THE UNIVERSITY of EDINBURGH
Edinburgh College of Art

UOA D33

MUSIC, DRAMA, DANCE, PERFORMING ARTS, FILM AND SCREEN STUDIES

RESEARCHER

Martin Parker

OUTPUT TITLE

Sonikebana

OUTPUT TYPE

Composition

DATE OF PERFORMANCE

April 2018

FIG. 1
Sonikebana, Version 2, Edinburgh Art Festival, August 2019. Image Martin Parker.

Extract of the sound installation*:
https://media.ed.ac.uk/media/Sonikebana_AudioDocumentation_ShortEdit/1_vranuzhm

Video documentation of the Edinburgh Art Festival performance:
https://media.ed.ac.uk/media/Sonikebana+v1.0/1_0m9ofoyf

* Extract of the sound installation, November 2019, Gymnasium Gallery, Berwick-upon-Tweed, 8 minutes.

01 / STATEMENT

Sonikebana is a long-form composition designed for nine loudspeakers inside wooden boxes on wheels. The audience is invited to move the speakers around the room in order to shape their experience of the piece itself.

Sometimes the slightest touch of a speaker will cause the music to take on a completely new direction, leading to the emergence of new sonic forms. At other points, the speakers react less obviously and audiences are encouraged to listen instead.

The formal idea for this piece is based on a model borrowed from the refined Japanese art form of flower arranging called *Ikebana*. This involves the careful arrangement of plant matter in order to reveal something already present (but hidden) in the materials being arranged. This approach has been applied to a sound piece where audiences take on the role of designer and listener. The compositional structure of the work allows for direct and un-rehearsed audience intervention, but without compromising the ultimate intent.

Sonikebana was first realised as the public facing dimension of an interdisciplinary EU-funded research project with biologists, ecologists, computer scientists and artists called *City Sounds*. *Version 1* used field recordings taken as part of the research project and focused on sample manipulation techniques.

Version 2 developed from this experience. Having observed audience behavior around the boxes and tested the hardware and software systems, *Version 2* focused on sound synthesis techniques, form and audience interaction. It was presented in August 2019 as part of the Edinburgh Art Festival.

The sounds of *Version 2* were synthesised from analysis of video shot at Little Sparta, the garden of Ian Hamilton Finlay. The movement of foliage shimmering in the wind was used to excite a range of novel synthesis and computer sound processes.

FIG. 2
Sonikebana, Version 1, St Cecilia's Hall, Edinburgh, April 2018.
Image Ewan Klein.

02 / RESEARCH DIMENSIONS

Sonikebana is a composition which lies at the intersection of computer music, sonic art and fine art installation.

It involves the crafts of sound design, product design and manufacture, and creative coding. The work allows audiences to move mobile speakers around a space in order to influence the sound of the composition.

The work exists in multiple versions that operate as either audiovisual installations or live performance with audience participation (see Appendix, page 18).

FIGS. 3–4
Sonikebana, Version 2, Edinburgh Art Festival, August 2019. Images Anna Chapman Parker.

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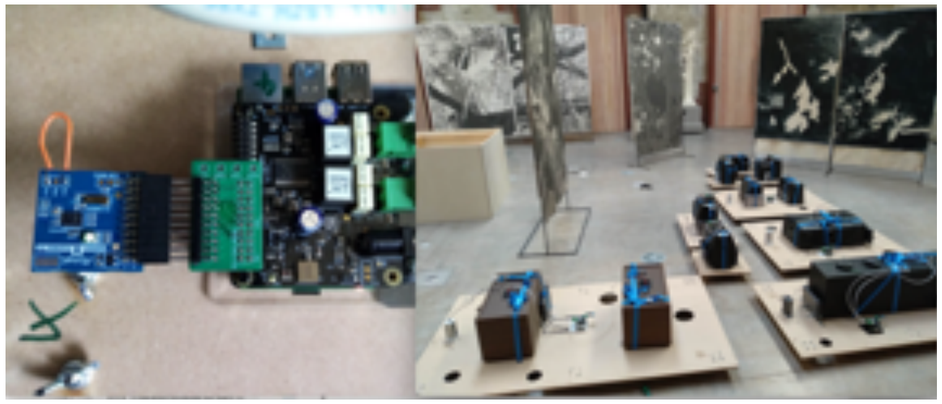
FIG. 5
Sensor system and Raspberry Pi, speakers attached. Images by Martin Parker.



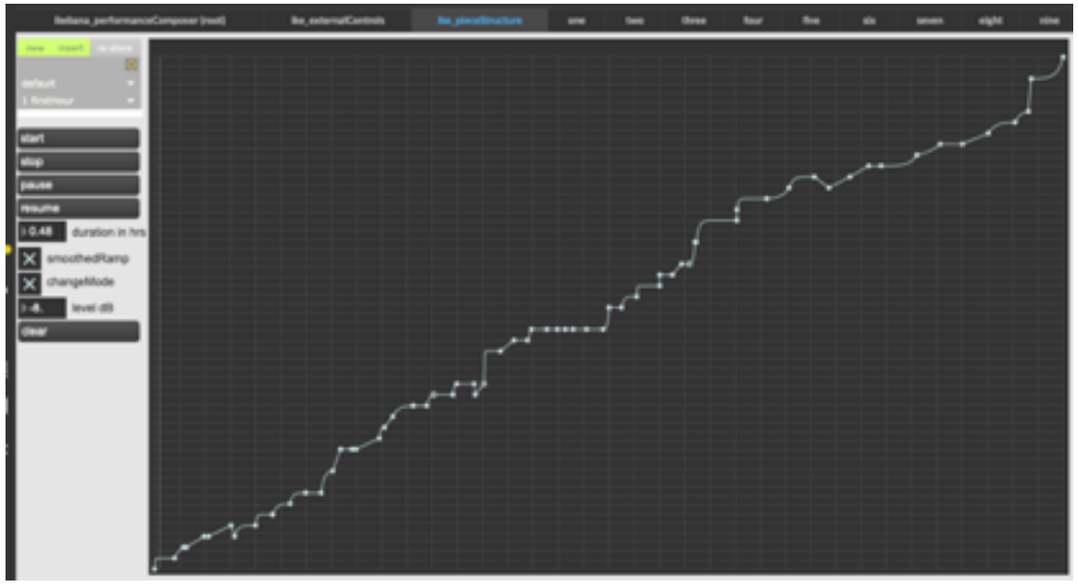


FIG. 6
Score of one of the layers of *Version 2* of the piece. The timeline morphs and changes through the day keeping the global form similar, but different aspects of the piece revealed at different points. Screenshot, July 2019.

03 / ORIGINALITY

Mobile speakers are now ubiquitous. *Alexa*, *Google Home* and mobile phones with Bluetooth speakers guarantee not only portability, but also sensors that track and reveal information about their users.

Even though these speakers know where you are, and are perhaps able to anticipate what you want, their sensing systems are not used in the generation and production of musical content itself. Very few projects exist where sensing loudspeakers do more than act as an alternative interface to the mouse and keyboard. *Sonikebana* uses sensors to manipulate sound materials in real time, turning the speaker itself into an instrument.

To do this, a sensor with nine degrees of freedom gives data about the speed of movement and its heading. This information is fed to a Raspberry PI (RPi) running custom PureData code. The RPi is also host to an amplifier. Good quality hi-fi speakers are attached directly to this unit. With a substantial battery pack, the speakers can run for several days playing sound with up to 30 watts per channel.

Creating this system has enabled the exploration of compositional form and structure in completely new ways. A fundamental shape and structure may exist in the macro composition, but any one moment in the piece can be perturbed by audience interaction and new sonic events and relations set in motion. New parts of it are revealed to varying degrees based on how the piece is played by visitors.

FIG. 7
Recording plant movement at Little Sparta as part of the research for *Sonikebana*, June 2017. Photo Martin Parker.

04 / RIGOUR

This submission represents several years of research and development into both the technologies required to realise the piece: the compositional and performative potential offered by the interface, and the sounds that are synthesized or processed in real time.

The first version of the piece *(Version 1)* was fully developed into a sound installation as the public face of an interdisciplinary research project called *City Sounds* in 2017–18. This was funded with a grant from an organicity.eu grant (see Appendix, page 19).

This work involved establishing a range of 'listening devices' across The Meadows, a public park in central Edinburgh. These were set up in order to track sounds in the area over several months, in order to better understand what sound recordings might be able to tell researchers about anthropocentric impact on biological life in the area. The sound materials captured by these analysis devices were then used as the basis for the installation.

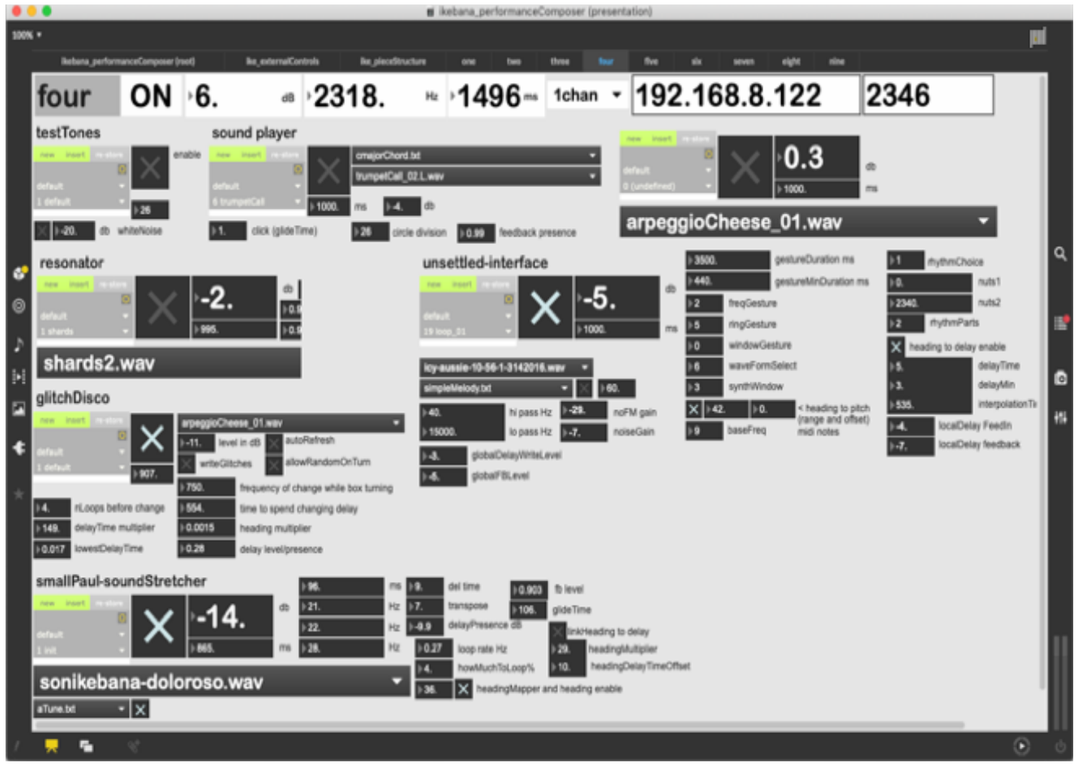
The main work of the *Version 2* of the project began during Parker's 2017 residency at Little Sparta, the garden of Ian Hamilton Finlay, based in the Pentland Hills near Edinburgh. This was funded by the Little Sparta Trust and enabled exploration of ways to link the movement of plants with sound synthesis algorithms.

Version 2 was presented during August 2019 as part of Edinburgh Art Festival. This work built on the knowledge gained in *Version 1*, and led to a completely new physical construction able to withstand a longer run in the public domain. The software system was updated and based entirely on sound synthesis techniques developed by the composer. These used the movement of plant materials captured on camera as modulation control for a chaotic synthesis engine.

The second version involved a much closer collaboration with visual artist Anna Chapman Parker. Her conceptual response to the idea of moving speakers around a room led to an enriching installation experience that reflected the main goal of composing a sonic parallel to the art and philosophy of *Ikebana*.

The code base upon which the project stands is being maintained on Github at the University of Edinburgh (see Appendix, page 19).

FIG. 8
Composing interface for one of the speakers. Screenshot.



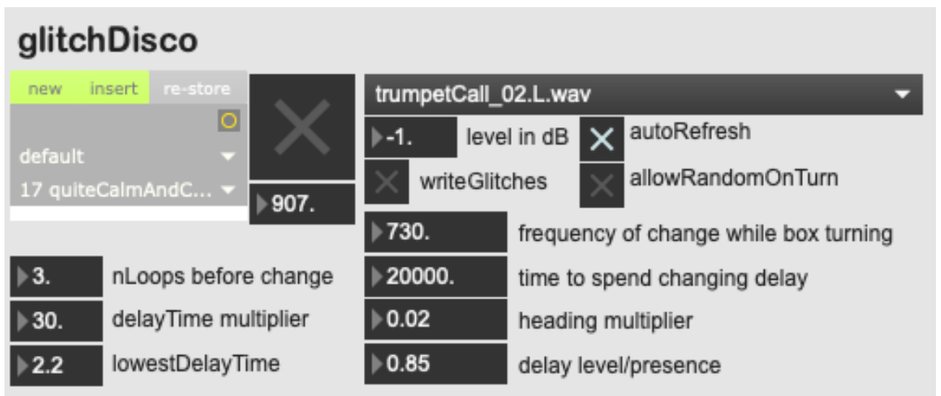
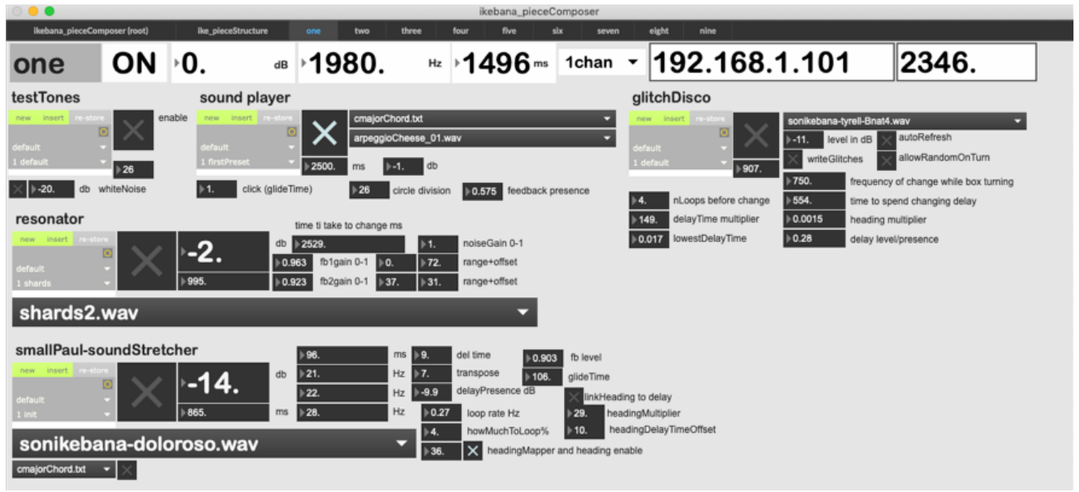


FIG. 9
Interface showing the range of parameters available to set for one of the sound modules on the speaker. Behaviour of the sensors can change for each preset meaning that the interface as well as the sound is in a dynamic state throughout the installation. Screenshot.

FIG. 10
The voice designer page enables configuration of each speaker individually and the behaviour of the sensors and their mapping to sound making synthesis is controlled individually for each speaker. Screenshot.



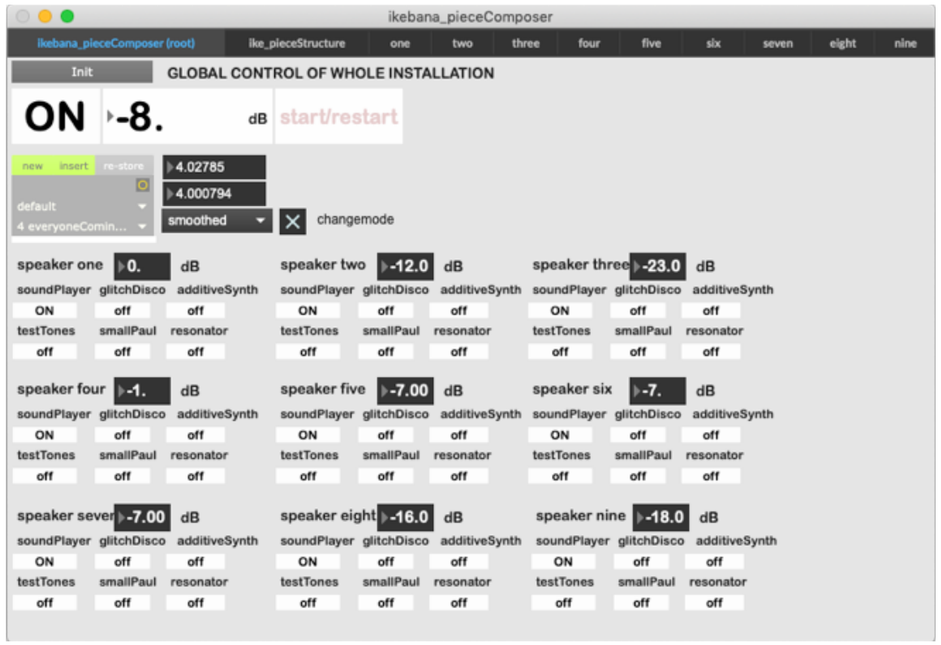


FIG. 11
Top level of installation control that enables gallery staff to turn the installation on and off. Screenshot.

FIG. 12
Workshop with *Version 1*, audience listening closely, Edinburgh, April 2018. Photo Ewan Klein.

05 / SIGNIFICANCE

The system has proven to be extremely adaptable and has been used in a variety of contexts, from education workshops, in collaboration with scientific research into the relationship between human and biological life in the city of Edinburgh (April 2018), as a sound installation and as a live performance piece (see Appendix, page 18).

The system has also been adapted for collaboration with work by others. For example the speakers were used as part of an ensemble playing James Tenney's *In a Large, Open Space* with the Montréal-based Bozzini Quartet, Berwick-upon-Tweed, November 2019.

School children from Berwick-upon-Tweed aged 6, 9 and 11 took part in educational workshops, as part of *Berwick Sound Day*, 20 November, 2019. The workshops involved site visits to schools to discuss the installation and record and discuss new sounds. Parker then embedded the new sounds into the installation and invited the children to come and play with it when the show was opened. A film of the process was made by Lighthouse Films (see Appendix, page 18).

A multi-authored paper where *Version 1* is explained was published in by the Social Science Research Network and presented at the *3rd International Conference on Smart Data and Smart Cities* in Germany (see Appendix, page 18).

FIGS. 13–14
Education workshops with school children from Berwick-upon-Tweed, November, 2019. Images by Lighthouse Films.

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06 / APPENDIX

Appendix 1:
Performances and Exhibitions

Version 1:
April 3–6 2018,
St Cecilia's Hall, Edinburgh.

Sound recording:
https://datashare.is.ed.ac.uk/handle/10283/3084

Version 2:
July–August 2019,
Edinburgh Art Festival,
Edinburgh College of Art.

Video documentation:
https://media.ed.ac.uk/media/Sonikebana+v1.0/1_0m9ofoyf

Version 2:
November 2019,
Gymnasium Gallery,
Berwick-upon-Tweed.

Video documentation:
https://media.ed.ac.uk/media/Sonikebana_educationProject_November2019_MadeBylighthouseFilms/1_f0bil7yp

Version 2:
November 2019, adapted for performance in James Tenney's *In a Large, Open Space* with Bozzini Quartet,
Berwick-upon-Tweed, 2019.

Appendix 2:
Workshops

Public workshop for 15 participants led by sound artist Zoë Irvine around *Sonikebana* and its findings. April 2018, St Cecilia's Hall, Edinburgh.

Crafting a Digital Object with Eleni-Ira Panourgia and Matthew Hamilton. A workshop explaining the use of Raspberry Pis and sensors in the making of digital objects. May 2019, Edinburgh.

Schools workshop using the speakers to explore sound with children aged 6, 9 and 11. November 2019, Berwick-upon-Tweed.

Appendix 3:
Publications

Klein, E., Chapple, S., Fainberg, J., Magill, C., Parker, M., Raab, C. D., & Silvertown, J. *Capturing the Sounds of an Urban Greenspace*, 3rd International Conference on Smart Data and Smart Cities, Delft, the Netherlands, 4–5 October 2018. SSRN Scholarly Paper No. ID 3262010.

https://doi.org/10.5194/isprs-archives-XLII-4-W11-19-2018

Appendix 4:
Funding and Support

Sonikebana has been supported by various funds and as part of larger projects.

Artist Residency at Little Sparta funded by the Little Sparta Trust, 2017, £2.5k.

https://www.littlesparta.org.uk/trust-partners/

Sonikebana v1.0 research, development and presentation as part of *CitySounds*, funded by the European Commission (H2020) through the *Organicity* project, €70k.

http://organicity.eu

Sonikebana v2.0 research, development and presentation funded by the Edinburgh Art Festival, £9k.

https://www.edinburghartfestival.com

Appendix 5:
Computer Code

Computer code used in this project is open access and available at the UoE's Github repository here.

https://github.com/tinpark/sonikebana

Appendix 6:
Invited Talks

Research Seminar talk, '*Sonikebana*, Rich Immersion and Responsive Play, Can We Have Both?'
Reid School of Music, University of Edinburgh.
Edinburgh, September 2019.

Public talk, '*Sonikebana* – Space for Sound'
Gymnasium Gallery,
Berwick-upon-Tweed, November 2019.

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