

Breathing with the Forest

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Additional Key Words and Phrases: generative, soundscape, ecoacoustics

1 Program Notes

As I travelled and camped down the East coast of Australia this summer, a standout feature of the experience was the sheer volume of cicada stridulations. The spatio-temporal pulsations of this sonic mass seemed musical in its phrasing, and felt to me like the sound of the forest breathing. In a literal sense our breath is entangled with the forest as we inhale oxygen that the forest has exhaled. This interactive sound installation is inspired by the notion of breathing with the forest, and aims to emulate that feeling through a breath controlled synthetic sound mass reminiscent of a forest full of cicadas.



Fig. 1. A cicada gathered on the trip.

2 Project Description

This is an interactive installation featuring a generative soundscape with breath control, that aims to capture the feeling of being in a forest full of cicadas. Inspired by a period of deep listening to cicada stridulations – in which I found the spatio-temporal pulsation of the sound mass reminiscent of breathing – this installation uses breath control to give a sense of breathing with a forest. The sound mass consists of multiple generative sources, each loosely modelled on an individual cicada stridulating. Each ‘cicada’ comprises a temporal hierarchy of pulse trains modulating a carrier frequency, with a simple sonic spatialization algorithm applied to give the sense of immersion in the sound mass. The algorithm is implemented in the Extempore audiovisual programming language, and utilizes an architecture in which each sonic parameter is inherently stochastic, much as the sound production mechanisms of actual cicadas exhibit natural variation.

The breath controller comprises a wireless device worn around the waist, which measures expansion from breathing, and uses an ESP32 to send wireless OSC messages to a laptop generating the soundscape. The controller informs the generative algorithm when the user is breathing in or out. As the user breathes in, the synthetic cicada sound mass

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increases in intensity, and moves 'closer' to the user in the spatial sound stage. As the user breathes out, the sound mass fades away and moves off into the distance.



Fig. 2. The breath sensor.

3 Technical Notes

This is an interactive sound installation, which involves donning a wireless waist-expansion based breath controller, and listening to a soundscape controlled by your breath. This installation could be quite small and self contained: with the sound generated by a laptop and listened to through headphones. The installation team can provide all of this equipment. The ESP32 creates its own WiFi access point so no internet is required. The requirements would be a chair for the user to sit in, and a table for the laptop.

Alternatively, a more elaborate setup could involve a chair in the middle of a ring of speakers. In this case a multichannel panning algorithm would be used instead of the binaural spatialisation algorithm designed for headphones.

4 Media Links

An audio recording of the installation has been listened to at <https://tobygifford.com/breathingwiththeforest>. For demonstration purposes, the sound of the user's breathing was recorded along with the generated soundscape, although this is not part of the installation itself.

5 Ethical Statement

No conflicts of interest are declared for this publication. This work involved non-invasive field recording of cicada soundscapes.