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# Synthesis in the Audiovisual



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## **Abstract**

The S T R A T I C audiovisual project<sup>1</sup> is based on the phenomenon that occurs when filming a pulsating light – lines appear on the screen. The thickness, color and movement of these lines are directly related to the frequency of the sound. In other words, the sound generates the visuals in real-time. The visuals are examined by the use of shutter speed and frame rate of a camera. In this project we explore the interactive potential through our live performances and the space for aesthetic expression by synthesizing the audio and the visuals. The project relates to the genre of visual music and abstraction in the arts and creates a synesthetic experience for the audience. We find it highly relevant to CHI since it concerns aspects of materiality at the intersection of the analog and the digital.

## **Author Keywords**

Interactive art; interaction design; audiovisual performance; sampling rate; new media art.

## **ACM Classification Keywords**

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

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<sup>1</sup> [www.stratic.net](http://www.stratic.net)

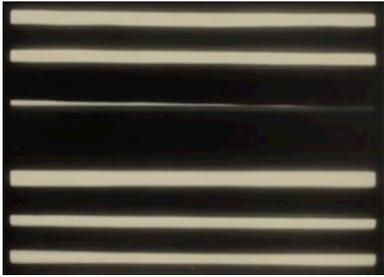


Figure 1. Still from Walter Ruttmann: Opus IV (1925).

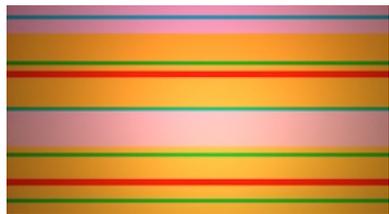


Figure 2. Generated abstract visuals.

## Introduction

Recently, audiovisual performances have been attracting more attention and interest in academia [3], in particular, in the fields of interaction design and HCI focusing more on artistic expressions [4,5,8]. Artists more often exhibit interactive art installations and designers demo their prototypes with a focus on aesthetic qualities in conferences such as NIME, CHI, and ISEA. This project intends to serve artistic audiences and those interested in aesthetic pursuits.

We want to expand on the ongoing discussion on materiality research and various connections between the digital and the physical in HCI. These refer to the tools we are playing with, but also to the projecting techniques that explore various screen surfaces.

The S T R A T I C project has its conceptual roots in ideas borrowed from Futurism, avant-garde cinema, and the visual music genre. Before we continue we would like to briefly mention how these are relevant.

## Background

The futurist art movement has strongly shaped the understanding of noise music promoting aesthetics that draw directly on machines and their processes. The Italian futurist and composer Luigi Russolo (1883-1947) [7] invites musicians and artists to embrace the aesthetics of noises created by machines and use them for artistic expressions by tuning the polyphony of noises into "*an intoxicating orchestra of noises*". The S T R A T I C soundscape generated both by hardware electronics and computer varies from ambient atmospheric to hardcore noise, the visuals impart minimalistic aesthetics from still and slow movement to vibrant and noisy patterns.

The project is grounded in a form of aesthetics referred to in the tradition as avant-garde cinema, in particular, abstract film with its avant-garde experiments, such as Walter Ruttmann: Opus IV (1925), see Figure 1, where abstract graphical elements play along with music, creating a synchronized audiovisual journey.

The influential *visual music* genre originated in the early 1920s with silent films where sound was directly translated into a related visual presentation. Nowadays, it has a wide range of references in expression from film to computer graphics. In the contemporary art scene, Monolake (Robert Henke) synchronized audio-visual laser performance Lumière<sup>2</sup> is a good example.

## Artist statement

The S T R A T I C project is concerned with the limits of human senses at those edges where the boundaries dissolve. In the audiovisual performance, both the audio and the visuals work together – to create evocative and extreme experiences.

## S T R A T I C project

The project explores the interplay of the sensed and the actuated in interactive media expressions as well as the aesthetic properties of analog and digital transformations formed by limitations and qualities of various forms of sensing apparatus. The result takes the form of noisy and hypnotic soundscapes linked with an abstract animation (examples in Figure 2). The abstract animation is directly and in real-time generated from the sound itself; audio frequencies affect the pulsation of the RGB diode. The artist plays with several parameters affecting the light (e.g.,

<sup>2</sup> <http://roberthenke.com/concerts/lumiere.html>

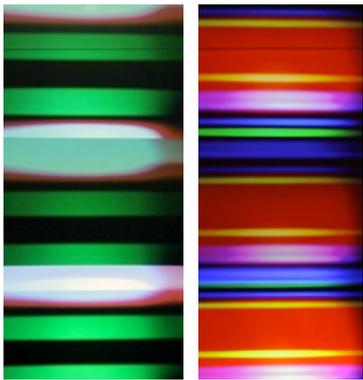
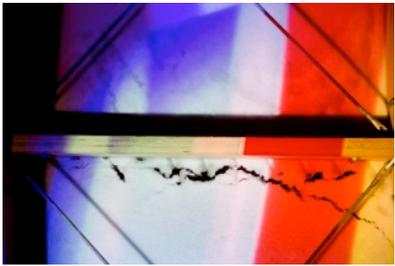


Figure 3. S T R A T I C performances at different venues, various "digital painting" techniques, from top down: rough wall surface, snow installation and vertical screen.

amplitude, frequency, phase, frequency modulation, and wave shape). The camera captures the pulsation of the light and generates moving colorful lines through that. Additional control of the sampling rate can be reached by adjusting the shutter speed and frame rate on a camera. In such generative process, here is no use of any post-production technique.

### Explorations

The project started as an exploration of audiovisual techniques from the basic research in the patterns of sampling rate. Various filming experiments became shaped into a film format and audio compositions were produced. The work with the shutter speed, frame rate and focus of a camera provided significant results in the visual part of the project. While this approach has been previously acknowledged, we explicitly leverage it to focus on creating artistic and evocative experiences for the audience and the performer. In this paper, we take an autobiographical approach to discuss our experiences in relation to this artistic practice and the sampling rate phenomenon.

Firstly, we started playing with hardware oscillators, but we have gradually moved into a hybrid system where we use digital technology to generate sound. This was in order to extend the capabilities of the material and be able to better control and sequence the sound frequencies generating the light.

The project renders a strong connection between the dichotomy of digital and physical, one being that the project and installation settings are concerned with a "painting" technique: an installment of video projection on different surfaces. The second is of major importance – physical hardware synthesizers are

connected to digital interfaces (MAX/MSP and Super Collider). By expanding the physical domain with the digital, we want to open the space for more subtle implications in the resulting artefacts.

### Previous performances

In several shows, various experiments were conducted where the artist combined analog and digital synthesizers, played with many cameras and their parameters, and ways of installing the video. The "digital painting" technique was executed in those venues (see images in Figures 3 and 4). One of the performances was conducted in an intimate art-space allowing the audience to closely experience and inspect this fascinating phenomenon. The rough surface of the wall transformed the projection into a vibrant and wavy movement of colorful lines. Another exploration on surface materials for projection was conducted in Dome of Visions (Stockholm). Here the video was projected on snow. The glass dome was covered by snow, and several projections were beamed on the snow from inside. As a result, the dome became illuminated. Several other performances were conducted along this line, but one installation focused on extending its visual aspect in which vertically stitched three-channel projections enhanced the dynamics of the video.

### Discussions

In this project, a particular light is shed on researching the concept of *abstraction* [9]: how abstraction takes place in both the contemporary art and media art worlds [6] and of its strength in dealing with ideas without representation. In our project, we also see the importance of abstraction in redirecting focus from a displayed content to more visual and formalistic presentations, where more extreme experiences may



Figure 4. S T R A T I C audiovisual performances.

arise. One example of such, is op (optical) art. Op art employs perception at its best, it explores the visual field of an abstract image and creates an illusionary and imaginary sphere, where the eye receives particular illusions and creates new visual narratives. All of this is a potential space for possible creative approaches, but also an open space with implications for design.

Another insight derived from the project relates to *visual music*. The researchers explore and try to overcome the separation of the audio signal in visual appearances; they map and deconstruct its properties to speed, thickness and color qualities. The notion of abstraction relates to the rejection of representation of realistic and visual references in the world. This sends the focus from the content of the message to the sensual experiences and explores the logics of the formal and minimalistic constructs of the audio and the visuals. This consolidated minimalistic appearance relates to synesthetic experience, where cross-modal associations create involuntary physical experience. "That is, the stimulation of one sensory modality reliably causes a perception in one or more different senses [2]". The HCI researcher Ilias Bergström discusses effects of audiovisual stimuli for the audience in connection to more than one modality. He also relates visual music and synesthesia with audiovisual perception: "Most relevant to the present discussion is the experience of sound as animated colours and/or shapes [1]".

In our project, the psychological perception of the color and its relations to a response between sound and visuals create an effect. The seeing of colors in different strengths and a constant and layered mix of various

colors create an illusion of a 3D environment, and it involves the viewers into an immersive experience.

### CHI 2016 Proposal

For CHI Interactivity, we propose a live audiovisual performance (Figure 4) where we will incorporate a more complex tool to control the light in order to create more evocative and extreme experiences. Both combined analog and digital interfaces will be employed.

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