

Impact case study (REF3)

Institution: University of Huddersfield		
Unit of Assessment: 33 Music		
Title of case study: Sounding Antiquity: Enhancing Public and Creative Engagement with the Past through the Exploration of Ancient Acoustic Cultures		
Period when the underpinning research was undertaken: 2008 – present		
Details of staff conducting the underpinning research from the submitting unit:		
Name: Prof Rupert Till	Role: Professor and Associate Dean (International)	Period employed by submitting HEI: 2002 – present
Period when the claimed impact occurred: August 2013 – December 2020		
Is this case study continued from a case study submitted in 2014? No		
<p>1. Summary of the impact</p> <p>The heritage industry often presents antiquity as silent, meaning that a crucial element of ancient cultures is omitted from public understanding of historic sites and ways of life. Research conducted by Prof Rupert Till at the University of Huddersfield since 2008 has revealed the importance of sound in ancient cultures. By analysing the acoustic ecologies of archaeological sites in unprecedented detail, and developing pioneering innovative multimedia techniques to present these findings, Till's research has presented the sounds of antiquity in new, immersive ways. Through exhibitions, commercial recordings, online resources, and extensive international media coverage, Till's research has helped shape understandings of the past for a broad public. It has informed the work of creative professionals engaged with prehistory in the UK, Japan, and Germany, and has brought financial and reputational benefit for leading record label Delphian Records. Through specially developed education packs, it has also enriched cross-curricular teaching and learning for primary school children across the UK.</p>		
<p>2. Underpinning research</p> <p>Ancient cultures, like our own, were aural as well as visual. Any understanding of antiquity that does not address sound is consequently severely limited. Yet in both archaeological research and the public presentation of heritage sites, sound has been neglected. Addressing this neglect, Till has explored the acoustic cultures of antiquity through a diverse methodology comprising original acoustic studies of archaeological sites (both on site and through digital acoustic modelling), innovative multimedia reconstructions, and research-led creative practice in the form of performances and sound recordings.</p> <p>Till's 2008/9 pilot study on the acoustics of Stonehenge offered a preliminary demonstration of the insights that modern acoustics methods can yield for investigation of the sound cultures of antiquity [3.1]. Using a combination of digital modelling and field tests at Stonehenge and the Maryhill Monument (WA, USA; a reconstruction of Stonehenge), Till demonstrated distinctive effects of sonic envelopment, low frequency resonances, and differentials arising from the use of historically appropriate instrumental sounds and varied performer location within the monument. These results pointed to previously overlooked ways in which the monument may have had spiritual significance for the people of prehistory, and suggested how different parts of the space may have been used during ritual events. The scholarly and public interest in this work inspired Till's creation of an AHRC/ESRC Research Network 'The Acoustics and Music of British Prehistory' (2009-10, £24,486, PI: Till) dedicated to developing base-line research methodologies and research questions for fieldwork at the intersection of archaeology, sound cultures, digital modelling, and on-site analysis using state-of-the-art acoustics methods.</p> <p>The methods developed by Till within the network were then applied to his work on two substantial funded research projects. The international and cross-disciplinary 'Songs of the Caves' project, funded by an AHRC/EPSCRC Heritage Science Research Development Award and directed by Till as PI (2013-14, £80,408), explored in depth the relationships between Spanish prehistoric rock art and acoustics. The project systematically mapped the acoustics of five caves at the Altamira World Heritage Site, using over 240 impulse responses to capture their acoustics in unprecedented detail. As well as advancing a new, scientifically robust methodology for acoustic studies of archaeological sites, the research provided for the first time empirical substantiation for earlier hypotheses that the positioning of cave art was related to the acoustics of a particular location, demonstrating in particular an association between visual motifs and low frequency</p>		

resonances [3.2; 3.3]. The methods employed at Altamira have subsequently been applied by Till to fieldwork at Malta's prehistoric Hal Saflieni Hypogeum, where the different resonant qualities of rock chambers offered evidence confirming or qualifying archaeologists' suppositions about their distinct function and ritual significance [3.4].

Till has also acted as co-investigator on the European Music Archaeology Project (EMAP), funded by the EU Culture Programme Grant (2013; €4 million). Till's specific research contribution to this international and multi-institutional project was the investigation of multimedia virtual reality and game technologies as a means of enabling immersive, first-hand experience of the acoustics of archaeological and ancient sites. Leading a team of technicians and performers, Till developed an ambitious installation – the EMAP Soundgate – that acts as a kind of multimedia time machine for the experience of hearing music and sound in Stonehenge, the Altamira caves, and the Paphos Theatre in Cyprus [3.5]. This work enquired into the potential of an unprecedented combination of specialisms – encompassing expertise in archaeological data, digital modelling, audio production, reconstruction of musical instruments and musical performance – to enable new experiences of the distant past, including of locations that no longer exist or are hard to access. As a further practice-research output for EMAP, Till produced five commercial compact disc recordings (e.g. [3.6]) that innovatively explored varied ways of presenting the findings of sound archaeology – especially the conjunction of reconstructed ancient instruments with digitally modelled acoustics of appropriate ancient sites – in convincing musical form, rather than as a museum exhibit. Drawing upon the experience of several professional musician collaborators, this body of work proposes creative music-making as a valid means to better understand archaeological finds.

3. References to the research

Evidence of the quality of the research: Outputs [3.1] to [3.4] were each subject to rigorous peer review prior to publication. [3.2] and [3.3] were outcomes of Till's £80K AHRC project. [3.5] and [3.6] were Till's primary contribution to the €4m EU Culture Programme-funded EMAP project.

[3.1] Till, R. (2010). 'Songs of the Stones: An Investigation into the Acoustic Culture of Stonehenge', *IASPM Journal* 1(2): 1-18. [https://doi.org/10.5429/2079-3871\(2010\)v1i2.10en](https://doi.org/10.5429/2079-3871(2010)v1i2.10en)

[3.2] Till, R. (2019). 'Sound Archaeology: A Study of the Acoustics of Three World Heritage Sites, Spanish Prehistoric Painted Caves, Stonehenge, and Paphos Theatre', *Acoustics* 1(3): 661-92. <https://doi.org/10.3390/acoustics1030039>

[3.3] Fazenda, B., C. Scarre, and R. Till, *et al* (2017). 'Cave Acoustics in Prehistory: Exploring the Association of Palaeolithic Visual Motifs and Acoustic Response', *Journal of the Acoustical Society of America* 142(3): 1332-49. (This is the principal scholarly output from Till's 'Songs of the Caves' project; Till's contribution: 30%). <https://doi.org/10.1121/1.4998721>

[3.4] Till, R. (2017). 'An Archaeoacoustic Study of the Hal Saflieni Hypogeum in Malta', *Antiquity Journal* 91(355): 74-89. <https://doi.org/10.15184/aqy.2016.258>

[3.5] Till, R. (2016) EMAP Soundgate app, <http://www.emaproject.eu/content/soundgate-app.html>

[3.6] Till, R. at al (2018), *Sounds from Classical Antiquity: Apollo and Dionysus*, compact disc recording, Delphian DCD34188-CD. (One of a series of five CDs produced for the EMAP project.) https://www.delphianrecords.com/products/dcd34188?_pos=1&_sid=d40703e66&_ss=r [can be supplied on request]

4. Details of the impact

Till's research has reached diverse non-academic users and beneficiaries through varied means. The 'Songs of the Caves' project (2013-14) produced a public-facing interactive website (6,599 visitors since August 2013), drawing directly on Till's research [3.2], [3.3] and [3.4], which allowed users to experience the spatial and acoustic properties of the caves, many of which are not open to the public. Films from this website, together with short films arising from Till's other sound archaeology work, have had 61,473 views on YouTube since August 2013. The multimedia Soundgate installation created by Till for the European Music Archaeology Project (EMAP, 2016), was a centrepiece of the EMAP exhibition 'Archaeomusica: The Sounds and Music of Ancient Europe' that toured leading museums in Germany, Spain, Cyprus, Sweden, Italy, and Slovenia between 2016 and 2018 (54,759 visitors in total). A version was also shown as part of the 'Klang der Antike' exhibition at Würzburg's Martin von Wagner Museum in 2019/20, and at Bradford's National Science and Media Museum's Widescreen Weekend event in 2019. The app version of the Soundgate [3.5] was released on the EMAP website in 2017 (4,678 downloads to date from UK, USA, Japan, China, Australia, Brazil and throughout Europe). In 2019, the app formed the basis for a 'Music Archaeology' education pack aimed at primary schools (described below).

Between 2016 and 2018 Till also produced five research-led albums on Delphian Records (e.g. [3.6]) related to the sites featured in the EMAP exhibitions (5,422 discs sold). Since 2013, Till has acted as consultant for creative professionals producing content on the cultures of antiquity (see below), and has received extensive international media coverage of his work in a wide range of press and broadcast media. These extensive engagement activities have given rise to impacts on a diverse international public, the creative industries and classroom settings, as follows:

Shaping public understandings of the distant past

Through the digital resources, exhibitions, commercial recordings and media engagement detailed above, Till's research has impacted upon museum visitors, history enthusiasts, radio and TV audiences, newspaper readers, and early music devotees around the world. Their understanding of the ancient past has been changed in ways that directly relate to Till's research findings:

(i) Enhanced engagement with the past enabled by the immersive approach: Till's focus on sound has generated newly immersive ways of engaging with the distant past that general audiences find exciting and absorbing. User feedback consistently highlights the role of sound in creating this sense of immersivity and the heightened quality of involvement it brings. Visitors to the Sounds of the Caves website commented: *'I love this! It's wonderful to have this acoustic work as well as the visual'*, and *'What a wonderful project. Quite fascinating, not to mention inspiring'* [5.1]; and a reviewer of the Soundgate app on Google Play wrote: *'Great app! Immerses and allows you to explore the environment in order to hear the songs and noises from different areas'* [5.2]. A National Science and Media Museum volunteer blogger wrote of the EMAP app's *'ingenious use of tech for the immersive film ... The experience of Stonehenge is multi-faceted, and this is especially apparent via the app. The 2200 BC night experience was beautifully tranquil with the, now rare, sounds of nightingales fluttering all around you – I got goosebumps at this one! ... It is a sensory experience which commands your attention as well as appreciation for these ancient cultures'* [5.3, pp.1-4]. A 2017 BBC News story on Till's research prompted professional archaeological consultant Caroline Wickham-Jones to advocate the value of *'immersive archaeology'* on her blog: *'I'm not in archaeology just to talk to myself, or my colleagues. I'm in archaeology in order to make the past come alive for everyone. ... Virtual reality, immersive archaeology, soundscapes – bring them on'* [5.3, p.6-8].

(ii) Enhanced understanding of ancient ways of life: Till's research has significantly impacted upon public attitudes to their ancestors. A user comment on Vimeo suggests that this impact can be transformational: *'This [i.e. 'Songs of the Caves'] is an amazing project! I love the fact that you use empirical tools and modern technology to explore the way prehistoric human beings would use those incredible spaces in their lives. ... I really hope that researches of this kind will continue to contribute to the meagre knowledge we have on the early days of musical (or sound) production. Well done!!'* [5.1] In a questionnaire completed by attendees of the EMAP exhibition in Ystad, Sweden (2016/17) [5.4], 83% (of 60 respondents) agreed that *'The music and sound examples in the exhibition helped me understand life in the past'*. This changed understanding extends beyond a purely historical appreciation to encompass aspects of present-day identity: for instance, 86% of Ystad exhibition respondents agreed that *'The exhibition has helped me understand my European cultural and musical history'*, and 79% agreed that *'understanding music of ancient cultures will make me experience music today differently'*.

(iii) Enhanced understanding of the sonic cultures of antiquity: Till's research has impacted upon public understanding of ancient sonic practices. 75% of Ystad exhibition respondents agreed that *'The Soundgate has helped me understand the role of acoustics in the past'* [5.4], and 44 of the 45 questionnaire respondents (98%) at the Bradford Soundgate screening [5.5] agreed that the event had increased their knowledge of ancient instruments. The commercial CDs produced by Till have further extended the reach of this impact: the Managing Director of Delphian Records states that *'as a result of the success of this series, there is a much wider understanding of the musical instruments of the past within the music industry and press, as well as amongst audiences worldwide. The series has certainly changed my understanding of what can be described as early music, moving my frame of reference back tens of thousands of years in some cases'* [5.6, p.1].

Influencing work in the creative industries in the UK and overseas

Building on the extensive media coverage of his research, Till has served as scholarly consultant to creative and media professionals in the UK and internationally, influencing the creation of high-

profile broadcasts, record releases and other cultural productions. In 2017, he was lead consultant and academic contributor on a 50-minute BBC World Service documentary 'Symphony of the Stones', which sought 'to recover the soundtrack of our ancestors' through visiting ancient sites that had been the focus of Till's research. The show's Producer writes of how *'we were able to shape the entire programme along the lines that your [Till's] work had inspired. Your research changed the team's understanding of music in the ancient past... [T]he programme would have been heard by millions of listeners worldwide'* [5.6, p.2]. In 2018, the flagship BBC television series *Civilisations* drew substantially on Till's research for episode 1 of the series, which addresses 'the dawn of creativity'. An extended scene in the Altamira caves involves Till explaining his findings regarding the relationship of cave art and musical performance, and the indications that cave acoustics give as to how sound was made; Till's research thus serves as the turning point for the episode's shift from a narrow focus on cave art towards wider indicators of early civilisation. *Civilisations'* Producer and Director writes: *'Until we made contact with Rupert, our thinking on the nature of the art and culture of the caves was lacking in significant ways. ... [I]t was when we spoke to Rupert about his acoustic and musical research that this moment in human history really began to come alive for us'*, creating *'a much more arresting dimension - and a far stronger conclusion'* to the programme [5.6, p.3]. The programme had BARB viewing figures of 2.42 million in the UK, was broadcast by PBS in the USA, and later streamed on iPlayer and Amazon Prime.

Till's work has also significantly shaped the programme-making of broadcasters in Japan and Germany. Till acted as consultant and composer for the Palaeolithic sequence of the 2018 Japanese Broadcasting Corporation (NHK) series *Out of the Cradle*, which traces the evolution of humanity's earliest ancestors; this included the filming of a 'behind-the-scenes' feature on Till's approach to archaeologically-informed musical performance. The producer estimates that this episode reached 8 million Japanese viewers, and remarks that *'we could not have accomplished [the programme] without the cooperation provided from you [Till] upon our preliminary research and your song composed for the Palaeolithic era'* [5.6, p.4]. Till also acted as lead academic consultant for the 2015 Deutschlandfunk Kultur 50-minute radio programme *Archäoakustik: Auf der Suche nach Echo (Archaeoacoustics: In Search of Echo)*, which examined how 'early cultures consciously shaped and designed their acoustic environment'. The programme's Director, who had earlier invited Till to give a talk at Berlin's CTM Music Festival, writes: *'As a result of working with you at CTM, with Deutschlandfunk Kultur I commissioned and produced a one-hour radio documentary ... which drew heavily on your expertise and research ... Broadcast on a national public service German radio station as a direct result of engagement with your work, ... I believe [it] contributed to changing public perception about the nature of music in the past.'* [5.6, p.5].

Till's research has also produced commercial success and influenced business strategy at the independent record label Delphian Records. The five sound archaeology recordings produced by Till as outputs of the EMAP project (e.g. [3.6]) have sold 5,506 physical copies since 2016, above average for 'early music' releases. The series has brought reputational as well as economic benefit; Volume 2 'Ice and Longboats' (2016) entered the UK Classical Music Official Charts at number 19; and the series has received substantial media attention on BBC Radio 3 (*Record Review*), and in the *Daily Telegraph*, *Observer*, *Guardian*, *BBC Music Magazine*, and *Sunday Times* [5.7]. This success has influenced label strategy. Delphian's Managing Director writes: *'We certainly would not have released a series of recordings based on music archaeology before I came across your [Till's] work. The EMAP series of CDs we have produced together based on your research, is truly unique, and has had a considerable effect on our output as a label. I would not have imagined that music such as this would tell us so much about the cultures of the past, or inspire such a positive and significant reaction in audiences.'* This success has influenced business strategy: *'the releases have ... developed a new market for recordings based on music archaeology. As a result of this project, Delphian Records is now actively seeking to develop further recording projects of this type, involving more musicians and composers'* [5.6, p.1]. The first of these new projects, based on Anglo-Saxon culture, was released by Delphian in October 2020. Till's musician collaborators gained economically from their involvement, and have had their artistic and professional horizons widened. Till asked Arabic nay virtuoso Mina Salama to play a model ancient bone pipe in the *Civilisations* episode; this experience gave Salama new insights into nay technique, including *'new ways to produce some notes in the nay'*, and further led him 'to

get a replica of Pharaonic nays to start detailed research ... on Ancient Egyptian and Coptic Music' [5.6, p.11]. Till invited Anna Potengowski to play models of bone pipes from the Hohle Fels and Isturitz caves for two broadcasts and the EMAP CD 'Edge of Time'; this gave her *'the opportunity to visit the Isturitz cave for the first time ... which changed my understanding of the instrument and its sounds'*, and enabled her to *'build a relationship with the museum and the archaeological team [at Hohle Fels cave], who have subsequently asked me back many times to perform'*. She writes: *'I had hoped to establish a reputation as an excellent performer on these ancient flutes, and Professor Till has helped me to do this, through involvement in his research* [5.6, p.12].

Sound archaeology as a tool for cross-curricular learning in primary schools

In 2019 a downloadable education pack 'Music Archaeology: From Stone Age to Roman Times' was developed by the university, based on Till's research and the Soundgate app, for use in the UK KS2 curriculum. 93 educators attended professional development workshops promoting the pack in Wakefield, Huddersfield and Leeds; the pack has since been downloaded by 167 educational establishments and heritage organisations nationally. A revised pack designed for home learning during the pandemic has been downloaded by a further 155 teachers and parents, with 66 further downloads via the TES Teaching Resource website. Responding to the pack, the Cultural Engagement Officer at Kirklees Museums and Galleries wrote: *'I love the concept of bringing the past to life through sound. ... Thank you for inspiring me again!'* [5.6, p.9]. Teachers at the Leeds workshop described the pack as *'highly engaging and useful'* and *'incredibly immersive'*, and drew particular attention to the value of Till's research for connecting subjects across the KS2 curriculum: *'creative links with science – interesting'*; *'ways to link history across the curriculum'*; *'a fascinating approach to learning music and history'* [5.8]. During the pandemic the popular Mr T Does Primary History Facebook site (15,000 followers) posted *'If you haven't used the Soundgate app, you're missing out as it brings prehistory to light in some unique ways! They've adapted it for home learning too which is fab!'* [5.8]. Commenting further on the app, Mr T wrote: *'I was taken by the way it links archaeological sites to the music that could have been played in it. It added some really interesting context that I was unaware of and adds real value to understanding prehistory (which is a completely abstract period of history)'* [5.6, p.10]. Five associated workshops for 160 KS2 children were also delivered in Huddersfield and Wakefield schools (2019/20). Pupil feedback highlighted the app's immersive qualities (*'it was like VR'*; *'it is like an adventure'*) [5.9, p. 6], and showed that the linking of ancient spaces to sounds left a lasting impression, with *'the amphitheatre and the ancient song'*, and *'that we could go in the [amphi]-theatre and learning about instruments'* singled out as things they enjoyed the most [5.9, p.3].

5. Sources to corroborate the impact

[5.1] *Songs of the Caves* website and video comments (2014)

[5.2] EMAP Soundgate app reviews (2017)

[5.3] Blogs: Hamilton, C. *Hearing is Believing: Sound Archaeology* blog post on National Science & Media Museum website (2019); Wickham-Jones, C. *Immersive Archaeology at Stonehenge*, blog post on Mesolithic.co.uk (2017)

[5.4] Feedback from EMAP exhibition attendees at Ystad, Sweden collected by EMAP (2016-2017)

[5.5] Audience feedback from *Archaeological Immersion*, Widescreen Weekend screening, National Science and Media Museum, Bradford, collected by University of Huddersfield (2019)

[5.6] Testimonial Letters: Senior Producer and Managing Director, Delphian Records; Producer, *Symphony of the Stones*, Wisebuddah; Producer/Director *Civilisations*, Nutopia; Program Director, NHK Japan Broadcasting Corporation; Director, *Archäoakustik: Auf der Suche nach Echo*, Deutschlandradio Kultur Radio; Cultural Engagement Officer, Kirklees Museums & Galleries; Primary History Specialist, Mr T Does Primary History; Mina Salama, professional musician; Anna Potengowski, professional musician

[5.7] CD reviews: *Edge of Time*, Daily Telegraph, 2017; *Edge of Time*, The Observer, 2017; *Home listening: digging up the past with a masterful flourish*, The Guardian, 2018; *Ice and Longboats*, BBC Music Magazine, 2017; and *Spellweaving*, Sunday Times, 2016.

[5.8] Education Pack feedback: Feedback from Yorkshire History Forum workshop attendees collected by the Historical Association, 2020; *Mr T Does Primary History* Facebook post (2020)

[5.9] Pupil & teacher feedback from Music Archaeology primary school workshops: Holme School, Horbury School and Overthorpe School, collected by University of Huddersfield (2018-2020)