

# Silver: A Wire Mesh Textile Interface for the Interactive Sound Installation Idiosynkrasia

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## ABSTRACT

*Silver* is an artwork that deals with the emotional feeling of contact by exaggerating it acoustically. It originates from an interactive room installation, where several textile sculptures merge with sounds.

*Silver* is made from a wire mesh and its surface is reactive to closeness and touch. This material property forms a hybrid of artwork and parametric controller for the real-time sound generation.

The textile quality of the fine steel wire-mesh evokes a haptic familiarity inherent to textile materials. This makes it easy for the audience to overcome the initial threshold barrier to get in touch with the artwork in an exhibition situation. Additionally, the interaction is not dependent on visuals. The characteristics of the surface sensor allows a user to play the instrument without actually touching it.

## Author Keywords

Interactive, Sound, Installation, Textile, Sculpture

## CCS Concepts

• **Human-Centered computing** → **Human computer interaction (HCI)** → **Interaction devices**; Haptic devices; • **Applied Computing** → **Arts and humanities** → *Sound and music computing*;

## 1. INTRODUCTION

This work originates from a collaborative interdisciplinary project whose overall goal is to connect textile and auditory art practice. A primary aim of the project is to place emphasis on the tangible material connections between textiles and sound, while de-emphasizing visual components.

Textile materials in combination with sound share a common history in the course of NIME, especially in the form of wearable interfaces. However, we did not find many examples of large-scale textile objects in connection with sound interaction. Find a video demonstration of the project at: [https://www.youtube.com/watch?v=5rFin71\\_2j0](https://www.youtube.com/watch?v=5rFin71_2j0)

## 2. RELATED WORK

There are several examples of projects that deal with textile interfaces as a controller for sound creation, *Zstretch* is an example of a haptic textile music controller [1], *Aural Fabric* uses conductive areas embroidered onto a fabric to create an interactive textile map [2], *FlexTiles* is a thin, flexible, stretchable and form-fitting pressure-sensitive textile sensor [3], Roh et al. introduced robust and reliable fabric, piezoresistive multitouch sensing surfaces for musical controllers [4] and the *FabricKeyboard* is a multimodal textile interface based on fabric trackpads and ribbon-controllers [5]. Another group of works deal with the handcraft aspect of textiles in combination with sound: Encinas et al. explore how audio augmentation of routinized motion patterns affects an individual's awareness of her bodily movements [6] and Posch et al. address the potentials of the intersection between the textile and the electronic domain [7]. There are also projects that integrate controllers into

wearable textiles or try to make soft materials create sounds [8][9][10]. Looking at textile and sound installations in an exhibition context we find related artworks by Hyojin Yoo [11] and Malin Bobeck [12].

## 3. COLLABORATION PROCESS AND DESIGN

### 3.1 Overview

The project brought together the two disciplines, textiles design and audio design. Our first questions circled around the correlation between sound and textiles and how qualities can be shifted from one domain to the other. That led to the idea of expressing the haptic sensation of touch into an acoustic manifestation. The goal of the project is to manifest aural representations of fabric textures through tangible interaction. In doing so the installation links tactile materiality with sound synthesis, complimenting a participant's sense of touch with an artist's sonic interpretation of that sensation.



Figure 1. *Silver* installed floating above the gallery floor.

With this in mind, students from the University Mozarteum's design: Tech.Tex course were brought together with students from the Fachhochschule Salzburg's Audio program for a series of workshops. Together the students experimented with a variety of fabric materials. They explored not only how the materials felt to the hand but also the sounds that the materials could produce and inspire, for example when rubbed together or rasped with a stick. Our design process followed a converging and diverging path. First the textiles students selected a variety of materials that they felt had engaging tangible properties. Many of their selections were woven mesh textiles that had a slight transparency. The ability to see through the material was desirable so that the fabrics could be layered together to create complex spatial forms, having both real and visual depth. These materials were presented during the first meeting between the disciplines, and together the students started experimenting with what sounds they could make and recording samples of these sounds. The students then

diverged: the textiles students began testing conductive silk screen inks and patterns, while the audio students generated 2 minute long looping tracks derived from their previous recordings. Converging for our second meeting, we all listened to the tracks and categorized them by style: metallic, destructive, atmospheric, wet, dark, etc. Diverging again the textiles students each took a style of audio and structured the form of their fabric sculpture on it. After seeing the fabric forms, the faculty coded the interaction mapping software to play selected audio tracks when the forms were touched using a combination of Arduino and Max/MSP.

Ultimately the project reminded students of the properties of each of their disciplines that they may have overlooked or forgotten: fabrics have inherent sonic properties, sounds evoke materiality.

### 3.2 Textiles

Textiles are used to create second skins like clothes, curtains, furniture, etc. But they can also build 3-dimensional spaces, like rooms, or sculptures.

The shape of the *Silver* sculpture resembles a cloud that is hung from three points in the ceiling and floats a couple of centimeters above the floor. The top of the sculpture hovers around waist level and invites the audience to touch and squeeze it, as seen in figure 1. This was done to place the sculpture around the average hand height for adults, making engagement with the sculpture an action of natural fluidity. One does not need to stoop down or reach up to activate it. Most of the sculptures in the installation were suspended to give them an increased sense of movement and weightlessness. Touching the sculptures deforms their surfaces but also changes their location in space. This stepping away of the sculpture allows for a greater range of input motion as there is not a rigid backing surface to stop the movement – small inputs result in large responses.

### 3.3 Sound

The Audio part was derived from sound experiments inspired by the haptic quality of different textile materials. The experiments included recordings of several fabrics by rubbing them, by crumpling them up, cutting or ripping them. The recordings were then manipulated with different filters, compressors, and extended by addition of composed electronic music pieces, to add depth, character and creating the mood of the sculpture. The two tracks conjure the underlaying steady but airy pulse of slow spinning fan with sudden interjections of crunches and rips that echo through a dark metallic space.



Figure 2. Audience interacting with the wire mesh sculpture.

### 3.4 Interaction

We applied a capacitive sensing method to the wire form as a sensory input for the surface. The output of the capacitive sensor circuit is mapped, using Max/MSP, to triggers that add additional effects and sounds in real-time. After the students composed numerous loops for the installation the team organized them into categories: atmospheric and melodic. A few of the melodic tracks were associated with the *Silver* sculpture as it had a more

characterized presence in the space. The texture and reflectance of the material invites touch, as seen in figure 2, while its materiality makes it durable enough to withstand such engagements. Touching the sculpture mixes together two of the student's audio tracks, *Scissors* and *Fences*, along with adjusting the fade in/out volume.

## 4. FUTURE WORK

The combination of textile and sound warrants further artistic exploration. This contains material research, as well as conceptual questions that deal with the different perspective of the two disciplines. For example, questions around their understanding of room, interaction, etc.

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