2017 YCCSA SUMMER SCHOLARSHIP PROJECT SUBMISSION

This form is for prospective project supervisors to submit their projects to be included in the YCCSA Summer Scholarships Programme for 2017.

It is the purpose of the YCCSA Summer School that any projects submitted are novel and interdisciplinary in nature.

Date	5/1/2017
Supervisors' Names and Departments / Affiliation and Contact Email	Dr Helena Daffern, Department of Electronics (helena.daffern@york.ac.uk) Dr Gavin Kearney, Department of Electronics (gavin.kearney@york.ac.uk) Dr Chris Neale, Stockholm environment institute (chris.neale@york.ac.uk)
Project Title	Singing in a Virtual Reality Environment
Project Description	*Please aim for around 2 paragraphs. Remember that this must be pitched at prospective project scholarship students.* *If your project proposal is for a group project, outline the overall structure.* A virtual reality experience has been developed by the supervisor's research teams to allow an individual to sing as part of an ensemble, whereby the user can replace a member of a quartet and hear and see themselves in situ in the original venue. The main intention for this project was for commercialisation of a product so that people could sing in groups from their own home. However, we now wish to explore a radically new idea based on using this VR experience as a tool for research, and building a new collaboration with Chris Neale at the Stockholm Environment Institute. Using the VR experience to explore the impact singing with other people has on an individual, including their voice, their subjective stress levels, neural responses (as measured by mobile electroencephalography (EEG) and their heart rate. This project will include three students exploring this larger idea from three perspectives, with work on the technology, experimental design and analysis. It is hoped that the project will prove fruitful as an idea and provide the foundations for this collaboration to work on a larger project in the future Project 1: To analyse the vocal activity of an individual singing in a virtual reality environment Project 2: To analyse the neurological / heart rate activity of an individual singing in a virtual reality environment Project 3: To improve the portability, realism and spatial audio quality of the Virtual Reality Singing Environment
Required Skills	*A short synopsis of the necessary skills for the summer student(s). Please be careful to specify the skills rather than requiring students to have followed a particular degree*

	programme. *Specify required skills separately for each student in a group project.* Project 1: This project would be suitable for someone from either an acoustics (audio engineering), Linguistics or Computer science background with some skills in audio recording; some knowledge of voice science (linguistic or acoustic); experience using audio analysis software such as PRAAT or MATLAB; ability to learn new hardware / software quickly is essential. Project 2: Personable students who can work well with a range of participants. Ideally would have experience in using human sensors including heart rate or EEG. Should be statistically literate, able to manage data sets and undertake basic statistical tests to look for differences between conditions Project 3: Basic skills in audio signal processing; experience of audio recording; experience of using real-time audio processing software such as Max-MSP; experience of digital audio workstations; experience using MATLAB. Experience of using the Unity game engine would also be beneficial, but not essential.
Supervision and Collaboration Arrangements	*Outline the planned workshare arrangements over the summer, including specific roles of supervisors.* All three supervisors will be connected to the individual student's work which will be fully integrated into the whole project. Fortnightly project meetings will take place with the whole team (students and supervisors). Initially there will be more meetings together as the project is reliant on building a protocol that addresses the central question of the project from all three perspectives. Based on expertise each project will also be assigned a 1st and 2nd supervisor as the main academic support for each student: Project 1: 1st Supervisor: H. Daffern 2nd Supervisor, G. Kearney Project 2: 1st Supervisor, C. Neale 2nd Supervisor, H. Daffern Project 3: 1st Supervisor, G. Kearney, 2nd Supervisor H. Daffern
Project Dates	*The summer school runs for 9 weeks, starting on Monday, 10 July 2017 and finishing on Friday, 8 September 2017.*
Other Information	*Anything that doesn't easily fit above.* Chris Neale is currently working on the EPSRC funded Mobility Mood and Place project (https://sites.eca.ed.ac.uk/mmp/) which uses the EEG equipment mentioned above.
References	*Please include at least one relevant source of information.* Kearney, GC, Daffern, H, Thresh, L, Omodudu, H, Armstrong, C & Brereton, JS 2016, 'Design of an Interactive Virtual Reality System for Ensemble Singing'. in *Proceedings of the Interactive Audio Systems Symposium.* Interactive Audio Systems Symposium, York, United Kingdom, 23 September. Aspinall, P., et al., *The urban brain: Analysing outdoor physical activity with mobile EEG.* British Journal of Sports Medicine, 2013.

When complete, please email the form to sarah.christmas@york.ac.uk