TUB Soundscape Project: Concept & Projects

Ilias Mavromatis[1], Mariana Carvalho[2], André Fiebig[1]

[1] *TU Berlin, Institute of Fluid Dynamics and Technical Acoustics, Department of Engineering Acoustics, Einsteinufer 25, 10587 Berlin, Germany, E-Mail: iliasmvrs@hotmail.com*

[2] *Berlin University of the Arts, Sound Studies and Sonic Arts, D-1059, Berlin, Germany*

Introduction

The TUB Soundscape Project is a project laboratory in the TU Berlin. Participating students explore the concepts of acoustic ecology, the relationship between people and their environment mediated by sound [1]. The project aims to explore the connection between the acoustic environment, scientific data, technology, society and artistic thinking in practice on the TU Berlin campus, as well as the potential of sound to serve as a socio-political tool and science communication.

Project laboratories, known as "Projektwerkstätten", give students the opportunity to self-dependently work on practical, interdisciplinary and innovative projects. Any students with a concept-design for a project lab with interested participating students can realize these labs, as long as the topic or format of the topic is not covered by regular studies and courses at TU Berlin. It offers an alternative to regular teaching methods at TU Berlin (see for example fig. 1), it is ecologically and socially usable or enables interdisciplinary projects. [2]

The scientific, critical and creative engagement with acoustic environments requires an interdisciplinary/transdisciplinary approach and students from different backgrounds are the actual users of the campus, making them the "local experts", which is a thriving principle in soundscape studies [3]. The project allows students from any study degree and university to approach the topic of soundscape from different perspectives and aims to combine theory with practical implementation projects and student interventions.

Soundscape and (sonic) commons

The concept of soundscape describes how an acoustic environment is experienced and/or understood by people in a certain context [4]. The inclusion of the campus public in the sense of Citizen Science reflects a fundamental understanding of the soundscape approach. The interaction environment of the TUB campus with its spatial and social dimensions can be used as a social and sonic commons model. Sonic Commons can be defined as any space where many people share an acoustic environment and can hear the results of each other's activities [5]. Noises and sounds caused by humans and technology are interrelated with the impact they have on ecosystems and places. Thus, sounds are suitable as environmental indicators and can serve as tools to develop sustainable ecosystems [6]. The soundscape concept addresses practical approaches to noise pollution and urban planning to promote the acoustic recreational value of a place and thus sustainable urban development.

Goals

The main goals of the project laboratory are the application of principles of sustainable development, identifying functional relationships between science and art and striving for the well-being of the campus visitors. In addition, the project promotes development capacity, equity, interdisciplinary exchange between students of different disciplines and critical thinking, taking into account socio-ecological aspects. Auditory perception, communication, self-organization as well as the application of placemaking principles are central [7]. Thus, the didactic form of the project combines networking, self-study, self-management, and application-based knowledge transfer.

As we are concerned with re-imagining and re-designing campus soundscapes, we aim to plan and implement practical soundscape interventions through installations, and creatively use field recordings in, for example, electroacoustic compositions, both offering accessible methods to experience soundscapes and to alter soundscapes.

In addition to providing a theoretical and practical overview of soundscape-design approaches, we aim to develop an interactive soundscape mapping of the TUB campus based on Neogeography, a diverse set of mapping practices that blend personal, intuitive, expressive, absurd, and/or artistic input and operate outside, or alongside practices of professional geographers [8].
We are constantly working on the knowledge transfer between the semesters.

Project outcomes

Over the period of three semesters (wintersemester 2021/2022 to wintersemester 22/23) there were in total 42 students actively participating and successfully finishing their projects.

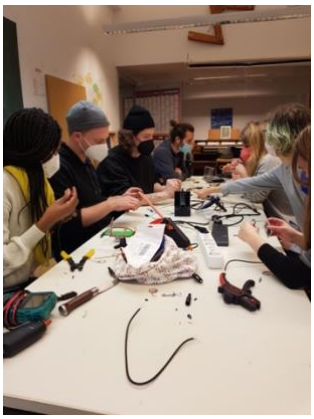

Figure 1: Participant-organized „DIY Contact-Mic making and applications" workshop at Tu-Do Makerspace, TU Berlin.

The following projects have been formed over the first two semesters (some of them are shown on the campus map in fig. 5: [9]

1. Comms & network

It is crucial to focus on network building, relationship management, expert interviews, strategic public relations, design & concept, web presence to foster communication within the involved students and to disseminate ideas and outcomes.

2. Circling Sound

The group set up an installation using 2D/3D sound to implement an artificial soundscape into the already existing on campus. It is based on a circular arrangement of eight surface loudspeakers, each using a wooden panel as a membrane and becoming a sound body by distributing vibrations on it (see fig. 2).

Figure 2: Circling Sound Installation with 8 self-made loudspeakers and sound compositions, TU Berlin.

3. Vents

The group researched and intervened in the sound environment of the TUB with a focus on the ventilation systems.

4. Study rooms

The application of auditory maps as a measurement method was applied with the goal to evaluate and possibly improve the auditory qualities of workspaces [10]. Part of this project was to set up a questionnaire for campus users as a data collection method.

5. TU-Verb

The group created a convolution reverb plug-in for music production software simulating the reverberation properties of certain TU Berlin rooms.

6. Sounds of TU

The project consisted of mapping possibilities of soundscapes, the project "Enter Bib": library soundmarks and steps towards conceptualizing a sound app of the TU Berlin.

7. Soundwalk evaluation

A statistical graphical evaluation of the conducted soundwalk over five locations of the Charlottenburg campus took place.

8. History Drift: An Audiopaper

The group created an audio-collage about soundscapes and what it means to drift at the threshold of sound theory and the sensual perception of sounds, experiencing parts of the acoustic past of the TU Berlin.

9. Making the edible campus audible

The group reflected on acoustically re-designing another student project (Essbarer Campus-Campus in Transition) concerned with urban gardening and leisure-time-spaces in the campus.

10. Vibration of things

The project explored and demonstrated the theory, scientific and artistic application of contact microphones.

In the third semester (wintersemester 2022/23), we were divided into little groups, each presenting their work at the exhibition in Bauhaus-Reuse (BHROX), located on the roundabout of Ernst-Reuter-Platz, surrounded by traffic noise. The BHROX is a participatory urban laboratory for research, education and performative practices [11]. The pieces dealt with sonic awareness within concrete or re-imagined terrains. They made the visitors aware of the power and responsibility an individuum has (or does not have) in society and the potential sound has in creating changes into our surroundings. Whether closer to a scientific or artistic approach, they welcomed the listeners to re-think the sounds of the city and the spaces they inhabit every day.

1. The Modular Soundscape Project

The project aimed to explore the impact of noise and sounds generated around the campus through an interactive modular soundscape that can be shaped by the users using a mixer. The listeners could control the rebuilt soundscapes by adjusting five faders, which represent five categories of sounds. Through this project, we could explore, for example, what a more environmentally friendly campus with less heavy traffic could sound like, or which elements of our daily soundscape we enjoy or dislike (see fig. 3). The recordings can be found on *Aporee*, where also new recordings can be added by other TUB users [12]. Soon the reimagined soundscapes will be found on *Cities and Memory*.

Figure 3: The Modular Soundscape Project during the exhibition at Bauhaus Reuse (BHROX), Ernst-Reuter-Platz.

2. Soundscape instrument and influence experiment

Ableton-based keyboard instrument which uses over sixty recorded sounds from all around the TU Campus. This instrument is not made to be played like a traditional instrument. It is made to explore the soundscape it creates. The influence experiment explored if having influence over a soundscape alters our perception of it. The experiment is

made for two participants' perspectives. One adjusts the knobs and alters the generation of the soundscape, while the other one listens. Both were asked how pleasant or unpleasant they perceived the resulting soundscape.

3. Masking chaos into harmony: Zooming into the everyday noise and its possible transformations

While it is impossible to eliminate noise in urban environments, the project encourages creative ways of transforming unwanted sounds into something new. Through this project, the audience is invited to think critically about the impact of sound in urban environments and imagine new possibilities for the future. The project created an interactive experience by using microphones to capture soundscapes from the outside and bring them into the room (with outside view) in real time. Once inside the building, different effects and microphones are placed in random places and invited visitors to create new soundscapes in addition to the acoustic environment from outside (see fig. 4).

Figure 4: Presentation of the installation "Masking chaos into harmony: Zooming into the everyday Noise and its possible transformations," Bauhaus-Reuse, Ernst-Reuter-Platz.

4. Uni Café Soundscapes

The group set up a survey with the purpose to characterize the atmosphere of some university cafes, following place-making and urban design principles. The structure of the survey will be used in the final semester of the project. [13]

Conclusions & Future

In the short period of three semesters the project achieved several milestones, such as creating audio papers, an interactive report of the first semester, a web page, measurement data in form of recordings, sound pressure level measurements,loudness diagrams of the courtyard of the main building, auditory maps, soundwalks, questionnaires, took steps towards a soundscape mapping of the TUB campus, designing and implementing installations, creating tools such as a plug-in for music production software, mixer, contact microphones, planned an exhibition and performances, created a common pool of information, literature, knowledge as well as a network between university and non-university project partners such as: [14]

- The artist-duo RePlayYourCity [15]
- Berlin School of Sound [16]
- Selbstgebaute Musik [17]
- Alexandersounds: project of Selbstgebaute Musik [18]
- Radio Aporee [19]
- Berlin Street Music and their project "Acoustic Shell" [20]
- Space Oddity podcast as a platform for audio publications [21]
- Colaboradio (Freie Radios Berlin Brandenburg) [22]
- Cities and Memory [23]

It can be said that the project workshop has enabled the students to approach the topic of soundscape from different angles. It also inspired them to deal with it in their personal everyday life. They also managed to bring their own ideas from vision to realization. In the process, students could learn to make collective decisions with hierarchies that are as flat as possible. Due to the high interdisciplinarity that is necessary for the topic, the project workshop is an enrichment of the curriculum at TUB and its openness makes it inviting for students from other universities. The commitment of the participants was high. Moreover, some have already participated in two semesters and would like to participate again to work further on projects.

We are currently working on the final semester, keep building on the web site and an interactive TU soundscape map in the form of an audio walk. We are collecting audio material and creating a deep mapping audio paper. With the experience we made through the History Drift project regarding lacking audio material of the TU in the past, we decided to create our own TUB Soundscape archive for the future. We would like to exhibit the results of our fourth semester in the "Festival für Selbstgebaute Musik" and develop our cooperation with external partners in new projects as well as in scientific theses.

Acknowledgements

The authors would like to thank all participants who were engaged so far for their individual projects, knowledge, trust and contributions to the project.

Figure 5: TU Berlin Map of the summer semester 22 indicating the developed interventions, TU Berlin.

References

[1] An introduction to acoustic Ecology, URL: https://web.archive.org/web/20140415001407/http:/www.wfae.proscenia.net/library/articles/wrightson_intro.pdf

[2] ZEWK, URL: https://www.tu.berlin/zewk/arbeitsbereiche/kooperations-und-beratungsstelle-fuer-umweltfragen/projektwerkstaetten/eine-eigene-projektwerkstatt-starten/eine-projektwerkstatt-beantragen

[3] International Organization for Standardization: Acoustics — Soundscape — Part 2: Data collection and reporting requirements (ISO 12913-2:2018) (2018)

[4] International Organization for Standardization: Acoustics — Soundscape — Part 1: Definition and conceptual framework (ISO 12913-1:2014) (2014)

[5] Reflections on the Sonic Commons, URL: http://www.oa.info/download/pdf_for_web/LEOMJ19_pp063-068.pdf

[6] Center for global Soundscapes, URL: https://centerforglobalsoundscapes.org/ourteam/amandine/

[7] Project for Public Spaces, URL: https://www.pps.org/article/what-is-placemaking

[8] What is Neogeography, URL: https://www.igi-global.com/dictionary/neogeography-virtual-cities/20050

[9] TUB Soundscape Project-Results Wintersemester 2021/2022, URL: https://www.researchcatalogue.net/view/1700964/1776687#tool-1776698

[10] Eine auditive-architektonische Entwurfsmethodik, URL: https://www.irbnet.de/daten/rswb/13039000592.pdf

[11] Bauhaus-Reuse, URL: https://www.bauhaus-reuse.de/

[12] Radio Aporee, URL: https://aporee.org/maps/work/projects.php?project=tuberlinsoundscapes

[13] TUB Soundscape Project on Research Catalogue, Exhibition Participants & co-authors, URL: https://www.researchcatalogue.net/view/1700964/2043842

[14] TUB Soundscape Project on Research Catalogue, Participants & co-authors, https://www.researchcatalogue.net/view/1700964/1776626

[15] RePlay Your City, URL: https://gameoversociety.com/

[16] Berlin School of Sound, URL: https://www.berlinschoolofsound.com

[17] Selbstgebaute Musik, URL: https://www.selbstgebautemusik.de/

[18] Alexandersounds, URL: https://www.deutschlandfunkkultur.de/kunst-alexanderplatz-ton-100.html

[19] Radio Aporee, URL: https://aporee.org/maps/

[20] Acoustic Shell, URL: https://www.mauerpark.info/acoustic-shell-support-team/

[21] Space Oddity, URL: www.sfb1265.de

[22] Colaboradio, URL: http://www.colaboradio.org/

[23] Cities & Memory, URL: https://citiesandmemory.com/