn by Author, 2020.	92
72. Illustration of the HC-SR04 Ultrasonic Sensor, connected to the Arduino Uno, taken from <i>ardumotive.com</i> , 2019.....	93
73. Example screenshots for Macro Mapping inside AbletonLive10.....	94
74. Example screenshots for Macro Mapping inside AbletonLive10.....	94
75. Sensor experimenting for the project <i>Lignum Vitae</i> , taken by the author, 2019.....	95
76. Image of the Touchdesigner Workspace for the project <i>Lignum Vitae</i>	96
77. Image of the 2D vine illustration inside Adobe Photoshop Workspace, for the project <i>Lignum Vitae</i>	97
78. Image of a part of the Touchdesigner Workspace for the project <i>Lignum Vitae</i>	98
79. Image of instancing inside the Touchdesigner Workspace for the project <i>Lignum Vitae</i>	99
80. Image of the filter-based audio-reactivity inside the Touchdesigner Workspace for the project <i>Lignum Vitae</i>	101

81. Screenshots of the Adobe After Effects Workspace for the masking process of <i>Lignum Vitae</i> , 2020.	103
82. Screenshots of the Adobe After Effects Workspace for the masking process of <i>Lignum Vitae</i> , 2020.	103
83. Screenshot of the Adobe Premier Pro Workspace for the lighting effects of <i>Lignum Vitae</i> , 2020.	104
84. Screenshot of the Unreal Engine Workspace of the project <i>Lignum Vitae</i> , 2020.	105
85. Screenshot of the Unreal Engine Gameplay Mode for the project <i>Lignum Vitae</i> , 2020.	105
86. Screenshot of the Unreal Engine Gameplay Mode for the project <i>Lignum Vitae</i> , 2020.	106
87. Screenshot of the Unreal Engine Gameplay Mode for the project <i>Lignum Vitae</i> , 2020.	106

CHAPTER 1:

INTRODUCTION

The multimedia arts and designs inside and outside the borders of the academy play an important role in the creations of virtual environments, which lay the endless possibilities of experimentation within interaction, function and aesthetics, today more so than any other period of time. It can be perceived that the sense of immersion and its artistic pursuit by human species is highly unlikely a new phenomena within arts along with the human conveyance of different realities within new narratives, as it will be covered in the following chapters, continue their pursuit through the multimedia room acknowledged as the cyberspace of today. Such pursuit of immersion can be seen through the observation of various spatial art forms, shown to us from Wagner's *The Ring of the Nibelung* (1869-76) and *Gesamtkunstwerk* to Moholy-Nagy's Japanese house inspired set design for *Madame Butterfly* (1931) and *Theater of Totality* to Krueger's *Metaplay*, and many more; all emerging from different eras in which art movements differ from one and other and yet, all of which strongly pursue the task of reaching a certain level of immersion. (Wagner, 1849; Moholy-Nagy, 1924; Krueger, 1977)

In this thesis the experimentation of immersion is a goal, through the synthesis of various domains of art and technical methodologies: Sonic Arts, generative and non-generative visual arts, spatial design and construction through data processing and

sensor conduction through body movement. The project *Lignum Vitae* is a multimedia artwork created in cyberspace and also the very aim of the artistic research of this thesis, being a multi-disciplinary experiment of a virtual experience conducted in space. *Lignum Vitae* is a virtual installation in a gallery space that is designed as a form of an experience that immerses the participants into its movement by simply taking movement data of the participants through sensors. It is based on *giving* and *receiving* as Wagner states in his work *Artwork of the Future* (1849) for describing the “Art’s need in a perfect theatrical edifice”. (Wagner, 1849). One can think of *Lignum Vitae* as a virtual plant that is watered by the participants existence as it starts to evolve and react to the participant in the space, much like a plant reacts to the movement of the sun, conducted by their movement of depth and distance to the root of the artwork, which is placed at the deep corner of the room space, so that before reaching the torso of the artwork one has to reach various depths for the sensors to receive various distance data. The reaction of the artwork to the interaction of the participant reveals itself through the synthesis of various art forms that come to be one, aiming to create a semi-directed sense of immersion in cyberspace where the participant feels both partially in control and also immersed by an outside source. The term semi-direction is crucial in the making of the artwork because although the setting and artistic process is directed by me as the artist, the use of sensors and linking the artwork to the participants movement is constructed to attain the feeling of the participant as in control of the reactions of the artwork towards their presence; thus aiming to create a mixture of active and passive feelings in the immersion of the artwork. The semi-directedness in *Lignum Vitae* is what Moholy-Nagy calls “control and organization” (Moholy-Nagy, 1924) that creates a non-chaotic immersive experience (See Chapter 3).

As aforementioned briefly, in detail the artwork is a synthesis of visual art, constructing, audio compositing, projection mapping and data processing, all of which takes the *Lignum Vitae* from a single art form and transforms it into a responsive *organism* (Moholy-Nagy, “*Theater, Circus, Variety,*” *Theater of the Bauhaus* ,1924). Although the conditions of *Lignum Vitae* are set inside a virtual reality rather than real life, this metaphorical resemblance is one of the anchor points of my own artistic perception of *Lignum Vitae* and also one of my main drives to create a partly generative artwork in cyberspace with the pursuit of answering the research question: How can an artwork created in cyberspace establish a new form of a living organism?

Lignum Vitae is an artwork inspired by the form of the mythical Yggdrasil, the tree figure that holds all the planes of existence, portrayed in Norse cosmology. It is a multimedia portrayal of the tree of life which is also where the artwork gets its name. The reason why *Lignum Vitae* is a multimedia artwork is because, it aims to represent the contemporary existence of humans in the present time, driven by the idea of mythical figure of existence of life. It aims to reflect a new light on the portrayal of existence in analysis of the modern human and her/his way of computational living. The tree of life is a metaphorical figure of a collective network, an organism that holds and connects all life in one, a central harmony of *connection*. (Murphy,2013) *Lignum Vitae* is a project born through the idea of taking these symbolisms and connecting them with cyberspace by arguing that the organic-based connection and network we encounter in history through the mythical tree figure is in fact, a synthetic one which humans have created through building an existence of

computer networks that we are symbiotically connected to. Therefore the artwork is a statement of connection and network of humans with virtuality, one that holds multidisciplinary aspects through a cyberspace organism.

Starting from the following chapter, Chapter 2: *YGGDRASIL TO LIGNUM VITAE:*

Central Harmony of Computational Living; An Ancient Monument of Cosmic

Existence VS. Computational Existence of Human Species, this thesis starts off its

focus on the main inspiration figure of the artwork *Lignum Vitae* which is the

mythical tree of life symbol found in Anglo-Scandinavian-Germanic North

mythology called Yggdrasil, it's cultural value for the cosmic existence of human

species and it's history by referencing Ronald Murphy and his work from Oxford

University Press, *Tree of Salvation: Yggdrasil and the Cross in the North* (2013) .

The significance of understanding its meaning and symbolism is important for

grasping its cultural value of central network and connection that combines all life

and becomes alive in a single embodiment that is the universe. That being said it is

the aim of this chapter to specify the bridge between the mythical figure and the

artwork of this thesis *Lignum Vitae*. Although taking inspiration from the mythical

tree of life, *Lignum Vitae* is an artwork that aims to embody its symbol as a central

network, using the source point from the modern human networks that come along

with humans' computational living, which is where *Man-Computer Symbiosis* (1960)

by J.C.R. Licklider is observed in connection to the artwork where Licklider

analyzes the collaboration between human species and computers.

Chapter 3: *Multimedia Art, Cyberspace and Artwork as Organism* deals with the

development of cyberspace as an art form by referencing the historical context from

the book *MultiMEDIA:From Wagner to Virtual Reality* (2001) edited by R.Packer and K.Jordan, along with the research question of this thesis, which connects to the artwork *Lignum Vitae* being portrayed as an organism. This is where the main source of the thesis is revealed: “*Theater, Circus, Variety,*” *Theater of the Bauhaus* (1924) by L.Moholy-Nagy. Overall, this chapter deals with *Lignum Vitae*’s connection to its methodology, and the artwork being an experiment of creating a synthetic organism in cyberspace, one that functions as a multi-disciplinary entity and reacts to human presence.

Chapter 4: *Sonic Arts and Sonic Interaction in Lignum Vitae* is based on understanding the relation of sonic art with the thesis project *Lignum Vitae* by seeking to go through historical steps in the evolution of the field and it’s definition in close analysis to; Musique Concrète and the phonographic experimentations of Pierre Schaeffer, John Cage’s practices that stand unconventional for their time by setting up the fundamentals of sonic creations, Trevor Wishart’s written work *On Sonic Art* (1996) that stands as one of the initial theories that establishes the field and finally Tony Gibbs’s *The Fundamentals of Sonic Art & Sound Design* (2007) that shows a more contemporary approach to define the field of sonic art. Later on sonic interactivity as a new emerging field is observed through Karmen Franinović and Stefina Serafin’s book *Sonic Interaction Design* (2013), as well as the analysis of sonic interaction designed in the artwork *Lignum Vitae*.

Chapter 5: The Process of *Lignum Vitae*, is the chapter where the detailed documentation and the analysis of the artwork *Lignum Vitae* is presented. The Documentation of the artwork consists of various different conductions which are the

construction of the torso and the prototype evolution from the beginning of the project planning to the final work; The visual art that is projected upon the constructed torso and it's symbolism; The sound composition that is created for the artwork which generates through human movement in space; The actual process of creating *Lignum Vitae* in a real gallery space with sensor placement; The final exhibition that is designed as a virtual experience through the 1st person walk through modeling of *Lignum Vitae* inside a virtual gallery space.

Overall, with the mentioned introductory, the thesis project *Lignum Vitae* is presented through its artistic research, inspiration sources, methodologies and technicalities with the throughout the chapters of this thesis.

CHAPTER 2:

YGGDRASIL TO LIGNUM VITAE: CENTRAL HARMONY OF COMPUTATIONAL LIVING; AN ANCIENT MONUMENT OF COSMIC EXISTENCE VS. COMPUTATIONAL EXISTENCE OF HUMAN SPECIES

2.1 History of Yggdrasil

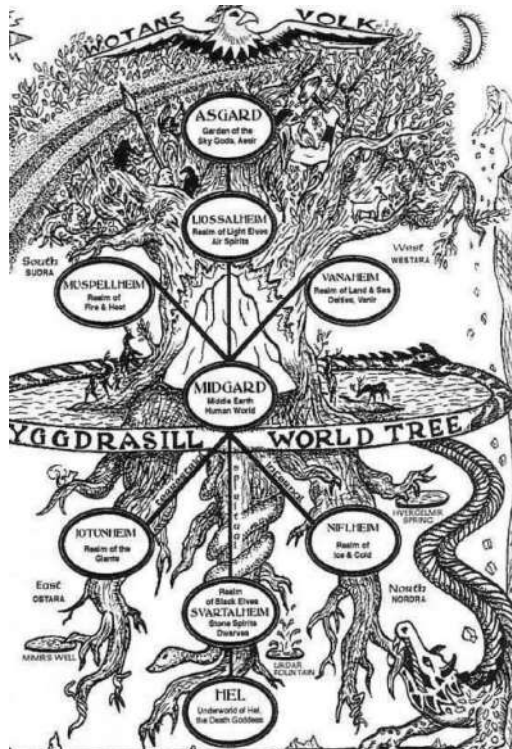


Figure 1: Historical depiction of Yggdrasil in Norse Mythology, Creator unknown.

The mythical tree of Yggdrasil is known to humans, only by two sources in history. Although a tree figure is seen as a source of life within the universe for a variety of cultures throughout different continents in different parts of human species' history (e.g. Shamanic Turkish Wild Pear Tree, Teachings of Kabbalah in Ancient Egypt & Israel, Ancient Mesopotamia and Urartu, Monotheistic culture and the Tree of Immortality, Bodhi Tree and Buddhism etc.), the particular legend of Yggdrasil is the core of the Anglo-Scandinavian-Germanic North mythology and a building block for Nordic Pagan culture.

It's earliest known source is called *Edda* which stands for "great grandmother" in Old Norse language, simply because the tale of the Yggdrasil was known and accepted as an heirloom of the elders, passed down to the children through great grandmother tales in a verbal form, although there were a collection of written poems as folk tales available with authors unknown. It wasn't until around 1220, approximately 200 hundred years passed the coming of Christianity and the renounce of Scandinavian Paganism in the North that an Icelandic poet named S. Sturluson created his own written version of the ancient *Edda*, in a book he wrote for the king of Norway. Nonetheless, both the ancient and the revised versions of *Edda* talks about the envisioning of the cosmos by the Nordic Pagan culture. According to the tale, Yggdrasil is the great tree placed in the very center of the universe, uniting the worlds Asgard where gods live, Middlegard where humans live and the world of Hel, the goddess of death, which is the underground world of the dead; all of which branching into three more planes within themselves, resulting in the mighty Yggdrasil holding all nine planes of existence.

Yggdrasil, or Ygg-drasil translates to “the awesome one’s horse or mount” (Murphy, 2013), by referencing Woden (Odin) as the “awesome one”. This translation is also a gateway to the Ursa Major of Northern skies, still known and referred as *Odin’s Wagon* in Scandinavia.

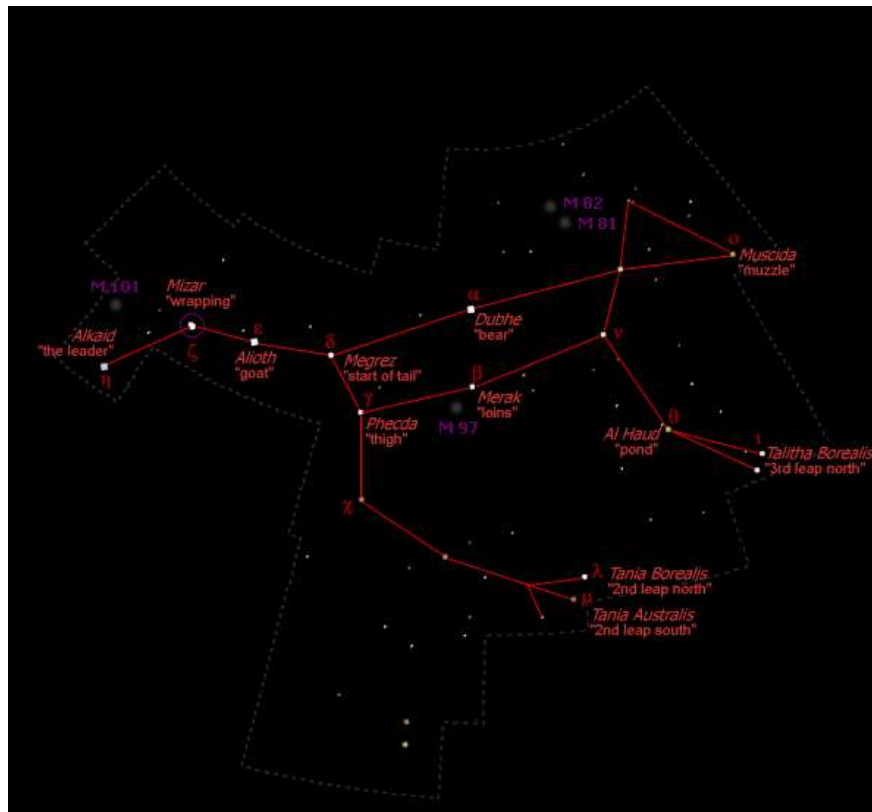


Figure 2: Illustration of Ursa Major, taken from skyguide.org.uk.

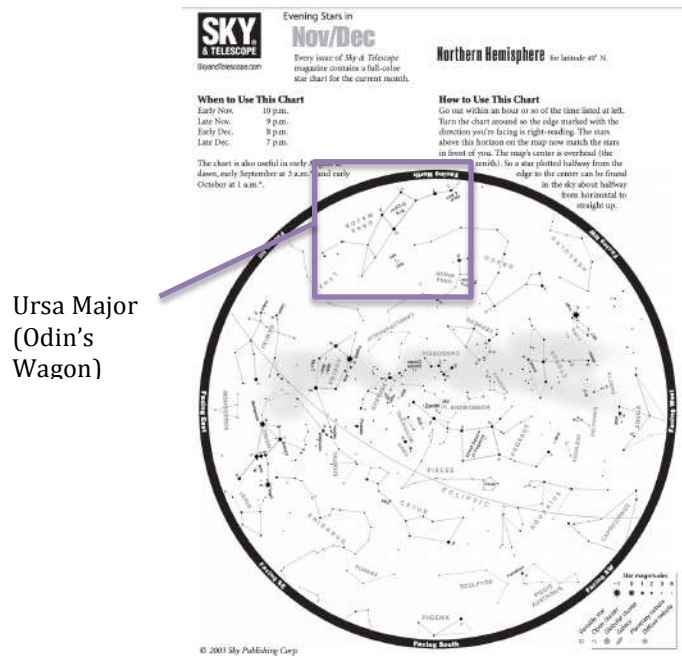


Figure 3: Location of Ursa Major in Northern Hemisphere, Sky & Telescope Magazine, 2003.

Another historic explanation of the Yggdrasil is “the awesome one’s (Odin) horse” which is linked with the mythical tale of Odin “riding the gallows” in order to make the big sacrifice of hanging himself by sacrificing “himself to himself” (Murphy 2013) for reaching the gift of seeing the future. The myth tells that Odin seizes the gift of twenty four secret runes and talking sticks on Yggdrasil by three mysterious women representing past, present and the future, for without the past and present there can be no future, giving him the ability to divine the future and the secret depths of the cosmos, later which he gifted this gift to human kind.

ƒ	u	þ	a	r	k	g	w	1st ætt
fehu	unz	þursaz	ansuz	raipō	kaunaz	gabō	wunō	
h	n	i	j	ī	p	z	s	2nd ætt
hagalaz	haupiz	isa	jera	ethwaz	perp	agiz	sōwulo	
t	b	e	m	l	ng	d	o	3rd ætt
teiwaz	berkana	ethwaz	mannaz	laguz	inguz	dagaz	ōpila	

Figure 4: The Rune Table that is mentioned in the *Eddas*, Historical Linguist Channel, 2018.

Yggdrasil is said to have three main roots coming out of the tree and yet connecting to no visible place on historical drawings and also told as such in the *Eddas*. It is unknown where the tree is stabilized; because as it represents everything within the cosmos, it connects to everything within the cosmos. The mighty tree is referred as an ash tree or *askr Yggdrasills* (Murphy 2013) , defying the abilities of the deciduous ash tree known in nature by preserving it's evergreen nature even through the winter in the North, representing the "mysterious" and "untraceable nature" of Odin; "sustained in life by the water poured on it by the *three weird sisters* of the flow of time." (Murphy, 2013, p.8)

The history of the mythological tale of Yggdrasil and it's interpretations for the meaning of our cosmos goes on but as it does, it moves away from the scope of this thesis therefore it would be appropriate to move on to it's relation to the thesis project *Lignum Vitae*. The importance of the figure of tree of life for this particular work is that, it is a universal symbol -believed to be philosophical as well as religious, although not portrayed by connecting it's basis to the realm of any religion through this thesis- where it's main significance is the idea of connecting to everything that is within the limits of existence: the infinite network of universe, the interconnectedness of the cosmos.

2.2 Relation of *Lignum Vitae* (Tree of Life) and Yggdrasil



Figure 5: Captured image from the visual art of *Lignum Vitae*, 2020

The interconnectedness of an infinite network within living beings is the idea that drives the inspiration of the thesis project *Lignum Vitae*. The artwork being designed as a contemporary central transmitter of human interaction in gallery space, it moves, grows and flourishes by the participants' existence and movement. In other words; the cyberspace artwork *Lignum Vitae* aims to embody and realize the philosophy behind the mythical tree figure, existing as a central network solely with the existence of life itself, by adapting the existence of life for Yggdrasil, as an equivalent of existence of participants in its own central network, that is placed inside the gallery space.

They tend to see Yggdrasil mainly as the central pillar, like the Irminsul of the Saxons, that supports the three worlds (actually nine, the three can be subdivided) and the sky, and which provides a safe structure with boundaries—which indeed it does—as it holds the inhabited worlds and the sky. Yet it is alive. (Murphy, 2013, p.6)

This *central pillar* that is accepted to be alive had been the source of the project Lignum Vitae from the start as the project itself is designed to be a responsive organism that is argued to be a living form and responsive to the existence and movement in space (mentioned in Chapter 3: Multimedia Art, Cybernetic Space and Artwork as Organism) . Not every aspect of the mythical figure of Yggdrasil is aimed to be fully realized on a mot-a-mot application through *Lignum Vitae*: Instead of portraying living beings on the tree figure like in the depiction of Yggdrasil in both *Eddas*, Lignum Vitae portrays a tree figure with no animals or living things shown on the torso -for it exists within the networks of cyberspace-, that does and doesn't exactly resemble a tree figure, considering it is formed by a generative movement of digital wavy vines and three main vines representing the *three weird sisters of the flow of time* (Murphy, 2013) whom sustain the existence of the interconnectedness within the cosmos. These three main vines (shown in the image at the beginning of the subchapter) aren't shown until the existence and movement of participant in space becomes very apparent and close in depth to the artwork's body. The significant role it plays is: it acts as the source point of my imagination by representing a perfect symbol of harmonious network within the history of human culture , in creating a cyberspace version of a tree of life through multimedia artistry.

Yet the most differing point of *Lignum Vitae* from its inspiration source mythical Yggdrasil is the perceptive **networks** that are previously mentioned to be representative of the tree figures in argument. While Yggdrasil embraces the sacred and somewhat holy interconnectedness of the universal network within all existence, *Lignum Vitae* on the other hand, derives from the human-made artificial cybernetic networks that are a part of the modern humans and their harmonious living with

computers and machinery. Being as such, it is noteworthy that it isn't a coincidence that *Lignum Vitae* is an interactive cyberspace artwork taking up both real space and cyberspace by interacting with the human species' existence as its subject. In the core, it is a computer-based, man-made organism that refers to a pre-historic monument of existence by creating a bridge to the realm of cybernetics as another plane of existence for human kind, perhaps the most significant as it offers literally an infinite network in which connecting with any knowledge or data is possible rather than a metaphorical one; in addition, a human-made one to be pivotal.

2.3 *Lignum Vitae*'s Central Network and Human-Computer Symbiosis

Lignum Vitae is a cyberspace artwork that exhibits the coupling of humans and computers in goal of creating a synthetic formation that has a hybrid potential of being both human-made and machine-made. It is an artistic creation made both by myself and my computer through various softwares and inputs. Equivalently it represents me as a human collaborating with a computer in the aim of creating an output. This is where the symbiotic bond of the modern humans and computers is the matter on table. Much like in the familiar fig tree and wasp example where the fig tree is solely pollinated by the insect, when the insect lives inside the tree where it gets nutrition; by doing so the tree's reproductivity, and the life of the insect is only sustained due to this interdependency. This symbiotic bond is mentioned by J.C.R. Licklider in 1960 in his work *Man-Computer Symbiosis* where he significantly

foresaw the development of computer machinery that would eventually grow into being a part of a collaborative relationship between computers and human kind.

Licklider expected the interaction of computers in human life ,in form of a “cooperation” (Licklider, 1960) back when even home-computers weren’t accessible in society. In an era in which, apart from the goal of mechanical calculations used for research cooperations, computers were not used by people in general; Licklider became one of the first scientists to refer to a certain symbiosis between humans and computers, which he saw likely to happen in the future. In his work written in 1960, as he mentioned the fig tree example by comparing it with mankind, he continued by underlining: “At present, however, there are no man-computer symbiosis.” (Licklider, 1960). He desired to foster the blooming developments of computational living that wasn’t available back then, to lead the way towards a certain coupling of humans and computers in order to advance and ameliorate advancements of human kind. In specific, he states this as following:

The hope is that, in not too many years, human brains and computing machines will be coupled together very tightly, and that the resulting partnership will think as no human brain has ever thought and process data in a way not approached by the information-handling machines we know today. (Licklider, 1960, p.2)

What seemed as a personal interest for me, doing this research, was Licklider’s wording on the matter: *cooperation, symbiosis, interaction, living together*, (Licklider, 1960) etc. From his obvious wording alone, one can grasp the depths of his understanding of computers next to the human kind: almost another species, a

“dissimilar” (Licklider, 1960) fellow organism with the potential of living together with humans. Which is -again on a personal note- a stand-alone curiosity considering the limited borders of the computer innovations stood at the spoken time and a rather posthumanist stand of Licklider’s foresight compared to other important takes on the relationship between humans and technology at the time, where technology, computers specifically in this case, are seen as mere extensions of humanity as subservient instruments made for the enhancement of human kind (e.g. M.McLuhan, *The Extensions of Man*, 1964). On this subject alone Licklider wrote in his work:

In the man-machine systems of the past, the human operator supplied the initiative, the direction, the integration, and the criterion. The mechanical parts of the systems were mere extensions, first of the human arm, then of the human eye. These systems certainly did not consist of “dissimilar organisms living together...” There was only one kind of organism—man—and the rest was there only to help him. (Licklider, 1960, p.2)

However this is not the first time in history that machines and humans are presented in an equivalent form of representation. The originator of Cybernetics, Norbert Wiener has set forth the notion of feedback through machines and information in 1940s, following in 1950 in his book *The Human Use of Human Beings: Cybernetics and Society* (Wiener, 1950), he mentions that the understanding society can only be made possible through the observation of its *messages* and *communication facilities* which involve the exchanging information between humans and machines. More explicitly in his words: “...Messages between man and machines, between machines

and man, and between machine and machine, are destined to play an ever- increasing part.” (p.16)

Later on, he goes on saying that humans and machines present a certain parallelism in their operation cycles of collecting information.

It is my thesis that the physical functioning of the living individual and the operation of some of the newer communication machines are precisely parallel in their analogous attempts to control entropy through feed- back. Both of them have sensory receptors as one stage in their cycle of operation: that is, in both of them there exists a special apparatus for collecting information from the outer world at low energy levels, and for making it available in the operation of the individual or of the machine. In both cases these external messages are not taken neat, but through the internal transforming powers of the apparatus, whether it be alive or dead. The information is then turned into a new form available for the further stages of performance. (Wiener, 1950, pp.26-27)

Following Wiener’s and Licklider’s literature, the information exchange inter-looping between humans and computer systems form the collaborative co-existence between the two forms of being.

Going back on *Lignum Vitae*, this particular thesis project stands as a subject on his own, not designed to be the extension of human body but instead interacting with human body and creating a semi- directed synthetic relationship with its “dissimilar” fellow organism. It is a cyberspace entity created by the collaboration of a human and computer systems. Licklider mentioned in his work that it would be no earlier than 1980 for a possibility on the development of artificial intelligence, which he

declared would leave room for the construction of human-computer symbiosis for at least 15 years. He also stated: “The 15 may be 10 or 500, but those years should be intellectually the most creative and exciting in the history of mankind.” (Licklider, 1960) Considering his statement made back on 1960 and contemplating upon the thesis project *Lignum Vitae*; it is a synthetic entity, a stand-alone artwork, acting as a kin that interacts with humans rather than being human-extensions, made into a synthetic organism by both human and machine, taking up both real and cyber space, 60 years later Licklider realized his work *Man-Computer Symbiosis* (1960).

CHAPTER 3:

MULTIMEDIA ART, CYBERSPACE AND ARTWORK AS ORGANISM

3.1 Computer-based Multimedia Artwork and Cyberspace:

The significance of cyberspace comes with the actual and physical realization of surrounding one and concretely immersing one into a space, as well as figuratively playing with the human perception of reality. In a personal opinion, the sense of immersion applied through various art forms up until today, for the most part, did not extend beyond the metaphorical or figurative form of existence, where one is moved so much by a painting that the brain self-immerses by imagining the actual movements of the paint strokes, perceiving a dynamic movement through a still image; One listening to a musical or sonic art piece of a multichannel nature and perceiving the feelings of depth, movement and even color and light in some cases, in which the brain self-immerses through the sound piece's characteristics that might convey a visual message that can be self-created solely by individual perception when there is actually no physical evidence of a visual content in that particular art piece what so ever. A very recent example of this is a sound experience created very recently in 2019 by myself called *The Traveler*. *The Traveler* is designed to be a 2.30 minutes long sound-walk with the aim of taking the participant into an isolated and individual journey where the specifics of the journey are not openly identified to the participants. The aim of this artwork was to be an experiment where one form of

art, which is sound design in this case, created an illusion of a visual environment for the participant to see, be in and experience through, and then share their own self-immersed story by writing it down. This stood for the interesting part of the project indeed, simply because the most exciting aspect of an individual self-immersion was the utmost freedom of imagining whatever one desires to experience. This is the reason why the documented stories were very differing from one another even though the sound art they have been exposed to was nothing but the identical composition.

...Some of them thought they were on the sea side, some of them in a forest, some said the forest is near the sea (Even though I've never sampled water sounds in creation of the work), some were seeing autumn leaves, some said that they saw a grey sky before a storm in a forest with huge green trees. Some of them traveled in day, some at night. Some entered a portal, some said an underwater realm, and some started flying. One of the subjects said that he could have sworn he was being taken to the outer-space and then he disappeared in the vast space. This is the true meaning of immersion to me. It comes from the mind first and from the tools secondarily. An artwork created only with sound makes you **see** things that are entirely up to your perception and imagination or the meaning you put into it, whether it is meliorative or pejorative. Nonetheless, you enter into the project with nothing and exit it with an image completely personal to you, as you do that, you become my fellow artist, and my work becomes yours.

Ece Erçevik, *The Traveler*, 2019

Of course by then, the experimentation of immersion had an aim of triggering the subject psychologically so that they open their minds into seeing things of their own making. Which represents itself as having the completely opposite method compared to the cyberspace as an art form, which happens to be the basis of this thesis. The difference and the significance of the sense of immersion created through an artwork in cyberspace, in the case of *Lignum Vitae*, is the phenomenon of collectivity. The moment collectivity comes to be the subject, the sense of immersion may preserve the act of self-immersing for each individual by their own but the experience itself has narrower borders of individual imagination, because now the artwork immerses participants to a collective experience, a more directed sense of immersion that comes also with the physical surroundings of space as an alter reality, compared to one that is experienced solely through the individuals mind. Being one of the Jungian archetypes of the unconscious mind, the tree of life is a cognitive symbol that features the world. (Doyle, 2018, p.173) From this source point *Lignum Vitae* has the idea of combining one of the product of the Jungian collective unconscious and a creation of an artwork in cyberspace which is aimed to be experienced through collective cognition inside an immersive space. Even in the cases of cyberspace artworks where only one participant is immersed at a time, the virtual construct is still designed to be perceived as a certain way that results in collective directedness where even the most generative artworks are bound to have the reactions of a certain extent, which forms the basis of the contemporary cyberspace artwork *Lignum Vitae*.

If observed chronologically, starting from the late half of 1900s computer based imagery and computer-based multimedia generated artworks started to be a part of

the vast varieties of art. Initially being technical and theoretical attempts of cybernetics and human-computer interactivity and reactivity, they started to enable the usage of synthetic materials, which has led to various radical changes in the evolution of art as known today in 2020. Mentioned attempts and their further development has risen to the idea of virtuality and in more retrospect brought up the formation of a virtual space. The word “space” has so much significance here in terms of the spatial phenomena of “surround” and “immersion”. The mere thought of transforming a current specific space of reality into another world, a new and virtually constructed reality, and to be taken in it as human, created the immersive fantasy of facing, and more importantly being in a new realm of existence; one that does not exist in terms of the human perception of reality and yet stays just as visible and surrounding. This is where the virtual environments has broken a mask of human perception and infused into a new reality that conveys the message of deep-rooted co-existence of human and computers. But one question emerges from this new reality, which is virtual space: how new is it in the core? As more and more advanced and evolved technical innovations may be, computer-based multimedia art that is a virtual environment is merely a reflection of human kind and it’s existing integration of the arts upon the point of the arrival of computers, if not anything. The thriving of virtual environments where a space immerses a story of another reality is in fact not new for humans at all. On the contrary it is a new formation of the very first and earliest known human self-expression in space: the prehistoric cave paintings. These environments are the ancestors of immersive spaces and are engaging for all the senses, the oldest known one being in Maltravieso cave, Cáceres, Spain and dated to more than 64.000 years old (Hoffmann; Standish; García-Diez; Pettitt; Milton; Zilhão; Alcolea-González; Cantalejo-Duarte; Collado; de Balbín;

Lorblanchet; Ramos-Muñoz; Weniger; Pike, 2018). Joseph Campbell's description for the cave paintings in the caves of Lascaux in Southern France (dating from 15,000 B.C) is as following: "These magical spots occur far from the natural entrances of the grottos, deep within the dark, wandering chill corridors and vast chambers, so that before reaching them, one has to experience the full force of the mystery of the cave itself." (Jordan; Packer, 2001) Upon which Randall Packer and Ken Jordan state: "To encounter the cave paintings was to immerse the self in an otherworldly domain, which would heighten consciousness and trigger altered states of perception." (Jordan; Packer, 2001) The computer-based multimedia artworks of virtual environments seek the same sense of immersion that seems to be very close to home in terms of human existence. One that is very similar in the sense of surrounding one inside it's tale not only by physically surrounding through walls and the use of solid architecture but also accomplishing one of the primal desires of human beings which is to be altered by an other worldly domain, to be taken into a different reality and finally to stretch the boundaries of time and space through altered perception of oneself. Spatial immersion is another embodiment of human species' need to tell stories, and self-expression. Which allows taking it from the hands of history and transcends it into the universe of arts with new and interchanging methods of self-expression compatible with computational living, thus making way of cyberspace and spatial multimedia arts as known today.

The definition of cyberspace is as following:

The electronic system of interlinked networks of computers, bulletin boards, etc. that is thought of as being *a* boundless environment providing access to information, interactive communication, and, in science fiction, a form

of virtual reality (Webster's New World College Dictionary, 4th Edition, 2010)

The implication of cyberspace in this thesis however, is depicted as the virtual environment that exists in a digital realm but is responsively attached to real space and time through human interaction. *Lignum Vitae* aims to represent a cyberspace in which entering the experience cuts the cords of the reality where participant does not recognize the exhibition hall anymore, the exhibition hall rather acts more as a vessel to the cyberspace (e.g. the Matrix in the Cyberpunk Sci-Fi Novel *Neuromancer* by William Gibson, 1984).

The virtual reality and interactive communication made available through computer networks as mentioned by Webster's New World College Dictionary above creates the ability to serve as a portal. A technological tool that acts as a portal by allowing the participant to "transport" and "transcend" their consciousness from the conceptual sphere of "here and now" into whatever world that is created through the cyberspace: a *liquid* (Novak, 1991) kind of existence, in a *liquid* construction of an interchanging non-reality space that develops into a new form of *liquid* reality.

Marcos Novak calls this phenomena *liquid architecture* in his work *Liquid Architectures in Cyberspace* (1991), by introducing the core of cyberspace as a liquidated landscape of imaginary construction that represents it's existence solely through digital domain. Considering every data that involves itself in the cyberspace is programmable by nature, it comes with the space construction of fluidity, which, according to Novak, turns architecture in cyberspace into a form of "poetry". Novak states in his words:

Cyberspace is a habitat of the imagination, a habitat for the imagination.

Cyberspace is the place where conscious dreaming meets subconscious

dreaming, a landscape of rational magic, of mystical reason, the locus and triumph of poetry over poverty, of “it-can-be-so” over “it-should-be-so”.

(Novak, 1991, p.2)

As farfetched it may be conceived to approach a technical construction of a virtual space as “magic” in the realm of academy, Novak goes on explaining that magic whispers to the most ancient desire of humanity, “to will the world into action” (Novak, 1991), and cyberspace answers and provides the path towards it. In addition, through the aforementioned description of cyberspace as *liquid architecture* (Novak, 1991), Novak suggests that creating the relationship between cyberspace and human, in other words, placing human into the space of information poses an “architectural problem” (Novak, 1991) that needs to be solved by the cyberspace itself thus justifying the cyberspace as containing architecture and that this particular type of architecture has an interchangeable fluidity to it. In order to expand the argument he continues as following:

The difference between embodied fiction and truth is that we are the authors of fiction. Fiction is there to serve our purposes, serious or playful, and to the extent that our purposes change as we change, its embodiment also changes.

Thus, while we reassert the body, we grant it the freedom to change at whim, to become liquid. (Novak, 1991, p.3)

This liquidity is formed by the opportunities offered by cyberspace through combining data processing, human existence and exchangeable information within the two into a synthesis of a new reality forming a river of endless possibilities of liquid constructions.

In relation to the endless possibilities, one would have to acknowledge the significance of the medium over the aesthetics of art in cyberspace. The mere core of the idea of cyberspace as an art form comes with the sensation of response and interaction. The real-time interaction between humans and machines create the gateway to the medium of cyberspace. The input output relation created between the two and the equation of the sender-receiver is the main conductor of the whole art space. No matter how mesmerizing it may occur to the senses, without the interaction and response, the artwork would not be able to break the boundaries of an animating painting. Whereas in cyberspace the control mechanism is bound to be within the hands of the interactor that recognizes and creates a physical behavior that serves as an input towards the whole space. Here it is inevitable for the artwork to be not limited towards various behaviors. As vast as the possibilities of responses in cyberspace may occur, they are always in the leash of the control systems being conveyed and turned into the medium of the artwork. Whether it is the voice of the participant that conducts the response of a certain cyberspace or the body movement, in relation to sound pitch or depth or the speed of the movement, it is always within the balance of the participants' conduction and the artist's predefined control limits. (Krueger, 1977) This is exactly why an artwork has to "know" as much as possible in terms of interaction forms, in order to establish the most interesting and various outputs that can present itself as the "intelligence" of the cyberspace. This phenomenon is addressed by Myron Krueger as following: "It is the composition of these relationships between action and response that is important. The beauty of the visual and aural response is secondary. Response is the medium!" (Krueger, 1977, p.11) As one of the first artists to experiment with computers and create computer-centered artworks starting from 1969, Myron Krueger elaborated on the relationship

between artwork and computer systems through interaction as a new and emerging form of art, one which he called “a new realm of human experience”(Krueger, 1977). Cyberspace as it is known today, is formed by the composition of the space in which art occurs, and the control over it. An entity engaging with the person of interaction, as Krueger calls it, creates a dialogue of abstraction rather than a literal one (Krueger, 1977). Here a problem occurs. If one calls a computer-based multimedia artwork an “entity”, the discourse shifts into the argument of mentioning the cyberspace as a “living” being. The case in which that is the situation, the cyberspace has to present itself through certain characteristics; in other words, it cannot afford to be one note, it has to have outputs that provide the intricacy that keeps the *entity* worth interacting with. Krueger calls this “the personality of the environment” (Krueger, 1977) , something that he defines as the problem to be solved to provide the interest towards the artwork. Once that is achieved, the rest is the act of transforming the body movement of the participant into an instrument and by doing so establishing the participant as the conductor of the aforementioned cyberspace *entity* and the responses it creates. Krueger, in his work *Responsive Environments* (1977), describes the relationship between the artwork-*entity* and the participants’ interest by comparing it to one towards a painting in comparison to a multimedia artwork.

A painting could accept any attention paid it, but could do little to maintain interest once it had started to wane. In an environment the loss of attention can be sensed as a person walks away. The medium can try to regain attention and upon failure, try again. The piece (cyberspace artwork) has a second strike capability. In fact it can learn to improve it’s performance, responding not only

to the moment but also to the entire history of its experience. (Krueger, 1977, p.14)

The fact that Krueger has called the cyberspace art an *entity* that has the capability to take the information data that forms as its prior experiences with participants in a space and learns to better itself towards an improved reaction in terms of gained and re-gained participant interest, is a very important anchor point to the argument that the computer-centralized multimedia artwork takes itself from the definition of the synthesis of computer engineering and aesthetics; and transcends itself further into a whole, an entity, a synthetic organism.

3.2 Artwork As Organism: From *The Total Work of Art* to *The Theater of Totality*

The approach that comes with the idea of an artwork being a synthesis of various arts enables transforming itself into an organism of some sort had began flourishing long before the existence of cyberspace as an art form. It first began towards the second half of 1800s when Richard Wagner, famous German composer, had defined a new form of opera with the term *Gesamtkunstwerk*. *Gesamtkunstwerk* is a term originally used by the German philosopher K.F.E. Trahndorff in 1827 in an essay (*Ästhetik oder Lehre von Weltanschauung und Kunst*, (Trahndorff, 1827)), which translates to English as “synthesis of the arts” or “total work of art”. Wagner took the term and revived it in order to describe his new and “improved” form of opera that collects more than one art form into a whole in pursuit of creating the ideal form of art. He was convinced that the lyric opera was presenting problems in terms of superficiality

and sincerity. Wagner believed with persistence that the future of arts didn't lay in the direction that it was going and that the perfect solution was to create a combination of music, dance, poetry, painting and architecture under one totality of drama. The significance of such pursuit was so high that it is argued to be the biggest fusion of the arts since the ancient Greeks. Wagner also acknowledged this by revitalizing the audience's seating formation that was used by the Greeks in opening the Festspielhaus Theater in Bayreuth, Germany. (Jordan; Packer, 2001) One of the biggest attempts of Wagner was to take the opera from the superficial setting that it was facing then and elevating it towards an art form that re-creates a bridge between humanity and nature. In his essay *The Artwork of the Future* (1849) Wagner talks about the art of painting in relation to his art form where landscape painting is the painter's way of re-creating nature. In his words:

What the painter's expert eye has seen in nature, what he now, as artist, would fain display for the artistic pleasure of the full community, he dovetails into the united work of all the arts, as his own abundant share. Through him the scene takes on complete artistic truth: his drawing, his colour, his glowing breadths of light, compel nature to serve the highest claims of Art. (Wagner, 1849)

This argument makes it appropriate to think that Wagner's approach towards his own *Gesamtkunstwerk* was in the midst of an artistic re-creation of the relationship between humans and nature. In retrospect, that is where the controversy of Wagnerian *Gesamtkunstwerk* began. In the book *The Total Work of Art from Bayreuth to Cyberspace* by M.W.Smith, there comes a brief description that the author saw fit to cite in explanation of the inevitable nature of *Gesamtkunstwerk*, as Smith claims it to be, which goes as "sub-Wagnerian self-flattering

Gesamtkunstwerk that constitutes American spectacle (J.Hoberman)”(Smith, 2007). Such description, as prepotent as it seems, is aimed to explain the dilemma of *Gesamtkunstwerk* that can not shake the fact that it hopelessly pursues an eternal goal of a natural and organic kind whereas in reality *Gesamtkunstwerk* simply can not maintain its existence without the totalitarian industrialization that it requires for production that serves to its ideals as a self-contamination or an “absorption into the larger totality of mass spectacle” as Smith called it in his work. Nevertheless *Gesamtkunstwerk* was very influential in the following evolution of the arts and it played an ancestral role in the improvement of cyberspace as an art form by embodying a similar multi-disciplinary sense of immersion.

His totalizing approach to music theater also foreshadowed the experience of virtual reality. Scenic painting, lighting effects, and acoustical design were intended to render an entirely believable “virtual” world, in which the proscenium arch serves as the interface to the stage environment.” (Jordan; Packer, 2001)

Years later, Hungarian artist from the Bauhaus school, László Moholy-Nagy, through his artistic experimentations came up with another form of theater that represented the synthesis of the arts. *Theater of Totality*, as Moholy-Nagy called it, stood as a re-interpretation of the Wagnerian *Gesamtkunstwerk*. One that stood out for bringing a variety of components together to make the notion of theater, which differed from *Gesamtkunstwerk* with embracing the “mechanized” organism it produced.

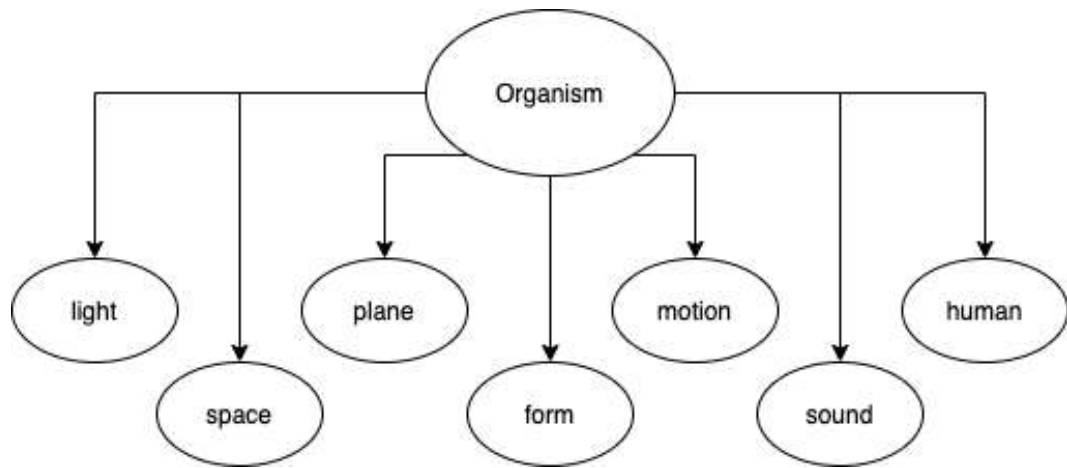


Figure 6: Illustration of Moholy-Nagy's description of artwork as organism, drawn by the author, 2020

According to his Theater of Totality an organism that is the art form has to bare the complexities of following components: light, space, plane, form, motion, sound and the human existence. This was the ultimate recipe for a “fully integrated, abstract form of artistic expression.” (Jordan; Packer, 2001). Moholy-Nagy described the historical form of theater as a one-way transmission of propaganda or information from the artists towards the audience by various aims of politics, cultism, content standing for “didactic moralizing” (Moholy-Nagy, 1924), and so on. By claiming such transmission historical theater was bound to having a transparent sub-message and an experience solely confiding in the physical and intellectual abilities of the humans on stage. As theater evolved, it became a gateway for the drama of action where, as Moholy-Nagy states, articulated intellectuality of theater started to leave its place to the art of improvisation. He mentions this phenomenon as following in his essay “*Theater, Circus, Variety,*” *Theater of the Bauhaus* (1924):

These dramatic forms were progressively liberated from a central theme of logical, intellectual-emotional action, which was no longer dominant.

Gradually their moralizing and their tendentiousness disappeared in favor of an unhampered concentration of action: Shakespeare, the opera. (p.2)

He continues his argument by mentioning the German poet and playwright August Stramm by stating that with his works, drama has broken the chains of tired propaganda by embracing a sense of “explosive activism” in Moholy-Nagy’s own words. Nevertheless at that stage he refers to this theater form within the leashes of verbal boundaries that make it impossible to take it towards the next level, as the “Literary encumbrance” of drama. This point seems to be one of the most significant arguments made towards the formation of *The Theater of Totality* as it presented the main problematique of theater and pushed the issue towards the notion of stagecraft that reveals a means of universal dynamism according to Moholy-Nagy. Then came *The Theater of Surprises*, a theater movement collectively constructed by Futurists, Expressionists and the artists of DADA where the intellectual reflection of theater is fully reduced by eliminating the verbal logic of human speech. Even that, in Moholy-Nagy’s perspective, was leashed to “still-dominating causal action and mental activities” (Moholy-Nagy, 1924). This rendered The Theater of Surprises to unachieving of its goal for the artist, simply because he was in pursuit of theater of purity which he referred as *The Mechanized Eccentric*. In his words Moholy-Nagy describes *The Mechanized Eccentric* as “a concentration of stage action in its purest form” where human on stage is no longer leashed to an intellectual and spiritual representation of themselves, and even physically speaking, Moholy-Nagy underlined the limited range of human body’s capacity and how insufficient their organism would be when stood alone next to the potential of organism that the theater as a whole could be. This led to the conclusion of how inadequate “human *Exzentrik*” (Moholy-Nagy, 1924) was when the solution was the appropriation of an organized union of a fully controlled mechanism that acts through form and motion; thus, *The Mechanized Eccentric* was born. With continuation of the investigations of

Moholy-Nagy , through the art forms' evolution with the additions of sound, space and light, it formed *The Theater of Totality*; a multi-disciplinary form of theater, a synthesis of space, motion, sound, light, plane, form and human; an organization that moves and acts as a whole through multi-disciplinary complexities, being a new form of an artistic organism.

3.3 Lignum Vitae (Tree of Life) and the Theater of Totality:

Through the idea of synthesizing different disciplines and art forms into a whole by merging them to act as an organism resulting to the embodiment of an artwork, created the core of the technical aspect in the thesis project: *Lignum Vitae* (Tree of Life). The project deals with the areas of visual art, construction (form) , audio compositing, projection mapping and data processing of people moving in space; in other words: light, space, plane, form, motion, sound and the human existence much like in the case of Moholy-Nagy's *Theater of Totality*. In the contemporary attempt of the recreation of a cybernetic *Theater of Totality* that is *Lignum Vitae*, one particular aspect of Moholy-Nagy's pursuit and research stood as an anchor point. In debating the "how" of the realization of the *Theater of Totality*, there stands a particular question posed by Moholy-Nagy himself that goes as following:

The creative arts have discovered pure media for their constructions: the primary relationships of color, mass, material, etc. But how can we integrate a sequence of human movements and thoughts on an equal footing with the controlled "absolute" elements of sound, light (color), form and motion?

(Moholy-Nagy, 1924, p.6)

This question is a significant point in the attempt of *Lignum Vitae*, as it is merely a mirroring of this question in its own manner of expression.

Lignum Vitae is a cyberspace artwork designed for a room space inside a gallery. It is an artwork of an artistic representation of the tree of life, projected onto a sculpture of cloth merging with the walls of the room. As one starts to emerge with the gallery room and become apparent by firstly through still existence and secondarily through the movement inside the realm of the cyberspace that *Lignum Vitae* encircles, which is the whole gallery room, the virtual tree of life starts to react and evolve through the movement of the participant by changing its various generative forms, lights and sounds. To put it in another phrase; the *Lignum Vitae* “integrates a sequence of human movements” in its own realm of existence that embodies the borders of the placement of its gallery room “on an equal footing with the controlled “absolute”” (Moholy-Nagy, 1924), a construct of totality created by the artist that is myself through my instruments in the creation of the artwork, that are: “the elements of sound, light (color), form and motion” exactly. The cyberspace artwork *Lignum Vitae* can be conceived as an attempt of answering the question of Moholy-Nagy in the pursuit of the appropriate realization of the *Theater of Totality*, along with answering the core question of this thesis: How can an artwork created in cyberspace establish a new form of a living organism?

In the following arguments of Moholy-Nagy in his work, there comes an interesting point where he mentions the solution to reach the “cathartic ecstasy” which he calls out in need to be reached, is by the necessary elimination of the constant separation between the spectator and the stage into two very different positions: “active” and

“passive” (Moholy-Nagy, 1924). The core reasoning of this argument is Moholy-Nagy’s strong belief that the secret of excitement from the spectator towards the theater has to produce some sort of “stage activity” by not only allowing but also making sure that the spectator participates instead of sitting and watching inwardly.

To see that such a process is not chaotic, but that it develops with control and organization, will be one of the tasks of the thousand-eyed NEW DIRECTOR, equipped with all the modern means of understanding and communication.

(Moholy-Nagy, 1924, p.9)

Having said such argument, Moholy-Nagy continues by also stating the pre-mature state of theater that he found not suitable in the development of *The Theater of Totality*, back in the first half of 1900s. The relation of this significant part of the research comes as an achievement by the means of setting the cyberspace-stage of *Lignum Vitae*, since not only it merges naturally the two phenomena that are the *stage* and the *spectator*, but it also bounds the outcome of the spectacle by certain data that are created to produce the semi-directed generation that lays in the central method of the work, also eliminating the chaotic randomness of spatial participant activity in this case. This elimination of chaos as mentioned by Moholy-Nagy as a task to pursue is in fact a natural outcome of *Lignum Vitae* because the project uses a limited part of participant activity which are movement (motion) and body conduction, and translates it into a new form of the arts that is sonic arts, that takes over by conducting the outcome of the light and form; creating an all-together harmonious organism through a cyberspace spectacle. It would be appropriate to polish off the chapter with a citation from Moholy-Nagy and his “*Theater, Circus, Variety*”, *Theater of Bauhaus*(1924), which goes as following:

“There will arise an enhanced *control* over all formative media, unified in a harmonious effect and built into an organism of perfect equilibrium.” (Moholy-Nagy, 1924)

CHAPTER 4:

SONIC ARTS AND

SONIC INTERACTION IN *LIGNUM VITAE*

Sonic Art is not just a new art form but a collaboration of art *forms* (Gibbs, 2007) says Tony Gibbs in his book *The Fundamentals of Sonic Art & Sound Design*. Which is the reason why the title of this chapter includes the deliberately chosen term *Sonic Arts* in plural. This chapter is a contemplation on the wide ranges of meanings Sonic Arts present in itself; observation on various examples of sonic works in history and the contemporary times; finally the ways in which the sonic interactivity is made through body movement which stands as a big part of the project *Lignum Vitae*.

4.1 Evolution of Sonic Arts

Before getting into the evolution of the art form, it is an appropriate way to start off with the questions: What is Sonic Art? What is its relation to music? While it is a field enclosing a wide range of fields and therefore is a hard one to come up with an exact definition; in his aforementioned book Tony Gibbs walks through the footsteps of the English composer Trevor Wishart in order to begin defining the art form.

The epiphanous moment when the English composer, Trevor Wishart, declared ‘Electroacoustic Music is dead – long live Sonic Art’ oversimplifies the issue by appearing to suggest that sonic art is simply the offspring of a highly specialised musical activity. (Gibbs, 2007, pp.8-9)

According to Wishart Sonic Art emerges from the womb of music, a well-established form of art that acts as a *parent-genre* (Gibbs, 2007) to Sonic Art, helping it to identify itself through similar footsteps. However, Gibbs opposes that while this approach may have a glimpse of truth to it, it does not represent the whole truth. According to his argument the coverage of sonic art goes well beyond music into various fields that don't even have a remote relation to music. He goes on reversing Wishart's argument in saying: "All music is sonic art but not all sonic art is music!"(Gibbs, 2007). In 1996, In his book *On Sonic Art*, Trevor Wishart indeed suggests that with the electronic developments such as the invention of sound processing and synthesis in the final quarter of the 20th century, came with the central shift of music towards sonic art. In his words:

Computer technology, offering us the most detailed control of the internal parameters of sounds, not only fulfils the original dream of early electronic music - to be able to sculpt all aspects of sound - but also makes the original categoric distinctions separating music from text-sound and landscape-based art forms invalid. (Wishart, 1996, p.5)

By linking the two art forms into one, Wishart also suggests in his following words that as the *lines of division* (Wishart, 1996) between the fields become somewhat blurred, in the future composers would re-identify themselves as *sonic designers or sonic engineers* (Wishart, 1996). As for the task of defining the field itself, he references to the approach of John Cage towards the field of music with his quote

from 1969 and suggests that as wide of an approach it may be, it would be “certainly a good definition to open our minds to the new possibilities”(Wishart, 1996) :

"Music is sounds, sounds heard around us whether we're in or out of concert halls: cf. Thoreau" - John Cage (Personal communication to Muray Schafer (Schafer 1969:1)) (Wishart, 1996, p.5)

From this throwback, Wishart states that sonic art can be perceived as all sounds surrounding us, shadowing John Cage's argument.

Indeed, John Cage is a very strong example for the early developments of sonic art. In his book Gibbs mentions him as “one of the figures that looms largest in the evolution” (Gibbs, 2007) of the field. He mentions Cage's studies with Marcel Duchamp and Arnold Schoenberg as a proof for his unconventional approach to the arts. Cage's sonic artistry goes into so many interdisciplinary fields that in 1986, he was named “Doctor of All the Arts” by the California Institute of Arts. One of the exemplary collaborations of Cage earning this title is his work with the choreographer Merce Cunningham, where they “wrote, painted and created early multimedia events such as *Variations V*(1965)”(Gibbs, 2007), in which Cage worked with the sound engineer Billy Klüver in order to interact the dancers with the visual aspect of the artwork, where video games and films of Nam June Paik were also included (Gibbs, 2007). But perhaps his most famous work was and still is, the composition called *4'33*, which brought a lot of controversy after he created it in 1952. *4'33* was a lasting 4 minutes and 33 seconds of silence where John Cage sat by his concert piano, with his sheet music written with breaks all over them, calculating the time for the exact 4 minutes and 33 seconds. This work is still one of the most

known examples in sonic art history for being a work out of the conventions, and is still being performed by different artists to this day.



Figure 7: Performance by William Marx of John Cage's 4'33'', McCallum Theatre, CA, 2010.

The idea of silence and John Cage's approach to it is rather unusual and is certainly something that I personally find ingenious. In one of his famous quotes from his written work *Silence* (1961) where he gathers his lectures and personal writings from the period, Cage says in his words:

"There is no such thing as an empty space or an empty time. There is always something to see, something to hear. In fact, try as we may to make a silence, we cannot." (Cage, 1961)

Stating this argument is equivalent to making the idea of silence something impossible to reach, or maybe on the contrary, re-defining the term silence as something with its own particular sounds rather than the soundless cognition that is generally depicted in people's minds. As for Gibbs's approach to Cage's work, he states that Cage created the idea of the communication of sound by its own natural way and this is how sound could be the basis of an entirely different art form, that is sonic art. Being a composer with classical background, Cage incorporated classical instruments and mostly the piano for his unconventional sonic experiments. On this matter, Gibbs also gives the example of Cage inserting various *sound-objects* (Wishart, 1996) such as washers, screws, or some pieces of rubber inside the piano, positioning them in precision amongst the strings of the piano and taking away the "piano-ness" (Gibbs, 2007) of the instrument by emphasizing the sonic experimentation and the differentiations of the sounds.

One of the significant distinctions of sonic art from the conventional structure of composing music is the possibility of creating an instrument out of every possible object. Equivalently to Cage's experimentations, Trevor Wishart talks about the *sound-objects* (Wishart, 1996) in his work *On Sonic Art* in 1996, for the explanation of Musique Concrète, a movement that started in the early half of 1900s that eventually created a gateway to sonic arts as well, telling that instead of using known classical instruments, Musique Concrète uses a "vocabulary of sound-objects of various types according to a phenomenological description of their properties and organised using studio techniques without any reference to the notated score." (Wishart, 1996). Musique Concrète created a more experimental structure in its era, especially with the development of recording technologies, through the utilization of

raw sounds, nature and human sounds, audio effects as well as synthesizer sounds and mostly manipulations on the recorded tapes. Perhaps one of the most known examples for Musique Concrète would be the experimentations of Pierre Schaeffer with *Studio d'Essai de la Radiodiffusion Nationale*, starting in 1942 where he experimented with the phonograph.



Figure 8: Pierre Schaeffer in his studio, 1954.

More on Wishart's term *sound-object* (Wishart, 2007), it contributes on the possibilities of sonic creations today, yet coming from an ancestral bond of Musique Concrète for the predefined term *l'objet sonore* (Schaeffer; Reibel; Ferreyra, 1983) that can translate to “resonating object” or “sounding object”, which relates closely to the term *sound-object* (Wishart, 1996). In another note, Wishart draws a line of distinction between the written work on Musique Concrète called *Solfège de l'Objet Sonore* (Schaeffer; Reibel; Ferreyra, 1983) and his own book *On Sonic Art*, explaining that *Solfège de l'Objet Sonore* creates a very clear separation between

musical and unmusical objects for the theory of *Musique Concrète* whereas in sonic art and also in the book *On Sonic Art*, Wishart states that there is no such thing as an unmusical sound-object. (Wishart, 1996), meaning every possible object with sound have the potential of creating a sonic experience. This potential alone makes the field of sonic art as wide as it gets by making it harder to define in words of precision but also giving it the utmost freedom of creation. Ironically, following this argument of freedom of potential that somewhat plucks the verbal discourse of the field, my personal depiction of sonic art stays as something to create and experience rather than something to write about or read on. That being said, Wishart continues writing on the meaning of sonic experiences by referencing the Platonian *idée*. He suggests that the idea of something takes a historical permanence in the written word which makes it into a more of a “reality” (Wishart, 1996). He goes on saying that the Platonic heaven where the ideal form of that which is experienced can be found, lays “between the covers of books” (Wishart, 1996), which is something he finds as the reason for the undervaluing of the non-written, the “non-verbal experience”(Wishart, 1996) in Wishart’s terms. This is where he creates a bridge between the history of music and sound based art forms and the significance of non-verbal experiences. Through this he states that the words as we know them are in fact stripped off their meaning without the signs and the “combinatorial process” (Wishart,1996) created by people, making it into the argument that words don’t mean anything at all, rather “she or he means”(Wishart, 1996), and the same goes for self-expression through sonic practice. Combining these arguments through Wishart’s footsteps, the meaning of sonic art can finally be stated as an open definition for this chapter in the following: The particular signs of the artist’s message through sonic expression, whatever that might be.

Below are different recent sonic art examples that are similar to the thesis project *Lignum Vitae* in terms of interactive conduction, which is further elaborated in the following sub-chapter. Through these examples it is made visible that sonic art can have an involvement with various fields. Upon which, in their book *Sonic Interaction Design* (2013), Karmen Franinović and Stefina Serafin mention this interdisciplinary nature of sonic art as following:

...A deep examination of such topics (multisensory performance) requires the involvement of diverse perspectives and methods belonging to a range of different disciplines including interactive arts, electronic music, cultural studies, psychology, cognitive sciences, acoustics, interaction design, and communication studies. (Franinović; Serafin, 2013, p.1)



Figure 9: The Artwork *Osmose* by Char Davies, MACM Montreal, 1995

Above are the images of the virtual space and hardware from the artwork *Osmose*, created in 1994 by Char Davies and exhibited in 1995 in Montreal. It is one of the most famous artworks created in interactive virtual-reality. It consists on 3D environmental design, 3D on-ear sound design and real-time motion tracking based on breathing and balance. The immersion of the artwork is based on the head movement and breath tracking through which the participant encounters interchanging environments that are based on the metaphorical representations of nature. Davies explains the choice of experimenting with breath as following:

The user interface we developed is based on tracking the participant's breathing and balance. Breath and balance provide the means by which people can navigate through the spatial realms of the work—they breathe in to rise, out to fall.... This interface was intended to pose an alternative to

conventional approaches to VR, whereby the interface usually involves the hands, in particular the joystick, which is so obviously phallic it makes me laugh.... There may be exceptions of course, but in general, hand-held interface devices reinforce a dominating stance to the world...(Gigliotti, 2002)

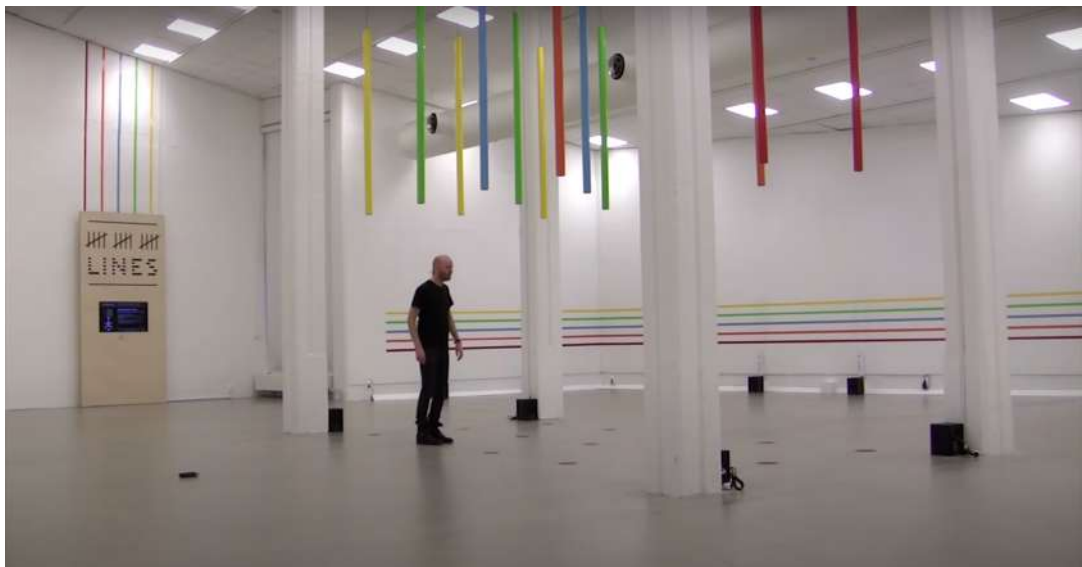


Figure 10: Performance of the sensor based interactive sound exhibition called LINES, by Anders Lind, Västerbottens Museum, Umeå, 2016

Above is the exhibition hall of the project LINES by Anders Lind. The project consist of lines attached to the walls and ceiling of the space that are also attached to various sensors. Every line contributes to the harmonic system of his sound sample. By moving around the space Lind showcases differences inside the harmonicity of the composition that is the output of his movement. LINES is made for creating a musical instrument to those who don't have a prior musical experience by creating new musical interactions of sound and space.



Figure 11: Performance of the sensor based interactive sound garden created by Mileece Abson, Los Angeles, California, 2014

Above is a frame from a short-documentary by Motherboard Vice, an independent internet channel, that features an episode of Mileece Abson's sound art. Mileece Abson is a sound engineer and a programmer with a background of sonic art and biology. She works with sensors and plants to create performative sound art. In the shown image she is performing a sound piece by touching different leaves of different plants in her sound-garden. She explains that she conducts micro-voltages that the plants emit through electrodes, and then amplifies those waveforms in creation of her sound art. She expresses that her work is based on bio-feedback on the purpose of enhancing people's interaction with nature. The following is her own words that explain her artistic purpose in the aforementioned documentary: "The world I want to see is where we use technology to enhance our relationship with ourselves. We are nature." (Abson, 2014)



Figures 12 & 13: Interactive light & sound exhibition called AURA, by Studio Nick Verstand, Dutch Design Week, Eindhoven, 2017.

Above are the images from the artwork AURA, an interactive light and sound exhibition translating emotions with color, light and sounds. During the Dutch Design Week in 2017, the outcome of the artwork was conducted with experimenting on a limited amount of audience. The participants would first be equipped with biosensors for gathering brainwaves, heart-rate and galvanic skin response. Then they were asked to lay down on the floor and were given a particular sound composition that would trigger the emotional responses that form the data which creates the colored light beams of various colors and intensities, accordingly. The artist Nick Verstand explains that his intention was to create and experiment on light as an indicator of emotions that is made visible to everybody inside the exhibition space. He adds: "It explores how this perceptual process influences the understanding of ourselves and of each other. The installation symbolises the materialisation of internal metaphysical space into external physical space."

(Verstand, 2017)

4.2 Sonic Interactivity & *Lignum Vitae*

In the conventional method of being exposed to a certain sound art, one perceives a one-way relation of sender, that is the sound art, and receiver, that is the participant, who is only the listener in this case. However this model transforms itself into a correlated two-way interaction when a sound art is triggered by the involvement of the participant, who ceases to be solely the listener in such case, the artwork becomes *embodied* (Franinović; Serafin, 2013) this time, which transcends it's sensation from a received message to a performative and responsive experience. This is what Karmen Franinović and Stefina Serafin calls out to be a new and emerging field in the conduction of sonic art, in their book *Sonic Interaction Design* (2013). Upon the introductory of the field in their book, they state the following:

By using sound in an embodied and performative way, this burgeoning new field works with emergent research topics related to multisensory, performative, and tactile aspects of sonic experience. (Franinović; Serafin, 2013, p.1)

According to Franinović and Serafin SID (Sonic Interaction Design) is an interdisciplinary research field that is in relation to a range of different practices such as “interactive arts, electronic music, cultural studies, psychology, cognitive sciences, acoustics, interaction design, and communication studies.” (Franinović; Serafin, 2013).

Multi-sensory conduction of sound art has been an exploration on “new musical instruments research”, Franinović and Serafin further notes in underlining the “importance of tangible computing in creating expressive interaction” (Franinović;

Serafin, 2013). There has been an increasing amount of instrument conceptualization created with the usage of sensors that differentiated the perception of sound art. Above the similar works given can represent performances created for exhibition spaces that are in the field of interactive installation art. However there have been numerous musicians that incorporated the multi-sensory musical expression on their work, which contributes to sonic art as well as electronic music, much like Franinović and Serafin stated in their book, as mentioned. In the following, three artist examples are given who create electronic music with the incorporation of multi-sensory conduction.



Figure 14: Performance of the electronic musician Chagall *Ivory/Wintana*, Eindhoven, Netherlands, 2020

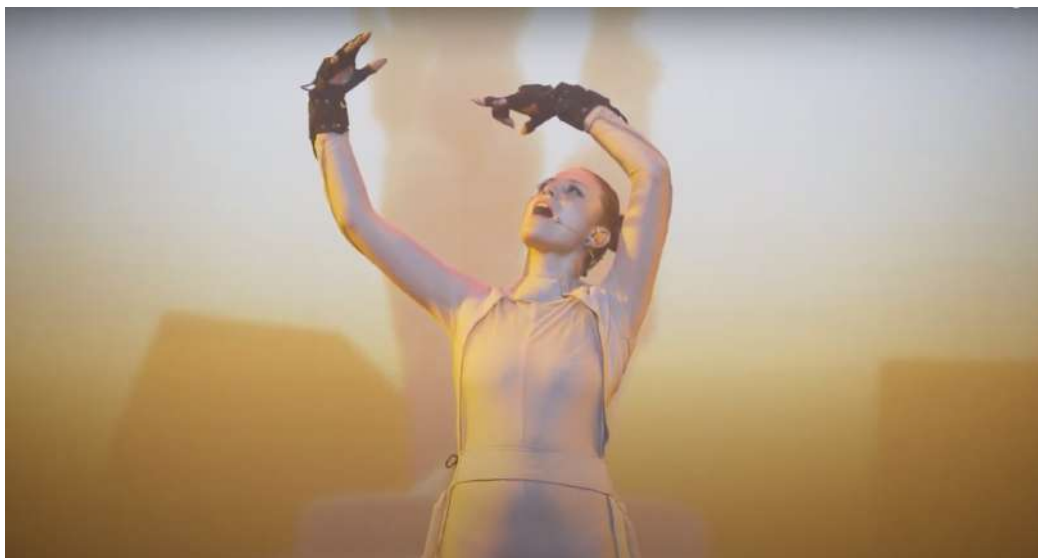


Figure 15: Performance of the electronic musician Chagall *Ivory/Wintana*,
Eindhoven, Netherlands, 2020



Figure 16: Performance of the electronic musician and sensor designer Imogen Heap,
NPR Music Tiny Desk Concert, Washington D.C., 2019.



Figure 17: Performance of the electronic musician and sensor designer Imogen Heap, NPR Music Tiny Desk Concert, Washington D.C., 2019.



Figure 18 : Performance of the electronic musician and sonic artist Fedde ten Berge, *The Egg*, 2017

These examples create a link between the computational designing and recording technologies in creation of an experimental instrument as well as “product design” (Franinović; Serafin, 2013). Although in the case of *Lignum Vitae*, the aim is to maintain the sonic interactivity at a spatial level, where the entire exhibition space acts like a giant theremin with multi-sensory construction that triggers various sound samples.

The sonic interactivity designed for *Lignum Vitae* is a method of interaction in which the aim is to create an explicit communication between the participant and artwork by immersing the participant in thinking their interaction triggers a responsiveness that takes the artwork into a living state. It would be appropriate to cite from Franinović and Serafin’s book where they reference Arjen Mulder in the aim of defining interactivity that I find suitable for the sonic interactivity that is constructed for *Lignum Vitae* as well:

...we want to promote a model of interaction in the manner in which the Dutch biologist and media theorist Arjen Mulder defines it: “interaction is a mode of bringing something into being—whether a form, structure, a body, an institute or a work of art—and, on the other hand, dealing with it”

(Franinović; Serafin, 2013, p.42)

The technical aspects in the creation of sonic interactivity in the artwork *Lignum Vitae* will be elaborated in the following chapter. In light of the mentioned information that covers this chapter, I want to conclude with Tony Gibbs’s quote in underlining the innovative nature of sonic arts, something of a personal excitement for me in creating my work:

Both music and fine art lay claim to sonic art. Clearly, it is regarded as a prize to be fought over and, given its diversity and 'tradition' of innovation, this is hardly surprising: innovation is increasingly valued in the arts, especially since older forms seem largely to have exhausted their ability to develop new responses. (Gibbs, 2007, pp. 42-43)

CHAPTER 5:

THE PROCESS OF *LIGNUM VITAE*

5.1 *Lignum Vitae* Analysis

The idea behind *Lignum Vitae* is the creation of a synthetic organism inside cyberspace. Being inspired by the Nordic mythical tree of life figure, it represents an interconnected virtual network, one which derives from the idea of showcasing a modern pillar of existence that represents the modern way of life and the human-computer interconnectedness (see Chapter 2). This is why the domain of the artwork being a multimedia creation in cyberspace, also serves to the symbolism and intention behind the meaning of the project.

The aesthetical formation of *Lignum Vitae* stands deliberately away from the organic forms and shapes of a real life tree figure. As mentioned above the goal is to create a **synthetic** organism, one that embraces the digitalism that is in the core of its creation. My aim was not to create a real-a-like organism as an artwork but one that embraces it's digital authenticity, therefore starting from the beginning of the prototype design I wanted to create a sharp, circular and prismatic figure that holds a rigid form and that doesn't have a mot à mot implementation of an actual tree.

In the initial model, the digital vines were designed as generative particles that move freely and respond to audio filters. In this model the torso of the figure was inspired

by a vortex figure that combines the floor and the ceiling, creating a digital glass-like vessel tube for the particle based organism to be seen living inside. However this particular design although derived from the tree of life, did not visually represent the metaphorical idea behind the project. This is when the design choice came to be dealing with synthetic vines that are moving generatively by the input of the audio filters. This change made it available to showcase a certain feeling of growth on the vines contrary to generative particles that are very scattered around to give a sense of controlled movement. Also, through the source of the *Eddas* that are historical depictions of the tale of Yggdrasil (see Chapter 2), it is stated that the tree of life figure is often described as wild vines that are intertwined, which are holding the planes of existence. (Murphy, 2013) This is also seen in the significant example of Gustav Klimt's *The Tree of Life in Stoclet Frieze* (1905-1911), where the painter portrayed the tree figure with curling wild vine-like branches that symbolize the sacred spirals of the continuity of life in the underworld (roots), the earth (torso) and the realms of the sky (up-reaching branches). From this source point I made the decision to work with vines, which gives homage to the historical depiction of the source, but also has a very synthetic feeling to it in terms of form, movement and color.

The color choice of black and white were related with the 0 and 1 digits in digital systems, in the case of the artwork 1 being (white) and 0 non-being (black). The movement of the artwork emerges as white digital vines on the black emptiness, in the intention of showcasing the emergence of being from non-being as a result of multisensory motion trigger.

5.2 Documentation

5.2.1 Prototype Evolution and Torso Design Phase

Initially, the torso of the artwork *Lignum Vitae* was designed as a vortex figure uniting the ceiling and the floor of the exhibition space.

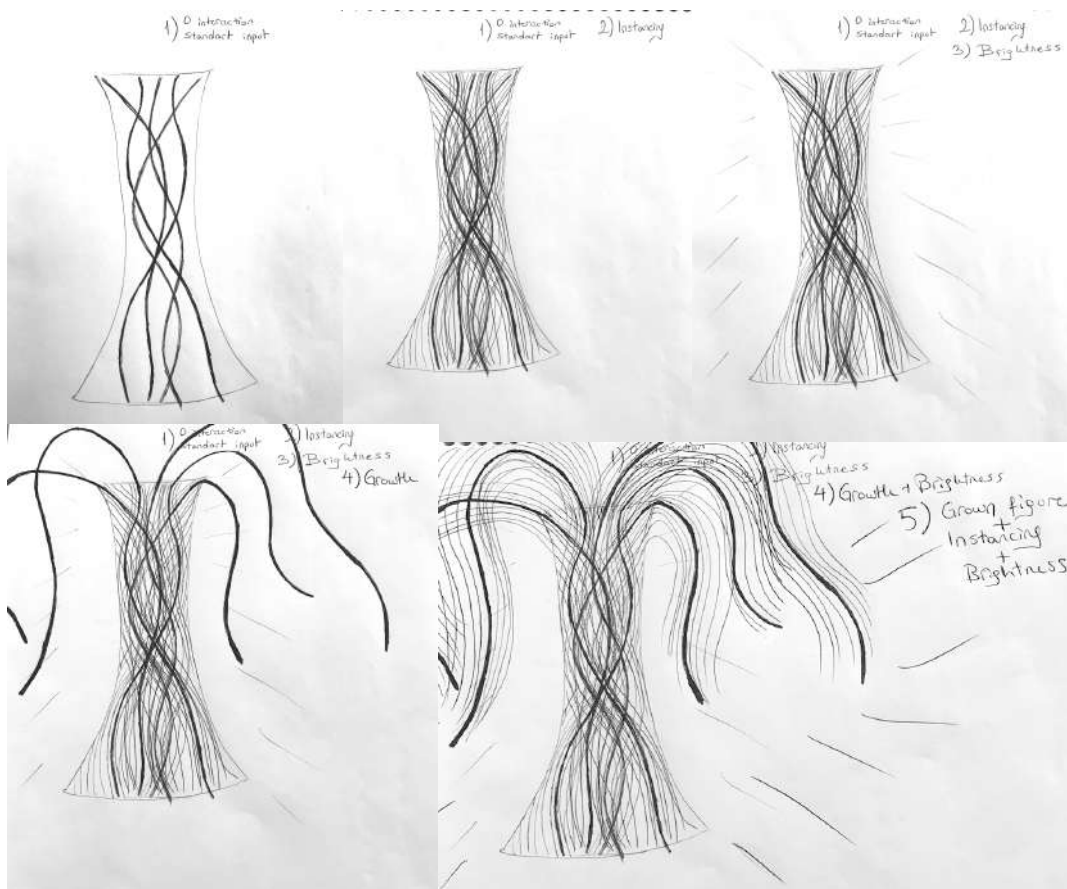


Figure 19: Initial drawings of *Lignum Vitae* torso and projection, drawn by the author, 2019

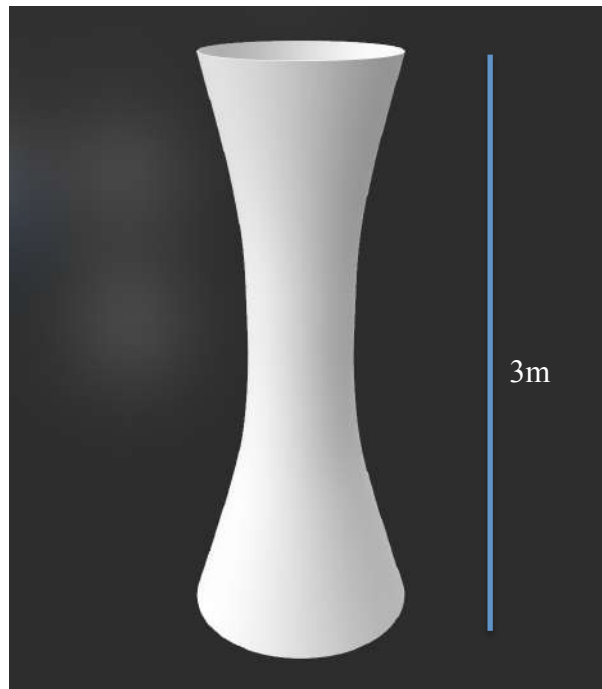


Figure 20: Initial torso figure for the project *Lignum Vitae*, created in 3ds MAX, 2019



Figure 21: 1st 3D prototype of the project *Lignum Vitae*, created in Lumion, 2019

In the early sketches of the artwork, the digital vines were represented as particle movements inside Touchdesigner in order to test audio-reactivity. At that point, the priority was to create the optimal spatial placement of the artwork. Below was the first plan of placement of *Lignum Vitae* inside gallery space.

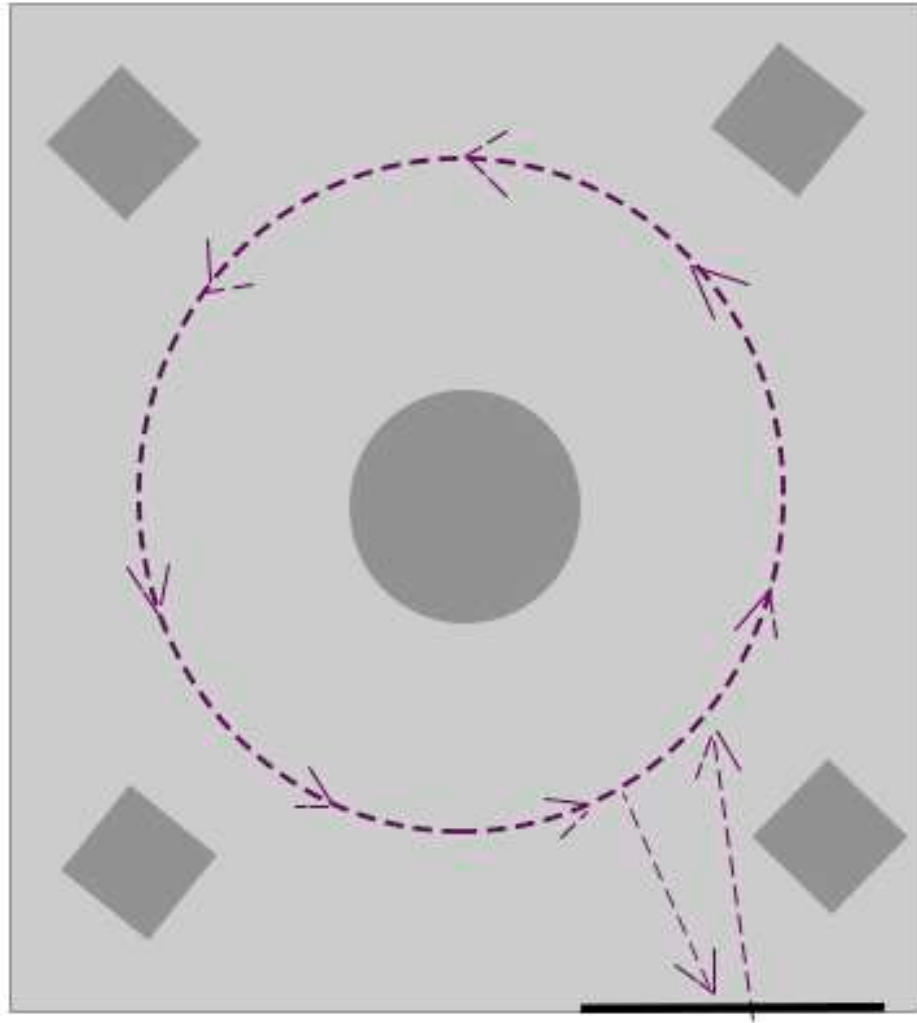


Figure 22: 1st placement plan in gallery space for the project *Lignum Vitae*, 2019

At the beginning of the project development, the artwork torso was designed as the navel point of the gallery room, placed in the very center of the space. Initially it felt like an appropriate plan for the artwork due to the ability of experiencing it from all angles. Also the speaker system would have the full surround effect of a quadrophonic placement, considering it was planned to encircle the artwork. However, one issue emerged in that placement plan; the artwork's sound composition was planned to be a complex progressive sound work with lots of layers from the beginning. Since it was planned to be additively interactive, meaning it would progress one layer on top of another with interaction, the participant would have to move towards the torso for the final state of the sound art, which is the climax. When the torso was placed in the center of the room, the climax of the sound art would have to have multiple trigger points from all 360 degrees, the sensor placement could have been confusing, also the time between the entrance to the room and the climax point of the artwork would be shorter than anticipated. That would cause the lack of contrast in the movement of the artwork and reduce the impact of the interactivity. This is why, in the second placement plan the solution was to place the torso in the top left corner of the room, facing the entrance directly from a diagonal standpoint, and placing the quadrophonic speaker system to right and left so that it would create a relatively narrowed aisle in which, one would have to walk through every states of the artwork until reaching the climax point when closest to the torso. This particular plan is decided to be much more ordinated in terms of artwork interaction and sensor placement. Following is the figure of this placement plan.

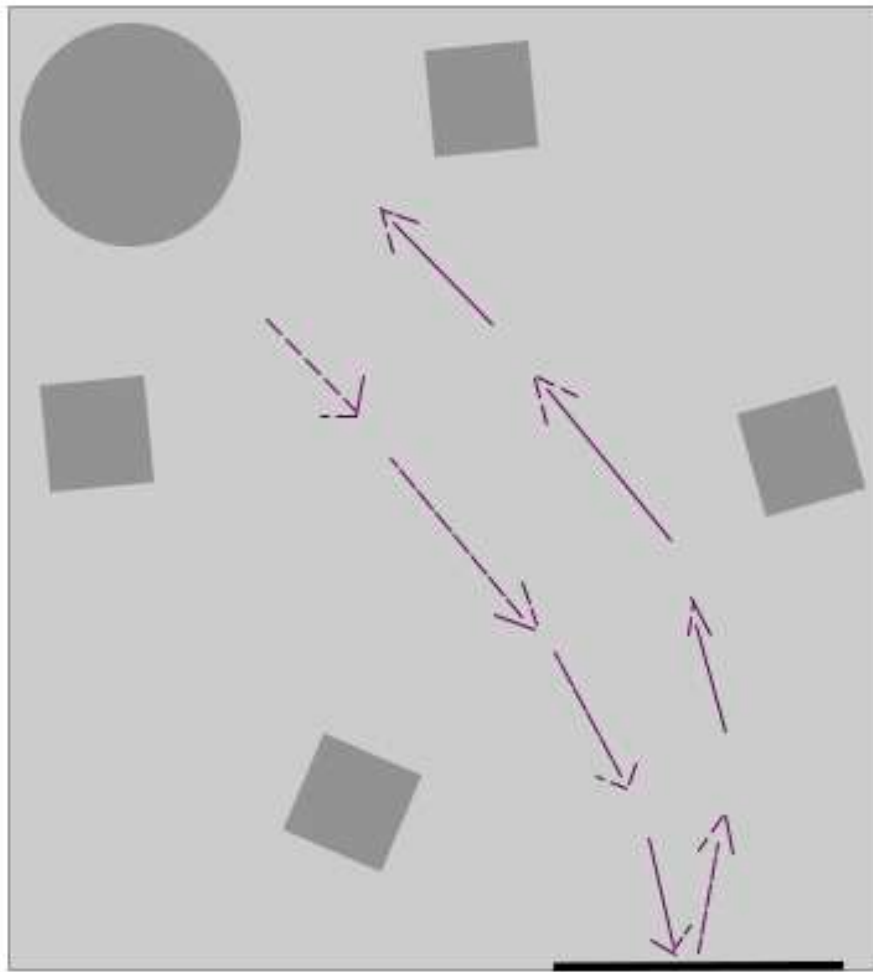


Figure 23: 2nd placement plan in gallery space for the project *Lignum Vitae*, 2019

The sensor placement plan that will be mentioned in the following sub-chapters was created entirely based on this placement plan. Later on, working with this placement planning, the first physical prototype of the artwork was created. The following photo documentations are the steps of construction of the torso and the tailoring of its cloth made by me for the following projection experiments.



Figure 24: 1st measurements of torso cloth for the project *Lignum Vitae*, 2019

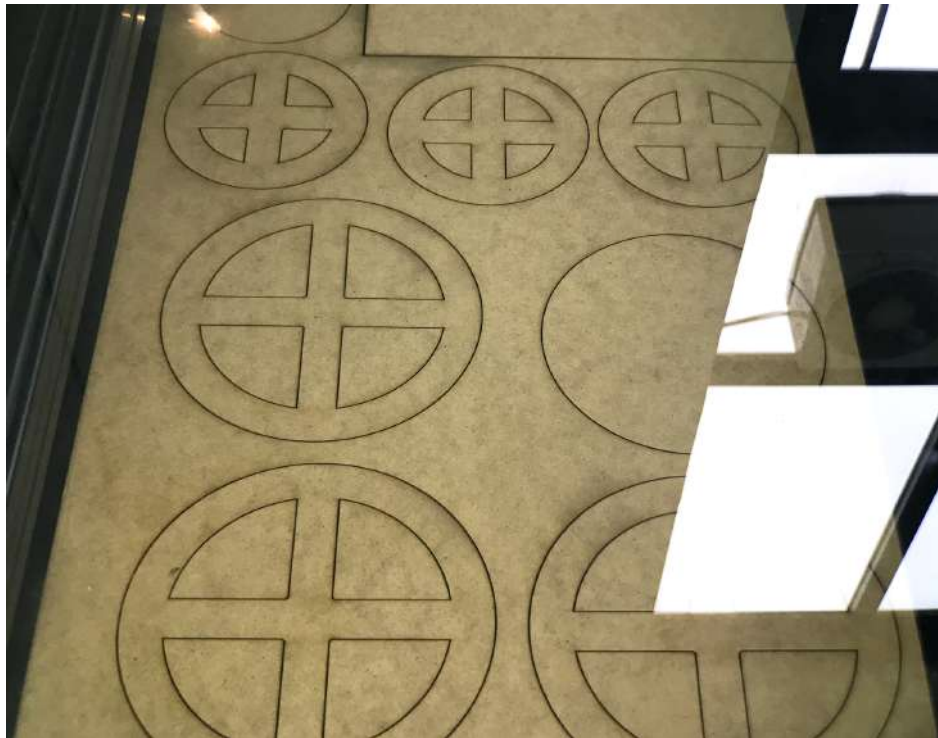


Figure 25: Laser cutting of torso skeleton for the model of *Lignum Vitae* in Bilkent University, 2019



Figure 26: Material for the model of Lignum Vitae, 2019



Figure 27: Tailoring of the model of Lignum Vitae, 2019



Figure 28: Skeleton construction of the model inside Bilkent University carpenter atelier, 2019



Figure 29: Model of Lignum Vitae, 2019

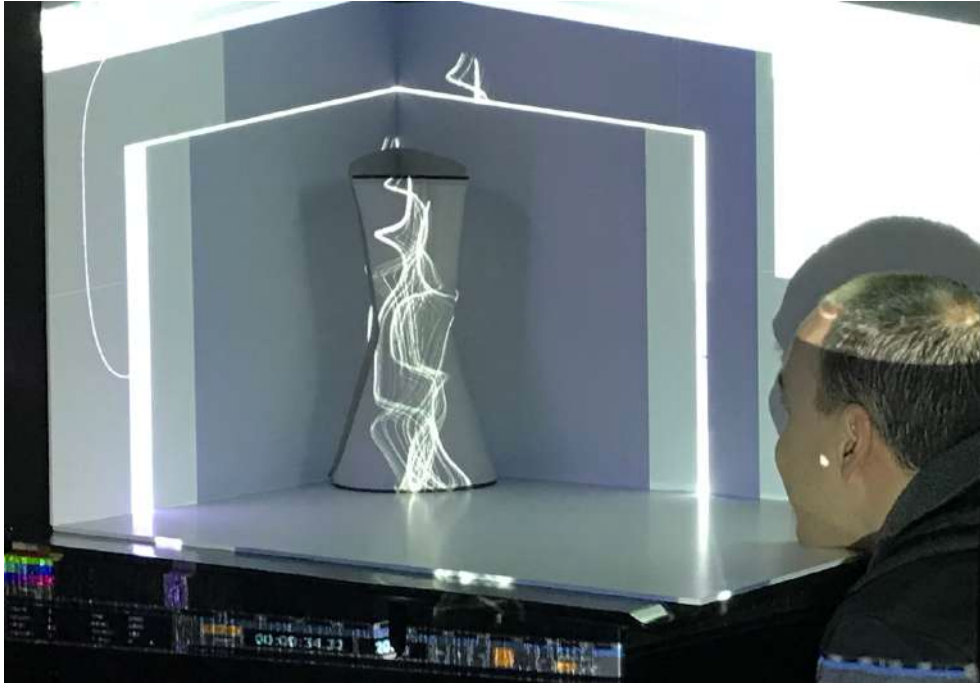


Figure 30: 1st interaction experiment of the artwork *Lignum Vitae*, 2019

Photographed: Volkan Acun.

After the model construction of *Lignum Vitae* was finalized, I wanted to experiment on the interactive movement of the artwork with a participant for the first time. At that moment the project had always been a half-done idea because the sensor works with sound and the visual art was always worked on separately. This was the first time the two was brought together and projected onto the miniature torso model. The photograph above is the introductory of the miniature *Lignum Vitae* to a participant that faced the project for the very first time. Since I was working with only one sensor, and movement inside the space could only be possible through hand movement inside the model, the eye-level interaction of the participant and the artwork had to be limited. Be that as it may, this was the initial representation of what the artwork would look like inside a real gallery space. Following is the close-up photograph from the model of *Lignum Vitae*.



Figure 31: Physical model of Lignum Vitae, 2019

Although the placement plan worked for the final project planning, there was another problem regarding the torso shape. Since it was designed initially to be placed at the center, there were dead spaces in the corners and back parts of the artwork's torso that created too much shadow when faced with the projection. This was not something desired by me because from the beginning of the artwork I wanted the climax point of the digital vines to reach beyond the torso of the artwork (This can also be seen in the initial sketches mentioned in the beginning of the sub-chapter). In the first plan where the placement was in the center, the design was to grow the vines up to the ceiling by projecting from a very low angle. However when the placement plan changed to the 2nd placement plan, the design of the reach for the digital vines went from the ceiling to the right and left walls of the corner which the torso is placed. The occurred problem with dead spaces was that, when projected wider than the contours of the torso, it created very harsh visual distortions because of the depth differences and the shape differences between the walls and the torso. This was eliminated by re-designing the shape of the torso for the 2nd placement plan and it's new conditions for the visual growth of the digital vines.

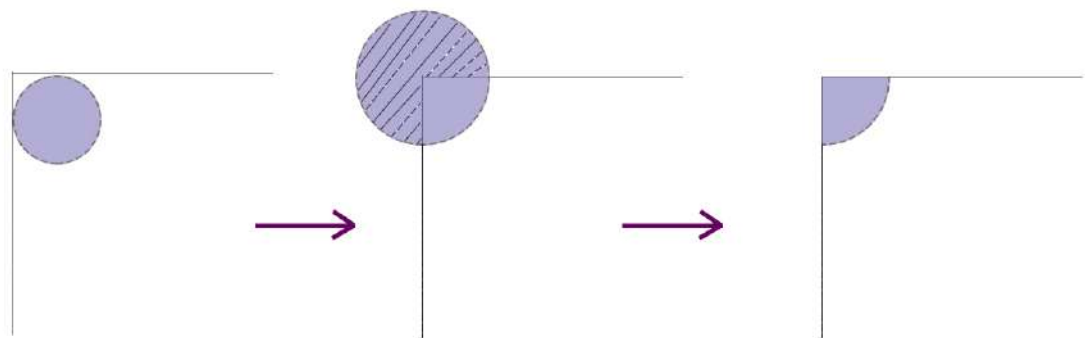


Figure 32: Illustration of the torso re-design for the 2nd placement plan in gallery space for the artwork *Lignum Vitae*, drawn by Author, 2020.

By creating an embedded shaped torso onto the corner of the gallery wall, the movement of the visual art became more fluid in terms of growing beyond the torso shape and created the elimination of the visually displeasing distortions that were causing a problem in the previous model. Thus the torso design and spatial placement plan of the artwork was finalized. This re-designed version of the torso and it's placement inside the gallery space was modeled in virtual environment instead of a real model, which can be seen in steps, in the following images below. This virtualisation of the project will be further mentioned in the following 5.2.5 *Final Work* sub-chapter along with the detailed documentation of the artwork *Lignum Vitae*.

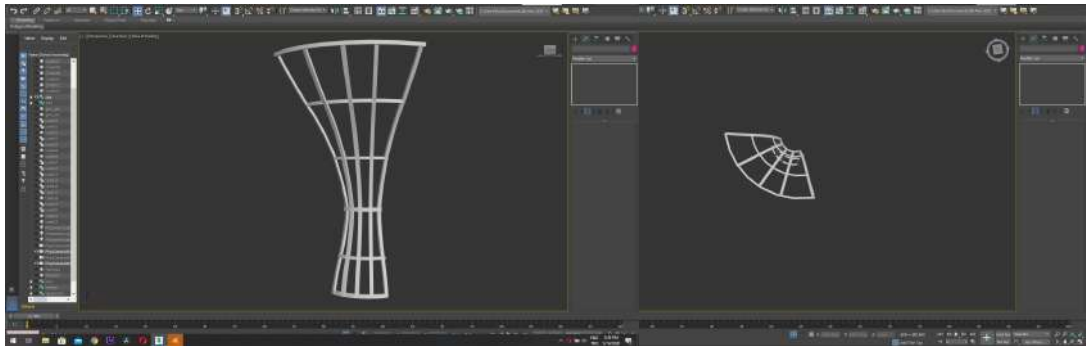


Figure 33: Virtual skeleton construction of the torso inside 3ds Max Software, front view & birdseye view, 2020

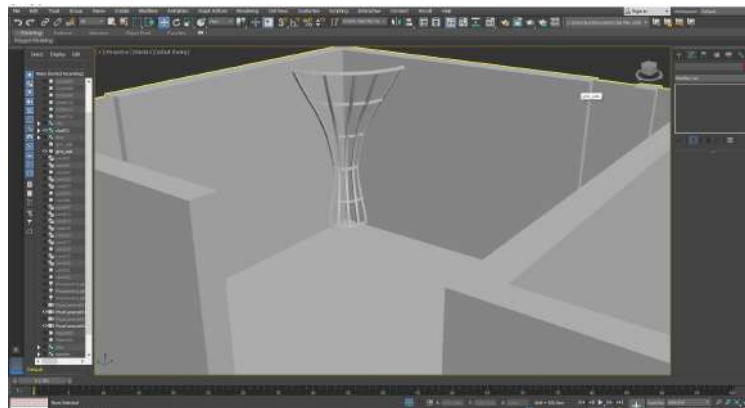


Figure 34: Virtual torso placement in gallery space, inside 3ds Max Software, 2020

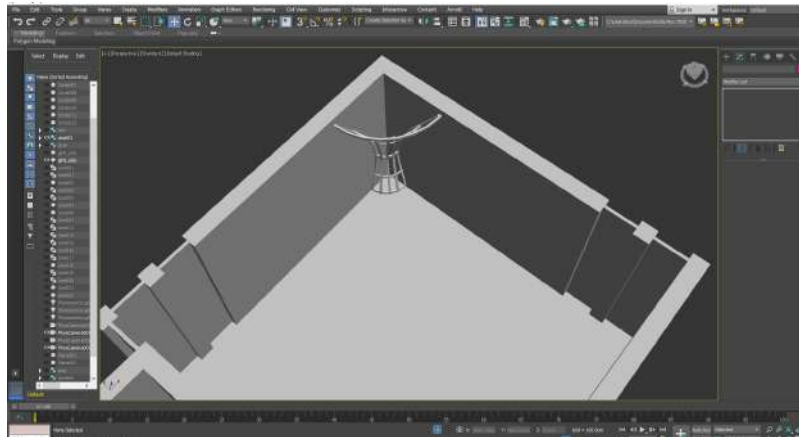


Figure 35: Up view of virtual torso placement in gallery space, inside 3ds Max Software, 2020

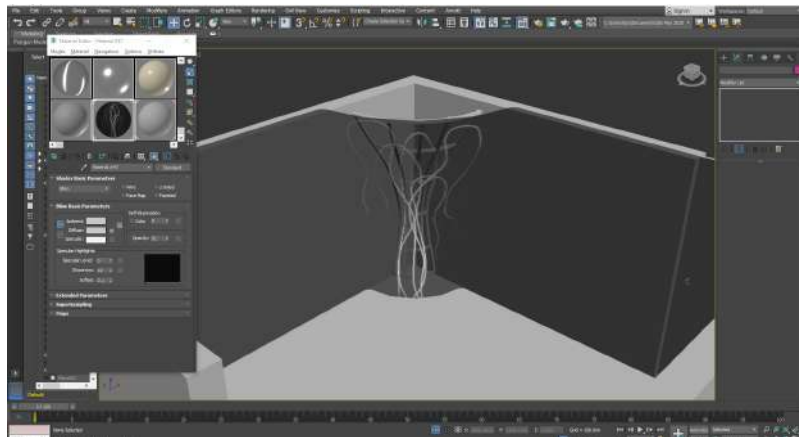


Figure 36: Visual art placement onto artwork torso in gallery space, inside 3ds Max Software, 2020

5.2.2 Visual Art

The visual art of *Lignum Vitae* is a work designed to be projected onto the constructed torso of the artwork. It portrays the digital tree of life figure that gave the artwork its name in the beginning of the project planning. The video consists of several states in which the participant experiences a progressive metamorphosis of the portrayed figure. This sub-chapter is entirely dedicated on walking through the mentioned metamorphosis state by state through imagery.

State 1: The free floating of the digital vine sprout.

This state is the audio reactive state of a constant ambient audio (that will be mentioned in the 5.2.3 *Sound Art* sub-chapter) and it is the initial state of the artwork when nobody is in the gallery room.



Figure 37: Screen-capture from State 1 of the visual art of the artwork *Lignum Vitae*, 2020

State 2: The first Interaction.

This state is the first time the artwork interacts with the participant. The moment the participant sets foot into the gallery space, the constant pad tune suddenly changes and generates new harmonics according to the participants movement in space (that will be mentioned in the 5.2.3 *Sound Art* sub-chapter). This is where the first sprawl of the digital vine sprout and the alteration in its movement is seen.



Figure 38: Screen-capture from State 2 of the visual art of the artwork *Lignum Vitae*, 2020

State 3: The Glitches.

This is where the artwork starts to morph with the movement of the participant. As the participant gets closer to the torso of the artwork (see Sensor Placement Plan in 5.2.4.1 *Actual Process*), percussive glitch-inspired samples (see 5.2.3 *Sound Art* sub-chapter) are triggered through sensors. The movement of the digital vines start to twitch according to the samples. This where the actual change of the digital vine figure is initialized.



Figure 39: Screen-capture from State 3 of the visual art of the artwork *Lignum Vitae*, 2020

State 3: The Explosion.

The explosion is a significant state for the visual art of *Lignum Vitae*. This is the beginning of the growth for the digital generative vines from a flouting sprout to a sturdy tree figure.



Figures 40 & 41: Screen-captures from State 3 of the visual art of the artwork *Lignum Vitae*, 2020.

State 4: The Growth.

This state is where the participant experiences the growth of the sturdy vines of the digital tree figure. Throughout this thesis I have been using the term *semi-directed* (Ercevik, 2020) in describing the artwork and this state is the reason. The floating vine visuals I have been mentioning in the previous states are based on generative movement that is directed by the audio-reaction from the sound composition, however in this state, it is the first time the participant is faced with a fully planned movement. Although it showcases itself according to the sensor-distance of the participant, the sensor only triggers a movement directed through image-mapping that I as the artist created for the construction of the final digital tree of life that is *Lignum Vitae*, which is explained in detail in the 5.2.4.1 *Actual Process* sub-chapter. In the following images the step-by-step growth of the artwork can be seen in detail.





Figures 42& 43& 44& 45: Screen-captures from State 4 of the visual art of the artwork *Lignum Vitae*, 2020.

State 5: The Transition.

The transition state is right after the growth of the digital vines and it represents the transition of the artwork from vine sprouts to a tree structure.





Figures 46 & 47: Screen-captures from State 5 of the visual art of the artwork *Lignum Vitae*, 2020.

State 6: The Climax.

This is the final state of the artwork. This is where the artwork states are finalized and there are no more additional reactions of the artwork to the participant.



Figure 48: Screen-capture from State 6 of the visual art of the artwork *Lignum Vitae*, 2020.

5.2.3 Sound Art

The sound art aspect of the project *Lignum Vitae* is a Sonic Art composition composed by the software AbletonLive10, which is an audio edit program most eligible for its unique vertical workspace suitable for generative sound compositing.



Figure 49: Screenshot of the workspace of *Lignum Vitae* in AbletonLive10.

The composition consists of five different levels that tell the growth of the tree of life figure, categorized in states below:

1. The constant ambient audio surrounding space (When no participant is in the room)
2. The moving echo of the ambient audio + Generative synthesizer (Starting with the first entrance of the participant into the room)
3. The Glitch (Glitchy transfiguration of the figure, as the participant moves closer)
4. The explosion + the cracking and growth of the virtual seed into the transformed tree figure (When participant is significantly close to the artworks' torso)
5. The *Breathing*- The reconsolidation of the tree of life in its final form (When the participant is the closest to the torso)

The significance in the usage of the vertical workspace of the software AbletonLive10 is the possibility of adding various elements and multi-texturing the audio samples' nature without working in linear form, which is the case for most of the audio edit software. By connecting each sensor to the master channel sub-channels, shown from 1 to 15 in the image above, a sound artist can activate one and deactivate the previous audio group (sub-channels) and by doing so, can measure the variety of the sound samples by the space in which sensors are implanted. This is the basic audio movement principle I applied in composing *Lignum Vitae*'s audio art. The work is formed by 7 Channels, and 9 groups of sub-channels harboring the sum of 9 main audio samples, resampled by me into 32 different samples added and consolidated to one another in the aim of creating a rich texture in the dynamism of the sound composition. The content in the main channels are designed as following:

Channel 1: Ambient Pad

This ambient pad is a licensed AbletonLive10 sample named *Aurora Pad* I chose from my sample library. It is a midi sample that I worked on getting different generative outputs.

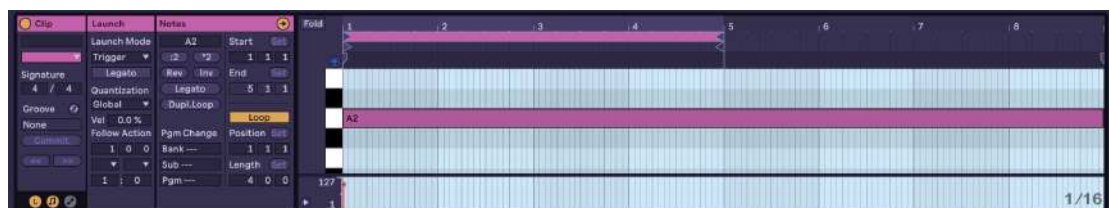


Figure 50: Midi sequence of the 1st *Aurora Pad* sub-channel inside AbletonLive10.

It is used in every state of the composition differently by resampling and random generating, therefore is a significant sample for the project composition. In state of the project in which there are no participants in space (State 1), the sample is used

solely by creating a constant random chord inside Pentatonic Scale, changing every time the room is emptied by the participants and then re-entered for the next interactive experience (In more technical terms, activated in a random chord every time the 1st sub-channel of the master channel in workspace is activated). This is achieved by using the plugins: *Random*, *Scale* and *Chord* found in DAW (Digital Audio Workstation) library. By using *Random* and *Scale* (Pentatonic in this case), I made sure that the generative outcome of the midi note would be a randomly generated note between x octaves (1 in this case) with a certain percentage of variety inside the Major Pentatonic Scale that I chose as the main scale of the project, with the reasoning that the Pentatonic scale tends to work flexibly with both minor and major progressions, leaving a bigger room to re-texture samples with different tones. Also by using *Chord* plugin I achieved a richer background of the generated note with its chord progression, again achieved generatively every time.



Figure 51: Plugin Table of the 1st *Aurora Pad* sub-channel inside AbletonLive10.

The second and third time this sample is encountered is as the echoed ambient pad (States 2&3), where the sample is not constant anymore, interchanging with the existence of participant in space not only with generative chord output put also with the usage of the *echo*, moving in a certain pace through the usage of *LFO* (Low Frequency Oscillation) that creates a dynamic rhythm by detecting the frequencies below 20Hz. Aside from technical terms, this effect creates a feeling close to the wind blow, a digital one; and by creating this my goal was to psychologically create

the perception that the sound is moving through the virtual wind surrounding the gallery space once the participant enters.



Figure 52: Part of the Plugin Table of the 2nd and 3rd *Aurora Pad* sub-channels inside AbletonLive10.

In the states 4 and 5 where the growth and final formation of the virtual tree body is finally visible to the participant, the ambient pad sample works in the same principle as the state 1, only this time made more dynamic by using auto-movement between speakers, by the usage of *Ping Pong Delay* and *AutoPan*, creating the feeling that the sample and the delay of the sample are moving separately from one another between speakers which adds on to the feeling of being surrounded by the sound art in actual space.



Figure 53: Part of the Plugin Table of the 4th and 5th *Aurora Pad* sub-channels inside AbletonLive10.

Channel 2: Generative Synthesizer

This channel is created by resampling a licensed AbletonLive10 sample named *Alphaphone*, with the aim of creating a reverberated soft synthesizer tone that might trigger the feeling of a digital wind chime, especially since I designed this sample as an add-on layer to the wind-like effect I achieved using echo on the pad sample, as mentioned above. Following the similar principles mentioned before, the generation of this sub-channel is also made with *Random*, *Scale* and *Velocity* plugins, again designed in Pentatonic Scale. The reverb of the audio has a different and wider feels to it, this is because of the usage of Valhalla reverb plugin that creates a wider depth to the reverb feeling on the sample.



Figure 54: Part of the Plugin Table of the *Generative Synthesizer* sub-channel inside AbletonLive10.



Figure 55: Part of the Plugin Table of the *Generative Synthesizer* sub-channel inside AbletonLive10.

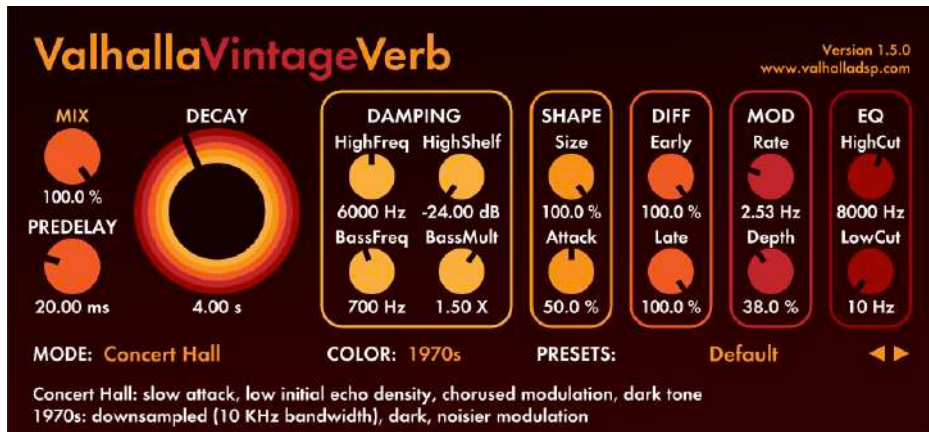


Figure 56: Valhalla Reverb Plugin in the *Generative Synthesizer* sub-channel inside AbletonLive10.

Channel 3: The Glitch

This channel is the last channel before the growing process of the tree of life begins. It is created by the grouping of numerous conga midi samples used in different rates in order to create a glitchy sound texture.

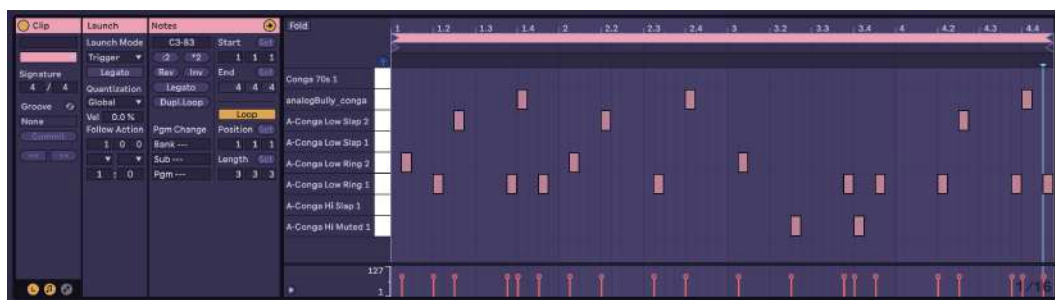


Figure 57: Midi sequence of the Glitch sub-channel inside AbletonLive10.

In the actual process of the artwork *Lignum Vitae*, it is triggered by the participant movements captured with sensors -as it will be mentioned in the following sub-chapters- whereas in the virtual process of *Lignum Vitae*, it is triggered with LFO

movement of the samples to reach a generative outcome as well as dynamic one.

This is achieved by mapping the *LFO* to the rate of the *Arpeggiator* that I inserted inside the Glitch sub-channel.



Figure 58: The Plugin Table of the Glitch sub-channel inside AbletonLive10.

Channel 4: Paper Shred

This channel represents the sound the tree of life figure makes while it's growing its vines on the visual art of *Lignum Vitae*. It is a sample recorded by me and as it's name foretells, it is a sample of a slowly shredded A4 paper that later on I resampled in numerous different tones, consolidated onto one another for the aim of creating a multi-textural single audio that can be felt as a slow growing of thin wood, digitalized by also adding high pitched and stretched versions of the sample. The image below shows the mono version of the consolidated sample, made with 3 versions of the same sample: first one transposed to a high pitch and then stretched, second one transposed to a lower pitch, the third one frequency shifted and reverberated.

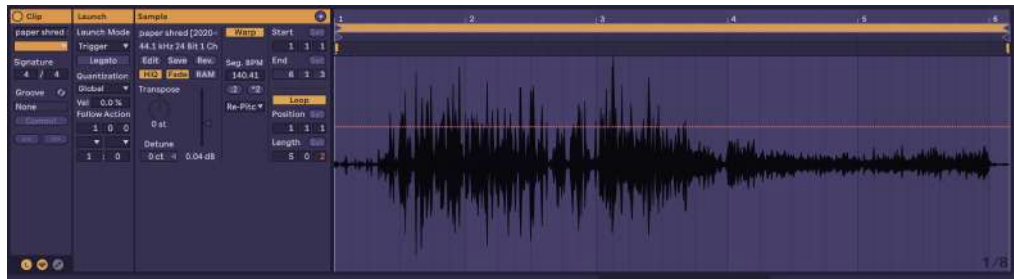


Figure 59: First audio sequence of the Paper Shred sub-channel inside AbletonLive10.



Figure 60: The Plugin Table of the 3rd Paper Shred sub-channel before consolidation, inside AbletonLive10.

At the end I took the resulted sample, duplicated it, stretched the audio very mildly to create a different feeling of the same sound and slide it a little to the right so that the samples wouldn't fit to one another time-wise, and finally consolidated these two versions into a single stereo sample. The end result is a multi-layered audio sequence that feels like multiple different sounds of tree growth is felt from all right, left and middle. Below is the last version of the audio graph of this sequence.

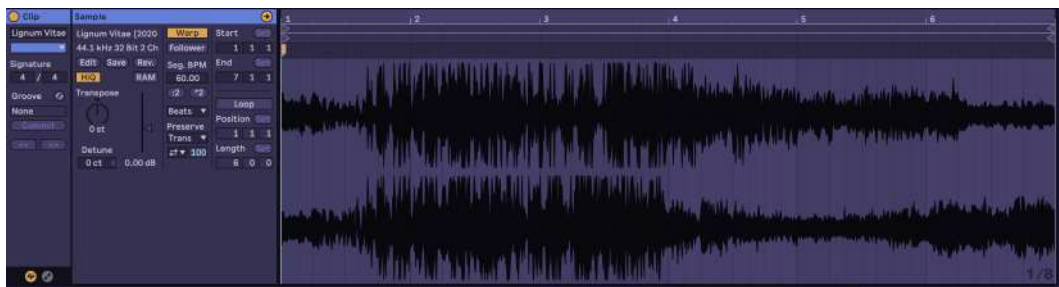


Figure 61: Stereo audio sequence of the Paper Shred sub-channel inside AbletonLive10.

Channel 5: Paper Shred-2

This channel is used in the function of a pad synthesizer inside the sound composition, which is used as a sustained sound that goes in the background of the composition, in creation of a harmonic atmosphere. In this case however, it is the stretched and manipulated version of the paper shredding sample mentioned in the previous channel ,Channel 4, being sustained in the background all throughout the states of the composition (mentioned in the beginning of the sub-chapter). By re-pitching the manipulated sample my aim was to create a thunder-like digital sound very distant and wide in the background to enrich the base of the composition.

In creation of this audio sample I used the *Utility* plugin inside the DAW to enhance the sound and create a wider stereo effect on it and saturated the sound by enhancing the drive through *Saturator* plugin. Although in linear timelines creating a manual panning automation is preferred for having total control over the left-right movement of the sound, since I work on generative compositing, I obtained constant movement between wider ranges of the soundscape through using the AutoPan tool which directs the sound between left (L) and right (R).



Figure 62: The Plugin Table of the Paper Shred-2 channel inside AbletonLive10.

Channel 6: Impact samples

The impact samples are found samples that I integrated into the composition to create impactful climax feelings, One reversed gong sample consolidated with a reversed kick sample in the middle of the composition, right before the symbolic growth of the tree is given with the paper shredding sample used in channel 4, and one ambient audio sample consolidated with a reversed and another transposed kick sample used at the end of the composition. The significance in using these impactful sound samples is to create a variety of ups and downs through the composition, showing the beginning and the end of the tree growth fitted with the visual art. Below are the captured audio graphs of the samples.

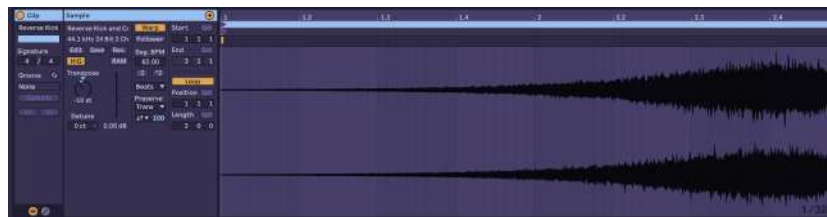


Figure 63: Audio graph of Gong sample, inside AbletonLive10.



Figure 64: Audio graph of Kick sample, inside AbletonLive10.

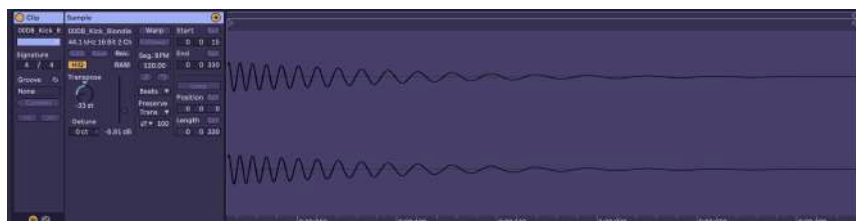


Figure 65: Audio graph of Kick sample, inside AbletonLive10.



Figure 66: Audio graph of Orchestral Ambient sample, inside AbletonLive10

Channel 7: *The Breathing*

The last channel used in the creation of the sound composition of *Lignum Vitae*, also on a personal note one of the most significant sounds that are used, is named The Breathing by me as the composer. The reasoning behind the name I gave to this channel is both regarding the source of the sound sample and the particular placement of it inside the composition. This sample that I manipulated is a NASA recording of the Milky Way, that is found as open source on the internet. It is literally the sound of our galaxy. I found it intriguing to use especially in one particular part of the whole audio sample: which is a few seconds-long part that felt like a sound-wave coming and going, much like inhaling and exhaling. This is why the channel is called breathing. With adding *Random* and *Chord* plugins I made sure that the sound emerges differently within C major scale. This sample is used in the composition, when the growth of the tree figure is complete and it is moving onto the final state of the composition (State 5).



Figure 67: The Plugin Table of the Breathing channel inside AbletonLive10



Figure 68: The zoomed sample of NASA recording in the Plugin Table of the Breathing channel inside AbletonLive10

5.2.4 Final Work:

5.2.4.1 Actual Process

Lignum Vitae is a multimedia artwork designed in cyberspace through various domains of sonic arts, space design, torso construction, visual art and data processing, linked to one another through chain reaction. The artwork interaction is triggered firstly by the participant entering the gallery space, activating the ultrasonic distance sensors placed in various spots in the room. These sensors trigger the software AbletonLive10 which they are connected to, and inside AbletonLive10, various channels that are designed for generative output (as mentioned in the Sound Art sub-chapter) will be triggered in the order of the participants' movement, as each channel is mapped to a certain place within the room, waiting to be activated. The output of the sound art plays role in the movement of the projected visual art upon the torso of the artwork, which is essentially a real-time generative Touchdesigner patch that works through audio reactivity (as mentioned in the Visual Art sub-chapter), that will form itself by the changing sound harmonies and frequencies. The reaction chain of the artwork is shown in the figure below.

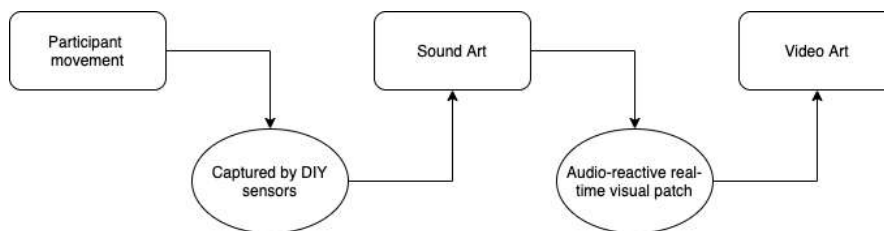


Figure 69: Illustration of the main principle of chain reaction in the artwork *Lignum Vitae*, drawn by Author, 2020.

The sensors are the first to be activated by the participant entering the space, and later on moving inside the space towards the artwork's torso. As the participant moves in the gallery space, the sound art emerges and varies according to the coordinate points that are planned in the placement plan of the artwork and sensors; through this movement of sound along with the human interaction, the audio reaction of the real-time visual patch designed inside Touchdesigner is activated. Thus the entirety of the artwork movement will be conducted solely by the participant movement in space. The artwork *Lignum Vitae* is designed to have a complete set of reactions with minimum 1 and maximum 7 participants -number of the sensors except the first activation sensor (8-1)- , however; in the case where there are 2 or more participants inside the gallery space, the already activated sound-channels' reactivation will provide additional reverberation to the sound art. The additional participants after the first, do not create the impact but they sustain it through reverb. Reverb, is by definition the hit and reflection of the sound from a hard surface, and as it gets to grow little by little, the feeling of the depth in space grows with it. This is why every time more participants get to be inside the space, the space gets bigger for them, and the resonances inside the room start to transform. That being said, *Lignum Vitae*'s reverberation process is limited to the number of the sensors inside the gallery therefore it is the generative composition itself that is underlined rather than the experimentation of reverberation. However, a valid example of such experimentation can be found in the sonic artwork *I'm Sitting In a Room* (1969) by Alvin Lucier composed in Brandeis University.

The ultrasonic distance sensors that will be used in the realization of the project are named HC-SR04 Ultrasonic Sensors. The working principles of these sensors is that,

they emit a sound signal of 40.000Hz to the air and if this signal hits a surface between 2 cm and 450 cm, it calculates the distance of the object from itself. While this is the theoretical distance measurement, in experience I've found that these sensors work best between 2cm and 200 cm (approx.). Which is why inside the gallery space of *Lignum Vitae*, these sensors are placed 2 by 2, mostly facing each other in order to eliminate a distance calculation error.

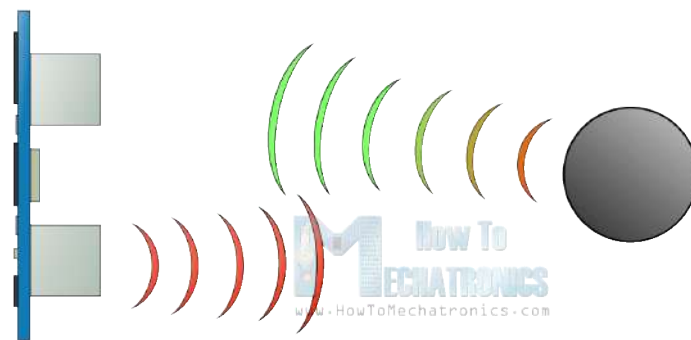


Figure 70: Illustration of the working principle of HC-SR04 Ultrasonic Sensors, taken from *howtomechatronics.com* , 2015.

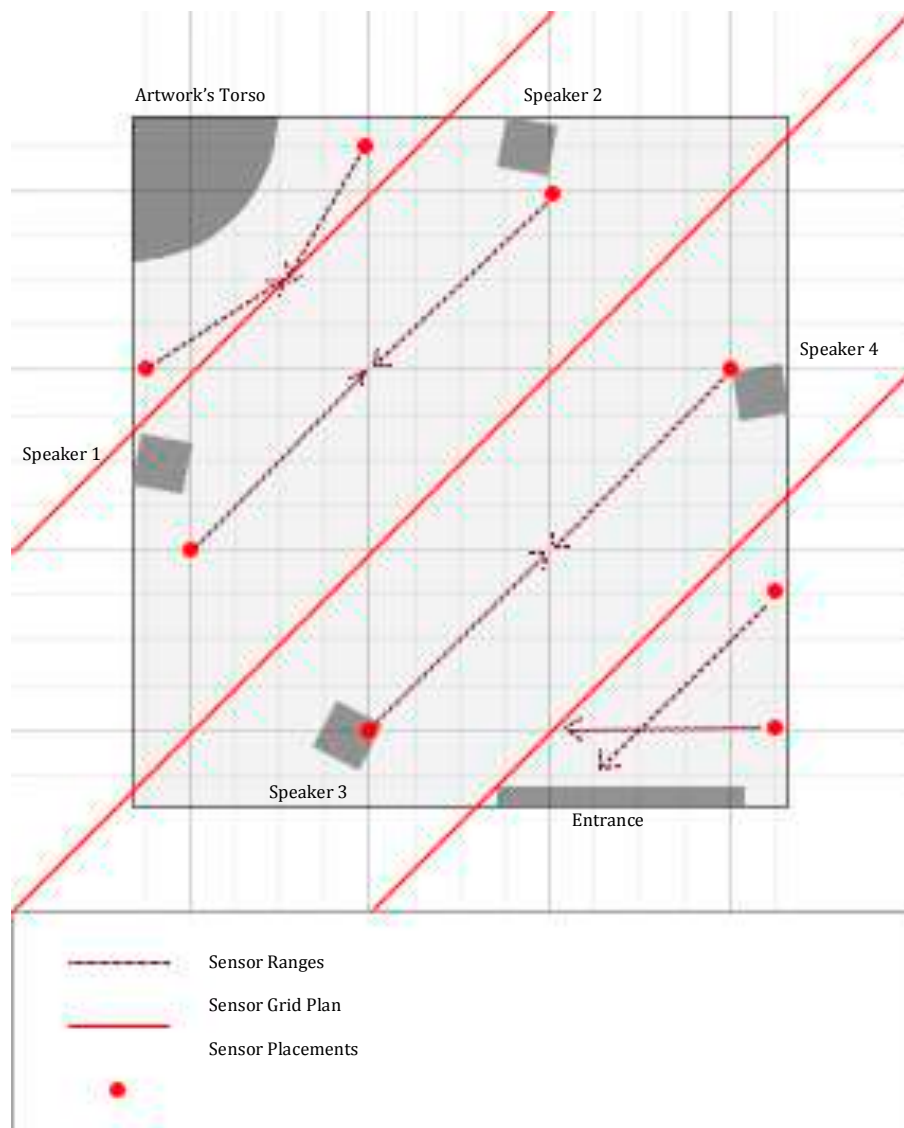


Figure 71: Illustration of the sensor placement plan in gallery space for the artwork *Lignum Vitae*, drawn by Author, 2020.

Getting these sensors working is through the usage of an Arduino Uno board. Also in the case of *Lignum Vitae* the Arduino Uno boards have to be run through AbletonLive10, because in the creation of a multichannel compositions with lots of variety in samples and instruments, AbletonLive10 comes with the utile *Arduino* plugin that can come in handy when one conducts the composition through sensors, made similarly to controlling through nobs of a midi controller.

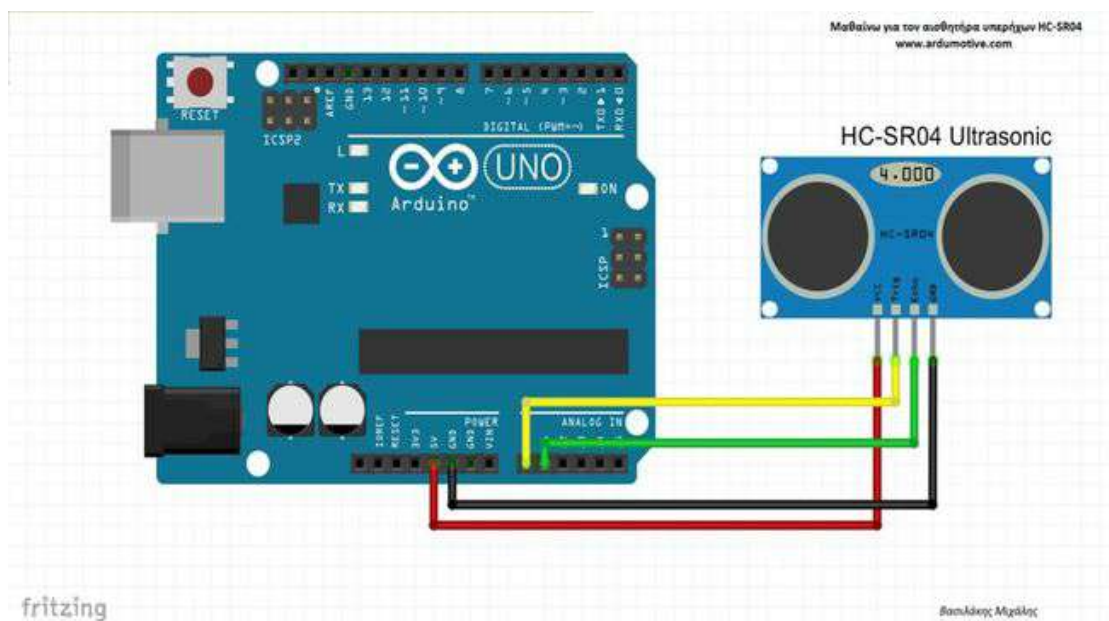


Figure 72: Illustration of the HC-SR04 Ultrasonic Sensor, connected to the Arduino Uno, taken from *ardumotive.com* , 2019

Macro mapping of *Instrument Rack* inside AbletonLive10 came particularly significant in the sensor usage of *Lignum Vitae*. As mentioned above, using the Arduino Uno and the sensors, the way I normally use a midi controller device came in handy however, the mapping of the sensor was limited towards a single parameter of a single device (e.g. Reverb >Wet/Dry) therefore there had to be a way to map a

whole channel with using only one sensor; which is where macro grouping was useful. Much like nesting video footage inside an editing software, macro mapping enabled creating various groups of samples and instruments which is how the composition of *Lignum Vitae* came to be both generative and complex in variety at the same time: by me connecting the Arduino Uno and the sensors to macro groups that I composed rather than mapping all parameters one by one or than keeping the composition simple in variation of channels just to control them easily.



Figure 73: Example screenshots for Macro Mapping inside AbletonLive10.



Figure 74: Example screenshots for Macro Mapping inside AbletonLive10.

Below are the photo documentations of the sensor process with Arduino Uno, HC-SR04 Ultrasonic Sensor and AbletonLive10:

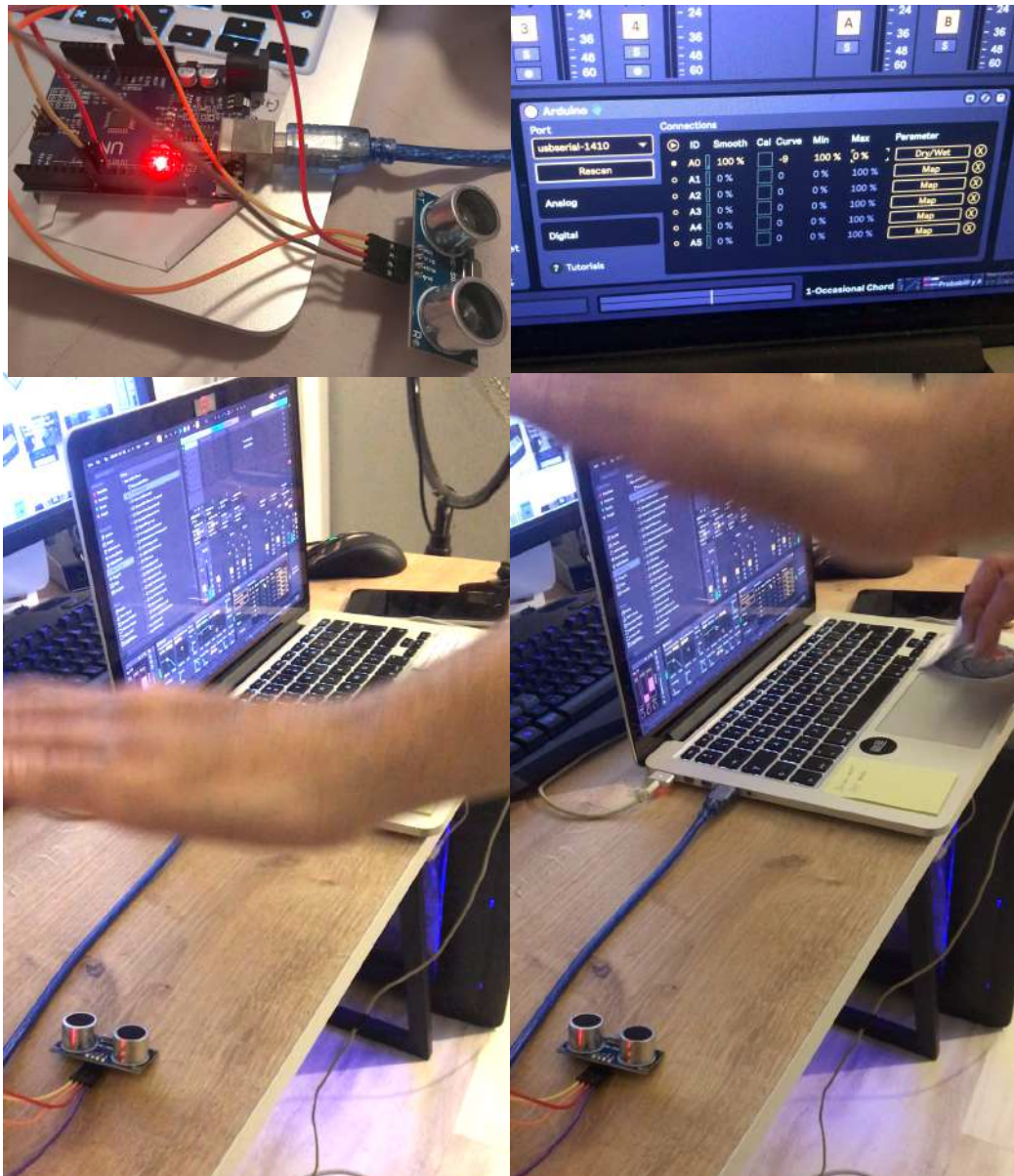


Figure 75: Sensor experimenting for the project *Lignum Vitae*, taken by the author, 2019.

The next step is to connect the audio composition output into the audio-reactive realtime visuals created inside Touchdesigner. Below is the audio-reactive visual patch's workspace inside Touchdesigner.

Figure 76: Image of the Touchdesigner Workspace for the project *Lignum Vitae*.

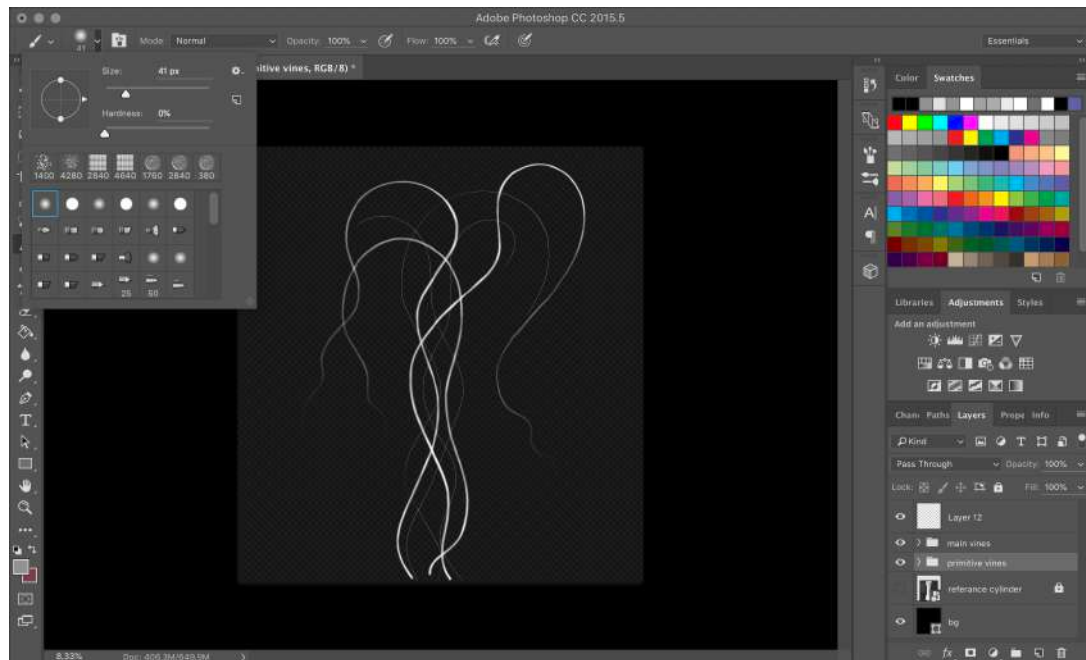


Figure 77: Image of the 2D vine illustration inside Adobe Photoshop Workspace, for the project *Lignum Vitae*.

Since I wanted to establish a generative movement for this first vine system that I wanted as the base of the artwork, I had to search for alternative ways to get the vines to react to audio inside Touchdesigner. After a while of experimenting, the solution lay with generating *noise* inside the software, taking its graph data and converting it into a 3D-like object (SOP). The *3D-like* wording comes from the fact that the data shape taken from the graph and converted to SOP was never actually a drawn 3D object therefore it could not re-establish a data that it never contained. In converting the graph shape into a SOP it only pretended as a 3D object by simply implementing the movement of a SOP rather than taking 3D dimensions. The image taken from inside the Touchdesigner software below, showcases the wave graphs of three different *noise* being converted into SOPs (3D objects) in creation of the vine shapes.



Figure 78: Image of a part of the Touchdesigner Workspace for the project *Lignum Vitae*.

After establishing the generative movement, I used instancing to increase the number of vines and reproduce more movement in resulting a visualization of a crowded vine bunch, that moves in audio-reactive principle.

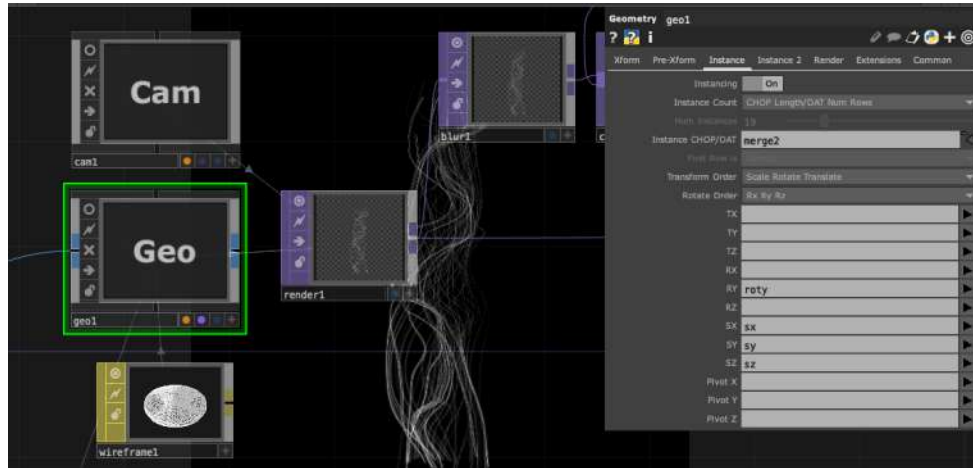


Figure 79: Image of instancing inside the Touchdesigner Workspace for the project *Lignum Vitae*.

This is where the realization process of the spatial conduction of the project *Lignum Vitae* and my experimentations as artist had to cease and take a virtual direction due to COVID-19 Pandemic. Everything mentioned up until this point bases its facts upon trial and practice. However, it would be appropriate to state that the rest of this sub-chapter (until the 5.2.5.2 *Virtual Process*) will continue as my un-realized findings for the theoretical planning of the thesis project *Lignum Vitae*.

The later state of the visual patch (as in the mentioned states inside the Visual Art sub-chapter) would have to contain the non-generatively structuralized tree of life torso, with its grown and established pose that will appear towards the end of the artwork experience. For this state, illustrated vine tree inside Adobe Photoshop will have to be imported into the Touchdesigner project as PNG, and converted into SOP objects, similar to the mentioned process previously for *noise* wave graphs. The main difference of this state from the wave graphs is that, they require different movement principles. The vines were moving with audio-reactive generation, however in order

to create a planned and structured growth that is non-generative, the required technique is to use masking. Masking will enable the growth to be controlled step by step in virtual environment, which is wanted here, opposite to the previous states of the artwork. Masking technique inside Touchdesigner can be applied by connecting the SOP and Ramp TOP together. Ramp TOP is a tool that enables the direct control over the object's opacity and by using the docked DAT>position number inside the parameter columns, one can control the growth movement of the object. That being said, keeping this controlled growth movement synchronized to the audio composition's exact channel that is designed for the tree growth, is only possible through linking the precise composition channel to the SOP movement, using *TD-Ableton* plugin.

There are two different ways of audio-reactivity inside Touchdesigner that can be used for the project *Lignum Vitae*: 1. Filter based audio-reactivity, 2. Detailed channel control through *TD-Ableton* plugin. In the previous experimentations of the generative vines, I have used the audio-filter based reactivity by separating the two main frequency groups of the project and creating two audio-reactive groups inside the vine bunch in order to have variety in generative movement; middle frequencies and high frequencies. This can be decided based on the particular audio composition, whether the low, middle or high frequencies are frequently used would decide which filters the audio would need amongst lowpass, bandpass and highpass filters. In the case of *Lignum Vitae*, it was highpass and bandpass filters because I frequently worked with middle and high frequencies in composing the piece.

While this audio-reaction method was used in experimenting of the project, it will only be useful in the virtual design of the *Lignum Vitae* gallery environment;

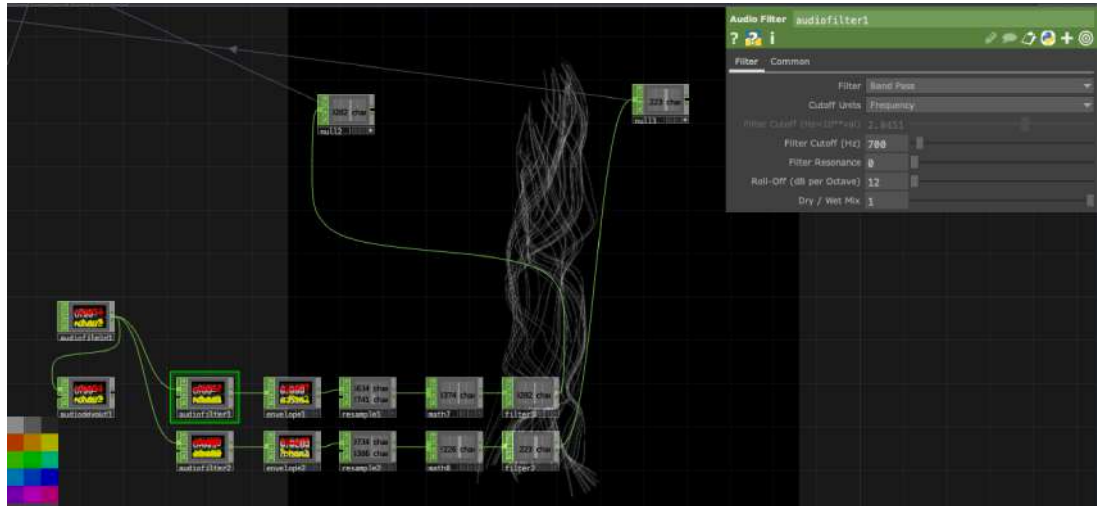


Figure 80: Image of the filter-based audio-reactivity inside the Touchdesigner Workspace for the project *Lignum Vitae*.

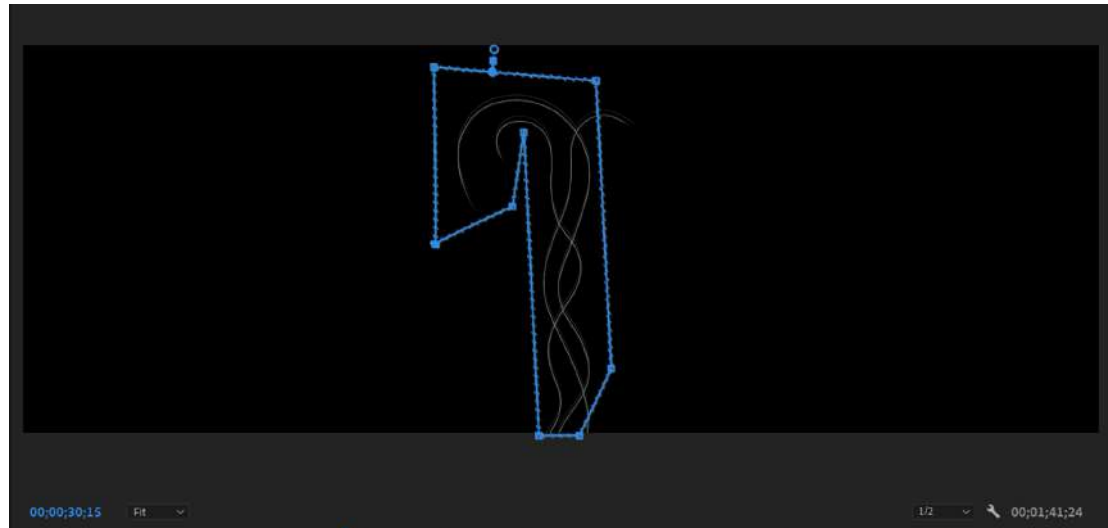
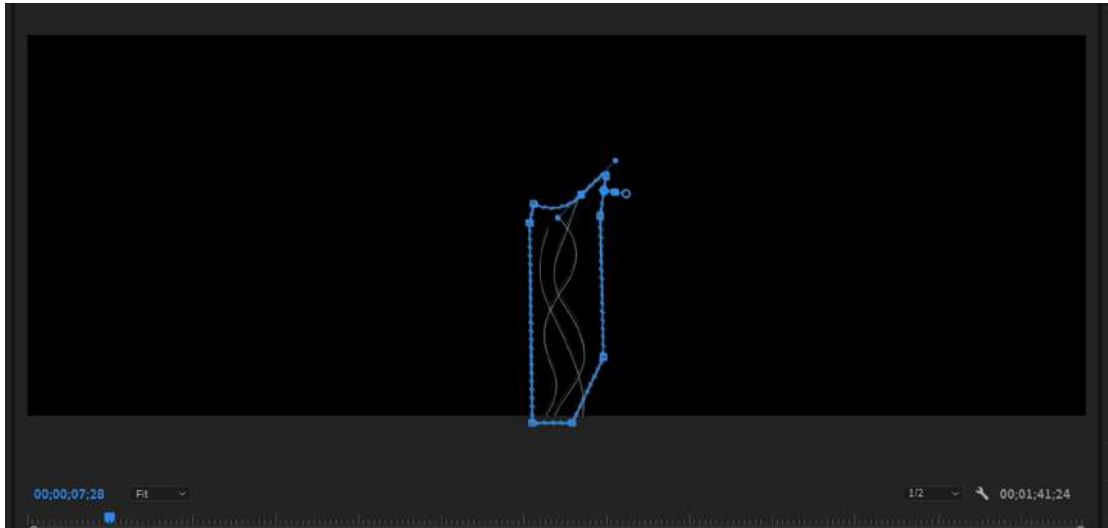
Although live usage of this method is available with using two interfaces and two computers, it will not work in the real-time realization of the project, because not all aspects of the visual art is planned as generative. For that process audio-reactivity has to have a close detailed linking and editing between the Ableton file of the audio composition and the visual Touchdesigner patch, edited channel by channel using *TD-Ableton* plugin.

5.2.4.2 Virtual Process

The virtual process of the thesis project *Lignum Vitae*, is based on recreating the spatial conduction of the artwork in gallery space, in a virtual environment where people can experience with their personal equipment (e.g. PC & Headphones or VR Goggles) and be participant to a virtual exhibition. Though it is appropriate to state that the most significant change in the virtual conduction of the final project, due to COVID-19 Pandemic is both the sensor usage and the collective experiencing of the final work that is prevented by quarantine. This is why the final project of this thesis remains an advancedly developed prototype as well as a virtual experience that is separate from the actual conduction plan of the artwork inside a real gallery space.

In creation of the virtual exhibition of *Lignum Vitae*, the first step was to export a generative variation of the sound composition created inside AbletonLive10 and importing it inside Touchdesigner. That is when I exported the audio-reactively generated vine patch creation inside Touchdesigner, as an animation that moves according to the sound composition I imported. The process up to this point -apart from the rendering- is the same as in the previously mentioned 5.2.5.1 *Actual Process* sub-chapter. However the differentiation started with the masking technique that showcases the digital vine growth with me recreating the technique through the usage of Adobe After Effects. This decision was made because the final product of the virtual exhibition will remain as a rendered artwork. This is why it was a personal

choice to work through the After Effects software. Below is the captured images of the masking process for the virtual conduction of *Lignum Vitae*.



Figures 81& 82: Screenshots of the Adobe After Effects Workspace for the masking process of *Lignum Vitae*,2020.

As the Climax state of the artwork (see 5.2.2 *Visual Art*) was created in Adobe After Effects, the brightness and light effects were made inside Adobe Premier software rather than the usage of *Luma* or *Light COMP* inside Touchdesigner software.

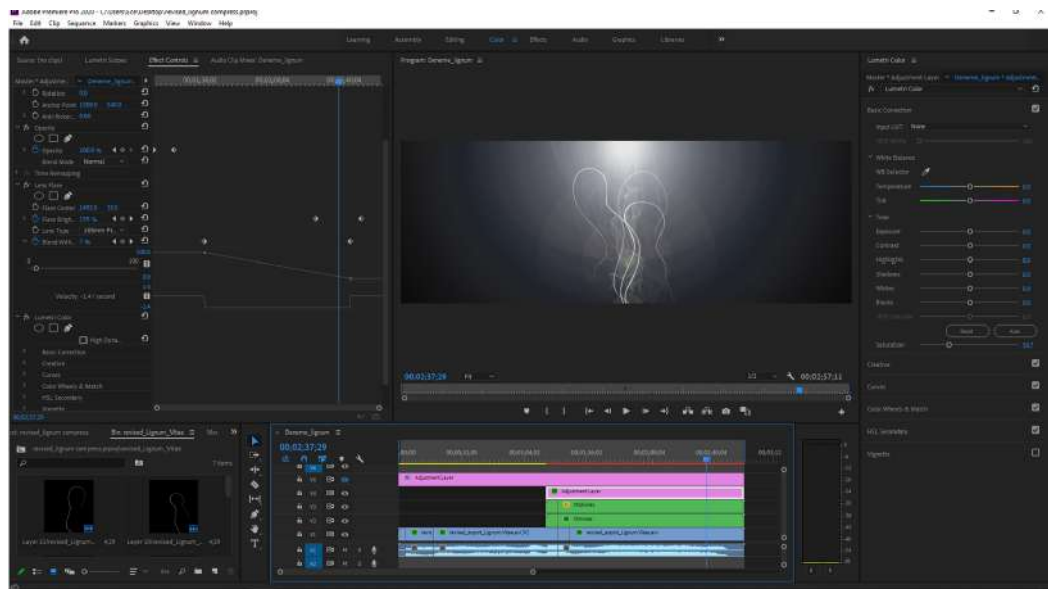


Figure 83: Screenshot of the Adobe Premier Pro Workspace for the lighting effects of *Lignum Vitae, 2020*

Later on the 3D gallery space and the artwork torso are modeled in 3ds Max software (see the end of 5.2.1 *Prototype Evolution and Torso Design Phase*) and imported into the Unreal Engine software which is used for the development of first person virtual reality experiences and video games. The reason why I wanted to showcase my final work using the Unreal Engine was because I aimed to create a personal experience through the showcase of this virtual exhibition and the eye level and the movement of the participant was very significant in the conduction of the artwork. Although through the virtual exhibition the sensor placement was eliminated, I still wanted to maintain the freedom of engaging with the artwork from inside the space with the capability of walking through and exploring the virtual gallery. Below is the

workspace of *Lignum Vitae* inside the Unreal Engine, and the finalized virtual exhibition of the artwork *Lignum Vitae*.



Figure 84: Screenshot of the Unreal Engine Workspace of the project *Lignum Vitae*,2020.



Figure 85: Screenshot of the Unreal Engine Gameplay Mode for the project *Lignum Vitae*,2020.



Figure 86: Screenshot of the Unreal Engine Gameplay Mode for the project *Lignum Vitae*, 2020.



Figure 87: Screenshot of the Unreal Engine Gameplay Mode for the project *Lignum Vitae*, 2020.

CHAPTER 6:

CONCLUSION

Throughout this thesis what was crucial was to closely investigate the methods in which lay the possibility of transforming a synthetic creation into a responsive organism in the form of an artwork. Starting from Chapter 2, the first observation of *Lignum Vitae* as a computational creation that seeks interaction with humans, it was the initial step to further research on the symbiotic bond between computers and our species, the information exchange between humans and computers systems that define our collaborative co-existence. Thus, going back to 1950 and Norbert Wiener's depiction of Cybernetics and our society, and to 1960 and researching through Licklider's footsteps where the cooperation of computers and humans were talked upon as a possibility of two equal entities that symbiotically co-exist, was a significant step to understand the nature of the creation *Lignum Vitae*, which is entirely dependent on co-existence with human interaction. This was more than the technical aspect of *Lignum Vitae*, because as mentioned throughout the first half of the second chapter, the drive to create a digital tree figure that flourishes, so to speak, with human interaction was inspired through the idea of the mythical Yggdrasil (Tree of Life) that is a historical monument of a universal network of existence (see Chapter 2). In light of this, it was important that *Lignum Vitae* was both literally and figuratively dependent on the presence of life inside its exhibition space.

The design of that exhibition space however, was closely related on creating virtual environments, spatial designs, visual studies and especially understanding the term cyberspace through its definition and historical developments (see Chapter 3). Which covered the entirety of Chapter 3 where Novak and Krueger were the first sources to be mentioned in explanation of cyberspace as an art form. Along with Novak's rather poetic perspective and Krueger's practical approach to the arts added a variety to the description of the arts as well as exemplified their personal depiction of artworks created in cyberspace.

Later on in Chapter 3, in close analysis to the theories that first depicted artwork as an organism, which was the main concern of the artwork *Lignum Vitae*, it led the thesis to Wagner's *Gesamtkunstwerk* that acts as a stepping stone to Moholy-Nagy's Theater of Totality and his artistic research on transcending theater into an organism by the means of using "light, space, plane, form, motion, sound, man." (Moholy-Nagy, 1924). These two theories were also sourced as the initial steps for the developments of cyberspace and virtual reality throughout one of the main sources of this thesis: *Multimedia: From Wagner to Virtual Reality*, 2001 by Randall Packer and Ken Jordan, which was in the interest of *Lignum Vitae*.

After the close analysis of artworks in cyberspace the other main aspect of *Lignum Vitae* was sonic art, starting from Chapter 4. As a still emerging field that many of its theoreticians find too broad to define under a single definition (see Chapter 4), sonic art was a crucial point of the artwork *Lignum Vitae* because the entire visual aspect of the artwork was conducted through a sonic experience using audio-reactivity (see Chapter 5). Therefore perhaps the main aspects of what make *Lignum Vitae* an

organism, began with sonic art and sonic interactivity, which was covered all throughout Chapter 4 by following the steps of Wishart, Gibbs and Cage in order to try and understand the emergence of the field and later on understanding the methods of sonic interactivity inside *Lignum Vitae* through close observation of Franinović and Serafin who introduce the sonic interactivity as a whole new field on its own.

Through the showcase of documentation process in Chapter 5, the artwork *Lignum Vitae* is presented in close analysis of creation in its every aspect such as technical creations and design choices. The final version of *Lignum Vitae* inside the virtual exhibition environment (see link in Appendices) remains as an adaptive work that can be converted to work with VR, Play Station, PC, Smart Pads, etc. But the initial idea of this artwork remains as a collective experience design in real life exhibition space with multisensory motion tracking and signal processing rather than a virtual walking simulation. In the future, the artistic aim of this research and the artwork *Lignum Vitae* is the realization of the initial exhibition plan inside a real gallery space.

With the artistic research that created the theoretical aspect of this study, the main aim of this thesis was the indication of the artwork *Lignum Vitae* as a synthetic organism that was created with cyberspace and sonic arts. Throughout the observations of the previous knowledge that helped construct this thesis, combined with the detailed description on the creation of the multi-disciplinary artwork (see Chapter 5), *Lignum Vitae* became a creation transcending from a pool of separate artistic practices into a single embodiment of a responsive entity.

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TREE OF SALVATION : Yggdrasil and the Cross in the North , G. Ronald Murphy,

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APPENDICES

Below is the Link for the Virtual Exhibition of the artwork *Lignum Vitae*:

<https://www.eceercevik.com/post/lignum-vitae-an-interactive-multimedia-artwork>

Artist Statement:

Multimedia artwork, Real-time, 2020

Bilkent University Master of Fine Arts

One can think of Lignum Vitae as a virtual plant that is watered by the participants existence as it starts to evolve and react to the participant in the space, much like a plant reacts to the movement of the sun, conducted by their movement of depth and distance to the root of the artwork. (Ercevik, 2020)

Lignum Vitae is a multimedia artwork inspired by the Nordic Yggdrasil (Tree of Life), one of the symbols of the cosmic existence of the interconnected universe portrayal in pre-historic cultures. Lignum Vitae on the other hand, symbolizes the contemporary cultures that deal with the interconnectedness of digitalization, humans and our computational living. Creating a computer-made tree-*ish* figure that is dependent on human presence is the irony of the tree of life, created in cyberspace as a multi-disciplinary experiment of virtual experience that designed to be exhibited in gallery space. It is an A/V installation covering the whole gallery room and taking movement data of the participants through sensor placement that transforms into

generative sound art, which triggers the audio-reactive visual art. In this sequentially organized chain reaction of Lignum Vitae, one important aspect is the pursuit of immersion where once participant sets foot in space; a new cyber-reality emerges into being. This cyber-reality aims to give birth to a reactive *organism* (Moholy-Nagy, 1924) that is the artwork in the state of synthesis in all its elements. Through this organismic formation, the artwork Lignum Vitae adjures to be an interactive cyber-theater, following the methodological footsteps of The Theater of Totality.

Artist Bio:

07/03/1995, İstanbul

Ece Erçevik is a musician, sound designer and visual artist. Her works in the frame of academy consists on exploration of Sonic Art and experimental sound design in integration with the visualization of sound. Her background in the long years of voice training, mixing with her practices in sound design has opened the possibility of experimenting with human voice, sampling and granulating it in form of a tentative instrument, free of verbal boundaries. In most of her sonic artworks, recorded and found samples (human & non-human) are dominant rather than the usage of instruments. With her education in Communication and Design, she initially practiced sound through Foley experiments for short-films, which helped-create the perception of telling three dimensional stories with sound that both reaches in the borders of soundscape creation and artistic experience. In 2019 she co-founded MARA Eclectic Music, a collective brand that specializes in fusing Neo-Soul genre and Sonic Art experiments. Her aspiration is to create a fusion style consisting of the

experimental approach that she gained through Sonic Arts in Academy with her professional music and performance arts.

Education:

Notre Dame de Sion '14,

Bilkent University Communication & Design '18,

Bilkent University Master of Fine Arts '20