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

Recapitulation of cardiac bioconductance by combinatorial additive manufacturing of intrinsically and extrinsically conducting materials for cardiac tissue engineering

The position will be based with the Monaghan and Nicolosi Labs at Trinity Centre for Bioengineering (TCBE) and Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN), Trinity College Dublin and be part of the Materials for Health platform within the Advanced Materials and Bioengineering Research (AMBER) Centre.

Summary of project

Every sixth man and seventh woman will die from a heart attack or related complications Heart attacks lead to the death of functional cells in heart muscle (cardiomyocytes; CMs) which cannot be replaced. CMs in vivo are exposed to a unique environment defined by the local extracellular matrix (ECM), dynamic mechanical forces via the beating of the heart and electrical action potentials being generated by the heart's electrical conduction system. Electroconductive biomaterials in heart tissue engineering have the potential to be a building block for advanced therapeutic medical devices and also to achieve functional cardiac tissue in vitro.

This project is a unique materials engineering approach to develop a cardio-inductive platform based on mechanical, electrical and ECM cues to generate the next generation of biomaterials. This research aims to generate the following outcome: a **cardio-inductive biomaterial system** derived from **extrinsically conductive nanomaterials** that have appropriate **mechanical**, **electroconductive** and **biocompatibility** properties that can facilitate the generation of cardiac organoids in vitro using primary cells and efficiently facilitate cardiomyogenic differentiation from progenitor cells. These advances will not only improve quality of life for patients, but also provide tools to study disease and perform pharmaceutical research.

This PhD program will develop a 3D biomaterial scaffold using synthetic nanomaterials together with naturally derived ECM that is biocompatible, suitably electroconductive and cardio-inductive towards facilitating the culture of cardiac organoids in vitro and enhancing stem cell cardiomyogenesis in vitro. Methods will include materials chemical characterisation techniques, cell culture, biochemical assays, mechanical testing, stem cell culture, immunohistochemistry, instrumentation. Support and training are provided throughout all stages.

The ideal applicants will have a 1st Class Honours Bachelor's degree in the Biomedical Sciences or Biomedical, Chemical or Mechanical Engineering (or related disciplines). Experience in biomaterials development or working with electroconductive materials would be advantageous. Specific skills that would enhance a candidate's application would include experience in some of the following areas: scaffolds in tissue engineering, materials synthesis and functionalisation; cell culture; mechanical testing of materials; advanced microscopy; PCR; immunohistochemistry and other histological and imaging techniques. 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 with the subject line '***AMBER PhD'*** to: Prof. Michael Monaghan; E-mail: monaghmi@tcd.ie. Provision of referees will mean that permission to contact them is granted.

Positions will remain opened until filled but preferred start date is September 2 2019. Only short-listed applications will be acknowledged. This position is funded by the SFI-research centre AMBER.

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**.**