StudentShapers Recruitment: Calling all students with an interest in Crowd science, Buildings, Coding, and Virtual Reality

ViRSE – Virtual Reality multi-use building laboratory to explore crowd dynamics

Bursary:

£365/week (8 full time weeks) – three students.

Who should apply:

Students with an aptitude for coding and enthusiasm for creating software for a built environment crowd dynamics are best placed to meet the requirements. We anticipate that students who have attended a previous semester of the Science of Crowds module will be most suitable, as they will have experience of the type of building installation needed to be designed in the VR environment. We anticipate recruitment from students in Physics, Computing, Electrical Engineering, Civil Engineering but all Imperial undergraduates are eligible. Preference will be given to students who are not in their final year.

Campus/Location: South Kensington; some work can be done remotely, but on campus attendance will be expected for at least 50% of the project.

Project details:

This is an opportunity to develop a three-dimensional 'building environment simulator' for use in virtual-reality teaching across Imperial College, with the I-Explore Horizons programme and the Department of Civil and Environmental Engineering. This engagement is for three students, who will design the ViRSE world(s) as a team.

You will be working in partnership with Prof Arnab Majumdar and Dr Georgia Bateman (CEE) and Dr Mark Sutton (ESE) to design, code and test a system to construct a free-form building environment in Virtual Reality. The buildings will seek to be multi-storey and multi-purpose, with retail units, offices, restaurants, cinema/ concert hall. Within each building, specific design constraints that affect evacuation will be included, e.g. narrow corridors, exits and entrances where crowds may congregate, staircases. Finally, the capacity to affect evacuation will be introduced, e.g. smoke, fire.

The goal is for this environment to form the core of an interactive virtual reality application in which students can experiment with and become familiar with the ways in which crowds move and evacuate when emergencies occur, e.g. smoke detected. The figures below indicate an initial development of avatars and individuals in a VR scenario of movements in a sports hall.

The students undertaking this engagement will gain a deeper understanding of crowd dynamics and emergency evacuations, as well as gaining technical skills and experience in coding (in C#/Unity), and in three-dimensional visualisation. They will also gain experience in collaborative software-development as part of a professional team.

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STUDENTSHAPERS

This engagement is part of the ViRSE (Virtual Reality Student Experience) project, which is developing a virtual reality platform to ease the development and deployment of 'multi-player' virtual reality into Imperial's teaching across a range of departments and subjects. ViRSE is built on the Unity game engine, and all ViRSE applications (including this project) are also built within Unity; code is written in the C# programming language. Students will not need to build a VR interface, write rendering code, or concern themselves with networking or administrative issues; these are handled by the ViRSE framework and the Unity engine. The development in this engagement will concentrate on the creation of a three-dimensional 'environment' specific to the project, and creating and testing the code necessary to make it function, and to interface with the ViRSE system.

All ViRSE student shaper engagements will commence with a two-week full time training course , which will provide the necessary grounding in the C# language, object-oriented programming, the Unity engine, the ViRSE platform, and 3D modelling tools. This course will take place on-campus July 3rd-14th 2023. In subsequent six project weeks the ViRSE student partners will lead on the development of the particular applications within Unity, in collaboration with the academic lead, and with the ViRSE team providing technical support and advice. These six project-development weeks are flexible in precise timing, but should take place over summer 2023, before the start of Autumn term of the 23/24 academic year.

How to apply:

Applications (300-500 words) should be made via the 'Student Expression of Interest' form on the StudentShapers website (here) or accessed using the above QR code. This will then be distributed directly to the appropriate staff partner.

Deadline: 31st March 2023

Contact details: Contact Prof Arnab Majumdar (Civil Engineering; a.majumdar@imperial.ac.uk) or Dr Mark Sutton (m.sutton@ic.ac.uk) or further information