UNIVERSITY OF WEST LONDON
The **Career** University

Job Description

Job title	Research Assistant
School / department	London College of Music
Grade	Research B point 22
Line manager	Associate Professor in Music
Responsible for	Daily management of duties

Main purpose of the job

This position will carry out research and development to contribute to the UWL part of the 'Haptic Authoring Pipeline for the Production of Immersive Experiences' (HAPPIE) project, assisting principal investigator Professor Justin Paterson.

Key areas of responsibility

The successful applicant will be responsible for the follow work:

Essential –
- 3-D modelling/animation
- Development of virtual-reality environments (preferably with Unreal Engine)
- Advanced (desktop) music production
- Understanding of the application of semantic-audio approaches to music production
- Experimental design and conducting participant-based studies and subsequent analysis of the data

Additional –
- Good C++ skills
- Experience of working with 3-D audio

In addition to the above areas of responsibility the role holder may be required to undertake any other reasonable duties relating to the broad scope of the position.

Dimensions / back ground information

UWL is funded by the Innovate UK 'Audience of the Future' call. The HAPPIE project aims to develop a generic piece of middleware that will facilitate the future integration of haptic-feedback hardware and software applications. UWL is conducting the 'music production' demonstrator of the technology.

Context

Virtual and other extended realities will soon grow beyond the games sector, and become a major disruptive force, impacting productivity, education, medicine and daily life. Virtual reality is being overhauled by the promise of extended realities where computer-generated artefacts can be superimposed upon, and integrated into the user's physical space. Systems such as Hololens and Magic Leap are leading the way, yet the visual illusions that they offer are undermined by that all-pervasive feature of the real world – touch. When the user reaches out to an

object, their hand simply passes through it, shattering the illusion, whilst simultaneously rendering the gesture inaccurate.

Music production follows a long-established paradigm, that of the recording studio, be it physical and/or desktop. In both cases, the interface is highly complex with a very steep learning curve. Huge numbers of parameters need to be managed in parallel, and the operator constantly needs to correlate these with aural effect. Many novel interfaces have been developed in efforts to manage such problems, with bespoke hardware associated with specific manufacturers and touchscreen apps offering new modes of engaging with limited feature sets. There have been some attempts in academia to form 3-D representations of sound (and its control), but these have been very awkward to use in the absence of actual touch.

UWL demonstrator

Through the convergence of emergent technologies, the opportunity suddenly exists to simultaneously combine and address these issues. This project defines the future of interacting with sound in mixed reality. What this means is that any sound (think drumbeat or vocal melody) might be represented by a physical animated model that is superimposed on the user's field of view (which might be a recording studio and/or its software emulation). Through use of haptic-feedback prosthetics, the user will be able to reach out and actually touch the shape, and through physics-based modelling, feel a natural weight and resistance, and be able to sculpt the animation with their hands by stretching or twisting etc. Not only will it change appearance with lifelike behaviour, but the shape will be intelligently mapped to sets of audio parameters utilising semantic relationships. Thus, the user's action will instantly and intuitively modify the sound, doing away with the need to iteratively adjust myriad controls, yet still allowing them all to be visible and adjustable as might be required by using mixed-reality solutions. Such manipulation might be of a sound in isolation or whilst it plays alongside many others. The control could also be over an entire music-mix in stereo, or even 3-D audio.

The funding is also supporting events that will draw in industry, the media, academia and the general public, and help to publicise this UK innovation in order to further increase awareness and impact.

Team

The principal investigator is Professor Justin Paterson of the University of West London – an experienced researcher, music producer and software developer. He has now teamed up with haptics company Generic Robotics and Numerion Software, a 3-D simulation technology/tools company; the HAPPIE consortium. Between them, these companies are defining a haptics pipeline – a workflow that enables transparent communication from software application to user experience, where the graphics match the properties of the real world, and the user can feel actual friction and texture. Sliced Bread Animation, Open University and Science Museum Group are also involved in the consortium, each developing different applications of haptics.

Person Specification

Criteria	Essential	Desirable
Qualifications and/or membership of professional bodies	• First degree in a relevant discipline • Doctorate in a relevant discipline	• Master's degree in a relevant discipline
Knowledge and experience	Experience is required in the job-specific skills below.	• Understanding of a variety of relevant research methodologies • Experience of statistical methods of analysis • Use of haptic-feedback devices • Development associated with mixed-reality headsets
Specific skills to the job	• 3-D modelling/animation • Development of virtual-reality environments (preferably with Unreal Engine) • Advanced (desktop) music production • Understanding of the application of semantic-audio approaches to music production • Experimental design and conducting participant-based studies and subsequent analysis of the data	• Good C++ skills • Experience of working with 3-D audio • Experience of preparing IP-related documentation • Experience of writing academic articles
General skills	• Independent workload management • Excellent communication skills • Good team integration • A robust and inquisitive approach to mastering new technologies	
Other		

Disclosure and Barring Scheme   Is a DBS Check required: This post does not require a DBS check Before making a selection, please refer to the University's Disclosure and Barring Checks Guidance for Staff and Criminal Convictions, Disclosures and Barring Staff Policy and Procedure. If a DBS check is required for the role, a Check Approval Form will need to be completed.

Essential Criteria are those, without which, a candidate would not be able to do the job. Applicants who have not clearly demonstrated in their application that they possess the essential requirements will normally be rejected at the shortlisting stage.

Desirable Criteria are those that would be useful for the post holder to possess and will be considered when more than one applicant meets the essential requirements.