



*ESPACIOS  
RESONANTES*  
2024

# BIO | CV

## ESPACIOS RESONANTES



Mathias Klenner, *Santiago de Chile (1986)*, based in Barcelona  
Sofía Balbontín, *Santiago de Chile (1985)*, based in Lisbon

Espacios Resonantes (Resonant Spaces Project) is an artistic research and a series of artworks that focuses on the aesthetic, political, social and acoustic dimension of aural architecture as a means to build alternative and subjective narratives, developing from this starting point experimental proposals around music, video, performance, installation, urban intervention, virtual reality and spatial sound design. The project its developed by an interdisciplinary team composed by Chilean artists Sofía Balbontín (PhD(c), architect and sound artist) and Mathias Klenner (PhD(c), architect and sound artist). In 2022, the project produced the first version of the Architecture and Listening Festival: Espacios Resonantes, an instance where a multidisciplinary community of international artists, researchers, architects and musicians converge to transform and speculate around the *Copas de Agua* from Santiago de Chile. This project has been funded by the Ministerio de las Culturas, las Artes y el Patrimonio, and the Research Unit of Universidad de las Américas. With the support of the Núcleo de Lenguaje y Creación and the Facultad de Arquitectura, Diseño y Construcción UDLA.

[espaciosresonantes.com](http://espaciosresonantes.com)  
[festival.espaciosresonantes.com](http://festival.espaciosresonantes.com)  
[sofiabalbontin.com](http://sofiabalbontin.com)

### PUBLICATIONS

>Balbontín, S. y Klenner, M. (2022). El sonido emitido por el espacio físico y el espacio invisible construido por el sonido. *Revista 180*, (49), 29-42.  
> Klenner, M, Balbontín, S. (2021). Listen to the space and inhabit the sound. *Revista Nodo* vol. 15 (31). Bogotá, Colombia. Issn: 1909-3888  
>Balbontín, S. Klenner, M. (2021). The sound created by space and the space created by sound. In: Masson, D. (ed.), *Ambiances, Alloaesthesia: Senses, Inventions, Worlds*. E-conference.

### GRANTS

2023 Grant "Culture Moves Europe", for mobility with PhD research in Berlin, Germany.  
2022 National Grant Fondart / Festivals and exhibition Fondart  
2020 National Grant Fondart / Creation and Production of artistic disciplines Fondart  
Funding Culture and Arts National Council for artistic residency.  
Scholarship BECAS CHILE for PhD Programme 2020-24.  
2019 Research fund 2019-2020 UDLA Research Unit.  
Grant for research and innovation in the fields of visual arts, performing arts, new creative sectors, music and thought, Generalitat de Catalunya.  
2018 Funding VcM UDLA for the project "Traslaciones Sonoras"  
2017 Research fund 2017-2018 UDLA Research Unit.  
2016 Specific Sound Competition, Contemporary Art Museum

### CONFERENCES AND LECTURES

2022  
>Conference, Sound Experiences, Universidade do Minho, Braga  
>Lecture, Sonec Sonoteca, Santiago  
>Interview, Radio Duna, Santiago  
  
2021  
>Conference, Add+Art, Barcelona  
>Panel, Tiempo Real, BARCO Architecture, Santiago  
  
2020  
>"Resonant Spaces" at the 4th International Congress on Ambiances, Alloaesthesia: Senses, Inventions  
>"Resonant Spaces" at the 7th Biennial, Yale Graduate Music Symposium, Yale University, New Haven  
>Panel, The Sound of Cities, Radio ARCADA, Tbilisi Architecture Biennial  
>Panel, Chroma Seminary, Universidad de las Américas, Santiago  
>Lecture, Sound and Architecture, Irruptiones, Contemporary Art Museum, Santiago

### 2019

>Conference, Estrategias Oblicuas, Sound Museum, Santiago, Chile  
>Conference, X Formas, XXI Biennial Architecture and Urbanism, Santiago, Chile  
>Interview, Como Operar, Teatro El Zócalo, Universidad de las Américas, Santiago, Chile

### 2023

>Resonant Spaces #25: Som sob o solo | Lisboa  
>M. Klenner: Oficina de Territorios Perdidos y Encontrados | Festival CREA | L'Hospitalet  
>Resonant Spaces #24: Wastelands VR | Sonar | Barcelona  
>Resonant Spaces #22: Fields of Noise | Quantum Sounds Symposium | Barcelona

### 2022

>Resonant Spaces #21: Polyphono | Festival Espacios Resonantes | Santiago  
>Resonant Spaces #20: Monumentos de futuros fallidos | Festival Espacios Resonantes | Santiago  
>Resonant Spaces #19: Festival Espacios Resonantes | Santiago  
>Resonant Spaces #18: Wastelands | Ctrl alt play - Art Center ETOPIA | Zaragoza  
>Resonant Spaces #16: Inchindown | XV Biennial of Media Art | Contemporary Museum of Santiago  
>M. Klenner: "Sons en Causa" ISEA 2022 | Barcelona  
>M. Klenner: "Acte Verge" for "Studio inframince" in Antoni Tàpies Gallery | Barcelona

### 2021

>Resonant Spaces #15: Space Dystopia | Spatial Sound Institute | Budapest  
>Resonant Spaces #14: La Casa del Sonido RTVE | Spain  
>M. Klenner: "El Sons de la Industria" Sound and Acoustic Heritage Archive for the "Museu Nacional de la Ciència i la Tècnica de Catalunya" | Catalonia

### 2020

>Resonant Spaces #13: Festival Tsonami 2020 | Valparaíso  
>Resonant Spaces #12: Virtual performance | VI International Congress on Ambiances | online  
>Resonant Spaces #11: Documentary | VI International Congress on Ambiances | online  
>Resonant Spaces #10: VII Biennial Yale University Graduate Music Symposium | New Haven

### 2019

> Resonant Spaces #9: Stationary Waves | Eufonia Festival | Berlin  
>Resonant Spaces #8: Album | Soundspace Records | Barcelona  
>Resonant Spaces #7: Resuenarradarresonante | Sala Base Tsonami | Valparaíso  
>Resonant Spaces #6: Hangar | Barcelona  
>Resonant Spaces #5: Cal Grau | L'Estruch | Sabadell  
>M. Klenner: "Ruido Cuántico" | "Barcelona Pensa Biennial" | "Bienal Ciudad y Ciencia" | Barcelona

### 2018

>Resonant Spaces #4: Babel | GAM Cultural Center | Santiago  
> Resonant Spaces #3: Traslaciones sonoras | Plaza del Péndulo, Valdivia

### 2016

>Resonant Spaces #2: Endogamia | Cruces sonoros - Contemporary Art Museum | Santiago  
>Resonant Spaces #1: Sound Constructo | Festival Desfase | Santiago

### 2018

>Invited Lecturer, Transdisciplinary Class, Architecture School, Universidad Austral, Valdivia  
>Conference, "Traslaciones Sonoras" for "We are All Able Bodies: From Sensory Deprivation to Sensory Augmentation", at San Pablo CEU University, Campus Monteprincipe, Madrid/ Spain

### 2017

>Conference «Sound & Space», UNICAL - Università della Calabria, Rende, Italia.



# OFICINA DE TERRITORIOS PERDIDOS Y ENCONTRADOS (DE LA TIERRA) CREA 2023 | L'HOSPITALET



SITE SPECIFIC SOUND PERFORMANCE FOR THE CREA 2023 FESTIVAL IN L'HOSPITALET. THIS SOUND PERFORMANCE USES "DE LA TIERRA" SITE SPECIFIC INSTALLATION BY LOLO & SOSAKU AS A FRAMEWORK TO DEVELOP THE SOUND NARRATIVE.

Renata Gelosi and Mathias Klenner are the "Office of Lost and Found Territories."

For the CREA 2023 festival, they generated a multi-channel sound performance within the old La Veloç factory, based on the installation "De la Tierra" by Lolo & Sosaku. The sound piece used both the resonant acoustics of the place and the sounds contained within the architecture, kinetic sculptures, and the water of the artwork. Using various types of microphones, such as hydrophones and geophones, they captured existing atmospheres and vibrations of the material structures of the space, creating a piece that elevates both the phenomena and the environment of the place and its memory. In parallel, using text, screams, and voice, another layer of meanings was generated to narrate a fictionalized story about the factory, the objects, and entities that inhabit and inhabited it. All of this was done with a sound spatialization system where the audience received sound fragments that emerge from different temporalities associated with the place, while the performers were blend into the architecture and its resonances.

# RESONANT SPACES #23 RESONANT SPACES: WASTELANDS VR FESTIVAL SONAR



VIRTUAL REALITY VIDEO  
GAME FOR SONAR  
FESTIVAL.  
SOUND AND VIRTUAL JOURNEY  
THROUGH A SERIES OF  
ABANDONED INFRASTRUCTURES.

2023

by *Espacios Resonantes*

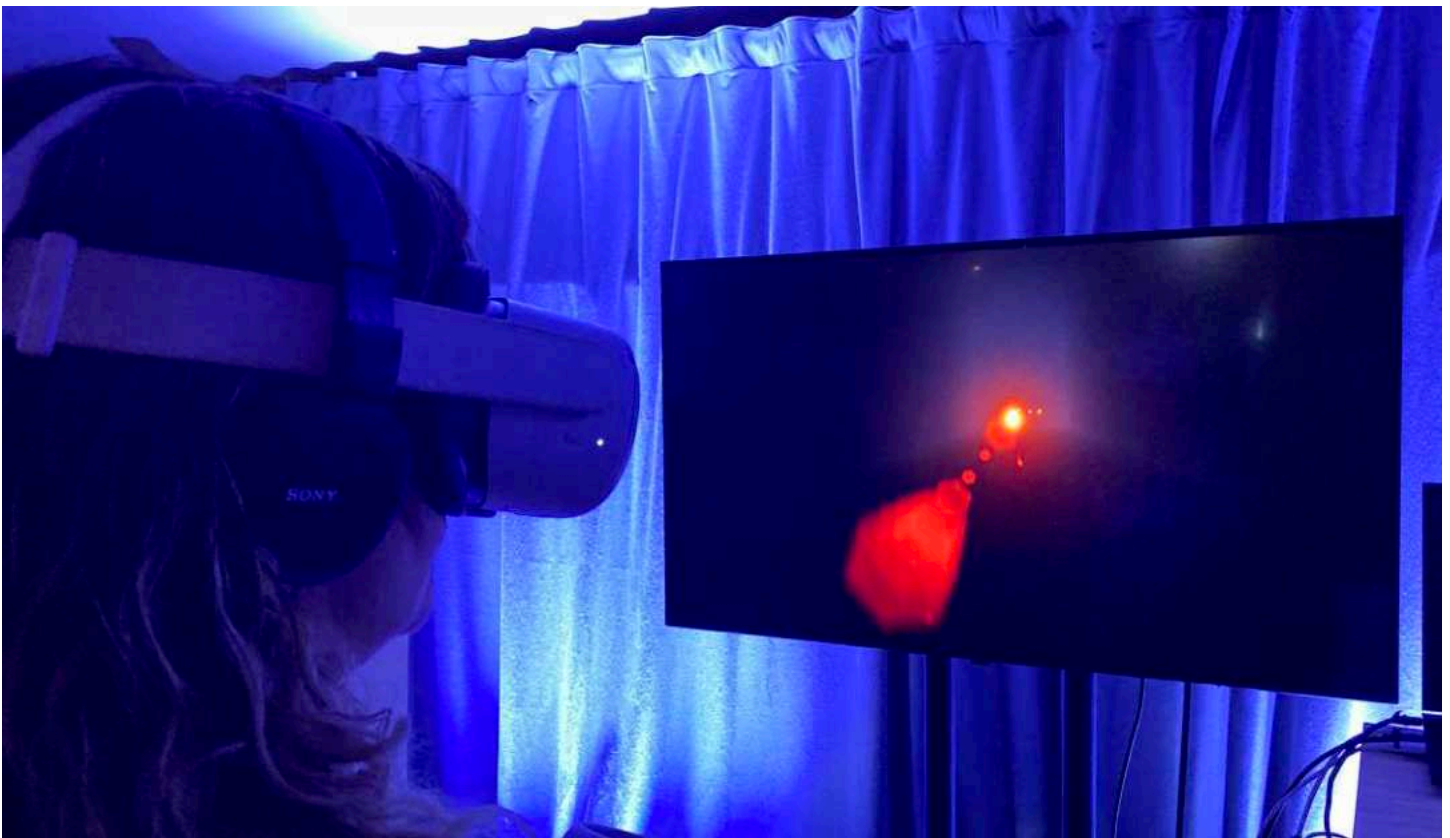
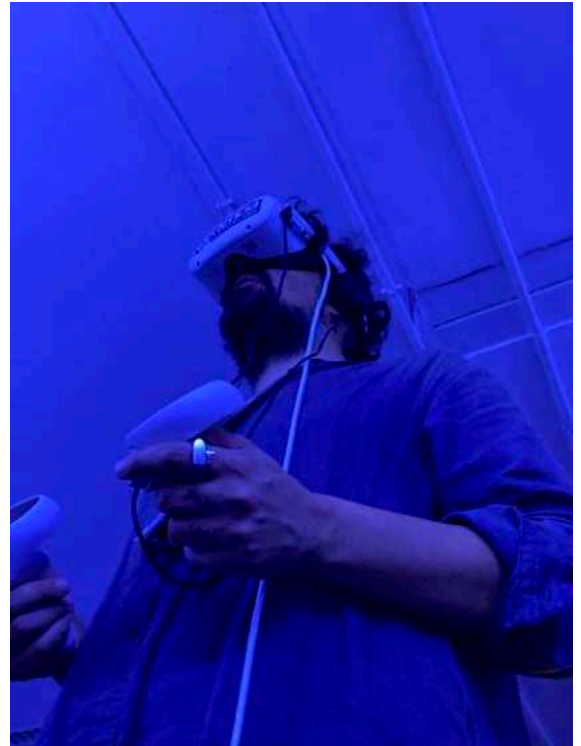
Through a virtual reality video game, the viewer-player takes a virtual and sound journey through reverberating spaces, liquid spaces destined to store oil, water and gas. The virtual space becomes a meta-instrument, where the viewer-player composes sound atmospheres through interaction with space.

Using algorithms to measure sound positions through binaural acoustics and convolutional reverberations, five spaces are reconstructed by simulation as a process of acoustic archeology: an abandoned thermal power plant cooling tower in Charleroi, a flood tank in Barcelona, a World War II oil tank in Scotland, a water tower and an underground water reservoir in Santiago, Chile, with reverberations ranging from 15 to 75 seconds in duration.

<https://youtu.be/U16JviW9G00>



"Resonant Spaces: Wastelands" is part of the research and series of works of art "Espacios Resonantes" that explores the creation of sound architectures through the intervention, recording and acoustic simulation of a series of abandoned infrastructures on the margins of memory and of the urban: sublime architectures with strange geometric shapes, uninhabitable spaces with unique and exacerbated acoustics.





RESONANT SPACES #22  
FIELDS OF NOISE  
QUANTUM SOUNDS  
SYMPOSIUM



ACOUSMATIC PIECES.  
SOUND COMPOSITION WITH  
VOICE AND FEEDBACK FOR  
ANECHOIC AND REVERBERANT  
CHAMBER AT LA SALLE  
UNIVERSITY, BARCELONA.

2023

by *Espacios Resonantes*

The sound piece presents two 10-minute compositions for the Anechoic and Reverberant Chambers at the Acoustic Engineer Laboratory of La Salle University in Barcelona. These compositions were showcased during the Quantum Sound Symposium 2023.

"Fields of Noise" explores the concept of background noise as a living entity, existing in two contrasting conditions: the anechoic room with minimal reflections and reverb, and the reverberant room with a diffuse acoustic field and long reverberation. The background noise from each room was captured using measurement equipment and subsequently enhanced using audio software. This process allows for the amplification of not only the room's existing sounds, but also the static electricity produced by the audio cables, microphones, and interface.

<https://espaciosresonantes.bandcamp.com/album/fields-of-noise>



Throughout the creative process, we delved into the distinct acoustic characteristics of each room, employing both conventional and unconventional techniques. These included frequency sweeps, bursting balloons, sound activation through voice and trumpet, as well as a gradual feedback process of noise recording.

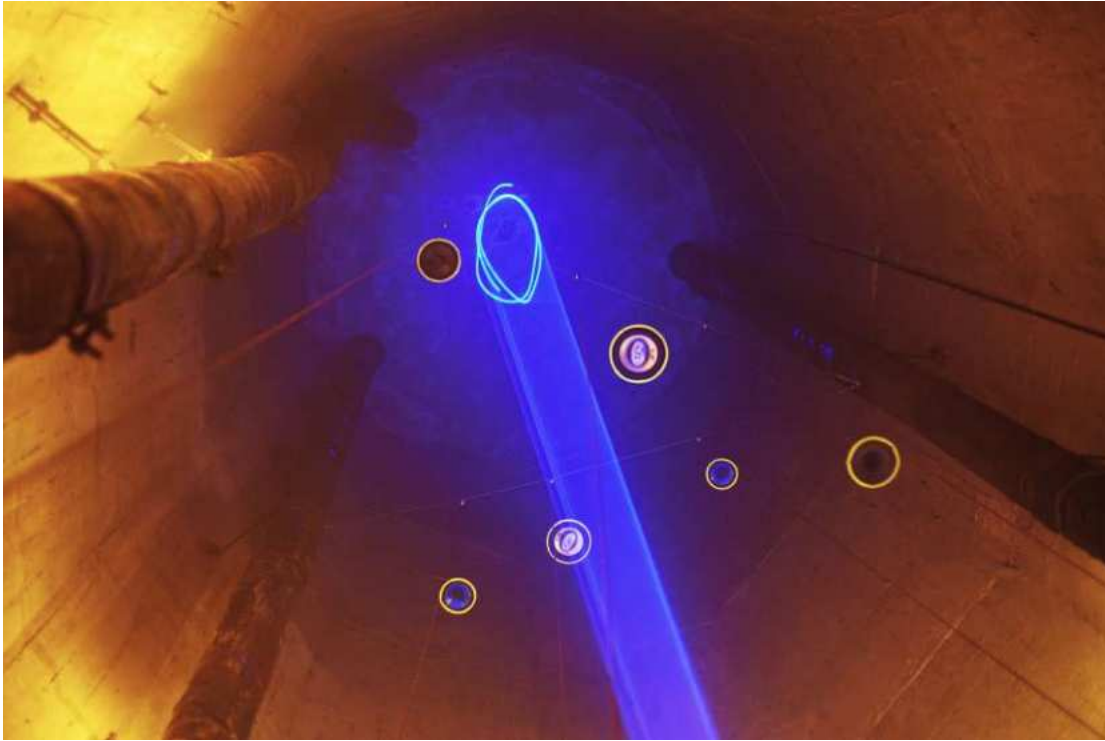
Each composition serves as an immersive experience, providing an introduction to the unique noise and sound environment of each space. By utilizing the human voice as a resonant medium for both acoustics and meaning, a series of texts are projected into the space. These texts include quotes from Michel Serres, Pauline Oliveros, Arata Isozaki & Taka Limura, as well as reinterpretations of excerpts from the Tao Te Ching, alongside personal reflections on sound and space.



# RESONANT SPACES #21

## POLYPHONO

### SANTIAGO



SITE-SPECIFIC  
PERFORMANCE FOR  
FESTIVAL ESPACIOS  
RESONANTES.  
A MULTICHANNEL  
PERFORMANCE WITH  
SPATIALIZED SOUND AND  
MOVING SPEAKERS FOR A 20  
METERS WATER TOWER.

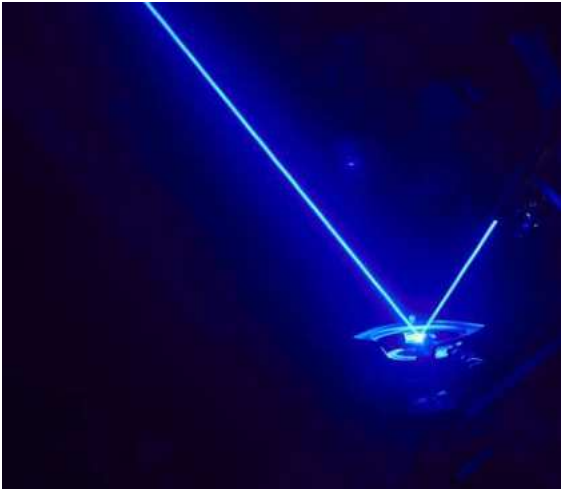
2022

by *Espacios Resonantes*

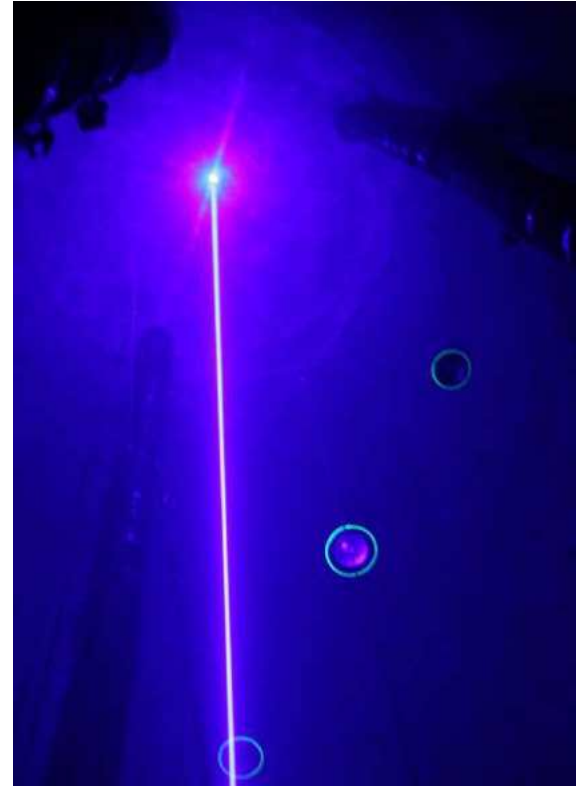
"Polyphono" is an instrument that dialogues with space through sound. The term is composed of two Greek words; "poly" meaning "many" and "phono" meaning "sound", thus evoking a sound system with many audible extremities. The project is based on the premise of echolocation and acousmatic to build a system of communication with space. The goal is to create a sound-spatial dialogue through the sonic reaction of space, from an auditory experience that allows us to observe the audible principles that build spaces through perception, which is unveiled from the artistic experience of a site-specific sound/light performance. The system becomes an instrument that is played by the space, creating compositions that are modulated through the spatial morphologies. Polyphono was performed inside an abandoned water tower 20m high with 8s reverberation for the Festival Espacios Resonantes.

[festival.espaciosresonantes.com](http://festival.espaciosresonantes.com)





Polyphono consisted of a system with 12 loudspeakers, each one of them speaking with a specific part of the space. To guide the communication with the space the system controlled a laser shaft that react to the sound-space interactions. The performance had three parts. The first part was spatialization, the loudspeakers were in a static position, but sound was moving through acousmatic means. The room was in complete darkness, avoiding other senses than the auditory. The second part was the vertical relation of sound with space. In this part the speakers were lowered through a system of pulleys and the laser was on, visualizing sound over the ceiling. The third part was the horizontal relation of sound with space. As a speaker dance, the performer moved the sound sources around the place, modifying the sound through the movement.



# RESONANT SPACES #20 MONUMENTOS DE FUTUROS FALLIDOS SANTIAGO



SITE-SPECIFIC  
PERFORMANCE FOR  
FESTIVAL ESPACIOS  
RESONANTES.

USING DIFFERENT TYPES OF  
MICROPHONES THE SOUNDS OF  
THE SITE'S ARCHITECTURE WERE  
AMPLIFIED INSIDE THE WATER  
RESERVOIR.

2022

by *Espacios Resonantes*

Using the practice of aural architecture research, the Quinta Bella's underwater reservoir emerges from listening through sound stimulation. A series of microphones captured various layers of resonance and memory of the Quinta Bella site. On the one hand, a geophone was installed on top of the water tower that captured the sounds of the city of Santiago, which were projected into the cistern, while another microphone picked up the sound through a pipe from the machinery room of the complex, another microphone attached to the central pillar of the pond was stimulated through a mallet that made the structure vibrate as if it were a rope and finally a hydrophone picked up the sound generated by pouring water on the ground, which in contact with the accumulated scale historically produced an effervescence effect. All these sounds were spatialized with software through the 8.2 sound system.

[festival.espaciosresonantes.com](http://festival.espaciosresonantes.com)





As spectral presences, industrial-era architectures rise in the contemporary city, abandoned spaces open up opportunities for artistic practice. Monuments of a previous state, of a future that never occurred, are now inhabited by new entities, stripped of the original purpose for which they were created. Liquid architectures, containers of long reverberations, empty spaces yet full of presence.



# RESONANT SPACES #19 FESTIVAL ESPACIOS RESONANTES SANTIAGO



## FESTIVAL OF ARCHITECTURE AND LISTENING.

FROM NOVEMBER 14 TO 26, THE FESTIVAL BUILT A COLLECTIVE AND PARTICIPATORY INSTANCE, WHICH THROUGH SOUND AND AUDITORY PRACTICE, BROUGHT OUT THE AURAL ARCHITECTURE OF TWO URBAN INFRASTRUCTURES: A 20MT HIGH WATER TOWER AND A 220M<sup>2</sup> WATER RESERVOIR.

The Festival Espacios Resonantes is an instance of artistic experimentation within two industrial spaces: a 20m high water tower and a 220m<sup>2</sup> underground water reservoir, located in Recoleta, Santiago. Both spaces have an acoustic character of great interest that is intended to be exalted with artistic interventions. Through the activation of these spaces it is intended to value the industrial heritage, with special attention to the water towers (*copas de agua*) as a fundamental component of the urban landscape of Santiago.

The event consists of a series of activities ranging from performances, installations, concerts, workshops, talks, discussions, artistic residencies and experimentation processes. The objective of the festival was to build a collective and multidisciplinary instance of discussion about architecture and listening, bringing together a community of architects, researchers, sound artists and musicians.

[festival.espaciosresonantes.com](http://festival.espaciosresonantes.com)

2022

by *Espacios Resonantes*









# RESONANT SPACES #18

## WASTELANDS

### ZARAGOZA



VIDEO GAME FOR CTRL  
ALT PLAY EXHIBITION  
AT ETOPIA ART CENTER.  
SONIC AND VIRTUAL JOURNEY  
THROUGH SERIES OF  
ABANDONED INFRASTRUCTURES  
WITH EXHUBERANT ACOUSTICS.

2022

by *Espacios Resonantes*

Using a video game the viewer creates a sonic and virtual journey through reverberant spaces, liquid spaces to store oil, water and gas. The virtual space is transformed into a meta-instrument, where the viewer-player composes the sound atmospheres through interaction with the space.

Using algorithms to measure sound positions through binaural acoustics and convolutive reverberations, three spaces are reconstructed through simulation as a process of acoustic archeology: a Cooling Tower of an abandoned Thermoelectric Power Plant in Belgium, a Flood Tank in Spain and a World War II Oil Tank in Scotland, with reverberations from 15 to 75 seconds.

<https://etopia.es/evento/ctrl-alt-play-alternativas-ludicas-al-control/>

[https://www.youtube.com/watch?v=d3\\_7zmYBHUg](https://www.youtube.com/watch?v=d3_7zmYBHUg)



The artwork marks a break between the human and the post-human, forging a narrative that transcends from human spaces to non-human spaces, raising issues around urban entropy and the current geological era of the anthropocene.

The sound exploration becomes a process of denunciation and the sound becomes the evidence that reveals the rhythm of the anthropic impact on the planet. The videogame presents the territory of accumulation of the residues of production. A useless landscape, petrified and presented in a sterile form.

This entropic action of residual territorialities is inhabited and transformed by the video game, constructing a new dialogue that links humanity with de-humanity, the natural and the artificial, to such an extent that the former becomes the latter and vice versa, until they merge into a single concept.

A landscape frozen in time by the oblivion of a humanity in the eternal process of production.



# RESONANT SPACES #16

## INCHINDOWN

### SANTIAGO



AUVIOVISUAL  
INSTALLATION FOR THE  
XV BIENNAL OF MEDIA  
ART | CONTEMPORARY  
MUSEUM OF SANTIAGO  
THE PROJECT PRESENTS A  
6-CHANNEL AUDIO PIECE AND  
VISUAL PROJECTION, WHICH  
THROUGH A VIDEO GAME  
PLATFORM SIMULATES THE  
AURAL ARCHITECTURE OF  
INCHINDOWN'S OIL TANK NO. 1.

The installation recreates the aural architecture of the World War II oil tank in Scotland, using algorithms that measure the position of sounds located in the virtual space, which correspond to records of acoustic activations performed within the space. The image built in Unreal Engine and Touchdesigner presents the virtual tour through the oil tank.

The installation consists in 6 speakers that emulates the sonic atmosphere of the tank. A projection of the wall emulates de oil that was all around the tank creating a sensorial experience of the interior of the tank.

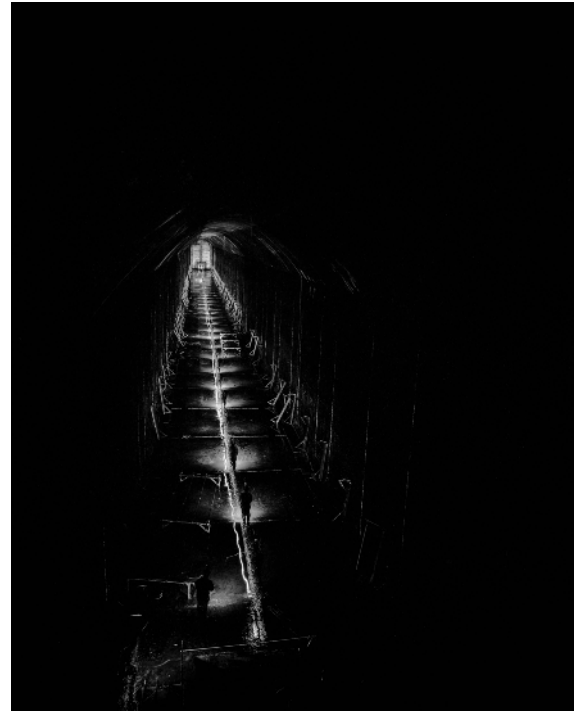
<https://15.bienaldeartesmediales.cl/obras/10-inchindown/>

2021-2022

by *Espacios Resonantes + EMARX*



In Inchindown, under the mountains of Invergordon, Scotland, there is a subway tunnel 200 meters long. At the end of its structure is the No. 1 oil tank, a completely enclosed space of vaulted shape and built in concrete, 9 meters wide, 13.5 meters high and 237 meters long. To access its interior, you must go through the pipes where the oil originally entered and exited, ducts of 45 cm in diameter and 3 meters long. Inside the tank, there is a space in darkness and absolute silence, where the light is totally absorbed by the oil-covered walls and any sound emitted is amplified as if it were a thousand voices. This structure was part of the set of subway tanks that supplied the British Navy during World War II, and currently holds the Guinness World Record Guinness for the longest reverberation in the world with 75 seconds.



Resonant Spaces #10: Inchindown moves this World War II oil tank to room 11 of the Museum of Contemporary Art of Santiago. An audiovisual installation that replicates the acoustic environment of the original space of the tank by means of algorithms that measure the positions of sounds through spatialized binaural acoustics. An acoustic journey that makes this virtual environment an instrument to modulate the compositions that arise from the series of sounds generated in-situ: percussions with found objects, voices and ambient sound.

Thus, this simulation of space, by superimposing the original space of Inchindown with the real space of Room 11, ends up generating a third space. A collective process of sensations generated by the sound in movement capable of producing several simultaneous spaces according to the subjective reinterpretation of the listener, whose presence and unique perspective, allows to reveal the architecture and its memory.



# RESONANT SPACES #15

## SPACE DYSTOPIA

### BUDAPEST



RESIDENCY, LISTENING  
WORKSHOP AND  
PERFORMANCE IN  
THE SPATIAL SOUND  
INSTITUTE.

PROJECT THAT EXPLORES  
THE SOUND-SPACE AS A  
FLEXIBLE, MALLEABLE  
AND INVISIBLE MATERIAL  
WITHIN THE ACOUSTICS OF  
IMPOSSIBLE ARCHITECTURES  
AND IMAGINARY SPACES THAT  
EXCEED THE LIMITS OF BUILT  
REALITY.

2021

by *Espacios Resonantes*

In Oct 2021, as part of the Resonant Spaces Project, I made a residency in the Spatial Sound Institute, Budapest, where I worked with the 4DSOUND System inside a room with 60 speakers. During my residency I explored a narrative process of unfolding spaces inside spaces, pushing the limits of the 4DSOUND in terms of spatialization of sound through movement as in spatialization of sound itself. The base materials were impulse responses collected inside industrial spaces with exacerbated acoustics and impulse responses created digitally, merging one into the other using convolution reverbs and 4DSOUND SpatialVerb. The result of the residency process is a journey that trespasses through different mutations that dissolves the boundaries of physical spaces into liquid spaces of dystopian scenarios.

<https://www.youtube.com/watch?v=5KURMDKGZZg&t>

<https://spatialsoundinstitute.com/>

# RESONANT SPACES #13 SOUND AND SPACE RADIO TSONAMI



RADIO DOCUMENTARY  
OF THE RESONANT  
SPACES PROJECT, MADE  
FOR THE SOUND ART  
FESTIVAL TSONAMI  
2020, BROADCASTED  
THROUGH RADIO  
TSONAMI.

In the sound piece Sofía Balbontin and Mathias Klenner explore the acoustic characteristics of a series of industrial sites encountered on a journey through Europe in search of abandoned infrastructures on the margins of memory and the urban, sublime wartime architectures, rare geometrical shapes, uninhabitable places with unique and exacerbated acoustics. This sound documentary tells the story of this journey and generates a series of reflections from the concept of sound space in the critical practices of art and architecture, mixing the spoken story with compositions, musical interventions with voices and instruments while recreating the acoustics of these spaces through convolution reverb.

2020

by *Espacios Resonantes*

<https://festival.tsonami.cl/wp-content/uploads/2020/12/PROGRAMATSONAMI2020final.pdf>



# RESONANT SPACES #12

## VIRTUAL PERFORMANCE

### ONLINE



VIRTUAL PERFORMANCE  
FOR THE 4TH  
INTERNATIONAL  
CONGRESS ON  
AMBIANCES:  
AMBIANCES,  
ALLOÆSTHESIA:  
SENSES, INVENTIONS,  
WORLDS.  
ONLINE PERFORMANCE WHICH  
USED A VIDEO GAME AS A  
MEDIUM FOR MUSICAL AND  
ARTISTIC CREATION.

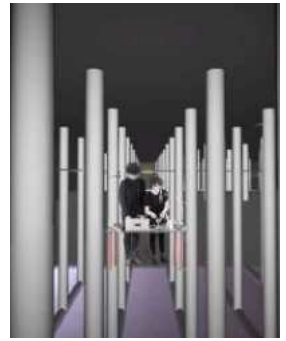
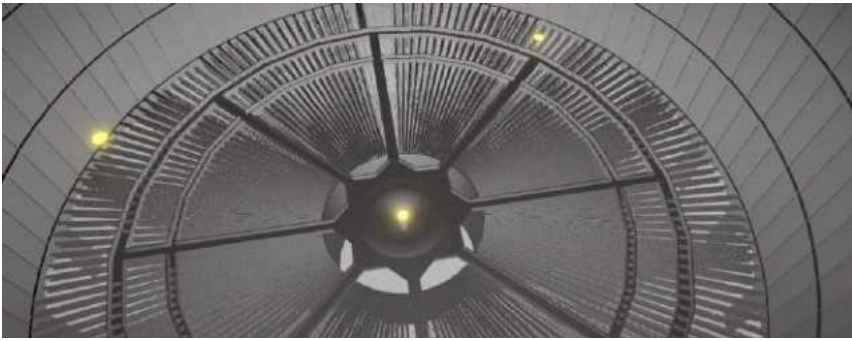
Using a video game, the project proposes an acoustic and virtual journey through reverberant spaces, which simulate the acoustics and geometries of utilitarian architectures, liquid spaces for storing oil, gas and water.

The journey in a virtual environment uses algorithms to measure the positions of sounds through spatialized binaural acoustics. At the same time, live sounds go through convolution reverberations of each space. The voices and instruments simulate the reverberation of these architectures and the sounds are records that were created within these places. The live performance uses the video game as an instrument to spatialize and modulate the compositions. Over the images of the video game the musicians were projected using a chroma key. The voices and electroacoustic instruments generated live were filtered through Max, using convolution reverb as the listener entered each space.

[https://www.youtube.com/watch?v=VeiQAx\\_IP48](https://www.youtube.com/watch?v=VeiQAx_IP48)

2020

by *Espacios Resonantes + EMARX + Natalia Cabrera*



The performance and the presence of the body in space builds a subjective and unique look, capable of reconstructing space, architecture and memory. The background noise is open, to give way to the flow of the sound-space, from its original history as architectures, to today as opportunities for artistic action. The project explores the relationship between sound, body and space through the real-time simulation of acoustic environments, through the video game, as a way to generate sensitive and subjective connections with the memory of architecture and its acoustics, and to promote an awareness of spatial navigation through sound. The presence of the listener in the acoustically simulated space builds a unique perspective, through which we can reconstruct the architecture and its memory. The simulation generates a third space, where the audience is part of the experience (Binaural Headscape).



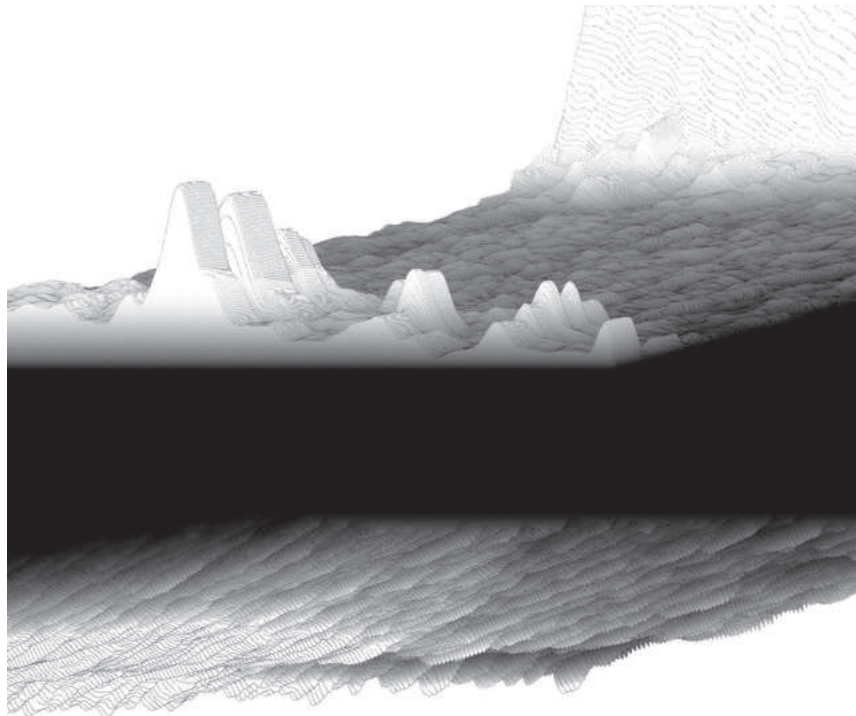
The simulated acoustics for the experimentation were industrial spaces with unique and exacerbated acoustics. The sound sources were specifically adapted to the resonance frequencies of each space, using electroacoustic media. The simulated virtual space was built using a video game developed on the Unity platform, which sent the listener's position in relation to the sound sources arranged in the 3D space through Syphon to the Max/Msp software where, through a patch developed by us, the triggered sounds were transformed into binaural audio.



# RESONANT SPACES #10

## PERFORMANCE

### NEW HAVEN



SPATIAL SOUND  
PERFORMANCE FOR  
THE SOUNDING SPACES  
CONFERENCE, VII  
BIENNIAL OF THE YALE  
GRADUATE MUSIC  
SYMPOSIUM FROM YALE  
UNIVERSITY MUSIC  
DEPARTMENT.  
THE PERFORMANCE CONSISTED  
IN A SCIENTIFIC REPORT AND A  
SOUND-SPACE MISE-EN-SCENE.

Scientific Report (15 minutes): 1) The study topic was presented: the sound space from contemporary artistic practices, 2) The dimension of the sound space is established, as the invisible space that creates the sound and as the sound that creates the physical space, 3) Critical spatial and sound practices are presented as a means through which to generate alternative narratives to prevailing, through the artistic experience of sound space, 4) The methodologies used to access the dimension of the sound space are presented through examples with videos and sound records, 5) The case studies of research, industrial and war buildings of the 20th century are presented with great reverbs, 6) A brief sample of the results of five studied spaces was presented.

<https://www.youtube.com/watch?v=VbZYrHO2NQc>

2020

by *Espacios Resonantes*





The physical relationship between sound and space can be perceived by the listener, when a sound wave is reflected against an object in its journey through a medium, that reflection generates an echo, the combination of those echoes from several surfaces creates a trail of reflected sounds that we perceive as reverberation.

When the acoustics of a space are stimulated, some predominant frequencies have a longer duration and greater intensity. These are called resonant frequencies, the fundamental wave and its overtones... The architecture, shape, materiality, temperature and air pressure define the resonant frequencies of each space and its timbre, its own soundspace.



#### RESEARCH - 03:00

This research focuses on the aesthetic, political and social experience of soundspace as a means for generating a sensitive relationship with architecture and its memory.

#### THE CONTEXT - 03:15

The great contemporary cities have been forged from the industrial revolution, the capitalist greed... millions of people who migrated and continue to migrate from the countryside to the city, now travelling from places in social, economical and environmental crises to more or less secure areas; many of those crises which were generated from the same processes that capitalism and industrialization have generated. But industrialization seems to be ancient history, thousands of factories that once housed working families, are now abandoned, as monuments of a future that never happened, an uncomfortable future, or as ruins of a past that escapes us. Architectures that in ancient times would have been extraordinary, today are just forgotten corpses.

The city continues to grow, the mechanisms of absorption and generation of capital are different, it is now the real estate industry that falls into these diffused territories and builds on them a new history, probably also impermanent, and to be forgotten.

#### QUESTIONS – 05:00

How can we hear these places in silence? Is there any story left among its acoustic ruins? What can these spaces tell us today? Are the sounds still vibrating on their walls?

#### INTRODUCTION - 00:00

Listening allows us to reach places that the eye cannot, makes visible the invisible... sound goes through space and our bodies. Sound can be understood from a sensitive and spatial dimension. Space, in turn, can be understood from a sensitive relationship between sound and body.

From the interaction between sound and space the dimension of soundspace emerges ...The sound created by space, the acoustic response that reveals when it is activated, that in fact it's always there, an imperceptible sound ... the background noise ... the room tone.

And the invisible space created by sound, like the one that creates my voice with the reverberation of another place, and its simulated movement in this room...

# RESONANT SPACES #9 STATIONARY WAVES BERLIN



AUVIOVISUAL  
INSTALLATION FOR THE  
EUFONIA FESTIVAL.  
SOUND AND VISUAL  
INSTALLATION THAT WHAT HE  
PROPOSES IS TO ACTÍVATE THE  
RESONANT FREQUENCIES OF  
SPACE AND VISUALIZE THEM IN  
ITS X, Y, Z AXES.

2019

by *Espacios Resonantes + EMARX*

If we take any given space, we can measure the resonant frequencies of that space. When sound waves travel through a medium, air for example, they have a constant velocity, a specific intensity and size. Every dimension of a given space, axial, tangential or oblique has its own resonant frequencies which are directly proportional in their length to the size of that space. In Acoustics those resonant frequencies produce normal modes of vibrations, and each of those frequencies are called Stationary Waves, sound waves that «stay still» in space, so you can hear the nodes and antinodes as you move through them. Every space has its own acoustic signature, its own timber and frequencies, its own proper voice. The «Stationary Waves» installation measures the resonant frequencies of a given space, and creates a specific sound composition for that given space based on the axial modes of vibration, from each of the three dimensions (x, y, z). That sound composition is visualized on three planes of that room (X, Y, Z), where you can see the nodes and antinodes of sound as black and white stripes. «Stationary Waves» creates new architectures of light and sound using the proper resonant frequencies of spaces. Ephemeral architectures where we can perceive sound and space as a unity.

<https://vimeo.com/360604990>

# RESONANT SPACES #8 ALBUM BARCELONA



SPATIAL COMPOSITIONS  
RELEASED BY SOUND-  
SPACE RECORDS.  
THIS FIRST RELEASE IS A  
PRODUCT OF THE RESONANT  
SPACES PROJECT WHICH CON-  
SISTS IN AN ALBUM THAT CON-  
TAINS SEVEN COMPOSITION OF  
SOUND-SPACES.

2019

by *Espacios Resonantes*

Each sound composition is a musical narrative that tells a story about the voices of the space:

Inchindown Oil Tank  
Lyness Oil Tank  
Gasometer Charleroi  
Water deposit Joan Miró  
Cooling Tower Charleroi  
Inchindown Voices  
Cal Grau Fabric

All the sounds recorded in this album have been made within the studied spaces using ZOOM H2n, TASCAM DR-05 and ZOOM H4n handheld recorders (there are no external sounds added). The voices correspond to those of the authors, the percussions were performed using found objects, the impulsive responses were performed with balloons, and the electroacoustic activations (feedbacks and frequency sweeps) were performed using a portable 200W RMS loudspeaker with a frequency spectrum of 60-20,000 Hz.

<https://soundcloud.com/espaciosresonantes>



# RESONANT SPACES #7

## RESUENARRADARRESNANTE

### VALPARAÍSO



RESIDENCY IN B.A.S.E.  
BASE FOR SOUND AND  
EXPERIMENTAL ARTS  
TSONAMI.  
ACOUSTIC STUDY OF THE  
URBAN AND ARCHITECTURAL  
SPACE OF VALPARAÍSO.

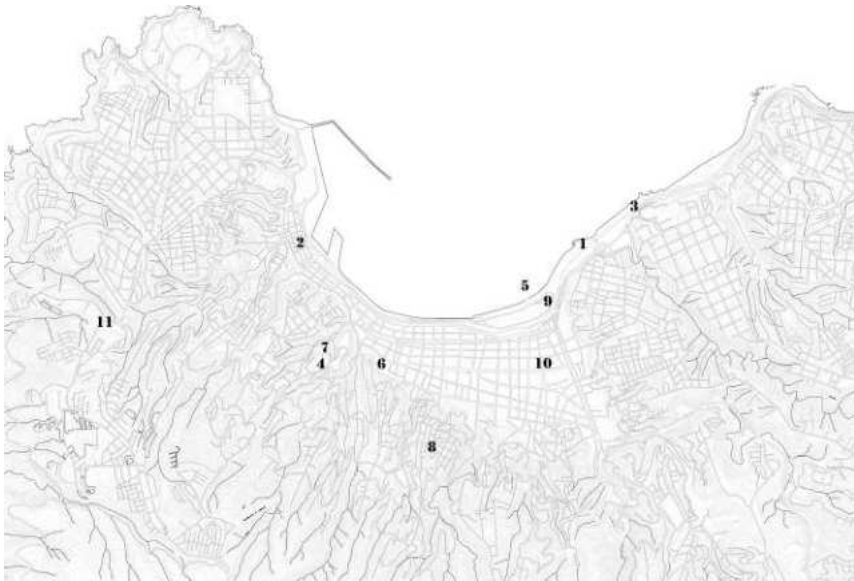
2019

by *Espacios Resonantes*

The research consists in exploring the resonance of the territory and the acoustic information of the space by means of the impulse response, where it is possible to make visible how the space is expressed soundly from its morphology, showing the contrast of the different spaces.

The residence culminates with a concert of balloons in the most important acoustic space of Valparaíso: The PCdV water cistern and an exhibition of the results in the B.A.S.E. gallery. The objective of the concert was to build an acoustic experience of the physical space of the cistern, while the exhibition shows the results of the residency, recreating in turn, the acoustic spaces of Valparaíso.

<https://www.tsonami.cl/2019/09/inauguracion-de-resuennarradarresonante-de-sofia-balbontin-sala-base/>



In this exhibition, a round-trip process is exposed, where the results of an acoustic study of the urban and architectural space of the Rada de Valparaíso are extracted, considering its ruins, alleys, forgotten and resorted spaces, considering its geographical character of peaks and streams that face each other. Through the impulse response, the acoustic information of the space is extracted, and then recreated within the BASE Room (base for sound and experimental arts), reconstructing the acoustic experience of the physical space of Valparaíso, only based on its sounds.



The sample consists of a module that is shaped as an effects pedalboard that brings together all the reverbs of Valparaíso. Each of these reverbs are the acoustic spaces collected in the residence and that form a loops of 11 spaces that pass one after another, marking the differences between their acoustic peculiarities.



To react to the acoustics of each place, the module consists of a fish tank with three different ornaments that trigger a specific bubbling, creating within its intermittent oscillation an aquatic composition that is mutated according to the reverbs of each space. The module also has a microphone that allows vocal interventions with different effects.

To build the pedalboard of reverbs of Valparaíso the convolution reverb is used, a plug in that reads the acoustic data of an audio and that transforms them into a simulator of real spaces.



To complement the sound installation and make the work understood, a map is displayed with the location of each of the acoustic spaces and a video with the sampling of each space.



# RESONANT SPACES #6

## CAL GRAU

### BARCELONA



RESIDENCY AT THE  
L'ESTRUCH CREATION  
FACTORY.  
SOUND-SPACE RESEARCH  
INSIDE A WATER TANK LOCATED  
IN THE SOUTHERN SECTOR OF  
THE FACTORY OF CAL GRAU.

2019

by *Espacios Resonantes*

The residency process ended with a public visit to the factory and a performance. This one that lasted 20 minutes and involved a first descending into the tank through a rope, using a fisherman's suit because there was accumulated water, up to one meter in the center of the tank. The space due to its cylindrical shape generated the effect of standing waves to any sound that was made inside. The performance was carried out following a circular movement against the needles of the clock, at first the walls and structures of the place were struck using found objects, and then went on to a series of balloon explosions that were installed on the perimeter walls, a total of 21 balloons. Then a loudspeaker was activated and played 12 minutes of a series of recordings of the same slow feedback from the place, made days ago.





Finally, when the reproduced sound of the feedback stopped, it was switched to a closure using the generator of standing waves developed together with Emilio Marx, which mixed with the ambient sound of the place. Throughout the performance, the sound of the body in motion with the water accompanies the work, while from the air a constant murmur of neighboring factories and small planes was heard crossing the sky.



# RESONANT SPACES #5

## BABEL

### SANTIAGO



SOUND INSTALLATION  
FOR THE EXHIBITION  
“SANTIAGO, CIUDAD  
DESTINO” IN GAM  
CULTURAL CENTER.  
BABEL IS A TRANSLINGUISTIC  
DIALOGUE DEVICE OF THE  
PHONETIC SOUNDSCAPE OF  
SANTIAGO.

2018-2019

by *Espacios Resonantes*  
+ *Sebastián Jatz*  
+ *Republica Portatiil*

A sound installation on the phonetic soundscape of the different languages and dialects that converge today in Santiago, Chile. The installation issues the conflicting dialogues of Spanish and Haitian Creole around the phenomenon of migration.

On Sunday, January 6th, Babel settled in the Plaza el Trébol, generating a space for dialogue so that migrant and resident languages could meet and communicate with each other. During this activation the objective was to collect stories, both from Chilean residents and Haitian migrants, about the experience of migration in the city of Santiago in recent years. Different organizations and neighbors of the commune who participated in the conversation were summoned contributing their vision on the phenomenon.

The dialogue generated between Haitians and Chileans was amplified by a high-level speaker, exposing in the public space and in an open way a story generally invisible and silenced. In turn, the device was implemented as a data collection tool generating two products: a transcript of the conversations in text and a series of audios of the two languages faced that was used for the exhibition “Santiago, Ciudad Destino”.

[https://www.youtube.com/watch?v=cdjr\\_0z4pM0&t](https://www.youtube.com/watch?v=cdjr_0z4pM0&t)





Babel was exhibited in GAM Cultural Center as a linguistic translation device that explores the role of language as one of the main elements of integration of the migrant population. As a prototype with 5 speakers that generated an immersive sound experience, it was possible to hear a fragment of the phonetic landscape of the effects of migration in Santiago, surrounded by a textil with words and phrases that were rescued from the conversations in the Plaza El Trébol urban intervention.





# RESONANT SPACES #3 TRASLACIONES SONORAS VALDIVIA



URBAN INTERVENTION  
AT PLAZA DEL PENDULO  
DE FOUCAULT IN  
VALDIVIA.  
WORKSHOP FOR STUDENTS OF  
UNIVERSIDAD AUSTRAL.

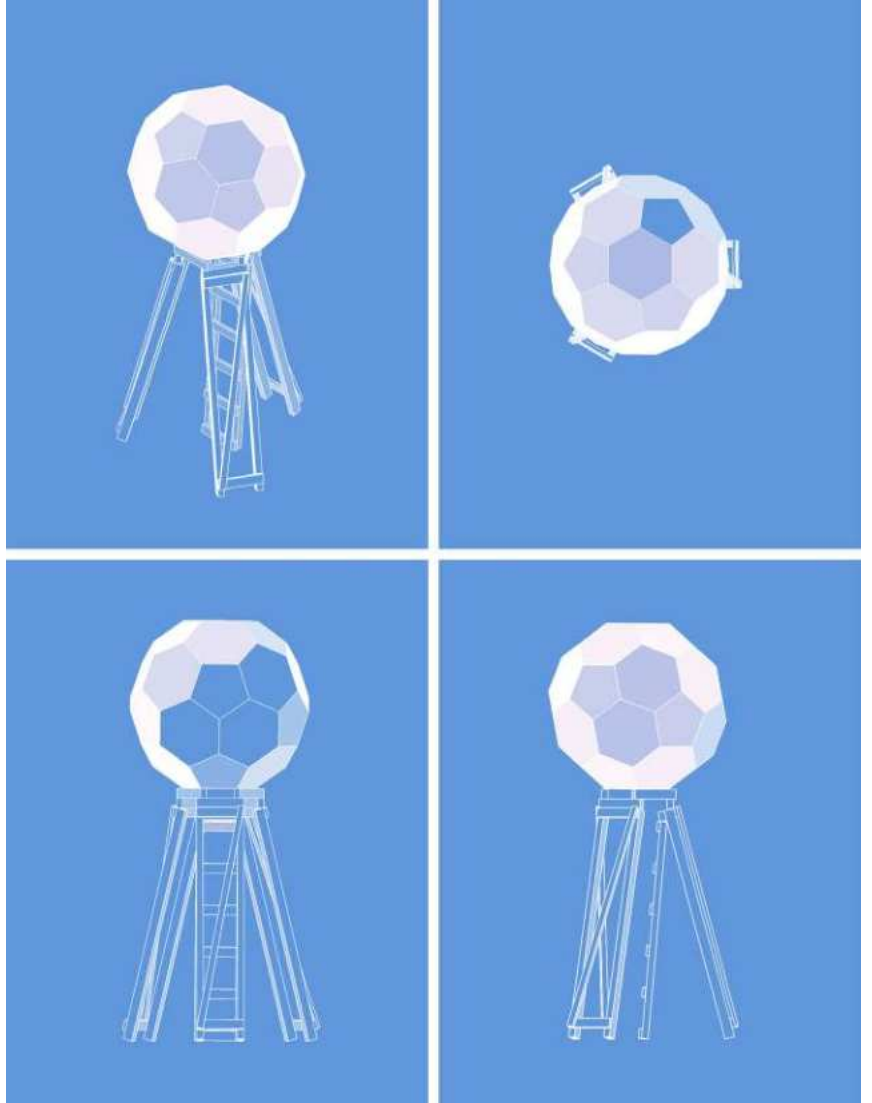
2018

by *Espacios Resonantes*

Traslaciones Sonoras is an urban intervention project that explores the diverse soundscapes of the city of Valdivia (Chile). A series of auditory architectures (sculptures) located in the city center, link the territories and communities through the real-time translation of multiple invisible and marginalized sonorities.

The project poses a connection between the concepts of soundscape and sound space. Through a process of research of the soundscapes of Valdivia, in parallel to the formal development of auditory architectures that contain them. The proposed connection between architecture and environment occurs through the translation of one soundscape into another, establishing the context as a sound source and the architecture as a translation device.

[https://www.youtube.com/watch?v=n-l87\\_G\\_cgY&t](https://www.youtube.com/watch?v=n-l87_G_cgY&t)



# RESONANT SPACES #2

## ENDO GAMIA

### SANTIAGO



CONCERT FOR  
THE EXHIBITION  
SOUND CROSSES:  
POSSIBLE WORLDS  
IN THE MUSEUM OF  
CONTEMPORARY ART  
OF SANTIAGO DE CHILE  
(MAC).  
A CONCERT OF FEEDBACKS  
THAT USED THE SPACE  
AS AN ACOUSTIC BOX OF  
REVERBERATIONS.

2016

by *Espacios Resonantes*

As part of the exhibition, Endogamia was a site-specific installation and performance for the Hall of the museum. A concert of feedbacks that used the space as an acoustic box of reverberations. The sound experimentation worked with the echoes of the place, creating an acoustic space from its own "silence" (ambient sound), which is captured through the microphones and returned to space by the speakers, bouncing into space to return to the microphones again.

Endogamy is the reproduction among the same members of a family, which eventually generates a degeneration of the genetic material. The concept was used to study the relationship between sound and space, stimulating the exponential reproduction of sound space through electrical transducers that take the sound (microphones) and reproduce it (speakers), creating a sound feedback in the space we call inbreeding sound.



