

## **Listening to the archive: bringing to life a meteorological journal by John Hough (1757-1825) through sonification, visuals and interaction**

### Background \*

This project addresses how archives can be digitised and enhanced to facilitate access and engagement with the items they preserve. Some time ago, I was asked by the Wellcome Trust (an organisation that funds medical and scientific research) in London to come up with a possible idea for the sonification of a 19th century manuscript kept at the Wellcome Trust library. (Sonification is the representation of data through sound) This manuscript (<http://blog.wellcomelibrary.org/2010/03/item-of-the-month-march-spring-comes-in-1807/>) was written by British natural philosopher John Hough who was blind. The journal contains daily meteorological data (temperature, air pressure, rain, etc.) for an entire year measured in a place called Middlesaw near Kendal, plus a number of notes about nature (when a bird is first heard, when a flower blossoms for the first time, etc.) Since the author was blind, many of the notes reflect sonic, tactile and olfactory experiences rather than visual experiences. This is a fantastic hand written document which both records scientific data with rigour, and also reflects the time it was written (from the handwriting, the words used in the notes, etc.) I propose to bring this journal to life using sonification, sound design, visuals and interaction so that it can be experienced in an immersive way.

### Project/Task \*

What specifically do you want the students to do? Build something new? Expand on something existing? Evaluate something existing? A combination? While the final details of each project may be negotiated with each group, try to be as specific as possible so students get a good grasp of what they are supposed to do. Try to include a short description of what skills you believe are needed in order to complete the project.

The main task will be to design and prototype this new digital representation of the journal. The sonification should remain true to the data, but the overall style should also reflect the period in which the document was written (this does not mean that the aesthetics should be from the 19th century, but there should be ways to connect with that time and that geographical place). In the group there should be skills related to use of sound, music and audio technology, visualisation methodologies, interaction design and user experience as well as the ability to use technology such as Arduino.

### Research Method

If relevant, say something about which genre/approach of research the project falls within. For instance, Constructive Design Research. Also, please indicate which methodology/methodologies will be used if possible.

Some understanding of sonification techniques will be useful. Qualitative research methods to evaluate the final design.

### References:

<https://sonification.de/handbook/>

More references to be discussed at first meeting

Supervisor Sandra Pauletto

## The Climate Change music box: understanding science to take action

Our goal is to increase young people's personal understanding of and engagement with climate change by providing them with a web-based app for making music that is based on environmental data employing novel musical sonification approaches.

Starting from Hans Lindetorp's web-based music framework (<https://github.com/hanslindetorp/imusic>), a prototype application will be developed that can accept data from the most recent Intergovernmental Panel on Climate Change (IPCC, <https://www.ipcc.ch/sr15/>) report (including data about emissions, impact on natural and human systems, and so on), and will allow a non-expert music maker to produce a number of musical sonification alternatives (different genres, keys, tempos, real-time interaction).

Qualitative and quantitative evaluation methods will be employed to develop and assess digital tools for music making that will facilitate understanding and engagement with climate change data.

Participatory methods will be used to design the application, user experience and select appropriate sonification strategies.

Questionnaires, interviews and participants observations, will be used to compare young people's attitudes towards the issue of climate change before and after a workshop, involving KTH and KMH students, in which they will have had the possibility to be expressive and creative with this data. This will allow us to evaluate how the process of creating music with climate change data impacts on young people's understanding of and engagement with this global issue.

Expected main outcomes:

- The Climate Change music box: a prototype of a web-based app
- Novel sonification strategies for environmental data
- Initial quantitative and qualitative results of using sonification for understanding climate change data

Supervisor  
Sandra Pauletto

## Emotions in sound design: exploring how context affects the perception of emotions in knocking sounds

In this project you will study how emotions are communicated in knocking sounds.

Knocking sounds are quintessential dramatic tools in storytelling for many media (e.g. games, films): the opening of a door often serves as a transition, a turning point to dramatic changes in the story. A knocking sound tells us not only about the emotion of the person that knocks, but also about their expectation of what they think they will find on the other side of the door. Knocking sounds are also a way to communicate to the person on the other side of the door to the point that particular patterns of knocks have developed in different cultures.

Understanding how emotions are communicated through the acoustic features of these sounds is a key step towards being able to synthesise these sounds in realtime, for example in games.

While there exists a lot of literature on emotions in vocal communication and music, less is known about emotions in everyday sounds produced by humans.

You will be asked to evaluate the perception of emotions in a given large data set of knocking sounds.

You will then evaluate how different visual scenarios can affect the emotion we perceived through these knocking sounds.

Finally, you will perform a similar evaluation using synthesised sounds and see if there is any difference between recorded and synthesised sounds.

Initial references:

Vitale and Bresin, 2008, Emotional cues in knocking sounds, Proc. of the 10th International Conference on Music Perception and Cognition.

• Pauletto, 2019, Invisible Seams: The Role of Foley and Voice Postproduction Recordings in the Design of Cinematic Performances, in Foundations in Sound Design for Linear Media: A Multidisciplinary Approach / [ed] Michael Filimowicz, Routledge, 2019.

• Barahona and Pauletto, 2019, Perceptual Evaluation of Modal Synthesis for Impact-Based Sounds, Sound and Music Computing Conference (SMC), Malaga, Spain.

Supervisor: Sandra Pauletto