Applications are invited for the following a PhD studentship for the following project:

**Microphysiological models of human bone: A new platform for investigation and drug screening.**

The position will be based within the Hoey Lab at the Trinity Centre for Biomedical Engineering, Trinity College Dublin and will be part of the Materials for Health platform within the Advanced Materials and Bioengineering Research Centre (AMBER) centre.

**Summary of project:** Drug development is a long, flawed process that can take 15 years and cost €2.3Billion per drug. 90% of drugs fail in clinical studies while 10% of drugs fail even after regulatory approval. A key determinant in this failed process is the lack of adequate lab-based models to test drug efficacy. Current human cell culture models are rudimentary and pre-clinical animal models do not accurately replicate the human response. Osteoporosis is a debilitating bone loss disease affecting over 200million people worldwide and current therapeutics are severely limited. This has resulted in a ‘crisis in the treatment of osteoporosis’. Therefore, the proposed project aims to develop a microphysiological model of human bone (bone-in-a-dish) and osteoporosis (disease-in-a-dish) that can be used to better understand bone physiology and importantly pathophysiology. These models would represent innovative lab-based platforms for orthopaedic drug development and screening.

This project will combine expertise within the applicant’s team, along with collaborators in the University of Birmingham, to develop new materials and cell culture platforms which will facilitate the recapitulation of human bone physiology in a dish, focusing on the establishment of a human osteocyte network within a vascularised and mineralised tissue that is capable of undergoing remodelling, in response to both hormonal and physical cues. This first of its kind platform will then be used to screen novel therapeutics which are being developed by the applicant in the form of extracellular vesicles (EVs) and G-protein coupled receptors as treatments for osteoporosis and will compare against commercial standards.

![Microfluidic chip containing a vascularized osteocytic bone](image)

**Fig. 1. Microfluidic chip containing a vascularized osteocytic bone**

*The outcome of this project will represent a transformative advance in our understanding of bone physiology that, through advanced training of a scientist/engineer, will open new frontiers in osteoporosis therapeutics development/testing leading to significant socioeconomic benefit.*

The ideal applicants will have a 1st Class Honours Bachelor’s degree in Biomedical, Chemical or Mechanical Engineering or the Biomedical Sciences (or related disciplines). Experience in biomaterials, biofabrication, tissue engineering, and mechanobiology would be advantageous. Specific skills that would enhance a candidate’s application would include experience in some of the following areas: Cell culture and associated techniques; histological and imaging techniques; Bioprinting; Advanced microscopy; RT-PCR.

The researcher will work closely with other members of a multidisciplinary project team including PIs, postdoctoral and postgraduate researchers within this TCBE & AMBER research cluster. Excellent written and oral communication skills are essential.

**How to apply:**

CVs with the names and addresses of three referees should be e-mailed to: Prof. David Hoey; E-mail: dahoey@tcd.ie

Positions will remain opened until filled but preferred start date is September 1 2020. Only short-listed applications will be acknowledged.

This position is funded by AMBER, SFI Research Centre for Advanced Materials and BioEngineering Research & CRANN Institute. The AMBER research centre, as a community of researchers, welcomes its responsibility to
provide equal opportunities for all. We are actively seeking diversity in our research teams and particularly encourage applications from underrepresented groups.