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**The Faculty of Computing, Engineering and the Built Environment (CEBE) is making major investments in growing the quality and volume of research across its two constituent Schools (Schools of Engineering and the Built Environment, and Computing and Digital Technology) through investments in academic staff and researchers, doctoral students and new labs, workshops and equipment.**

The [Water, Environment and Communities Research Centre](https://www.bcu.ac.uk/computing-engineering-and-the-built-environment/research/water-environment-and-communities) is located in the Faculty of Computing, Engineering and the Built Environment (CEBE) and based at our City Centre Campus. The Centre undertakes applied research on a range of contemporary themes relating to water and the environment reflecting the diversity and interdisciplinary nature of issues concerning the development of resilient communities. The Centre undertakes a portfolio of applied interdisciplinary research, knowledge exchange, education, community engagement and advice for decision makers and policy makers at all levels. The Centre’s work embraces and integrates local, national and international perspectives on water, focusing on environmental challenges towards sustaining resilient communities.

We have a range of PhD studentships now available across the range of disciplines represented in the centre. There are a limited number of funding opportunities available with some studentships including full scholarships while others having partial or self-funding options. Funding will be determined based on the strength of the candidate and quality of the proposal. Some of these projects also include support from our collaborating organisations.

**USING VIRTUAL REALITY GAMES TO ENCOURAGE POSITIVE FLOOD RESILIENT BEHAVIOURS AMONG RISK PROPERTY OWNERS**

**How to apply**

**The closing date for applications is 23.59 on Sunday 1 December 2019.**

To apply, please complete the [project proposal form](http://www.bcu.ac.uk/Download/Asset/1c822112-124b-e911-818d-005056831842) , **ensuring that you quote the project reference,** and then complete the [online application](https://www.bcu.ac.uk/courses/bsbe-research-degrees-phd-2018-19)  where you will be required to upload your proposal in place of a personal statement.

You will also be required to upload two references, at least one being an academic reference, and your qualification/s of entry (Bachelor/Masters certificate/s and transcript/s)

For international applicants, a valid English language qualification, such as International English Language Test System (Academic IELTS) or equivalent with an overall score of 6.5 with no band below 6.0, must be submitted with your application.

These studentships come with full fee waivers for both UK and international candidates. There will also be the opportunity for some paid teaching work of up to 180hrs per academic year. Exceptionally strong candidates may also be offered a bursary. Final funding arrangements will be determined based on the strength of the candidate and quality of the proposal. Some of these projects also include support from our collaborating organisations.

You can find further details on studying for a PhD and details of how to apply [here](https://www.bcu.ac.uk/courses/bsbe-research-degrees-phd-2018-19)

**Project title: USING VIRTUAL REALITY GAMES TO ENCOURAGE POSITIVE FLOOD RESILIENT BEHAVIOURS AMONG AT RISK PROPERTY OWNERS**

**REF: CEBE-VIRREA**

**Contact:**

The successful candidate will be supported by an interdisciplinary research team, consisting of Dr Andrew Wilson, Dr Vahid Javidroozi and Professor David Proverbs. For further information please contact the Director of Studies, Prof David Proverbs, [david.proverbs@bcu.ac.uk](mailto:david.proverbs@bcu.ac.uk).

**Overview:**

Background

Flooding is a global phenomenon which causes widespread devastation, economic damages and loss of human life (Jha, et al., 2012). The dramatic increase in average annual economic and social costs of flood disaster can, to a greater extent, be explained by the effect of climate change, population growth and the increasing urbanisation of societies (Evans et al., 2004; OST 2007). Fay et al (2009) asserted that floods currently account for half of the fatalities across the world arising from natural disasters. In particular, there now appears to be clear evidence that climate change will lead to an increase in the frequency and severity of extreme precipitation and other weather events (IPCC, 2007, IPCC 2012). For the UK this may well result in wetter and stormier winters (UKCIP, 2009). As such, it is predicted that the risk of flooding will at least double by 2080 (Evans et al., 2004) and that annual average damages will rise to some £4 billion by 2035 (Environment Agency, 2009).

It is widely argued that structural flood defences alone are not enough to tackle the level and types of flood risk currently being faced by floodplain residents and that there is a need for a paradigm shift to integrated flood risk management, by balancing structural and non-structural measures (Jha et al,. 2012). Under this paradigm homeowners need to take more responsibility for managing flood risk at an individual property level, if not for the purpose of reducing flood damage on their properties but at least to reduce the intangible impact of their households, by for example, adapting their properties to potential future flood risk (ABI, 2006, Pitt, 2008, Lloyd, 2008, ABI, 2008, Halcrow, 2009, Joseph et al., 2011a). Given that there are over 5million homes at risk of flooding in England and Wales alone, this represents a significant challenge.

In recent years, UK Government policy has tended towards the encouragement of local ownership of flood risk challenges as part of the devolution strategy and the localism agenda. Additionally, flood risk management approaches have moved away from hard engineering defences towards the concept of *living with water* and *making space for water*. This has seen a rise in the concept of resilience and with it towards more sustainable approaches to flood risk management. This focus on resilience has led to the promotion of property level flood resilience measures to help protect individual properties and importantly speed up the recovery / reinstatement process. Despite this and ongoing awareness raising campaigns and incentive schemes, there has hitherto been low up take of such measures within the at risk flood community. A number of barriers to uptake have been found to exist including cost, information, perception, appearance, psychological issues as well as a lack of expertise and advice on such interventions. Most property owners need professional, reliable and independent advice on the design and implementation of measures and interventions, taking into account the nature of flood risk, characteristics of the building and range of measures deemed appropriate. Previous research has found this expertise to be lacking among the professional guidance available.

Virtual, augmented and / or mixed reality solutions offers home owners or home builders a way of visualising and interacting with complex ‘what if‘ scenarios regarding managing home flood defences. This project will explore the use of virtual reality technologies to model the different risks factors that would typically be encountered in a vulnerable home. This will then result in the creation of a simulated environment where people can learn appropriate home flooding management strategies.

Proposal

To model the different scenarios that are typically associated with home flooding.

To explore and evaluate the application of how virtual and augmented technology can be used to raise awareness and support the take up of property level flood resilience.

To develop a fun, entertaining yet informative simulation to support decision making process when designing which range of flood resilience interventions to adopt given the circumstances of the property.

To provide guidance and training for experts (building surveyors, loss adjusters, etc) and other property professionals in advising property owners on which measures to adopt.

To measure and evaluate the educational effectiveness of the simulation.

**Person specification:**

MSc or equivalent professional or research experience in Computer Games Technology / Design with skills in Unity or Unreal, C#, C++, knowledge of usability and user experience design and evaluation.

**References:**

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