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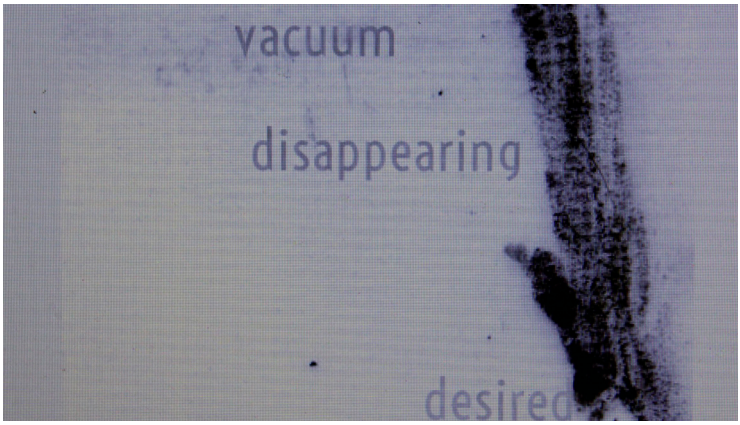
Hanns Holger Rutz
rutz@iem.at
University of Music and Performing Arts Graz, Institute of Electronic Music and Acoustics, Graz, AT

Nayarí Castillo
castillo-rutz@tugraz.at
Graz University of Technology, Institute of Spatial Design, Graz, AT



In|fibrillae

Keywords: Reconfiguration, Unravel, Web Audio, Personal Space, Sound Art

This audio-visual web piece explores the possibilities of defining a new type of personal aesthetic space in the audience's browser, reconfiguring and transposing a former interactive multi-channel installation piece for a physical 100 m² space. How can the underlying principles of filtration, fibres and latent sonic spaces be applied to this new type of space? How can a meaningful sound art experience be created for personal laptops and desktop computers, an experience that one wants to return to, surviving the short-lived attention economy of the screen space and the crowded browser tabs?

Description

In|fibrillae is a reconfiguration of an audio-visual installation for a real space into the online browser space. It unravels the previous piece into hundreds and thousands of small fibres, in order to transpose the original materiality for a personal space at somebody's home.

Its origin is the piece *in|filtration* that was conceived for esc media art lab Graz in 2020, placing twelve rows à four widths of fabric, 48 speakers and 96 infrared sensors in the space. The driving question for the new piece is, how elements of such a specific and physical structure can be selected and poetically transformed to make (new) sense for an audience that "opens" the piece, possibly in their private surroundings, in a browser tab, while preserving some of the conceptual underpinnings of the originating piece. Almost everything speaks against such a reconfiguration: You can no longer walk around in a large and open space, flooded by daylight, surrounded by the city, to discover the localised sounds in the room. You now find yourself in an unknown, personal, individual space, perhaps with headphones or your home stereo, and the small visual rectangle of your laptop's or desktop computer's screen.

Where it Comes From

To understand the new piece, we first want to describe the originating scenario, which is also documented online.[1] *in|filtration* was a collaboration between the EU project MAST (Master Module in Art, Science and Technology) at the Institute of Spatial Design of TU Graz, and FWF project Algorithms that Matter (Almat) at the Institute of Electronic Music and Acoustics (IEM) of KUG Graz. During the workshop *Algorithmic Space Studies* (2019), students of MAST were tasked with developing prototypes for a space installation in esc media lab, learning about algorithmic processes, and preparing for the presence of a sound installation within the space. Based on one of the prototypes, a grid situation of gradual visual filtering and accompanying fabric materials was selected (Fig. 1).

1. https://www.researchcatalogue.net/view/711664/711665 (accessed 12-Apr-2021).

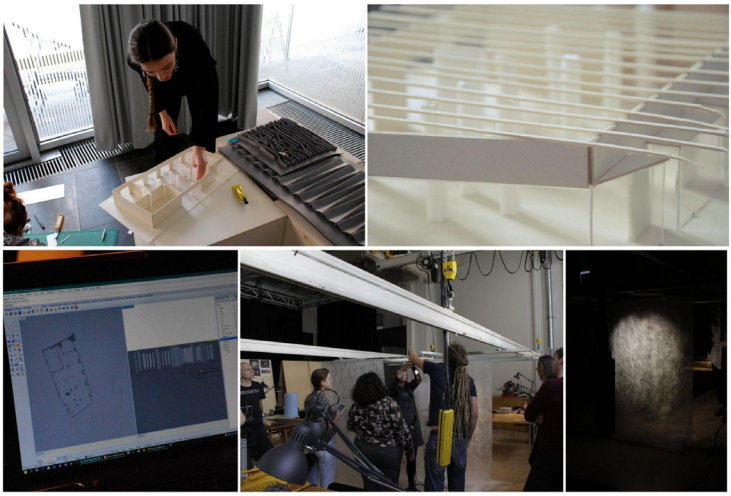


Fig. 1. Top: Model prototype during the workshop. Bottom left: CAD model of the visual prototype. Bottom centre and right: Testing the fabric material in the light laboratory.

The conceptual frame for the compound piece was the question of algorithmic segmentation and its potential for a positive interpretation of societal segmentation. Segmentation is a core principle of analysis in many different disciplines, such as biology (literally to disassemble organisms, but also the sequencing of DNA), in music and phonology (to structure the stream of sound), or in informatics (to formulate and implement an algorithm). It is also an artistic operation, ranging from film cut to the sampling of sounds and other existing materials. What we are interested in this project is to understand the segmentary, not as an expression of isolation or fragmentation, but on the contrary, as a decentralised surface of "fitting pieces" whose meaning emerges through assembly by the audience.

How can exchange happen between otherwise disconnected and uncommunicative segments? We introduce the notion of persistent and inconspicuous processes of exchange, leakage, filtration, grafting of xenomorphic elements onto others. Surfaces and membranes between adjacent actors and systems are not only regarded as forms of dissociation, but as partially permeable layers, thus allowing imaginings, signals, materials, light and sound to propagate and melt the identities of the separate. A translucent and sensorial space body acts as a vessel for sound structures that migrate between two seemingly opaque computer systems. Space is seen as a basic precondition, not just for architecture, but also for our lived environment. The physical space is interwoven with an algorithmic space, sounding and sensing its environment. Algorithmic space is not primarily the result of form generation but of an intrinsic speculative

movement and the interaction with humans who write code and experiment with it. Making visible and audible the exchange processes between humans and machines becomes a means of critically articulating this space (Fig. 2).

Fig. 2. Installation views.

The sound composition translates two mutually coupled systems used in the improvisation project *Anemone Actiniaria* (Rutz / Pirrò) into the installative context. Instead of two human performers, the two systems are replicated six times each, and augmented with processes that act as simple autonomous improvisers themselves. The departing point again is space and spatiality: first, there is the distinction between a common space and an individual (or inner) space. The common space is what is shared as structure between Rutz' six nodes. This is a repertoire of forms; forms of topology in the sense of a sound situation in *SoundProcesses* — the system Rutz uses for improvisation — a graph of connected nodes. The individual space is opened through genetic programming of synthetic sounds. The identity is divided into a given form of a "trunk space", and a reflected one through the introduction of sensor data. The "trunk space" is obtained from digital scans of drawings created from tracing tree trunks on wax paper. These drawings were previously used as one component of the video piece *Inner Space*. Now the scans were algorithmically transformed into sounds which served as targets or attractors to the genetic programming of sound synthesis structures, each row in the space associated with one trunk drawing. The signal processing repertoire is constrained to "rectangular forms" (rectangle and impulse waveforms), frequency filtering, and non-linear filtering and distortion, to create a correspondence with the visual and the concep-

tual space of the piece. The structures thus obtained were algorithmically augmented with input points that spatially extend the sound and allow it to be modulated by the sounds coming from the neighbouring nodes in the space (microphones pointing outside the gallery are used at the ends of the line). The sensor data is used to issue transformations on the *SoundProcesses* structure, for example altering the balance between the neighbouring nodes, or inverting (flipping) parameter ranges (Fig. 3).

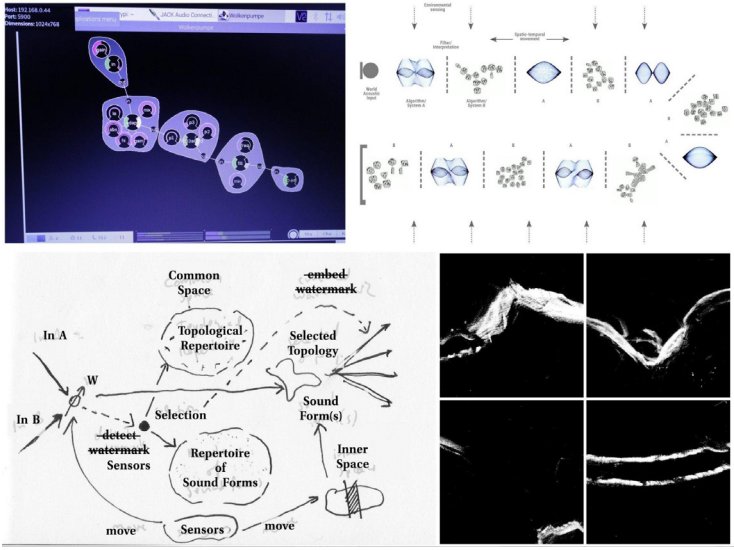


Fig. 3. Elements of sound composition. Top left: Wolkenpumpe / SoundProcesses improvisation interface of one node. Top right: Original 6+6 interleaving of two systems. Bottom left: Basic algorithmic spaces and procedure per node ("watermarking"-grafting had been removed for simplicity). Bottom right: Frames from invisible "trunk space" that directs the genetic programming.

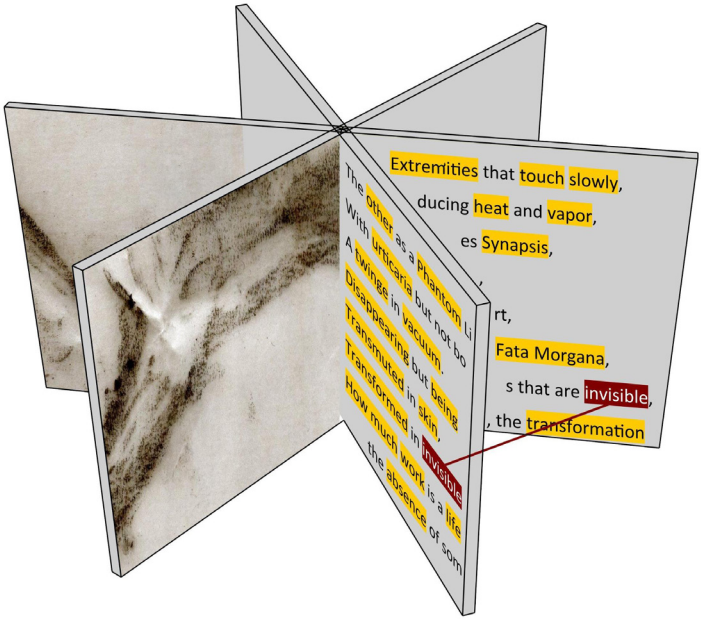
Where it Went

The new piece is documented online[2] and accessible at https://www.sciss.de/exp/infibrillae/. It is a conscious transformation of the originary visual and auditive scene. Sonically, it focuses only on one of the two algorithmic sound systems (*SoundProcesses*), and reinterprets its gestures under the new acoustic and spatial conditions. Instead of a matrix of movement sensors, different subtle ways are probed as means of "walking" through the virtual space or corpus of sounds.

The scanned images of the tree trunks are explicitly used as visual material, indicating six spaces through which one can move. At any one moment in time, the visitors find themselves in one of these audio-visual spaces, shown as a square "window" into a larger underlying virtual surface. Each space is also identified by

Fig. 3. https://www.researchcatalogue.net/view/711664/1111185 (accessed 12-Apr-2021).

a set of poetic words that appear and disappear in the “trunk surface”. The visitors can either consciously move the cursor around to explore the sounds and words, triggering invisible sensory regions that influence the sound, or simply observe what is happening, as the system slowly starts to move by itself. The poetic sets contain bridging words that cause the piece to move into an adjacent space. Conceptually, the six spaces form a sort of carousel, as depicted in Fig. 4



Technologically speaking, the developments of browser capabilities, in particular the introduction of the *Web Audio* API and the *Web Assembly* virtual machine, make it possible to run ambitious real-time generative sound pieces in the browser. In the end of 2020, we ported the *SuperCollider* sound server (*scsynth*) to this new technology, allowing *SuperCollider*-based sound pieces to run on the audience’s browser without the need to stream audio from a web server. In a second step, Rutz’ computer music framework *SoundProcesses* was ported to the browser as well, allowing a translation of the original installation code base to the new situation. While an obvious approach for transporting sound pieces would be to setup the software on a server, and understanding the server as a kind of remote space that is statically present like a virtual gallery one can visit any time, *in|fibrillae* makes a deliberate decision to run purely on the front-end

side of the browser, exploring this volatile “space” that is created ad-hoc as a person opens the project’s URL in a tab. Using local storage, the piece’s state is not only individualised for everyone who visits the project, but one may return to the piece at a later point in time and find it in a similar state as one left it. *in|fibrillae* plays with this volatile permanence.

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