

The Sounds of Science: a practice-based PhD exploring the use, purpose and potential of music in science centres

Deadline: June 7, 2021

Please fill out the blank sections in the template below. Because this is a specific funded PhD project, you do not need to write the "Research Summary" and "Research Proposal" sections, as the supervisory team has already written them (but please do read them thoroughly to ensure that the project is a good fit for you.)

After you have filled out this form, please:

Apply through UCAS: <u>https://www.ucas.com/conservatoires</u>. References can be added to your UCAS application or emailed to <u>references@rcs.ac.uk</u> once you submit your application. After you have done so, please submit your application and portfolio via <u>https://app.getacceptd.com/rcs</u> according to the following instructions.

- 1. Please do fill out all of the Student Information section on the online form
- 2. Please do NOT fill out the Research Summary and Research Proposal sections of the form online! If you need to type something to get past a window, just type N/A.
- 3. Instead, please upload:
 - a. A PDF of this form, completed. You will note that we have already filled out some sections (shaded grey), and you do not need to write in these.
 - A representative portfolio of works (including recordings, videos, scores, and/or photos, as appropriate for your practice)
 - c. A sample of your writing (academic or non-academic)
 - d. Your academic records

The RCS application fee is waived but you will need to pay £26 for the UCAS application. Please select the option to pay later by invoice (this is presented as an option for those unable to pay by card) and arrange a bank transfer of the application of £26 to UCAS. We can then waive the RCS fee.

Personal Details

Name		
Research proposal title		
Mode of Study (please delete as necessary):	Full-time	Part-time

Cross-institutional supervision:

Institution: Royal Conservatoire of Scotland	Dr Rachel Drury and Dr Emily Doolittle
Institution: St Andrews	Dr Bede Williams and Dr Mhairi Stewart
Institution: Dundee Science Centre	Rebecca Duncan

Qualifications

Admission to doctoral level programmes is normally on the basis of a first degree at 2.1 level or higher (or the overseas equivalent) in the relevant subject or a relevant postgraduate qualification.

Applicants for whom English is a second language must demonstrate an IELTS score of 7.0.

Qualifications gained

University or College	Dates of award	Degree/Diploma	Main subjects	Grade, Class or GPA

Qualifications pending

University or College	Anticipated date of award	Degree/Diploma	Main subjects

Relevant professional experience, as applicable (300 words maximum)			

Research Summary (100 words)

In this practice-based PhD, the candidate will explore the use of sound in creating effective learning environments within a science centre. Supervised by an interdisciplinary team with expertise in composition, music psychology, public engagement, and science education, the student will embark on a thorough literature review before creating and evaluating the impact of three large-scale sound installations for long-term use at the Dundee Science Centre (DSC). This project will meet the concrete goal of providing a uniquely suitable sonic

environment for the DSC, while also contributing to wider conversations about effective sound design in science education contexts.

Research Proposal (1000 words)

Title: The Sounds of Science: a practice-based PhD exploring the use, purpose and potential of music in science centres

The primary purpose of science centres is to educate and enthuse the public, in particular children, about science, technology, and the natural world through informal learning. Whereas traditional museums often attempt to manage the sonic environment, whether through encouraging quiet contemplation or by introducing sound into the environment in controlled events such as concerts, readings, or public talks, science centres encourage visitors to interact freely with exhibits. In so doing, all the noises associated with play and discovery are welcomed, both those made directly by the exhibits, and the human sounds that accompany them. Though this kind of free interaction can facilitate learning, it can also create a noisy atmosphere which may disturb focus, and can ultimately discourage visitors. Indeed, visitor reviews of science centres often mention negatively the sonic chaos of the environment.¹ This problem is now some decades old: 'If interactive museums are concerned with experiential learning, why do the places we inhabit so often allow an atmosphere of acoustic chaos?'²Robert Fry asked in 2002.

In this practice-based PhD project, a student with a background in music composition, sound design, and/or sound-based installation will design and create a series of compositions, sound installations and/or sound interventions for different parts of Dundee Science Centre (DSC), which seek to facilitate learning while also striving to mitigate the effects of unpredictable and noisy sounds coming from multiple directions. Excess noise has been shown to have a detrimental impact on the learning of children, across multiple socio-economic backgrounds.³ By working directly on the sound design with DSC, we thus aim both to make DSC a more inviting, aesthetically pleasing environment for visitors, and to enhance the potential for effective learning to take place. Many science centres have already begun to tackle these issues. Elwick et al. (2020) offer a review,⁴ though their focus is on sonic experiences of younger children, while we intend for the student to consider the experience of visitors and staff of all ages.

In the first year of their PhD the student will complete a literature review: this will include literature specifically about music and sound in science educational contexts, as well as more broadly relevant literature, including from sound design, theatre, psychological acoustics, architectural acoustics, and museum studies. In addition, they will conduct in-person reviews of existing scientific installations which incorporate music. They will visit relevant institutions in the UK and mainland Europe, both those with notably successful sound design (as determined by the student), as well as those with less controlled sonic environments. The

student will also spend considerable time in DSC, observing the physical layout, exhibits, and the way visitors and staff use the space.

For the second and third year of the project, the student will determine the needs of DSC in discussion with key staff, and define their objectives for the creative (practice-based) part of their research, in terms of the music psychological aspects, educational aims, and aesthetic goals. They will take into account the principles of inclusive design, which recognise that making sure the (sonic) environment meets the varied individual needs of visitors will in fact enhance the experience for all.⁵ The student will then create three large-scale installations: depending on the background and interests of the student, this could include creating recordings of instrumental music, writing songs with specific educational content, creating interactive installations, writing music which interacts with the flow of visitors, creating an acoustic background which seeks to integrate the diversity of unpredictable sounds heard throughout the day, and/or creating music for DSC's off-site outreach activities. The student will be given the opportunity for at least one of their installations/interventions to be made collaboratively with DSC curators from the point of conception. Offering the student the opportunity to both 'respond' to existing exhibits and create new ones will be fruitful for the findings and impact of the research.

Evaluation of the outcomes of interventions for all stakeholders will be built into the student's process of creating and delivering their musical compositions and/or sound installations. The student will work closely with DSC and Mhairi Stewart (Head of Public Engagement at St Andrews University) to determine the questions that need to be asked and the best ways to gather data. In the final 6 months of the PhD the student's focus will shift towards analysing the data, to understand better how the sonic environment of DSC, and the student's sound interventions, affect the experience of different demographics of visitors, and of staff. The student's final submission will be mixed mode, consisting of a portfolio of the three musical/installation works, and a written commentary addressing the conception, creation, and effectiveness of each of these works.

The goals of this project are thus twofold. On a local and concrete scale, the student will create music and/or sound installations which will be uniquely suited to the context of DSC. On a larger scale, the student will contribute new knowledge to an ongoing international discussion about how music and sonic interventions can be used most effectively in science centres. Some of this knowledge may also be relevant for museums, science education in schools, and/or educational concerts. While this project was conceived because of the specific needs of DSC, it additionally addresses a number of SGSAH's strategic goals. In particular, it shows how those in the **Creative Industries** and the **Culture and Heritage** sector can work together to better achieve greater **inclusion** within an artistic and science educational context.

¹ e.g. <u>https://www.tripadvisor.co.uk/ShowUserReviews-g186534-d295983-r649499316-</u> <u>Glasgow Science Centre-Glasgow Scotland.html</u> ² Fry, R (2002). Delightful Sound and Distracting Noise: The Acoustic Environment of an Interactive Museum. *J. Museum Ed.* 27:1, 14-17.

³ Shield, JM and Dockrell, JE (2008). The effects of environmental and classroom noise on the academic attainments of primary school children. *J. Acoust. Society Am*. 123:1,

doi.org/10.1121/1.2812596

⁴ Elwick, A et al. (2020). Young children's experiences of music and soundings in museum spaces. *J. Early Child. Res.* 18:2, 174-188.

⁵ Heylighen, A et al. (2008). The Sound of Inclusion: A Case Study on Acoustic Comfort for All. Designing Inclusive Futures. doi:10.1007/978-1-84800-211-1

Knowledge Exchange, Public Engagement & Impact: Contribution to Dundee Science Centre

This proposal, the outputs and research goals have been conceived in collaboration with DSC and have a very tangible and practical benefits to the partner directly, but also to the wider science and discovery centre sector through enhancing the centre's core mission and contributing to a knowledge base of how purposeful sound can contribute, or indeed detract from core mission.

DSC are currently nearing completion of a major redevelopment of exhibits and outreach. Exhibits have been deeply considered with regards the visual aesthetic and tactile environment, however, there has been less emphasis on the soundscape in the centre and how this might contribute to delivering the key outputs for the centre. This project is designed to contribute synergistically to create an environment which in its entirety, through vision, touch, and sound, is conducive to achieving the core mission of the centre.

In addition, this project builds on DSC's history of engagement with science through the arts. The Centre is also known for its collaboration in designing, delivering, and assessing engagement with research projects and exhibits. This project is therefore an evolution of these informal interactions building to a new and greater depth of interaction and knowledge exchange.

Interest in and approach to proposed doctoral project (300 words maximum)

Please tell us a bit about why you are interested in this project, and any thoughts you have about how you might approach it.

Preparedness for proposed doctoral project (300 words maximum)

Please demonstrate how your previous study (UG / MA) and / or professional experience have prepared you for **this particular doctoral project**. This might include reference to your UG and Masters programmes of study and your dissertation topics, specific and appropriate methodological training and/or expertise, work-based learning or employment in a relevant occupation, commissions, installations, collaborations, etc.

Training needs (300 words maximum)

However well prepared applicants may be to undertake this research opportunity, it is expected that they will need to develop new skills during their programme of study.

- Please identify your training needs what skills will you need to develop to ensure that you are able to complete this research project successfully?
- What skills do you seek to develop for professional development purposes?