

Institution: Falmouth University
Unit of Assessment: 35 - Music, Drama, Dance and Performing Arts
Title of case study: Organ of Corti: a sonic crystal listening aid
<p>1. Summary of the impact</p> <p><i>Organ of Corti</i> is an experimental instrument by David Prior (Associate Prof. Falmouth University) and Frances Crow that filters the sound around it into new listening experiences. Winner of the 'Performing Rights Society (PRS) for Music Foundation's New Music Award' in 2010, <i>Organ of Corti</i> toured England in the summer of 2011. The piece was presented in partnership with nationally recognised regional music festivals reaching an estimated audience of over 400,000 during its tour, both live and via National and International media coverage [Section: 5, Ref:14-23].</p> <p><i>Organ of Corti</i> has received recognition from a number of International awards within the disciplines of new music, acoustics and technology [Section: 5, Ref 10-12]. The project has contributed to research within the areas of meta-materials, policy implementation on 'soundscape design' and new ways of listening [Section 5, Ref: 5-9]. <i>Organ of Corti</i> has received planning permission for a permanent sound sculpture on the banks of the river Severn in Worcester [Section: 5, Ref: 25].</p> <p>2. Underpinning research (indicative maximum 500 words)</p> <p>In 2008, <i>liminal</i> (architect Frances Crow and David Prior) [Section 3, Ref: 1] were awarded a grant from the Wellcome Trust for their research project <i>Tranquillity is a State of Mind: Listening Aids for a Listening Impaired Society</i> [Section 3: Ref 2 & 3]. Working in partnership with Sustrans, the sustainable transport charity, they brought together a research team comprising two acousticians, a computational neuroscientist, and a clinical audiologist in order to develop a concept for a 'listening aid': a device that rather than correcting an impairment in hearing, might facilitate contemplation on the act of listening itself. <i>Organ of Corti</i> (then named <i>The Cochlea Unwound</i>) was the outcome of this process, an experimental instrument that contributes to a dialogue on the relationship between sound, health and wellbeing by means of an artistic-acoustic intervention in to a natural environment, encouraging reflexive listening.</p> <p><i>Organ of Corti</i> filters the sounds around it into new listening experiences. The piece utilises a class of metamaterial referred to as a 'Sonic Crystal'; a physical object comprised of periodically spaced acoustic scattering elements that alter the behaviour of a sound wave as it passes through it. Designed in collaboration with the Acoustics Research Group at the Open University, lead by Professor Keith Attenborough, <i>Organ of Corti</i> is an array of 96, 4-metre cylinders that form an enveloping structure through which the visitors moves. Sound from the surrounding environment passes through the array of cylinders and is sculpted by the structure, creating changing perceptions of familiar sounds. Acoustics research into the use of sonic crystals is still in its infancy <i>Organ of Corti</i> became a vehicle through which the Open University team could expand their ongoing research into this emerging technology. [Section: 3, Ref: 4]</p> <p><i>Organ of Corti</i> is particularly unusual in the contribution to Sound Art in that it makes to this history in that it does not make any sound of its own, but rather, it attempts to draw our attention to the sounds already present by framing them in a new way. The piece builds on the pioneering work if Alvin Lucier, who through numerous pieces, establishes a complex interplay between the material of the sounds produced and the acoustic context of the place in which they are heard. Similarly, some of the installation work of Michael Asher sought to change the acoustic behaviour of existing spaces. However, with its specific focus on rematerializing sound and dehabituating the listener's relationship to it, <i>Organ of Corti</i> bears just as close a relationship to the light sculptures of James Turrell and the environmental philosophy of Gernot Bohme or the anthropology of Tim Ingold. The research has contributed to further impact within the wider academic disciplines of acoustics, music and sound art, being cited in a number of peer reviewed papers and a book [Section: 3 Ref</p>

5-10].

3. References to the research (indicative maximum of six references)

- [1] www.liminal.org.uk
- [2] www.liminal.org.uk/tranquillity-is-a-state-of-mind
- [3] Wellcome Trust Arts Awards 2008
http://www.wellcome.ac.uk/stellent/groups/corporatesite/@msh_grants/documents/web_document/wtp052972.pdf
- [4] The Open University Acoustic Research Group follow on grants expanding on the research used in Organ of Corti project: EC FP7 project HOSANNA (see www.greener-cities.eu) 2012 EPSRC-funded project Periodicity-enhanced absorbing layers and structures (PEALS) ongoing.
- [5] Prior, David. (2012) Organ of Corti: A Listening Device. Leonardo Music Journal, Volume 22, November 2012, MIT Press
- [6] Taherzadeh, S. Bashir, I. and Attenborough, K. (2012) Aperiodicity effects on sound transmission through arrays of identical cylinders perpendicular to the ground. J. Acoust. Soc. Am. 132 (4), EL323 – EL328 October 2012. <http://dx.doi.org/10.1121/1.4751991>. Chong, Y.B.A.
- [7] Taherzadeh S. and Attenborough, K. (2011) Report of in situ measurements of the acoustical performance of the 'Organ of Corti' Sonic Crystal at Diglis weir, Worcester. © Open University Acoustics Group 2011, September 10.
- [8] Cox, Trevor (2013) Sonic Wonderland: A Scientific Odyssey of Sound. Bodley Head, Nov 2013
- [9] Balit, Daniele. (2013) From Ear to Site: On Discreet Sound. LMJ Leonardo Music Journal, Vol. 23. MIT press. pp. 59-63.
- [10] Batchelor, Peter. (2013) Lowercase Strategies in Public Sound Art: celebrating the transient audience. Organized Sound, Volume 18 / Special Issue 01 / April 2013, Cambridge University Press, pp. 14-21.

4. Details of the impact (indicative maximum 750 words)

In 2010 *Organ of Corti* won the 'PRS for Music Foundation's New Music Award' [Section: 5, Ref: 1] with a unanimous vote from the judges who were 'impressed by the quiet purity of the idea...' [Section: 5, Ref: 2]. Over the summer of 2011, *Organ of Corti* toured England, being hosted by organisations including the City of London Festival, Lake District Summer Music Festival, Costwold Water Park's summer events and Worcester Music and wider summer festivals [Section: 5, Ref: 3]. At each location a series of accompanying events were offered which extended the reach of the structure itself. [Section: 5, Ref: 4]

Grants

Following an initial research project funded by the Wellcome Trust (£30,000) [Section: 5, Ref:9] *Organ of Corti* was made possible by the £50,000 commission from the 'PRS for Music Foundation's New Music Award'. Arts Council England funded a further £10,000 to widen the impact of the tour by enabling the tour to stay longer at each location. £6101.80 was also received from the Escalator Fund, administered by University College Falmouth as well as £490 from Worcester City Council. Sustrans adopted *Organ of Corti* as part of the ongoing public engagement project *Tranquillity is a State of Mind*, and contributed to the costs of hosting *Organ of Corti* in Worcester. Through the project we made strong links with other local businesses that provided in-kind support in the form of time, resources, marketing and access to existing audiences to make the project a success. [Section: 5, Ref:9]

Following the Wellcome Trust funded *Tranquillity is a State of Mind* research project, liminal worked with Sustrans to commission Worcester Artist Rob Colbourne to undertake his project *20ft to an Inch* with a separate £30,000 award from the Arts Council [Section: 5, Ref: 9]. The project formed a key element of the outreach for *Organ of Corti* and engaged 300 children and adults from local schools and community groups in Worcester.

Audience

The live audience to the 4 tour locations and the accompanying events was 8725, the wider audience reached through online, print and broadcast media during the tour was estimated at over

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403,000 [Section: 5, Ref: 6]. Following the tour *Organ of Corti* was installed at Poltmore House for a period of 2 years

Media Coverage

The PRS for Music Foundations New Music Award received extensive media coverage during the short-listing process and following *Organ of Corti's* win in September 2010. The ceremony itself was reported widely in the International press. SkyArts subsequently made a documentary about the New Music Award and its three winners [Section: 5, Ref: 7]. *Organ of Corti* later featured in the BBC TV programme 'Bang Goes the Theory' [Section: 5, Ref:13]. The project featured in local, national and international radio, newspapers and magazines, both online and in print, covering culture, science, art, architecture and music during the period of the tour [Section: 5, Ref: 7]. Since the tour it has received further international coverage in specialist magazines covering business, architecture and music [Section: 5, Ref: 18-22].

Research Networks and Policy

Following the original research project funded by the Wellcome Trust – *Tranquillity is a state of mind* which resulted in *Organ of Corti*, David Prior was invited by Dr Tjeerd Andringa to conduct a workshop as part of the Groningen University 2010 research project looking at ways to mitigate the sound annoyance problems in Assen [Section: 5, Ref: 8]. The aim of the research project was to contribute to changes in the city of Assen's sound policy. Liminal also presented *Organ of Corti* to the COST (European Cooperation in Science and Technology) Network - TDU Action TD0804 as an exemplar case-study in their project that is working towards preparing guidance on assessing and improving Soundscape design in planning policy in response to the EU Noise Directive [Section: 5, Ref: 6]. *Organ of Corti* was also exhibited as part of the Noise Abatement exhibition promoting positive soundscapes in collaboration with Brighton and Hove city council and has been exhibited as part of the TDU Action workshop as part of the AIA-DAGA 2013 Conference on Acoustics, Merano, Italy, in March 2013 [Section: 5, Ref: 7].

Awards

The project's contribution to new ways of thinking about music was recognised by the PRS New Music Award, who funded the project. The piece was also shortlisted for the Phonurgia Nova sound art award (2011) [Section: 5, Ref: 12]. The Wellcome Trust, recognised the project's contribution to the debate around sound, health and wellbeing, funding early research for the project. The piece won the John Connell Innovation Award (2011) for contribution to acoustics and the environment [Section: 5, Ref: 10]. *Organ of Corti* pioneers the use of sonic crystal arrays in art, an innovation recognized by an honorary mention at Prix Ars Electronica 2012 [Section: 5, Ref: 11]. In July 2013, following public consultation, planning permission was granted for a permanent version of *Organ of Corti* – called *Cochlea Unwound* on the banks of the river Severn. [Section: 25, Ref: 10]

5. Sources to corroborate the impact (indicative maximum of 10 references)

- [1] PRS for Music Foundation New Music Award: www.prsformusicfoundation.com/Partnerships/Flagship-Programmes/New-Music-Award/
- [2] Charlotte Higgins (Chair of Judges) Guardian Newspaper 17th Sept 2010 www.theguardian.com/culture/charlottehigginsblog/2010/sep/17/classicalmusicandopera-turnerprize
- [3] *Organ of Corti*, Impact and Evaluation Report, September 2011 published online at www.liminal.org.uk/organ-of-corti under documents tab.
- [4] Audience numbers can be found in the *Impact and Evaluation report* for *Organ of Corti* submitted to Arts Council and 'PRS for Music Foundation's New Music Award' published online at www.liminal.org.uk/organ-of-corti (under documents tab)
- [5] Sustrans project, *Art in Worcester Tranquillity is a State of Mind Evaluation Report*, March 2012 for Arts Council England Grant, published online at www.liminal.org.uk/organ-of-corti (under the documents tab)
- [6] COST (European Cooperation in Science and Technology) Network – TDU Action TD0804 <http://soundscape-cost.org>

- [7] AIA-DAGA 2013 Conference on Acoustics, Merano, Italy, March 2013. <http://www.aia-daga.eu/index.php/en/>
- [8] Andringa, Tjeerd. *Dutch Sound Annoyance Report: Sound annoyance: causes and effects*. Rijksuniversiteit. DRAFT. Nov 14th 2011
- [9] EUCOG summer school 2011 Presentation and soundwalk for the Auditory Cognition workshop as part of the. <http://www.eucognition.org/index.php?mact=News,cntnt01,detail,0&cntnt01articleid=55&cntnt01returid=15>
- [10] Winner of the John Connell Innovation Award 2011 <http://noiseabatementociety.com/john-connell-awards/john-connell-awards-2011-2/>
- [11] Honorary Mention in Digital Music and Sound Art at Prix Ars Electronica 2012 <http://prix2012.aec.at/prixwinner/5301/>
- [12] Phonurgia Nova Awards 2011 (shortlist) <http://phonurgianova.blog.lemonde.fr/2012/11/>
- [13] Bang Goes the Theory, Series 6, Episode 2 *Is Life too Loud*. 19 March 2012. BBC1 <http://www.bbc.co.uk/programmes/p00q6qnz>
- [14] Wired Magazine - home page for one week. *Everything London* tweeted the *Wired* article and this reached 126,183 people via twitter (tweetreach report for 5 July 2011). <http://www.wired.co.uk/news/archive/2011-07/05/organ-of-corti>
- [15] Time Out - editors recommendation in their *Classical Music* section following an interview with Liminal just before the tour began 30 June 2011, *Breaking the Noise Barrier*, Tom Lennie, *Time Out Magazine*, London, pp113
- [16] The Gramophone Blog - an extensive review <http://www.gramophone.co.uk/blog/the-gramophone-blog/listening-to-yourself-listening-through-the-organ-of-corti>
- [17] Blueprint Magazine (September/October 2011) and in the November 2011 issue as one of five case-study projects that contributed to Sound and Music's *Ways of Hearing* project. Amadei, Gian Luca, *Produce*, Blueprint, Issue 309, November 2011, pp 73 – 75
- [18] ISM Music Journal *Organ of Corti – an invitation to listen to ourselves listen*. September/October 2011 pp 16-19
- [19] Glasna (Slovenian Magazine) February 2013, - *Organ of Corti* was also featured in the Chinese business magazine *CEOICIO China Magazine*, alongside the work of Jem Finer and David Byrne. Other online features in *Organ of Corti* include an article for the Taiwanese Digiarts online magazine and Pill-A's online contemporary archive of 'everything architecture'
- [20] CEOICIO China Magazine article, 5 March 2013 p133 - 137 Pei Yan
- [21] Digiarts Online magazine *Hearing Life Experience of One City* Chiang Ling-ching, (2012) http://www.digiarts.org.tw/english/Column_Content.aspx?n=42B9A64DC480BC01&p=E612E6F6E4C14DCF&s=F0D97B2CC104ED27
- [22] Pill-A (2011) *everything architecture* <http://www.pill-a.com/wp/stop-and-listen/>
- [23] SoundArtRadio (2011) *Take Note* - one hour programme on *Organ of Corti* first broadcast 25 October 2011 and online at www.soundartradio.org.uk to an estimated audience of 5000 listeners.
- [24] Testimonial: Claire Donovan, Secretary for Poltimore House Trust, 4 October 2011
"The Organ of Corti has provoked much interest from Poltimore visitors. There is a layer of mystery to it which, through learning more about it, will enable Poltimore House volunteers to provide better guidance to its impact on the way we hear the Poltimore landscape - and in particular the way it encourages us to listen. Visually of course it is stunning, and has transformed that area of the great lawn behind the house, shimmering in the sunshine, reflecting the trees around and the changing patterns of clouds. It mediates sound for visitors, but equally mediates the way we see the familiar landscape of lawn, trees and people".
- [25] Planning permission granted, July 2013 – Application Number P13C0225: Installation of "Cochlea Unwound" Artwork. Worcester City Council
- [26] For further testimonial contact Vanessa Reed Executive Director of PRS for Music Foundation