





Espírito da floresta/Forest spirit, Installation at the Inter-American Development Bank, Washington, June 2017.

Espírito da floresta/Forest spirit

An artistic-acoustic observatory
2017/2018

AmazonFACE is a free-air CO₂ enrichment (FACE) experiment assessing the effects of increased atmospheric CO₂ on the ecology and resilience of the Amazon forest. The experiment will simulate the atmospheric CO₂ composition of the future in order to help answer the question: How will rising atmospheric CO₂ affect the resilience of the Amazon forest, the biodiversity it harbors, and the ecosystem services it provides.

Carbon Dioxide was discovered by the Flemish chemist Jan Baptist van Helmont in the 17th century. He called the gas that evaporated from burning wood „Spiritus sylvestre“, „forest spirit.“ In the installation „Espírito da floresta/Forest spirit“, a local ecosystem in the Amazon rainforest is represented acoustically. The acoustic emissions of a tree (*Ocotea* Sp.) and the environmental sounds in the field station of the AmazonFACE research project were recorded in 10-minute intervals over three days. The sounds of the tree and its inhabitants were recorded using specially developed contact microphones at three positions – in the crown, on the trunk, and at the roots. These sounds can be heard through the sound panels of the installation (in the module to the right of the projection surface), together with the environmental noises (through the video projection surface itself) and the sonification of the CO₂ concentration at three heights in the forest (through the module behind the projection surface). In the sonification, the CO₂ data flow is used to control the generation of sound in the installation's computer. A flute-like synthetic sound is used in for data sonification: this is reproduced for each of the three measurement heights, and the current measured values control the pitch of the three flute-like

sounds. By these means the dynamics of the CO₂ concentration at three different “storeys” in the rainforest are rendered audible.

In the installation changes to the soundscape of the rainforest at an increased atmospheric CO₂ concentration in the atmosphere are rendered observable. Beyond that, new acoustic research methods of biodiversity will be tested. The so-called Acoustic Complexity Index ACI is displayed in the video projection. In this acoustic estimate of biodiversity, the amplitude envelope is being analysed in a number of frequency bands: the greater the number of different volumes measured over a certain amount of time in specified frequency bands of the audio recordings, the higher the acoustically quantifiable biodiversity – what interests us here is the dynamic of this value over short and long time periods. Will biodiversity decrease under an elevated CO₂ concentration?

The installation “Espírito da floresta/Forest spirit” aims to make the processes in a local ecosystem audible and acoustically examinable: the noises in a tree and its immediate environment change, depending on the time of day and the weather, the CO₂ values increase or decrease on the different “storeys” in the forest, and it becomes possible to experience sensually the close connection between environmental conditions and life processes in the rainforest.

Concept and artistic design: Marcus Maeder 2017/2018. Preparation of environmental data: Alessandro Araujo, Empresa Brasileira de Pesquisa Agropecuária (Embrapa). Implementation ACI: Martin Neukom, ZHdK. Programming support : Thomas Peter, Philippe Kocher, ZHdK. Production support sound panels: Thomas Tobler, ZHdK. Supported by Fondation ZHdK.

Video/Sonification excerpt:
http://www.domizil.ch/excerpt_amazonface_lowres.mov

Exhibitions:

Inter-American Development Bank IDB, Washington DC, USA. June 2017

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Embassy of Brazil, Washington DC, USA, June 2017

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www.amazonface.org



Recording station in the rainforest.



Screenshot of the video part of the installation.



AmazonFACE measurement tower next to the recording station in the rainforest.



Bakar - Kraljevica (45.292898°, 14.572163°). Next page: Measurement station at Bakar bay, summer 2015.



Bakar-Kraljevica (45.292898°, 14.572163°)

An air quality data sonification installation
2015

The installation „Bakar-Kraljevica (45.292898°, 14.572163°)“ renders local air pollution dynamics at the mediterranean sea sonically and musically perceptible. My project consists in creating a contemporary musical landscape “painting” of the Bakar Bay: At the mouth of the bay lies Croatia’s largest refinery, and a new motorway runs alongside the bay at a dizzy height. With an artistic/scientific measuring station, which I set up opposite the mouth of Bakar Bay, I have obtained a time-lapse video of day-to-day life on sea and land and have used the data from my own air quality measurements (nitrogen dioxide, ground-level ozone and carbon monoxide) and data from a state-run measuring station in Urinj (sulphur dioxide) on the opposite side of Bakar Bay.

Nitrogen dioxide, ground-level ozone, carbon monoxide and sulphur dioxide are all pollutants arising from

the use of fossil fuels and pose a risk to public, animal, and plant health. Moreover, some of these gases are key drivers in the greenhouse effect, i.e. global warming. The installation creates a sensory experience of the local, weather- and circadian rhythm-dependent air pollutant dynamics by combining data sonification and video images. Daytime, wind direction and approaching weather systems can be observed in the sky and on the sea surface and can be correlated with air pollutant levels and sounds.

The sonification of the four pollutants consists of four string sounds of different pitches, played back in four spherical resonators: The lowest sound (carbon monoxide) is played back in the lowest resonator; the second lowest sound (nitrogen dioxide), in a slightly higher one; the next (sulphur dioxide), in an even higher one; and the highest-pitched sound (ozone), in the highest of the four. The daily dynamics – the rise and fall of pollutant concentrations during the played-back measuring period – are converted into sound: During the second night, it rained briefly, and the following

morning there were virtually no audible sounds as the air had been washed clean. During the course of the week, the sound volume then increased, particularly at noon (nitrogen dioxide and ozone) and in the evening (carbon monoxide). All pollutant levels dropped again significantly during rain and Bura (a stormy fall wind flowing down the mountains towards the sea).

Nitrogen dioxide (NO₂) is a highly toxic gas arising primarily from the burning of fossil fuels (gas, coal, oil and motor vehicle emissions). Nitrogen dioxide contributes to ozone formation and environmental effects such as acid rain and soil eutrophication. The European limit for nitrogen dioxide is 200 µg/m³ and may be exceeded 18 times a year. Our measurements revealed daily peaks well below the limit, i.e. between 26 and 33 µg/m³ at noon. The low NO₂ values are attributable partly to the coastal location with its constant breeze, which quickly carries away local gas emissions. In addition, at high temperatures (sometimes as high as 43°C at the measuring station), NO₂ reacts readily, forming nitrogen monoxide, ozone and

nitric acid.

Carbon monoxide (CO) is a highly toxic gas, too. It, too, arises from the burning of fossil fuels, mainly by motor vehicles. Our measurements revealed higher concentrations of carbon monoxide towards the evening; Carbon monoxide accumulated in the local atmosphere during the day as a result of ship and vehicle traffic in the bay. The European limit for carbon monoxide is 10 mg/m³ over eight hours. This average value was not exceeded for the same reasons as those given for nitrogen dioxide.

Ozone (O₃) is a highly oxidative gas: it causes irritation of the airways in people and animals and leaf necrosis in plants. Ozone is formed when nitrogen oxides react with oxygen in the presence of UV radiation. The agents responsible for producing ozone do not originate locally but are carried to Bakar Bay from further afield, presumably from the south on the Jugo wind blowing along the coast. The European limit for ozone is 180/240 µg/m³, an 8-hour value which may be exceeded 25 times a year. This value was not exceeded during our measurements.

Sulphur dioxide (SO₂) is formed primarily from the burning of coal and heating oil. Main emission sources include combustion plants used for power generation, in industry and in small-scale consumption. At high concentrations, sulphur dioxide has damaging effects on humans, animals and plants. Oxidation products cause acid rain, which endangers fragile ecosystems such as forests and lakes (Scandinavia) and damages buildings and materials.

Concept and artistic implementation:

Marcus Maeder

Scientific advice:

Marcus Schaub, Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)

Programming support:

Philippe Kocher

Air quality measurement technology:

decentlab GmbH

Thanks:

TZ Grada Bakra, Sonja Jelušić;

PZ Dolcina and Ivona Miloš

Source of pollutant information:

Austrian Department of the Environment

Video/sonification excerpt:

<http://www.domizil.ch/bakar-kraljevica.mp4>

Exhibitions:

Nixe @ Musikprotokoll im Steirischen Herbst 2015,

Joanneum im Lesliehof, Graz

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Screenshot of the time lapse movie on the monitor of the installation



trees: Pinus sylvestris, spatial audio version, Creative City, Zurich University of the Arts ZHdK, October 2014



treelab, adaption for ICST's Immersive Lab, San Diego/San Francisco, November 2015



Left: «trees» stereo/headphone version at ESC Medien Kunst Labor, Graz 2015. Right: Adaption of «trees» for ICST's FlowSpace, National Museum of Contemporary Art, Athens

trees/treelab

Spatial audio/stereo sound installations
2014 - 2016

The link between trees and various climatic processes is usually not immediately apparent. Trees and plants do not live merely on moisture from rain, sunlight (which drives gas exchange) and nutrients from the soil: they absorb carbon dioxide from the air and produce the oxygen that we breathe, maintaining our climate and biosphere. Gathering ecophysiological data by measuring the local climatic and environmental variables and the physiological processes within a plant in response to changes in these variables has become an important method of researching climate change and vegetation dynamics. It helps to determine physiological thresholds of plants in terms of increasing temperature and consequently drought stress.

Plant physiologists have known that plants emit sounds for several decades now. Many of these sounds are of transpiratory/hydraulic origin and are therefore related to the circulation of water and air within the plant as part of the transpiration process. Each plant species – in fact each plant individual – has its own acoustic signature, related to its anatomical structure and to the local climatic conditions. Investigating the acoustic emissions of a tree in response to dynamically changing climatic conditions might reveal biological or physical properties that place these emissions in a broader ecophysiological context and enable us to explain processes that are not yet fully understood.

In our observation system «trees» and «treelab» we combine recordings of acoustic emissions of a tree with sonic representations (sonifications) of ecophysiological data in one single auditory experience, enabling the visitor to experience and comprehend

cause and effect of the plant-atmosphere relationship. The installation replays measurement data from early summer 2015, the peak of the growth period of a Scots pine (*Pinus sylvestris*) located in the central Swiss Alps in Salgesch in the canton of Valais.

Scots pines in Valais have experienced high mortality rates for some decades now: this phenomenon is believed to be caused by the effects of climate change, e.g. longer drought periods. A downy oak (*Quercus pubescens*), for example, is able to better withstand the current climatic conditions whereas a Scots pine is pushed beyond its physiological limits despite the fact that both tree species have coexisted there for thousands of years. Consequently, shifts in the abundance of tree species are observed. The ecophysiological knowledge acquired is used to explain the underlying processes: Hence the cooperation between a biologist and an artist opens up new ways to study the complex relationship between tree physiology and climatic conditions on the one hand and to explore the possibilities of acoustic and artistic representations of ecophysiological processes in trees on the other.

„trees: Rendering ecophysiological process audible“ was a research project conducted by the Institute for Computer Music and Sound Technology ICST of the Zurich University of the Arts ZHdK, in collaboration with the Swiss Federal Institute for Forest, Snow and Landscape Research WSL. „trees“ is funded by the Swiss National Science Foundation (SNSF) and the Zurich University of the Arts ZHdK.

Artistic realization and programming: Marcus Maeder.
Scientific data and analysis: Roman Zweifel (WSL).
Programming support: Philippe Kocher, Thomas Peter (ICST).
Technical engineering field measurements: Jonas Meyer (ICST, decentlab).

<http://blog.zhdk.ch/trees>
http://immersivelab.zhdk.ch/?page_id=1014

Video/sonification excerpt:
<http://www.domizil.ch/trees.mp4>

Exhibitions:

Ars Electronica Festival 2017, Linz
September 2017

BOZAR Palais des Beaux-Arts, Bruxelles
September - October 2017

United Nations Climate Change Conference COP 21,
Paris 2015

Gray Area, San Francisco
Nov 13 – 30, 2015

IDEAS - Calit2 Performative Computing Lab, Atkinson
Hall, UC San Diego
October 9, 2015

ICAD Conference 2015
ESC Medien Kunst Labor, Graz
08.07. - 11.07. 2015

Clarke House, Bombay
03.06. – 07.06. 2015

SoundReasons Festival, New Delhi, India
Outset India
31.10.2014 – 10.11.2014

ICMC SMC 2014 Conference, Athens
National Museum of Contemporary Art, Athens
September 2014



Cover image of the progeny CD

progeny

CD, domizil 41, 2015

Nature has presented itself as the idea in the form of otherness. *G. W. F. Hegel*

In his work as a research associate at the Institute for Computer Music and Sound Technology of the Zurich University of the Arts, Marcus Maeder has spent a number of years working on the sonification of scientific data. This involves the use of data to control sounds in order to study processes in nature that would ordinarily be beyond the reach of our senses. In observing his research work, Maeder increasingly found himself asking fundamental artistic questions, such as: When a piece of art or music provides new or different insights into the world around us, how do we specify its epistemic content? In other words, when an artist describes a process or phenomenon in nature in musical form, or simulates, imagines it through music, what does such a piece of art achieve? Is music, purely artistic in its approach, capable of casting a new associative and emotional perspective on concepts and theorems in science by isomorphically applying, in its implementation, certain aspects of scientific views?

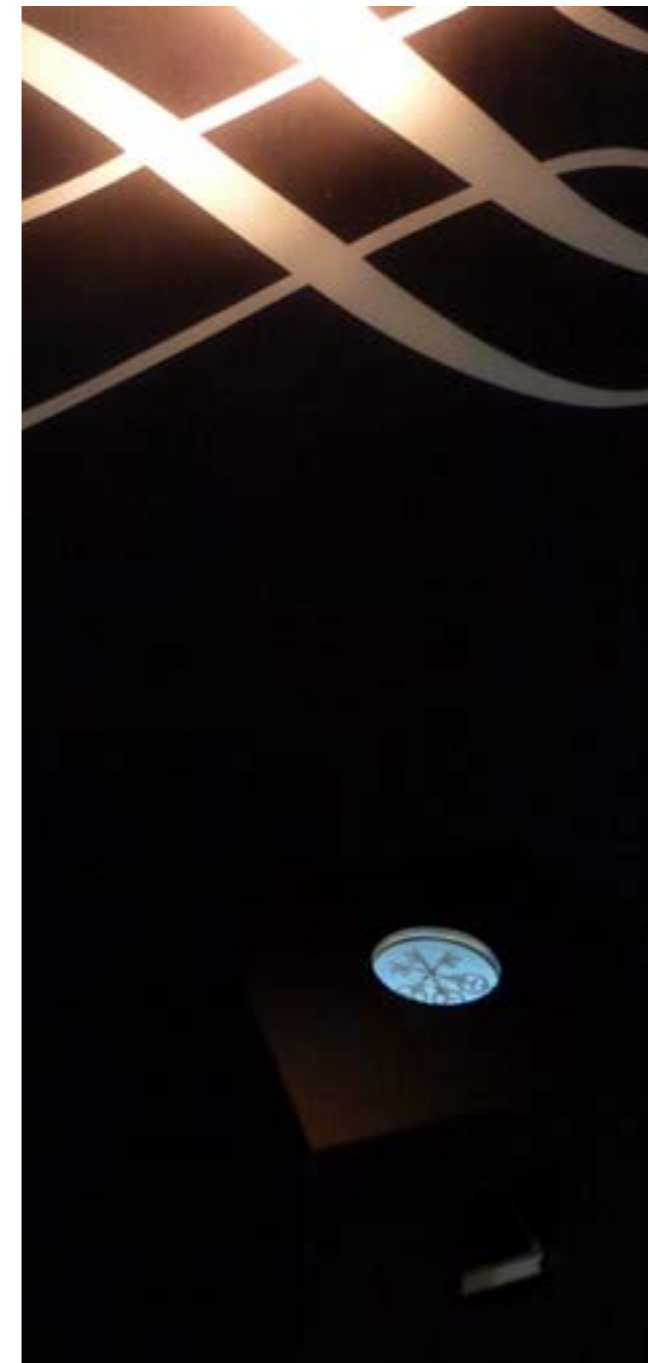
The progeny project has produced ten pieces and attempts at artistic associations of concepts as shaped in Biology and Theoretical Biology, particularly in the Theory of Living Systems. Far from shying away from the label of „ambient music“, progeny expressly positions itself in the fields of Ambient Poetics and Environmental Aesthetics, as outlined by American philosopher Timothy Morton. Ambient Poetics develop speculations about nature that transcend our conceptual and ideological limitations of perception, thus reshaping our environment: here,

art is seen as a heuristic act that involves counterposing images and sounds of otherness, on the one hand, and ideological perspectives on nature on the other.

Listen to a piece of this CD:
www.domizil.ch/marcus_maeder/mp3/growth.mp3



Exhibition poster for The Left-Hand Path, Graz and Zurich 2011



Left: Base station/installation at Shedhalle Zurich. Right: Visitors at the Old Botanical Gardens, Zurich – Lange Nacht der Museen 2011



On the way with smartphone and installed App, Stadtpark Graz, 2011

Der Pfad zur linken Hand (The Left-Hand Path)

A GPS-based audio play app for Smartphones
2011

Graz Path: First showing at Steirischer Herbst, Musikprotokoll, Schlossberg/Stadtpark, Graz, 2011

Zurich Path: First showing as a contribution to „Connect. Art between Media and Reality“, an exhibition with media art from the Sitemapping programme (BAK), Shedhalle Zurich/Alter Botanischer Garten, 2011

Direction, Text, Music:
Marcus Maeder

Interactivity, Software, Music:
Jan Schacher aka. "jasch"

The topographical audio play *The Left-Hand Path* was developed as a Smartphone app and is available for download free of charge on our project website and from the Apple App Store. We set up The Left-Hand Path in 2011 as a GPS-based audio play at the Old Botanical Gardens in Zurich as part of the „Connect“ exhibition at Shedhalle Zürich and at Graz Stadtpark for the Musikprotokoll programme of the Styrian Autumn festival. Equipped with smartphones, headphones and this app – specially developed for this project – visitors are invited to wander around and explore a designated area, where they will come across various sound clips situated at different locations throughout the landscape.

The concept of the Left-Hand Path stems from Indian mythology and denotes religious and worldly practices opposed to the prevailing homogenous, established beliefs. In the West, the term is used to describe ways of thinking involving opposing views: on the Left-Hand

Path, one often finds the devil himself as a travelling companion. Listeners of the GPS-based audio play The Left-Hand Path are led along paths of thought characterized by a fundamental opposition of the state of affairs in a „post-everything“ society, a society in which social and ecological progress risks stalling as a result of the establishment of global neo-feudal power structures.

Following the economic and terrorist crises of recent years, conservative thinking seems to be reinstating itself around the world: Right-wing politics and the associated exclusionary attitudes that characterize the wealth gap, be it on the basis of national or ethnic identity or religious belief, are becoming acceptable once again. A renaissance of conservative and religious promises of salvation is drowning out rational discussions on how we wish to lead our lives and how society should evolve in both the West and the East, in rural and in urban areas. Today, we live in a society dominated by monetary relationships and ridden with myths to the point of becoming a veritable jungle; a society in which power, money and faith are intertwined – (post-)post-modern, global capitalism has become the vast motley painting of everything that has ever been believed painted by Gilles Deleuze and Félix Guattari.

The question as to what today's enlightenment processes should look like – referring to the processes for raising awareness in society with a view to exposing and dismantling the existing power structures – requires an urgent answer. The Left-Hand Path system is associated with a diabolic figure, which manifests itself as enlightenment in its purest form, as an antagonist, as a rebel and as symbol of polemic and failure, urging listeners, in specific terms, quite simply to challenge the established ways of thinking, as Kant put it in his maxim Sapere aude! Have courage

to use your own reason! On the Left-Hand Path, several fundamental enlightenment-seeking questions arise: What society do we live in? Are we content with our current way of life? How can we determine our own destiny? In the audio play, these questions are posed by individuals characterised by having an oppositional attitude towards their environment: artists, radicals, intellectuals, sectarian gurus, alcoholics, the exploited and supporters of an alternative society. The Left-Hand Path is like a maze: a broad range of views are expressed, but which lines of thought lead out of dead ends? Can listeners find their way out of this maze of thought?

Production: ORF Kunstradio and Musikprotokoll im Steirischen Herbst Graz, Austria
Editor: Elisabeth Zimmermann
Directors Musikprotokoll im Steirischen Herbst Graz: Susanna Niedermayr, Frank Zimmer

Supported by the Swiss Arts Council Pro Helvetia, Sitemapping of the Swiss Federal Office of Culture, SRF Swiss Radio and Television, Ethnographic Museum of the University of Zurich. Project Partners: HTC (Smartphones) and Holding Graz Schlossberg-Service.

www.derpfadzurlinkenhand.net
http://kunstradio.at/2011B/02_10_11.html
<http://www.shedhalle.ch/de/marcus-maeder-jan-schacher-der-pfad-zur-linken-hand>



trees: Downy Oak

Spatial audio/stereo sound installations
2012/2014

“Phytoacoustics”

Plant physiologists have known that plants emit sounds for several decades now. Many of these sounds are of transpiratory/hydraulic origin and are therefore related to the circulation of water and air within the plant as part of the transpiration process. The frequencies of these acoustic emissions lie mostly in the ultrasonic range, depending on the species-specific characteristics of the plant tissues. Some of the acoustic emissions (so-called cavitation pulses) are indications of embolism in the water transport system, which occurs when a plant is subjected to drought stress and desiccation. The excessive water tension in the water-conducting system leads to the rupture of the water columns in the plant vessels. Each plant species – in fact each plant individual – has its own acoustic signature, related to its structure and to the local climatic conditions.

Sonification of ecophysiological data

Gathering ecophysiological data (i.e. conducting measurements of the local climatic and environmental conditions and of the physiological processes within a plant in response to these) has become an important method in research on climate change and vegetation dynamics. It helps to determine physiological thresholds of plants in terms of increasing temperature and consequently drought stress. A downy oak (*Quercus pubescens*) in the central Alps, for example, is able to withstand the current climatic conditions of the air and soil whereas a Scots pine (*Pinus sylvestris*) is pushed beyond its physiological limits despite the

fact that both tree species have coexisted there for thousands of years. Consequently, shifts in the abundance of tree species are observed, and the ecophysiological knowledge acquired explains the underlying processes.

In this installation, we have combined field recordings of meteorological phenomena, recordings of acoustic emissions in a tree and acoustic representations (sonifications) of ecophysiological data, collected by Roman Zweifel (WSL) and Fabienne Zeugin of the Swiss Federal Institute of Technology (ETH) on a downy oak at Salgesch in the Swiss mountains in 2003 and 2004. Zweifel and Zeugin measured relative air humidity, sap flow, stem radius changes and ultrasonic acoustic emissions (UAE) throughout an entire tree growth cycle and recorded the data at ten-minute intervals throughout the day and night. As the data relating to the ecophysiological processes was multidimensional, an analytical system is needed that focuses on the key factors and the interrelations between these and renders them intuitively perceptible.

Downy Oak: Data sonification

The sonification system is based on a combination of different sonification techniques, i.e. playback of original acoustic emission recordings (by transposing them into the audible domain) and parameter mapping sonification, whereby the sound parameters of a sample player (amplitude, pitch and filters) and the sound distribution system (spatial position or movements of virtual sound sources) are controlled by the data flow. The different sonification modules are implemented in a set of Max Patches, which replays the measurement data of a downy oak throughout an entire growth cycle (April-October 2004). A larger number of ecophysiological and meteorological phenomena do not manifest themselves acoustically, and it is a challen-

ging task to generate metaphorical sounds to portray a single phenomenon, such as sunlight or air humidity effectively. Besides the diurnal course of the tree's response to sunlight, there are many other recognizable patterns: As it gets drier in the summer, the cavitation events become longer, sometimes lasting deep into the night; the stressed plant needs more time to refill with water from the soil. In addition, the number of cavitation sounds is greater when a plant is well drained and exposed to full sunlight than in very dry periods.

Artistic realization and programming: Marcus Maeder (ICST)
Scientific data and analysis: Roman Zweifel (WSL), Fabienne Zeugin (ETH)
Programming support: Philippe Kocher (ICST)
Technical engineering field measurements: Jonas Meyer (ICST, decentlab)

www.swissnexsanfrancisco.org/event/tuningintrees/
<http://blog.zhdk.ch/downyoak/>

Exhibitions:

Baum/Mensch/Klang/Kunst
Alpen Adria University, Klagenfurt
May – June 2014

swissnex San Francisco
Juli – August 2012

Left: trees: Downy oak – spatial audio version at swissnex San Francisco, 2012. Right: trees: Downy oak – stereo version at Alpen Adria University, Klagenfurt 2014



Milieux Sonores – sound and imaginary space. An exhibition at Grey Area Foundaten, San Francisco, 2010.



Exhibition detail: „Flow Space“ by Daniel Bisig, Jan Schacher and Martin Neukom



Exhibition architecture with detail of „Mutmassliche Windlasten“ by Yves Netzhammer and Bernd Schurer

Milieux Sonores: Sound and imaginary space

Exhibitions and book project, 2009/2010

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 Edited and curated by Marcus Maeder
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Version 1.0 of the Milieux Sonores exhibition took place at Kunstraum Walcheturm from 16. 1. 2009 – 21. 2. 2009. Version 2.0 from 11. 9. – 19. 11. 2010 at Gray Area Foundation for the Arts, San Francisco, in collaboration with swissnex San Francisco and the support of the Swiss Arts Council Pro Helvetia.

Participating artists: Daniel Bisig/Jan Schacher/Martin Neukom, Jason Kahn, Yves Netzhammer/Bernd Schurer, Felix Profos, Jeroen Strijbos/Rob van Rijwsijk a. o.

Contributors to the Milieux Sonores publication: Daniel Bisig, Sabine Gebhardt Fink, Marcus Maeder, Yves Netzhammer, Martin Neukom, Mathias Oechslin, Nils Röller

The exhibition

The so-called „spatial turn“, the „topological turn“, has since the end of the eighties been a topic of cultural and social studies. Topological termini are broadly used in disciplines that deal with systems, entreties or groups of elements influencing each other. More recently, physical, social, geographical, psychological or physiological structures have been described using spatial categories; the concept of space has always served to define relations between things in our imagination, thus interpreting reality. According to Japanese philosopher Kitaro Nishida, space can be seen as a place that absorbs ideas and allows the expansion of our thinking to be grasped in linguistic terms.

Without any doubt, reasons for this stronger emphasis on the spatial aspect can be found in the increasingly important role spatially oriented media plays in our living environment. Whether it is the simulation of space used in almost every computer game, GPS navigation systems or space metaphors in the internet such as chat rooms: the large share of virtuality structured in analogy to space is defining of our discourse on the world. Furthermore, through recent media technology, a veritable topos of media related experience and acting is taking on form, an ontology of the virtual is in the making. With cinema, DVDs and computer games the spatial design of sound and the sonic design of space has gained importance. Surround technologies allow to simulate complex acoustical spaces: the „virtual“ acoustic space has become a widely discussed subject. If we view the fields of media and sound art, of electronic music, of game and sound design from such a perspective, it is striking that especially in these disciplines, topological terms become parameters in artistic and medial work. Furthermore, sounds do not only exist in a spatial relationship to one another, they are on a level of imagination and creation part of a consciously generated sonic and spatial milieu.

If we understand artificially generated sound spaces as fields of imagination that are composed of sound milieus structured in space and time, they are nonetheless primarily composed of technically generated signals that trigger sensations. The producer's as well as the artist's and the recipient's imagination through acoustic sensations creates a space for association which brings into relation our knowledge about the real world and the simulation of the possible. Under the influence of our perception's expansion brought about by media technology, the conception of reality begins to change. Space simulations created by artists, be it in films, in installations or musical works,

create „hyper-natural“, surreal spaces of experience that are filled with strange sound objects, impossible or remote spaces, sounding artificial life forms – they create mental landscapes which become part of our environment. On this phenomenon, Gilles Deleuze and Félix Guattari noted in the dawn of the computer age: „The real is not impossible, but it becomes more and more artificial.“

In the exhibition Milieux Sonores, we focused on artistic and musical designs of sound spaces, on working with sound and the visualization of imaginary space. Milieux Sonores presented five different artistic approaches, each of which either creates, in its own unique way, a world of sounds and a space for a framework of sounds or transforms and redefines space through sound. Two of the five works were developed at the music department of the Zurich University of the Arts, namely Vier Nebenräume by Felix Profos and Flow Space by Daniel Bisig, Martin Neukom and Jan Schacher from the Institute for Computer Music and Sound Technology.

The book

Milieux Sonores/Klangliche Milieus

Sound, Space and Virtuality

The idea for this book came up during preparations for the Milieux Sonores exposition. Inspired by the numerous reactions of a very interested public, the contributions in this book aim to reflect the multi-faceted aspects of sound and the acoustic space within the current discussion of virtuality. The examination of musical methods and practices in the virtual sphere as a veritable intersection of research and art has only just begun.

If we understand artificially generated sound spaces as fields of imagination that are composed of sound milieus structured in space and time, they are nonetheless primarily composed of technically generated signals that trigger sensations. The producer's as well as the artist's and the recipient's imagination through acoustic sensations creates a space for association which brings into relation our knowledge about the real world and the simulation of the possible. Under the influence of our perception's expansion brought about by media technology, the conception of reality begins to change. Space simulations created by artists, be it in films, in installations or musical works, create „hyper-natural“, surreal spaces of experience that are filled with strange sound objects, impossible or remote spaces, sounding artificial life forms – they create mental landscapes which become part of our environment. This approach comes close to a long held dream of surrealists. Leading surrealist thinker André Breton wrote in his first surrealist manifesto back in 1924: “I believe in the future resolution of these two states – outwardly so contradictory – which are dream and reality, into a sort of absolute reality, a surreality, so to speak. I am aiming for its conquest, certain that I myself shall not attain it, but too indifferent to my death not to calculate the joys of such possession.”

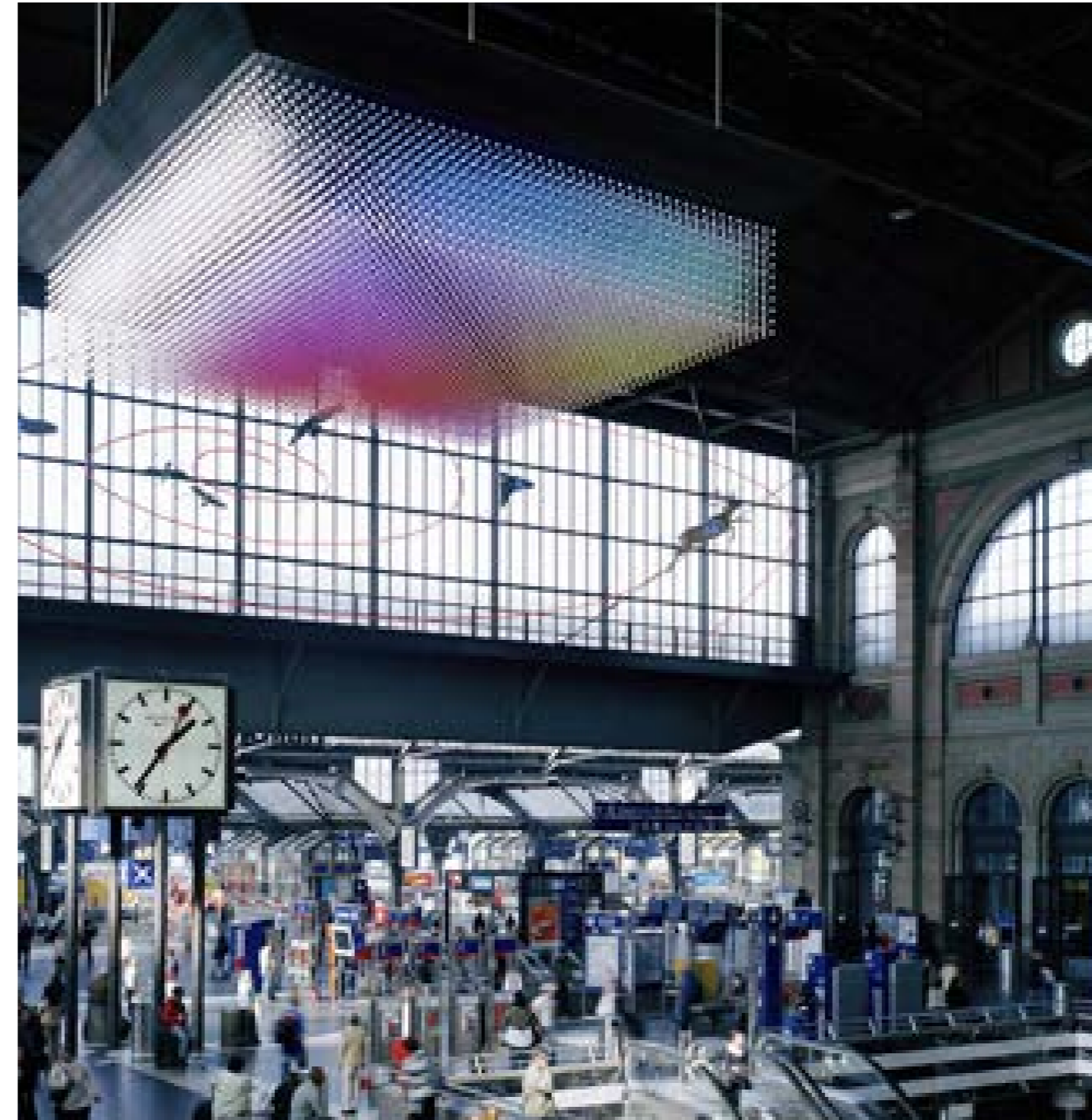
Editor: Marcus Maeder, Institute for Computer Music and Sound Technology, Zurich University of the Arts (ZHdK)

Publisher: Transcript Verlag, Bielefeld

Authors: Daniel Bisig, Sabine Gebhardt Fink, Marcus Maeder, Yves Netzhammer, Martin Neukom, Mathias Oechslin and Nils Röllner

Publication: July 2010

www.transcript-verlag.de/ts1313/ts1313.php



Sonifications and Music for the NOVA display system 2008

NOVA is a three-dimensional screen with the capability to display dynamic visuals in three dimensions. NOVA consists of 25 000 luminescent spheres, which can be activated one by one, which are equipped by 12 light emitting diodes each. The display can show two-dimensional images as well as three-dimensional abstract content.

The NOVA of ETH Zurich served as a platform for art and science displaying algorithms from a variety of scientific departments of the ETH Zurich (Swiss Federal Institute of Technology).

A prototype of the system was been installed from 2005 until 2012 on the ceiling of Zurich's main train station, and the console was located at the group meeting point at the centre of the hall, where Maeder's sonifications and music accompanying the scientific animations and visualizations of all departments of the ETH have been broadcasted.

www.nova.ethz.ch

A video simulation:
www.domizil.ch/ETH_Boomsma_Concentration_1.mov



Presentation/installation detail of „Die Wunschmaschinen“ (The Desiring-Machines), a surround play and live installation, 2008

Die Wunschmaschinen

(The Desiring-Machines)
Surround Play/Live Installation, 2008

Based on *Anti-Oedipus: Capitalism and Schizophrenia I* by Gilles Deleuze and Félix Guattari. Cast: Antonin Artaud, Hélène Barat, Ivan Chtcheglov, Guy Débord, Eliza, Sigmund Freud. Music based on Kraftwerk, Velvet Underground, Nick Cave and Richard Wagner.

The desiring-machines

In the aftermath of 1968, the desiring-machines embodied the unconscious in a world fundamentally affected by technology for the philosopher Gilles Deleuze and the psychiatrist Félix Guattari. An unconscious, which is not seen as a theatre of symbolic representations – criticism belonged to psychoanalysis – but more politically understood, as a productive factory. The productive, reality-producing desires are desiring-machines; they are our desires in the interaction with the world. The desiring-machines are a critical affair: the market, the media and politics know how to use the desiring-productions; in its delimitation, psychiatry treats them as illness. The machines splutter, overheat, break down, and, again and again, break up into new structures of a schizophrenic, capitalist society, without ever having realised themselves.

One who sets off on his own in order to liberate his desiring-machines is the Schizo. We roam with him through the psychogeography of a city where he encounters others who have, in their social and creative delineation and delimitation, themselves become revolution: eccentrics, schizophrenics, artists and writers – existences on the thin line between passion and pathology.

The play is performed in acousmatic form (a loudspeaker performance/installation) using Ambisonics technology, a special surround sound system that can create three-dimensional spatial audio.

Direction, Music: Marcus Maeder. A production of the Institute for Computer Music and Sound Technology, Zurich University of the Arts, Music Department. Speakers: Sascha Gersak, Pilu Lydlow, Dagmar Gabriel, Edward Piccin, Yves Raeber, Oleg Lips, Helmut Schüschner, Jörg Reichlin. Casting, Locations, Assistant Director: Bettina Disler. Production Manager: Simon Könz. Recording Technology: Silvan Gretener, Tobias Stritt. Programming: Jan Schacher, Philippe Kocher. Ambisonic Technology: Peter Färber. Composition Studio Support: Johannes Schuett.

www.wunschmaschinen.net
<http://zhdkrecords.zhdk.ch>

Presentations:

Kunstraum Walcheturm, Zurich, 19.04.2008

—
40 Jahre 1968, Frankfurt, 23.07.2008

—
Cabaret Voltaire, Zurich, 18.03.2009

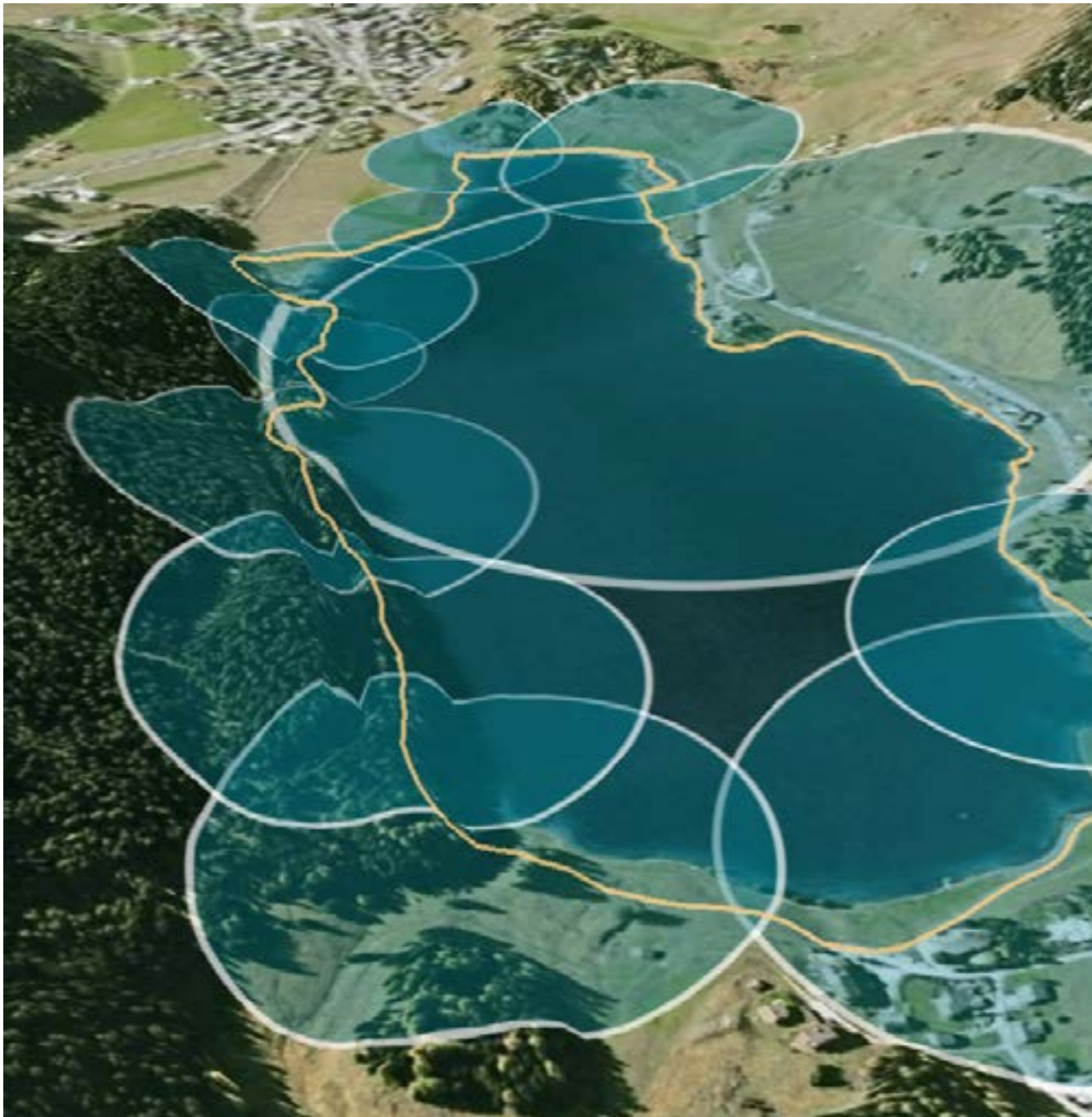




.ds Davos Soundscape: Landmark of a sound segment, Davos 2007



Map of .ds Davos Soundscape



Left: Sound segments at Davos lake, Davos. Right: Visitor with microcomputer and headphones

.ds – davos soundscape

A topographical composition by Jan Schacher and Marcus Maeder for the Davos Festival 2007

The experience and composition of .ds – davos soundscape emerges from the movement, peregrination and strolling of the listeners throughout the landscape of Davos and surroundings. Ten micro-computers equipped with GPS were available for rent at the Davos Tourist Office. Together with the device the visitor received a map (see image p. 13) with the proposed routes and a diagram showing the locations of sound fragments. These sound-zones or so-called "sweet spots" were placed in the landscape with a surveyor's stake painted in a fluorescent color to mark the area where a piece of music or sound is located and to simplify the acoustic "treasure hunt"; Google Earth has been an invaluable tool and composition aid for .ds – davos soundscape.

.ds davos soundscape is based upon two concepts. The first – The Open Work – stems from Umberto Eco and is the title of one of the most influential writings about contemporary aesthetics. The text, which dates to the year 1962, defines an open work as one that doesn't intent to convey a definite meaning to be comprehended by the audience. The creation of the work of art is much rather an act into which the perceiving individual is directly involved by assigning the work a personal meaning. In .ds davos soundscape we intend to intensify this relationship insofar as we establish a composition in the landscape whose temporal structure and sonic attributes are generated by the presence and movement of the public in a real territory.

In their seminal book *A Thousand Plateaus* the two authors – philosopher Gilles Deleuze and psychia-

trist Félix Guattari – have addressed the territoriality of sound and music in an extremely inspiring way. Their approach to the concept of the ritornello is quite unique. The term ritornello is known from baroque music: it denotes the part of a rondo that returns periodically, like a refrain during the course of the piece. Deleuze und Guattari consider the ritornello in an extended sense as the sound(track) or melody or acoustic signature that defines a natural territory. Humans and animals produce this kind of ritornello. A child that sings a song in the dark does this to block out its fear, to create through song a stabilizing centre in the "chaos" of the unknown and to establish a safe territory. Birds establish through their repeated song pattern their territory and thus build an acoustic barrier around it. The ritornello is territorial or localized and according to Deleuze and Guattari even the keys and rhythms in music are territorial and influenced by their regional provenance.

Sounds form territorial structures and from this fact originates the term 'soundscape': a sonic landscape. A sonic landscape consists of acoustic environments that can be traversed. They overlap, are defined and shift in relationship to each other. Sonic environments can be entered, traversed and left: this constitutes the territories – according to Deleuze and Guattari the defining of a territory is the act, the action which influences sounds and environments and territorializes them by using their specific characteristics. When the sonic and acoustic factors and components of an environment cease being functional and acquire an expressive quality they generate a territory. In .ds davos soundscape we shape the sonic environments by marking them acoustically and giving geographical elements a musical shape.

We plant a number of sound zones or acoustic markings in Davos' landscape. Sound engineers call the

area within a loudspeaker setup, which gives the best listening result the "sweet spot". By taking this concept into the landscape our "sweet spots" become the centers of topographical, acoustic and musical circles. We define and compose the sonic territory specifically in relationship to the characteristics present in such a zone. The starting points and basic materials for the sound of an area are located on these spots. Fascinated by the specific natural sound ambience of a place, for instance the murmuring of a brook or the geographical properties of a stretch of forest we might be inspired to compose a romantic motif of melody-loop.

.ds davos soundscape creates a composition and sonic landscape from a number of sound territories and overlapping sonic circles. By moving through the zones and areas the visitors create their own open composition. The routes proposed on the .ds map can be followed in any direction and may be experienced in shorter sections. The totality of the zones emphasizes the eclectic and sometimes contradictory character of Davos's landscape: Davos Dorf and Platz present an urban face, the zones of Schatzalp and Weissfluhjoch show their alpine character, whereas the path around the lake and along the Landwasser river to the woods cemetery are idyllic and on a stroll in the Kurpark and along the high promenade a more cultivated experience ensues. By following the routes and zones in an personal manner, varying chronologies and superpositions of our sounds emerge and a non-linear soundtrack to a movement through the landscape is produced.

www.davosoundscape.ch



Recurrence Plot, Helmhaus Zürich, 2005

Selected exhibitions and projects

2017

treelab
Ars Electronica Festival, Linz
BOZAR Palais des Beaux-Arts, Bruxelles

—
AmazonFACE: Espirito da floresta/Forest spirit
Inter-American Development Bank, Wahington DC;
Embassy of Brazil, Washington DC

2016

trees: Pinus sylvestris – Stereo version
Klimagarten 2085, Old Botanical Garden, Zurich

2015

trees: Pinus sylvestris – Stereo version
UN Climate Change Conference COP 21, Paris

—
Bakar/Kraljevica
Musikprotokoll im Steirischen Herbst
Joanneum im Lesliehof, Graz

—
trees: Pinus sylvestris – Stereo version
ESC Medien Kunst Labor, Graz

—
trees: Pinus sylvestris – Stereo version
Clarke House, Bombay

2014

trees: Pinus sylvestris – Stereo version
SoundReasons Festival, Outset India, New Delhi

—
trees: Pinus sylvestris – Spatial audio version
Creative City, Zurich University of the Arts

—
trees: Pinus sylvestris – Stereo version
Swiss Federal Institute for Forest, Snow and Landsc-

pe Research WSL, Birmensdorf

—
trees: Downy Oak 2 –
Baum/Klang/Kunst/Mensch, an exhibition of the Al-
pen Adria University, Klagenfurt, with Ch. Kubisch, B.
Traubeck, W. Ritsch

2012

trees: Downy Oak – Exhibition, Workshop, Symposi-
um. swissnex San Francisco

2011

The Left-Hand Path – An interactive audio play,
in collaboration with ORF Kunstradio. Zurich: Shed-
halle/Old botanical garden. Graz: Musikprotokoll im
Steirischen Herbst

2010

Curating of the Milieux Sonores Exhibition, Kunstraum
Walcheturm, Zurich/swissnex San Francisco

2008

Die Wunschmaschinen – Surround play/Installation
after Deleuze and Guattari's Anti Oedipus: Presenta-
tions at Kunstraum Walcheturm, Zurich (premiere) and
the „40 years 1968“ festivities, Frankfurt

2007

Davos Soundscape – Topographical composition for
the Davos Festival 2007, together with Jan Schacher

2005

Recurrence Plot – Audio installation at Helmhaus Zü-
rich, Stipendia exhibition

2004

Transient Travels – World New Music Days 2004,
Switzerland; composition and installation with Jasch,
COH, AGF, Hecker and Ilios

Radio play for Swiss Broadcasting Corporation SRF
2: Tenderenda der Phantast by Hugo Ball with Bernd
Schurer and Marc Matter.

—
Music for theatre: Migrantenstadt – Tim Zulauf,
Fabriktheater, Zurich, with Bernd Schurer

2003

Participation at Electronic Music Archive, an exhibition
curated by Gianni Jetzer and Norbert Möslang (Voice
Crack), Kunsthalle St. Gallen

2002

Music and sound design for the national exhibition
Expo.02, Expoagricole, Murten

2001

Music for theatre: Die Stelle im Park – Tim Zulauf,
Theater am Neumarkt, Zurich

1998

Co-founding of the k3000 Medialab in Zurich together
with musicians, artists and designers

—
We Are Somewhere Else Already – Swiss Institute,
New York: Group exhibition and presentation
Viper Festival, Lucerne: Das metaphysische Kabinett,
with Felix Kubin, Amus Tietchens. a. o.

—
ISEA Festival, Manchester: Revolting@
Participation and presentation

1997

Hörnetz 2 [listening network]: Contemporary radio
work and counter-information, Shedhalle, Zurich: Or-
ganization of workshops and conferences

1996

Co-founding of Kombirama, an independent art spa-
ce.

Foundation of the music label domizil, with Bernd
Schurer



domizil US tour: Marcus Maeder live at LACE, Los Angeles, 2009

Selected live performances

2016
20 years domizil, Silent Green, Berlin/Kunstraum
Walcheturm, Zurich

2015
Mehrspur Club, Zurich
Biennial of Independent Art Spaces, Geneva

2014
SoundReasons Festival, New Delhi, India
—
HEAD, Geneva

2013
@PTT, Geneva

2012
The Lodge, Zurich, with Michael Northam and Deer
Happy Place
—
Nova and Music, Zurich Main Train Station, with
Steinbrüchel, Biosphere a. o.

2010
Présences Electroniques, Geneva
with Monolake, Leila, Biosphere a. o.

—
Cabaret Voltaire, Zurich
with Asmus Tietchens, Biosphere a. o.

—
MOS ESPA, Geneva

2009
domizil USA Tour: Sonic Circuits Festival,
Washington; SFAI, San Francisco; LACE,
Los Angeles; swissnex, San Francisco

—
Electron Festival, Geneva

2008
MMKamp 2008, Dubrovnik,

—
Die Wunschmaschinen, Surround Radio Play,
Malsehn, Kino, Frankfurt, „40 Years 1968“
Synthèse Festival 2008, Bourges, France
Contribution to the concert of CIME Suisse

—
Die Wunschmaschinen, Surround Radio Play,
Premiere, Kunstraum Walcheturm, Zurich

2007
Dorkbots Tokyo, Yokohama, Japan,
with The Interactive Swarm Orchestra

—
Hotel Schatzalp, Davos Festival 2007 –
with Jan Schacher

—
SonicDays, Fri-Art, Fribourg, with Schurer,
Steinbrüchel, Fennesz, DAT Politics a. o.
—
„Tenderenda der Phantast“, Cabaret Voltaire

2006
Cuba, Münster – with Schurer and Frank
Niehusman

—
EEI Festival, Labin, Croatia

—
Walcheturm, Zurich, with Jasch (Visuals) and
Ryoichi Kurokawa

2005
Unsound Festival, Krakow – with Schurer,
Steinbrüchel, Günter Müller

—
Club 1955, Warsaw – with Schurer, Steinbrüchel,
Günter Müller

2004
Horse Hospital, London

—
World New Music Days 2004, Zurich
Gare du Nord, Basel

—
La Suisse Festival, Regents Studio, London
—
Club Transmediale, Construction Sonor, Berlin

2003
—
Ausland, Berlin

—
Electrograph Festival, Athens – with Bernd Schurer,
Marc Behrens, Dieb 13 a. o.

2002
Domizil vs. Antifrost Tour – with Bernd Schurer,
Steinbrüchel, Jason Kahn, Ilios, Coti

—
Ear we are Festival, Bienne - with Teleform,
Stephan Wittwer, Barre Phillips a. o.

—
Substrat, Zurich

—
Boa, Lucerne - with Dat Politics

—
Rote Fabrik, Zurich - with Coil

—
Expo.02, SonarSound, Neuchatel, with Teleform

—
Le Crime, Lille - with Teleform, Steinbrüchel
Batofar, ...cherche la Suisse Festival, Paris

Discography

2016
non-human, CD, domizil 46

2015
progeny, CD, domizil 41

2013
topographie sinusoïdale, CD, domizil 38

2010
annex, Mini CD, domizil 35

2009
subsegmental, CD, domizil 32

2008
Die Wunschmaschinen, DVD, domizil 30/ZHdK Records

2007
This ship in trouble, Mini CD, domizil 24

2005
Opera Calling, CD (Compilation)

2004
Transient Travels, VA, CD, domizil 23 (Compilation)

2003
domizil vs. Antifrost live, - Live CD, domizil 19 (Compilation)

Club Transmediale, CD, Data Error (Compilation)

La Suisse, CD, SME (Compilation)

Bees & Honey, Andrey Kiritchenko, CD, Zeromoon (Remix)

2002
Quiconque, CD, domizil 17

2001
Poisonhats, CD, Arts Centre Dublin (Compilation)

2000
Substrat, CD, Stattmusik (Compilation)

—
Institut für Feinmotorik: Verschiedene, CD, IFFM (Compilation)

1999
solipsistic_motion, 12", domizil 10

Prizes/Grants

2017
STARTS Prize of the European Commission and Prix Ars Electronica - Honorary Mention for ‚treelab‘

2016
City of Zurich, grant for arts and cultural mediation - 20 years domizil

2010
MediaProject: The Left-Hand Path, Sitemapping, Bundesamt für Kultur

2009
Composition commission by the Swiss Arts Council Pro Helvetia

2006
Composition commission by the Swiss Arts Council Pro Helvetia

1995
Studio grant of the Binz 39 Foundation in Scoul/Switzerland

Publications

Maeder, M. (Ed.) 2017. „Kunst Wissenschaft Natur. Zur Ästhetik und Epistemologie der künstlerisch-wissenschaftlichen Naturbeobachtung, Bielefeld: Transcript Verlag.

Maeder, M. 2016. „trees: Pinus sylvestris“. Journal for Artistic Research JAR, edition 11, www.jar-online.net

Maeder, M. Zweifel, R. 2016. „trees: An artistic-scientific observation system“, proceedings SMC/SMAC Conference 2016, Hamburg, Germany

Maeder, M. 2014. „Ambient culture: Coping musically with the environment“, proceedings ICMC/SMC Conference, Athens, 2014

Maeder, M. 2014. „Der Klang der Bäume“, in: Christoph Flamm: Baum/Mensch/Klang/Kunst, Ritter Verlag, 2014

Maeder, M. and Zweifel, R. 2013. Downy Oak: Rendering Ecophysiological Processes In Plants Audible. Proceedings SMC/SMAC 2013, Stockholm, Sweden.

Maeder, M., Schacher, J. 2011. „The left Hand path“, in: Connect. Kunst zwischen Medien und Wirklichkeit, Nürnberg: Verlag für moderne Kunst, 2011

Maeder, M. 2010. „Elektronische Musik, Kunst, Pop- und Subkultur – in der Schweiz und anderswo“. In: Bruno Spoerri: Musik aus dem Nichts – Elektronische Musik in der Schweiz. Zürich: Chronos Verlag, 2010

Maeder, M. (Ed.) 2010. Milieux Sonores - Klangliche Milieus. Klang, Raum und Virtualität. Bielefeld: Transcript Verlag

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www.wunschmaschinen.net
www.davosoundscape.ch
www.transienttravels.net
www.kombirama.ch
www.k3000.ch



Marcus Maeder

Marcus Maeder studied Fine Arts at the University of Applied Sciences and Arts of Lucerne and Philosophy at the University of Hagen. He is currently working on his PhD thesis in Environmental Systems Science at ETH Zurich. Maeder runs the music label domizil, which he co-founded in 1996 with Bernd Schurer. He has worked as an editor and producer for the Swiss radio station DRS and has been working as a curator and research associate at the Institute for Computer Music and Sound Technology since 2005. His artistic work focuses mainly on sound and media art, electronic music and the artistic and media extensions of the term. As an author, Maeder has written on a number of topics in the fields of sound art and artistic research.

