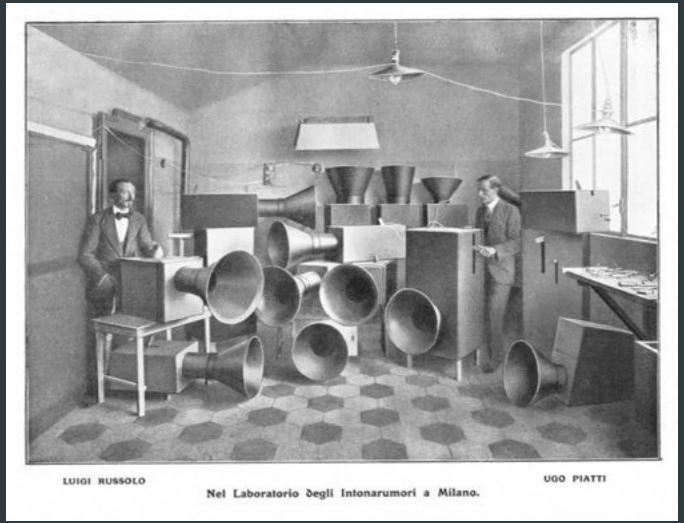
MONS NIKLAS SCHAK

HYPERREALISTIC SOUND EXPERIENCES

ACROSS MULTIPLE PLATFORMS

How can sound and music drive the development of immersive audio on multiple format?

Mons Niklas Schak
Composer & Sound Artist



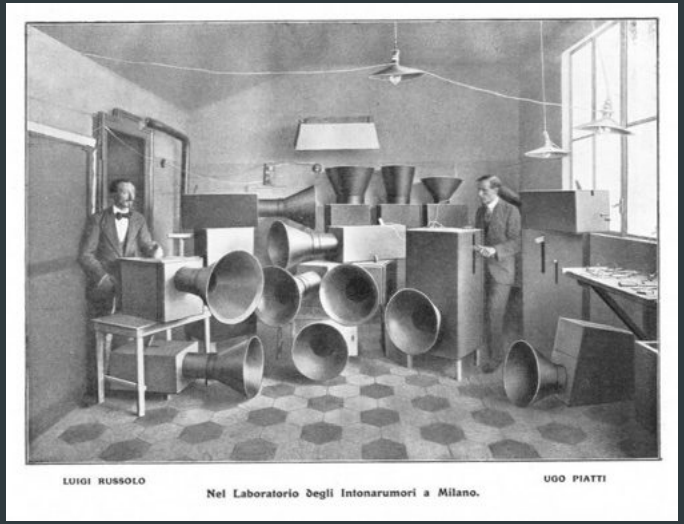
Luigi Russolo and Ugo Piatti with the Intonarumori, Milan 1913

MONS NIKLAS SCHAK

Russolo asked:

can the sound of the world itself become music? They built new instruments to find out. Today I ask the question .

How can sound and music drive the development of immersive audio on multiple format?



Luigi Russolo and Ugo Piatti with the Intonarumori, Milan 1913

WHO AM I

Composer & Sound Artist based in Copenhagen

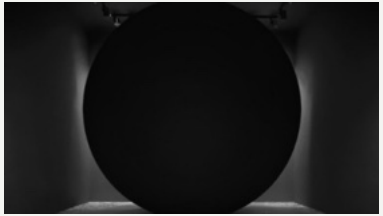
Associate Professor of film composition, SDMK

Film scores for feature films, documentaries, TV series and art films. More than 30 films and 15 TV series since 2001: The Ambassador, Sepideh, A Friend, a Murderer (Netflix)

Heirloom by Larissa Sansour and Søren Lind, 58th Venice Biennale

8 releases in 3 in Dolby Atmos.

Artistic research at SDMK in 3D sound, VR and XR, 2022–2028



Installation Heirloom, Venice 2019



Releases



Stage and dance with Pernille Garde



Film The Ambassador

FORMATS

2021	Cars Choir	Site-specific sound installation	
2022	360 VR film	Virtual reality with spatial audio	4 Sound Perspectives in Virtual Reality (2022–2024)
2023	Redemption Sound	Dolby Atmos release	
	The binaural walk	Location recording	
2025-26	Cars Choir: The Redemption Sound	Site-specific sound installation	
	3D models of the cars	Augmented reality	Sound Perspectives in Hyperrealistic Spaces (2026–2028)
2026-28	Gaussian splats and XR	Virtual worlds	

WHAT IS A HYPERREALISTIC SOUND EXPERIENCE?



Image: Ron Mueck, A Girl, 2006



Ron Mueck, A Girl, 2006

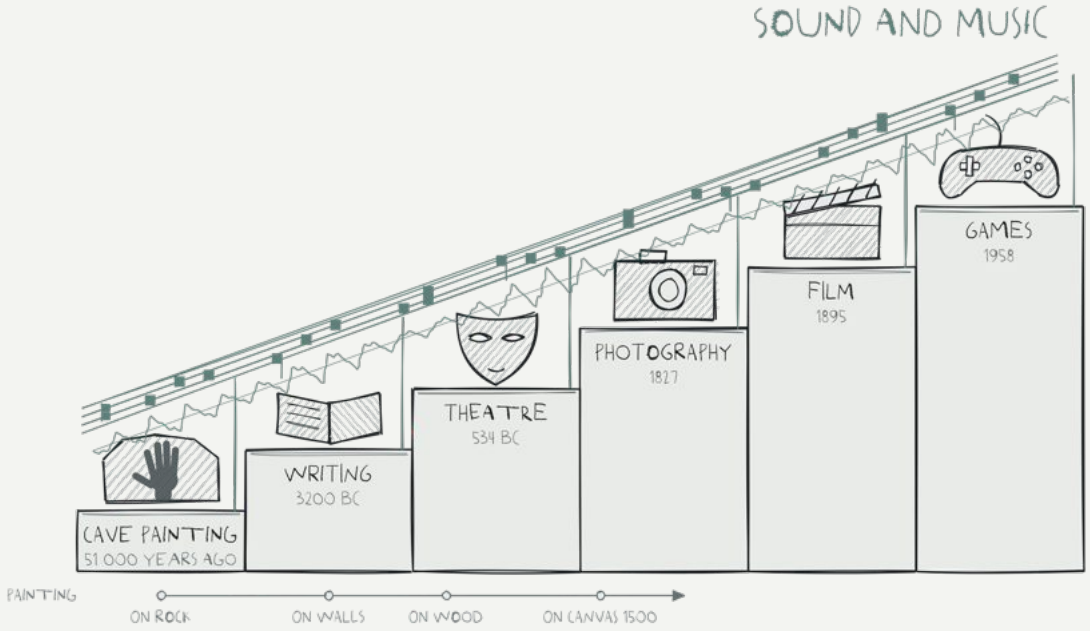
MORE REAL THAN REALITY

A sound experience that feels more real than reality.

The sound has a body and a place: you hear the space, the material, the distance and the size.

SPACE MATERIAL DISTANCE SIZE

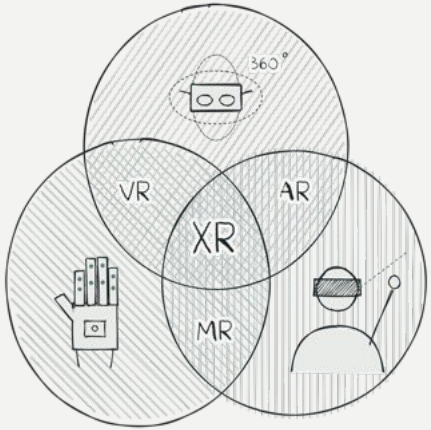
MEDIA IN THE PAST



MEDIA 2026

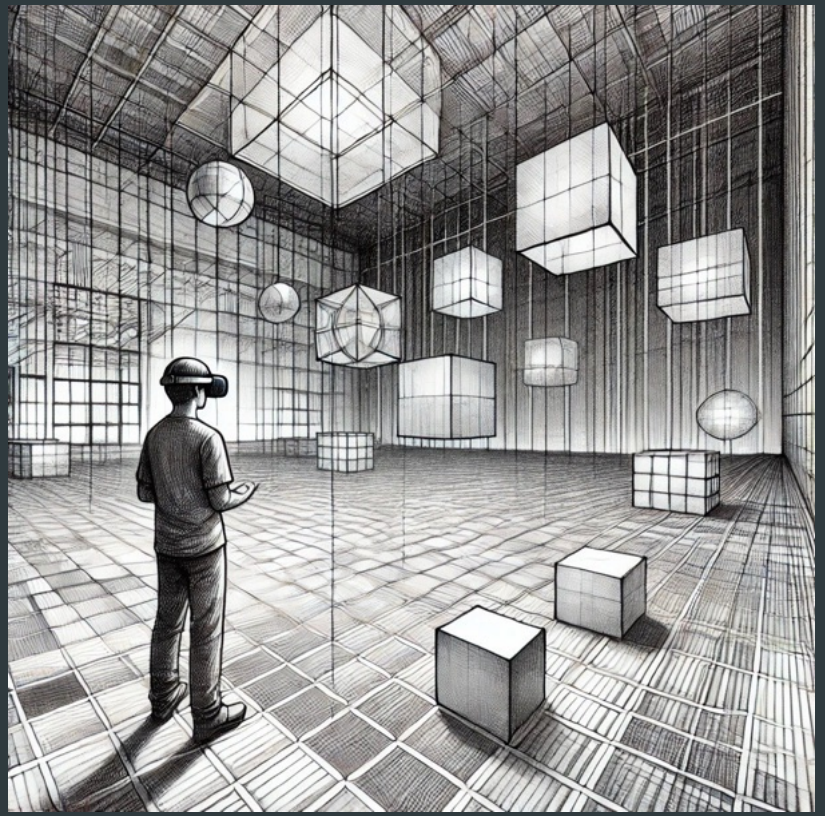
With XR technologies we can:

- Explore fully simulated 3D environments (VR)
- See digital elements on top of reality (AR)
- Blend physical and virtual objects (MR)
- Interact with virtual objects and avatars
- Have immersive experiences that engage several senses



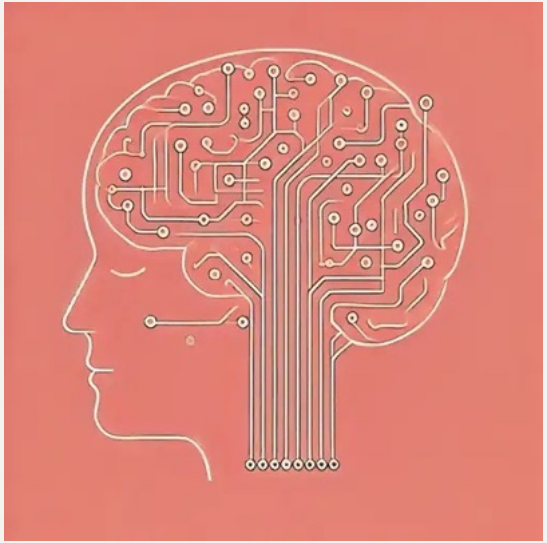
WHAT CAN BRING LIFE INTO XR?

3D SPATIAL AUDIO

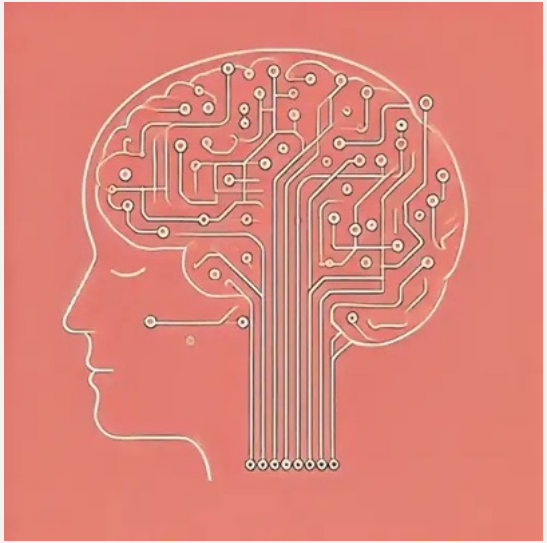


WHAT IS A SPACE?

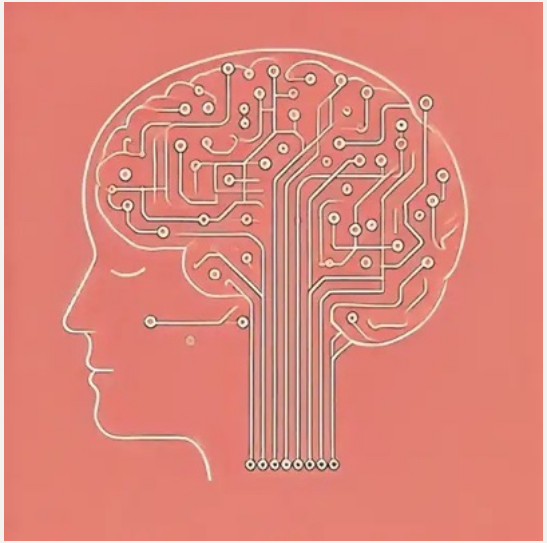
A space is a pattern of information that helps us navigate the world we are in.



This pattern includes how we perceive distance, direction and the relationship between different sounds.



A space gives our brain a framework for understanding and interpreting our surroundings.



SPACE AND INTERACTION

What interests me is the space, its dimensions, and how I can interact with it.

MATERIAL

what is it made of?

DISTANCE

how far away is it?

SIZE

how big is it?

TIME

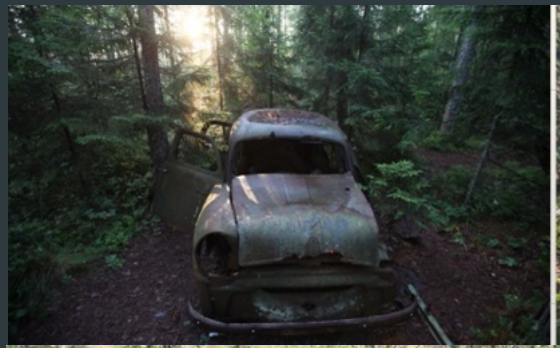
how long does it last?

And what changes when format changes ?



BUT YOU NEED A SPACE...

IN 2014 I FOUND A SPACE...









KYRKÖ MOSSE, RYD

SWEDEN

250 kilometres from Copenhagen, in a Swedish forest that used to be a peatland , lies a very peculiar landscape: about 150 old, rusty car wrecks, mostly from the 1940s and 1950s, slowly decomposing into the forest floor.

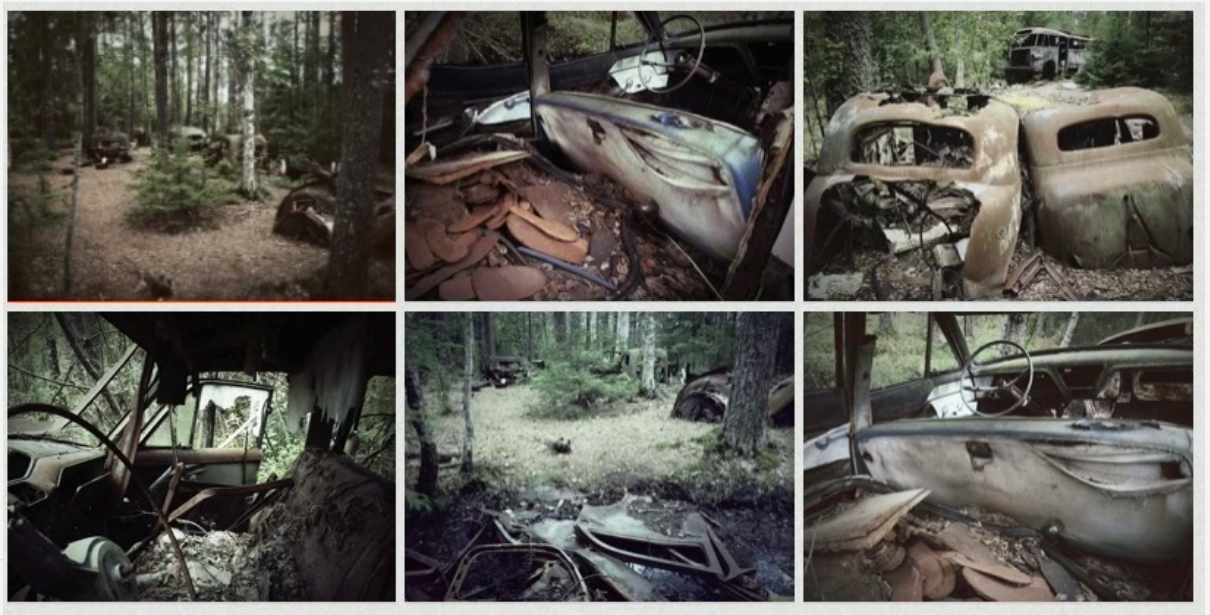


The sensation of being immersed in a lifelong, decaying reverb.

PRE-PRODUCTION

The cars have been decaying for 80 years,
like a visual reverb.

I wanted to capture that in sound.



2017

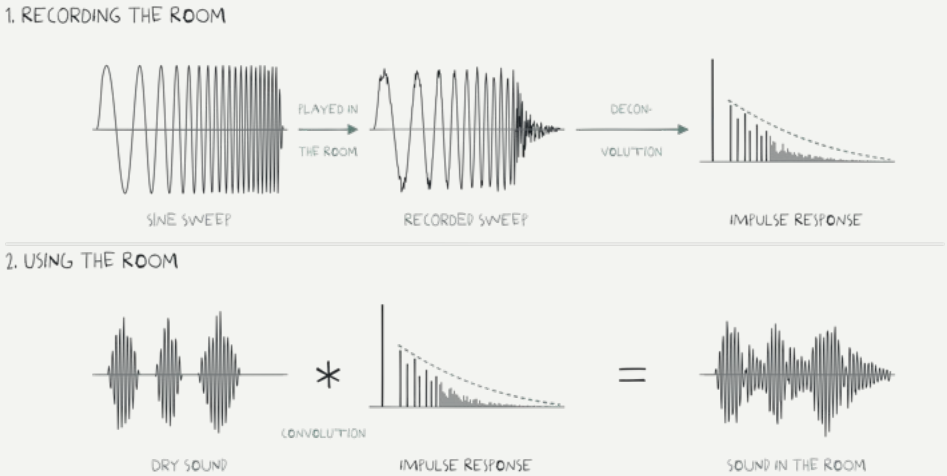
In 2017 I began recording and processing sounds and images from the site.



I WAS LOOKING FOR DIFFERENT WAYS
TO AMPLIFY, MODULATE AND MANIPULATE
REVERB AND SPACE

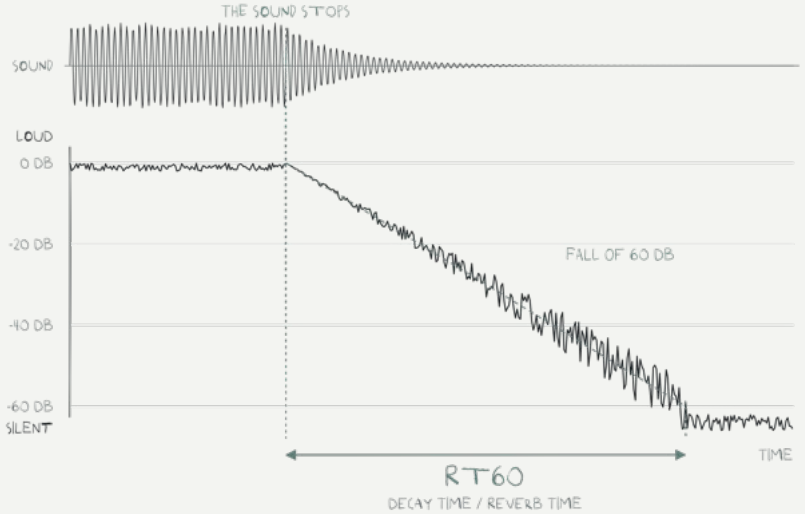
METHOD IMPULSE RESPONSES

different ways to amplify, modulate and manipulate reverb and space using impulse responses.



METHOD RT60

RT60 (decay time / reverb time) is the time it takes for a sound to fall 60 dB after it stops. That is roughly from loud to silent.



ways to amplify, modulate and manipulate reverb

METHOD WORLDIZING

A technique where a recorded sound is played back in a real space and re-recorded, to capture the acoustics of that space.

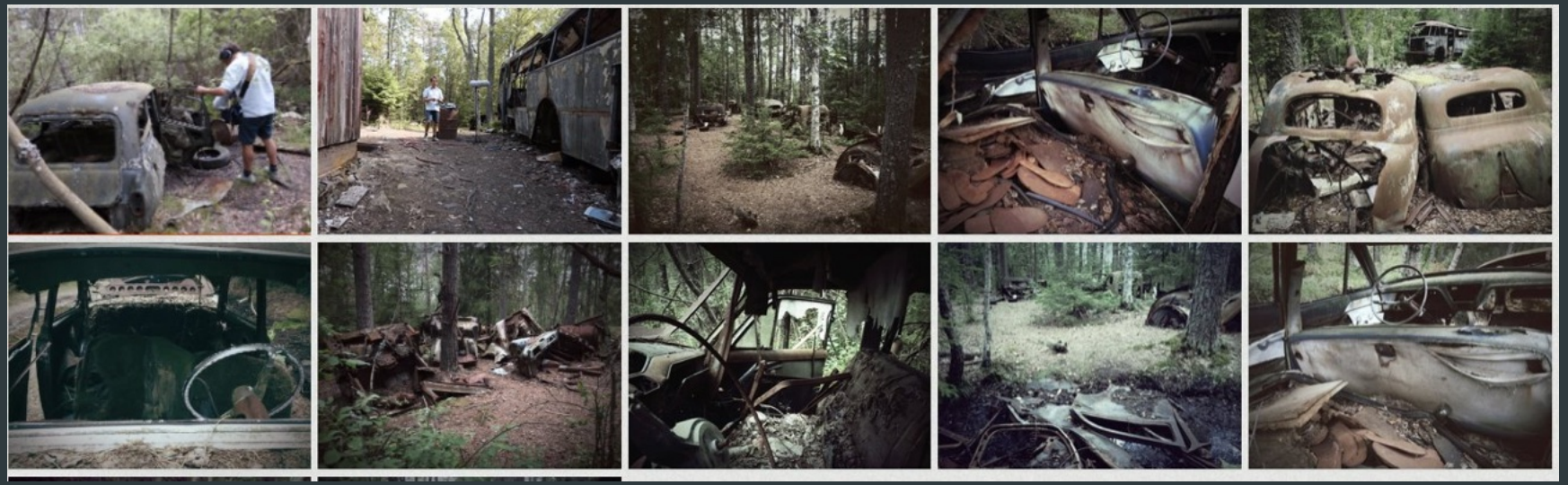


▶ CLIP

ways to amplify, modulate and manipulate Space

A VISUAL REVERB

The cars have been decaying for 80 years.



HOW CAN I PLAY BACK
SOUND IN THE LOCATION?

2019 PROTOTYPE

1 Raspberry Pi . Exciter, Visaton EX 80 S 1.

Software : Python. Power car batteri





▶ CLIP

2021 THE FIRST VERSION

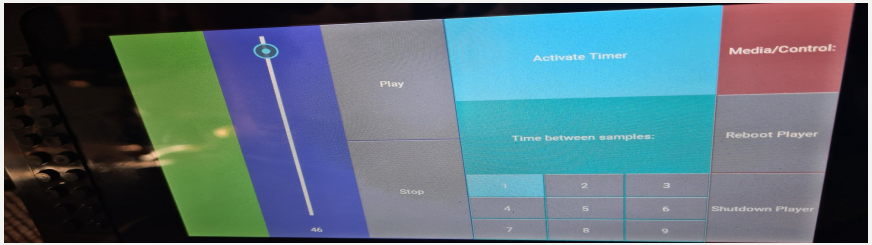
Music	Not in sync. No clear rhythm, harmony or melody that had to fit across the cars. Each car had its own stem.
Playback	Ten Raspberry Pis that could not see each other
Network	LoRa (Long Range)
Transducer	Exciter, Visaton EX 80 S
Software	Python











JULY 2021

CARS CHOIR

Vibrations, Cars, Nature: A Three-Dimensional Sound Art Experience

26–30 July 2021. Supported by the Danish Arts Foundation.

▶ CLIP

2022-2024

4 SOUND PERSPECTIVES IN VIRTUAL REALITY

SYDDANSK MUSIKKONSERVATORIUM
DANISH NATIONAL ACADEMY OF MUSIC

Artistic research supported by the Danish National Academy of Music (SDMK).

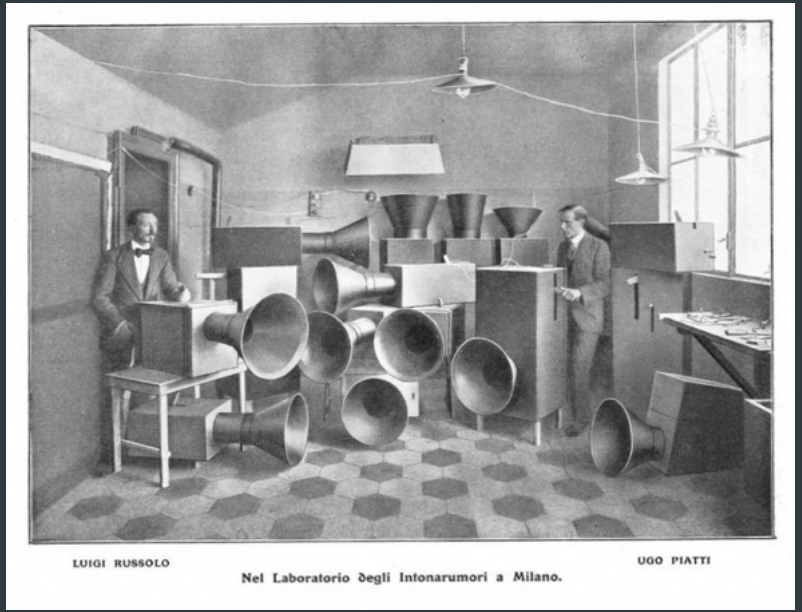


REPRODUCING PERSPECTIVE...

SOUND PERSPECTIVE 1
PHYSICAL SOUND IN OUR ENVIRONMENT

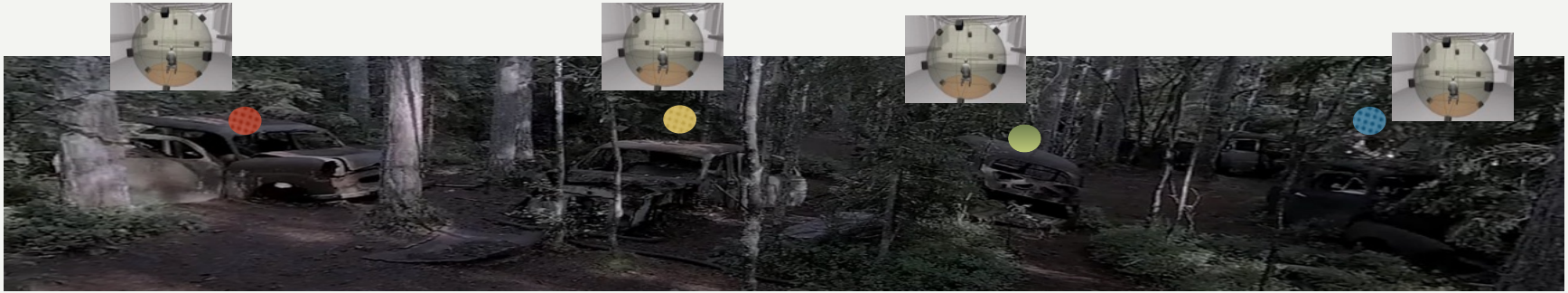
Sound waves and sound pressure physically present in an environment, In other words, the sound that surrounds us all the time.

The sound is captured from a "sweet spot": a position from which we receive the sound.

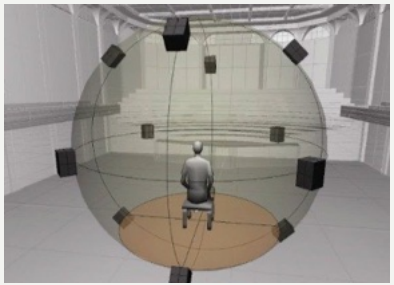


2022 360 VR FILM

Reproducing the experience of the 2021 installation in VR: a 360 film with spatial audio.



Recording: Zoom H6, M/S , 2rd-order Ambisonics,
Recording: sound played on location through exciters
Processing: Reaper, 2rd-order Ambisonics, Noise Makers Ambi Bundle
Encoding: Facebook 360 Spatial Workstation
Format: FuMa and AmbiX
Screening: Oculus Quest



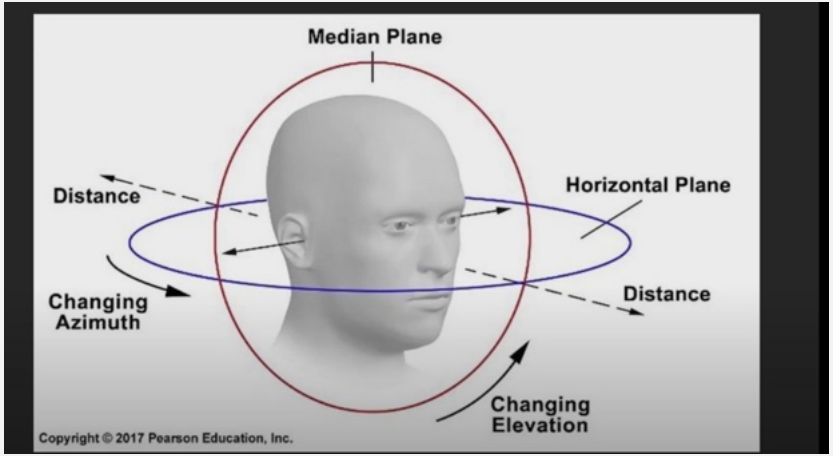
HRTF Head-Related Transfer Function

How the head and ears filter sound before it reaches the eardrum. Three cues:

1. The pinna (outer ear): frequency filtering, vertical localisation, front–back differentiation

2. Interaural Time Difference (ITD): the sound reaches one ear before the other

3. Interaural Level Difference (ILD): the sound is louder in the nearer ear









Visuals recorded with Insta360 and Kandao Obsidian R. The film can be experienced on Oculus Quest.

RECORDING METHOD

How the installation was recorded for the VR film.

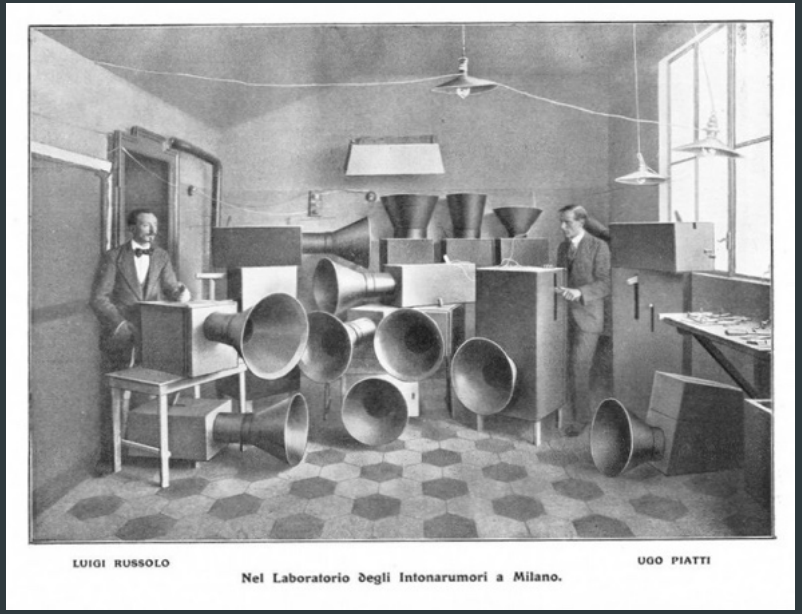
▶ CLIP



SOUND PERSPECTIVE 2
FROM THE EMITTER

Sound from a speaker system:

We listen to audio reproduced through an emitter system.5.1, 7.1.4 Dolby Atmos



2023 DOLBY ATMOS IN ADM FORMAT

A surround panner places the sound in the speakers.

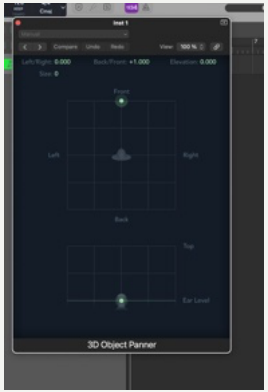
Surround panning (channel-based). Each sound is sent to fixed channels for set speaker positions, as in 5.1 or 7.1. A sound can only be placed where the speakers are.

Surround-panner: Lyden bliver lagt ind i faste kanaler. Positionen hænger sammen med højttalerne i formatet.



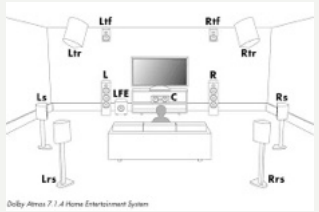
Surround panner

An object panner places the sound in the Space



Object panner

Object-based panning (Dolby Atmos). Each sound is an object with metadata that describes its position in 3D. It can be placed anywhere, independent of the speakers, and move freely in the space.



Dolby Atmos 7.1.4

Objekt-panner: Lyden får en position i rummet som metadata. Positionen er uafhængig af højttalerne, og rendereren afgør bagefter hvilke højttalere der skal spille den.



Cover artwork: Anders Ladegaard

REDEMPTION SOUND

Dolby Atmos release on Apple Music, Tidal and more

Vocals Randi Pontoppidan, Augusta Schak, Leo Schak

Cello Peet Morrison

Viola, 1st and 2nd violin Bjarke Falgren

Piano, dobro guitar, organ Mons Niklas Schak

Cristal Baschet Nicolas Becker, Mons Niklas Schak

Field recordings Mons Niklas Schak

Recorded at Man Eat Fish, Copenhagen. Cristal Baschet recorded at Structures Sonores Baschet, France

Mixed and mastered in Dolby Atmos at Eidnes Studios

Speakers 7.1.4

File Dolby Atmos ADM, max 128 channels. Beds max 10 channels (7.1.2)

Also binaural and stereo

Plymouth Deluxe Coupe, a track from Redemption Sound.

CLIP



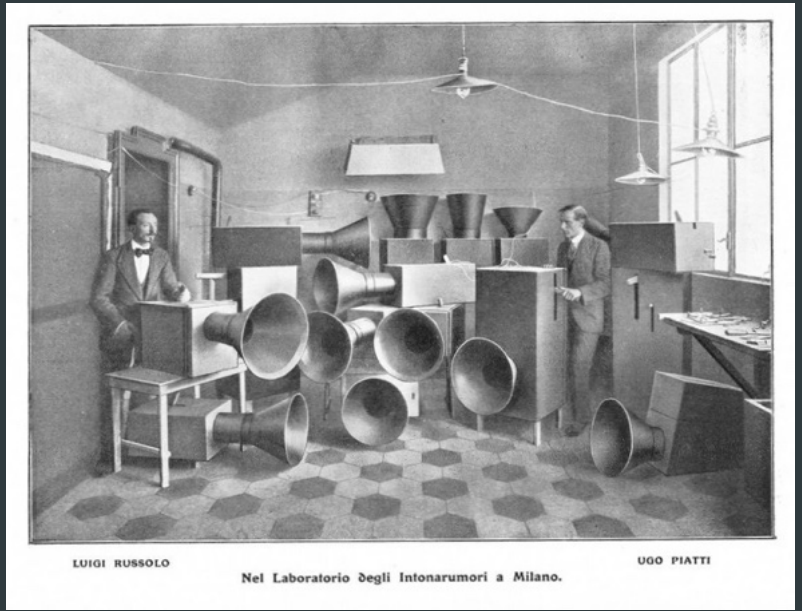
REFLECTION

I discovered how the spatial dimension of immersive sound allows me creating a more physical experience of the sound. I find that when working with 3D audio formats in the composition process, it becomes easier for me to embrace and sustain a simpler musical approach, perhaps even a more primitive form of music.

SOUND PERSPECTIVE 3

FROM THE RECEIVER

In a binaural recording, our ears become the microphones. The recording keeps the shape of the head and ears, so on headphones you hear the space from one listener's position.



PLAYBACK

Network :LoRa.

The ten cars this time the could play together !!









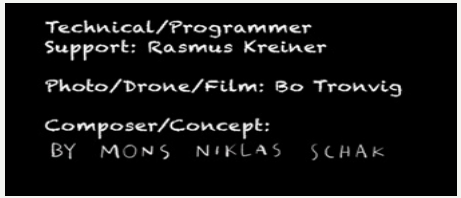
THE BINAURAL WALK

Location recording from the receiver's perspective.

Cadillac Eldorado 56, a track from Redemption Sound.







▶ CLIP



Cover artwork: Anders Ladegaard

REDEMPTION SOUND

Dolby Atmos release on Apple Music, Tidal and more

Vocals Randi Pontoppidan, Augusta Schak, Leo Schak

Cello Peet Morrison

Viola, 1st and 2nd violin Bjarke Falgren

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Speakers 7.1.4

File Dolby Atmos ADM, max 128 channels. Beds max 10 channels (7.1.2)

Also binaural and stereo

Cadillac Eldorado 56, a track from Redemption Sound.

CLIP

2021 CARS CHOIR

Title	Vibrations, Cars, Nature
Date	26–30 July
Music	Each car its own stem
Playback	Ten Raspberry Pi that could not see each other
Partners	Danish Arts Foundation



FROM SOUNDTRACK TO INSTALLATION

The album. Redemption Sound (2023) was mixed for a fixed sweet spot in Dolby Atmos.

The forest. For the installation the soundtrack is taken apart and rearranged into ten stems, one for each car.

The listener. There is no fixed sweet spot. The listener walks between the cars and makes their own mix.

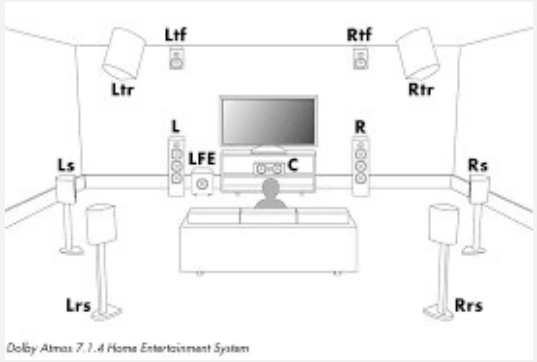


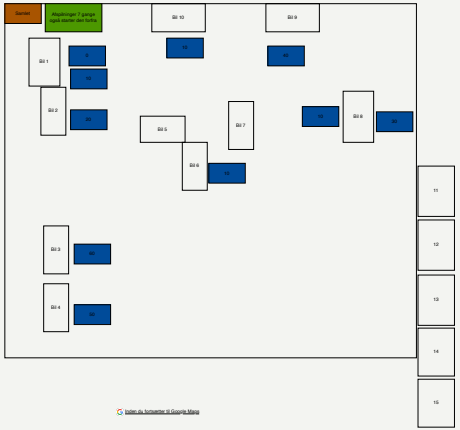


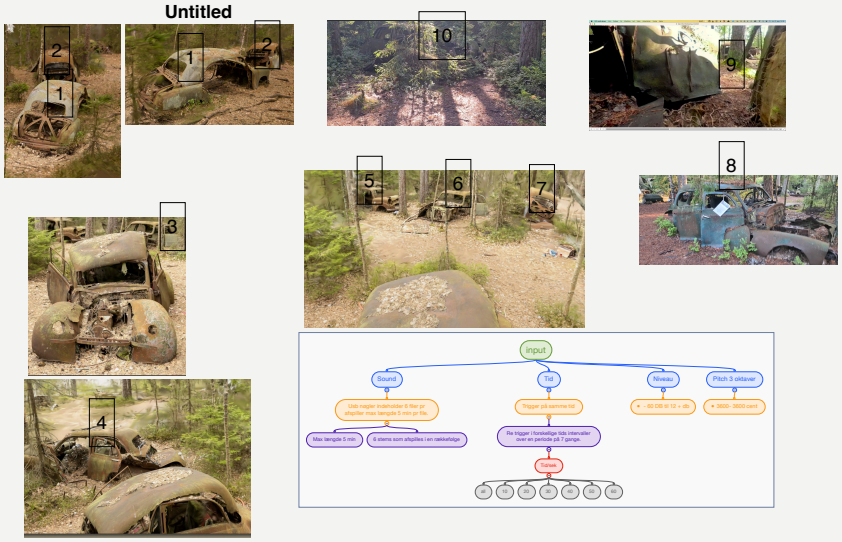
A DIFFERENT KIND OF ARRAY

In a concert or in Dolby Atmos, the listener sits in the sweet spot. In a sound installation, the listener moves, and makes their own mix.

Album: you sit, 3–4 minutes per movement.
Forest: you walk, about 10 minutes per movement.







2025 CARS CHOIR: REDEMPTION SOUND

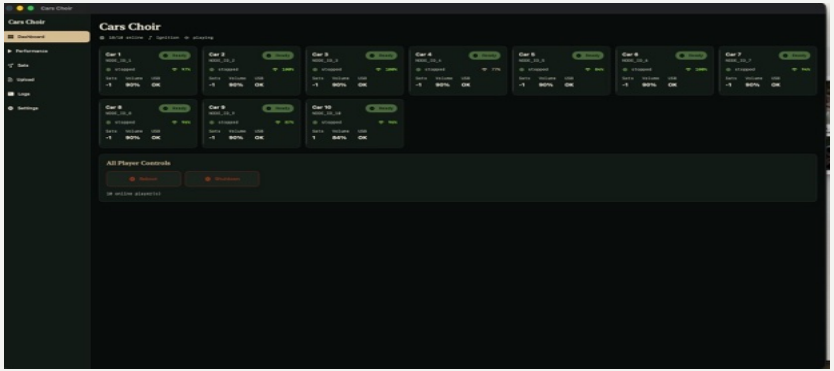
Date	30 July–17 August 2025
Music	The Redemption Sound soundtrack, rearranged . Six Movements, one Hour in Total.
Network	LoRa. The ten cars play together
Partners	Tingsryd Municipality, Danish Arts Foundation



2026 CARS CHOIR: REDEMPTION SOUND

Date	17 July–16 August 2026
Software	New, vibe-coded software
Network	Wi-Fi in the forest, controlled from Copenhagen
Partners	Smålandstriennalen, Tingsryd Municipality, Tingsryd Library, Danish Arts Foundation





2026 CARS CHOIR: REDEMPTION SOUND

In the *press*





POLITIKEN · KULTUR, FRONT PAGE · 4 AUGUST 2026

Og pludselig hører jeg lyden af noget, der for længst er holdt op med at eksistere

Text: Kjeld Hybel. Photo: Loui Brøndum Pedersen. Two pages in print.

Politiken's culture section travels with Mons Niklas Schak to the car cemetery at Kyrkö Mosse in Ryd, where he first came twelve years ago. The article describes how ten of the rusting car bodies have been turned into loudspeakers that play one shared, hour-long work, and how the site, protected until 2050, slowly disappears into the forest. Schak calls it making transience audible.

> *"... lyden af noget, der for længst er holdt op med at eksistere."*
> Kjeld Hybel, Politiken

Read the article (2 pages) →

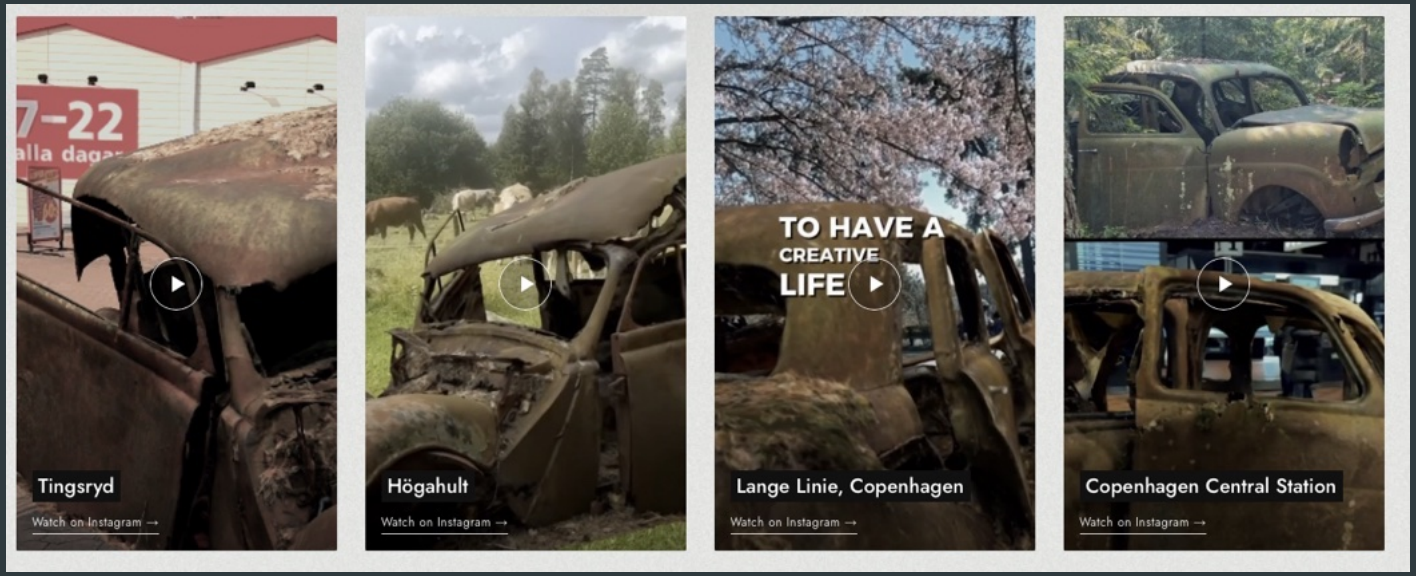
CARS CHOIR 2050

A permanent sound installation at the car cemetery in Ryd, Sweden, 2028–2050

- The municipality has protected the process itself: the cars are left to disappear into the ground until 2050.
- Ten cars become instruments. A small speaker makes each car play.
- Sensors measure how the cars rust, and the data shapes the music.
- As the site changes, the music changes with it.
- One idea: show it in Ryd and virtually in, for example, Helsinki at the same time, so the two audiences can affect each other's sound.



3D models of the cars



▶ CLIP

More on insta.

MONS_NIKLAS_SCHAK

SOUND PERSPECTIVES IN HYPERREALISTIC SPACES

2026-2028

How can sound and music drive the development of a new format?

- Can we develop the real place and the virtual world side by side, so they feed into each other.
- What is lost, and what is gained, when a place becomes virtual?
- The final format is open on purpose. The technology changes from month to month.
- First I create and collect the visual and the sound in the formats I need. Then I decide how they meet in a virtual world.

THREE PILLARS

VISUAL

Scanning the site and the cars, and rebuilding them as a 3D world

AUDIO

Recording the cars and the forest, and composing music that follows the listener

PLATFORM

The technology that brings it together: Unreal Engine, Wwise and XR

SPACE AND INTERACTION

What interests me is the space, its dimensions, and how I can interact with it.

MATERIAL

what is it made of?

DISTANCE

how far away is it?

SIZE

how big is it?

TIME

how long does it last?

And what changes when format changes ?

PHOTOGRAMMETRY

Tests to find the best format for capturing the cars and the place.

How can we turn the site and the cars into a visual world we can bring into XR?





THREE WAYS TO SEE A CAR

monsniklasschak.com/spatial/spatial-viewer.html



3D MODEL

A surface of small flat triangles, with a photo painted on top. Strong on the car body, weak on leaves and branches.



POINT CLOUD

Millions of points in 3D, measured from the photos. Only position and colour, with gaps between the dots.



GAUSSIAN SPLAT

Each point becomes a soft, see-through blob of colour. The blobs blend and look like a photo from every angle.

SPATIAL SOUND VIEWER

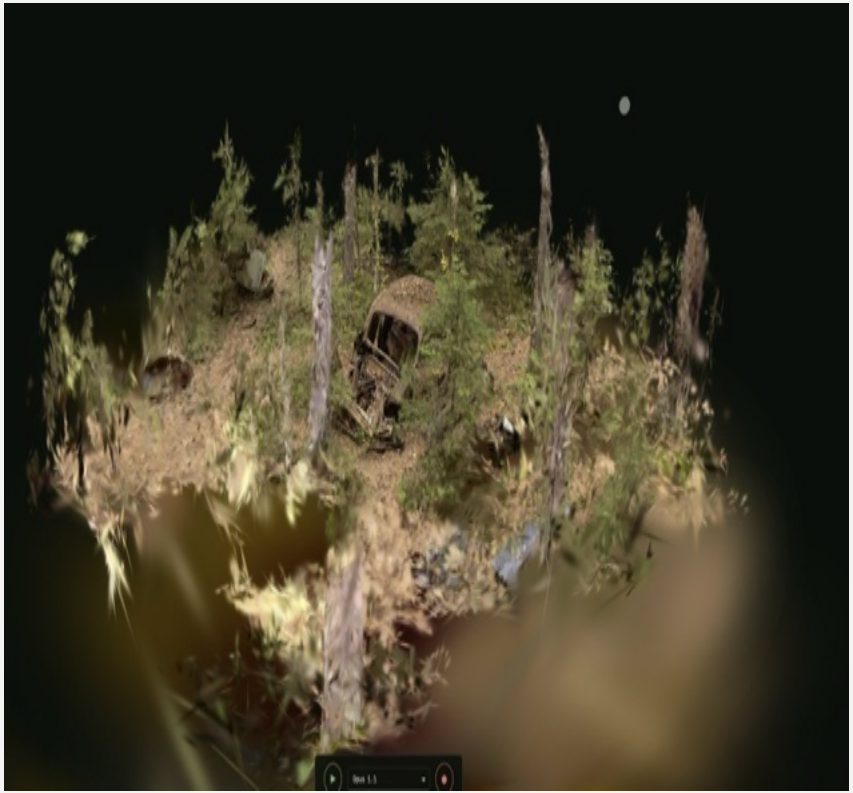
An interactive 3D model of a car from Kyrkö Mosse. The sound follows your position and gaze. It runs in the browser on computer and phone, no app needed.

Three ways to see the car. Mesh, point cloud (1 million points) and Gaussian splat, alone or together.

The sound follows the listener. 3D sound (HRTF) from the car. Distance controls volume, filter and pitch: close to the car, the music drops up to three octaves. Forest reverb outside, short cabin reverb inside.

The car as an instrument. Tap the car and hear a hit from that exact spot. Each hit plays the next note in a pentatonic scale (A C D F G).

Recording. Record what you hear as a 24-bit / 48 kHz WAV file, and layer new takes on top.



RECORDINGS

How can we capture the environment? We record the installation in four layers.

TOTAL

The whole choir in the forest. An ambisonic microphone in the middle of the cars captures all ten voices and the acoustics of the site.

CLOSE

One car at a time. The microphone stands 1.5–2 metres from the car and records its voice and direction.

INSIDE THE CAR

The listener inside the instrument. The microphone sits on the passenger seat; the forest and the other cars are heard through the body.

SUPER CLOSE

Contact microphones on the metal capture rust, plates and resonance: the material of the sound.

SWEEPS AND IMPULSE RESPONSES

We send sweeps through each car and record them. This gives us the acoustic fingerprint of every car and of the site, so afterwards we can play any sound through any car and change the music without going back to the forest.

HOW CAN SOUND AND MUSIC DRIVE THE DEVELOPMENT OF A NEW FORMAT?

Mons Niklas Schak
monsniklasschak.com

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