

# CONCEPT

Polyphonic is a performance for a prepared harpsichord and a DIY spectral modeling synthesizer. The performance is developed with the help of several machine learning approaches.

In this performance we reflect on the theme of polyphony in nature. This kind of polyphony consists of many hidden processes with no function understandable to a human. One example could be a genome: a gene expression rarely controls a single determined biological function and often affects a wide range of processes [1]. Another example could be a concept of *polyphonic assemblage* by Ann Lowenhaupt-Tsing: a gathering of intertwining ways of human and non-human being [2]. The concept is based on a wide range of post-humanistic theories.

It is hard to explore this phenomenon with a traditional deterministic toolset. Neural networks as non-human entities can give us a clue in understanding this kind of processes.

In our performance we model the situation of complex polyphony. We use autoencoder neural networks as interfaces to our instruments. We train them in evolutionary way to encode the harmonies and timbres of the source material into 5 parameters. The function of these parameters is to be explored during the performance: some combinations lead to recognizable harmonies/sounds and some lead to complex harmonic/spectral clusters. The latter is especially interesting to us to explore.

[1] <https://ashpublications.org/blood/article/123/7/950/105652/The-polyphony-of-BACH2>

[2] <https://press.princeton.edu/books/paperback/9780691178325/the-mushroom-at-the-end-of-the-world>

# SETUP

In our performance we use two types of DIY-instruments:

- A prepared harpsichord. The pushers of this harpsichord has been replaced by piezoelectric exiters which are controlled by a neural network. The network is trained to extract the hidden harmonic structures from the Well Tempered Clavier by I. S. Bach.
- A spectral modeling synthesizer controlled by another network. We were inspired by the baroque tradition of musical onomatopoeia and trained this network on various sounds (bells, human voice, birds, choir).

During the performance we play these instruments using interfaces with 5 faders. The timbral/harmonic patterns controlled by the faders interfere with each other thus modeling the situation of interconnectedness and polyphony. During the performance we explore this phenomenon.