



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin



Postdoctoral Researcher in 3D Printing, Biomaterials and Tissue Engineering at Trinity College Dublin and the Royal College of Surgeons in Ireland

Position: Postdoctoral Research Fellow

Project Title: Tissue-derived Bioinks for 3D Printing Applications- Material Characterisation, Biocompatibility and Immunomodulatory Behaviour

Project Description: This project is part of multidisciplinary team that is exploring the use of emerging 3D Printing and 3D Bioprinting strategies for Tissue Engineering and the development of next generation medical devices. The project is part of the AMBER centre (<http://ambercentre.ie>) and located primarily at dedicated bioprinting and additive manufacturing laboratories based in Trinity College Dublin. With the advent of 3D printing in tissue engineering, the advantages of precise deposition and highly defined geometric patterning 3D biomaterial structures that it offers, efforts have been made to combine the benefits of ECM hydrogels with this technology. However, many of the existing ECM bioinks lack the necessary physiologically relevant mechanical properties, e.g. compressive strength, especially for application to high load environments in musculoskeletal, or high wear environments such as the cardiovascular system. Other drawbacks include slow thermogelation times, hindering printing speeds, and rapid degradation times, limiting their potential active therapeutic window for in vivo applications. Further chemical functionalisation of the ECM through the incorporation of photoactive moieties to the collagen fibre backbone allows for light polymerised photogelation, increased polymer network crosslinking, and improved tuning of material properties. To this end, we are developing a range of photoactive ECM shear thinning hydrogels, which can be used as injectable therapeutics or as bioinks for 3D bioprinting applications. This approach aims to combine the intrinsic regenerative potential of ECM and engineering precision of 3D printing, with distinct improvements in material and mechanical properties. In addition, understanding how these bioinks influence macrophage phenotype is important for in vivo applications. Engineering an appropriate immune response is integral to successful tissue regeneration given its importance to clearing damaged cells and tissue, recruiting host stem cells and inducing vascularization.

For more information please contact Prof. Conor Buckley conor.buckley@tcd.ie

Applicant criteria: The ideal applicant will have a PhD in biomedical engineering, biomaterials, tissue engineering, biochemistry and immunology or a related discipline. Previous experience in 3D printing, hydrogels, tissue engineering, cell culture, gene expression, biochemical analysis, mechanical testing, histology techniques, immunomodulatory behaviour would be highly advantageous. Excellent written and oral communication skills are essential. An excellent publication record and/or development of intellectual property would be advantageous.

How to apply: CVs with the names and addresses of three referees should be submitted via email to Prof. Conor Buckley conor.buckley@tcd.ie with the subject heading "AMBER-Bioink Postdoc". Positions will remain opened until filled but preferred start date is **January 2021**. Only short-listed applications will be acknowledged.

The Buckley lab: Prof. Buckley leads a multidisciplinary research group in the School of Engineering at Trinity College Dublin and is a Principal Investigator within the Trinity Centre for Bioengineering (TCBE) and Advanced Materials Bioengineering Research (AMBER) Centre. The goal of the Buckley lab is to develop novel responsive biomaterials and cell-based strategies to regenerate damaged tissues to restore function using minimally invasive strategies (MIS). The main research interests of the Buckley lab include intervertebral disc, peripheral nerve, meniscus and cartilage regeneration, cellular microencapsulation for therapeutic regeneration, injectable biomaterials, 3D bioprinting, tissue cryopreservation, biomimetics and tissue decellularization strategies for innovative clinical intervention. For more information please visit our website: <https://www.buckleylab.eu/>

Prof. Buckley has received funding in the areas of biomaterials, tissue engineering and regenerative medicine as PI (>€3.5million) and as co-investigator (>€10.45million). He has published 70 international peer reviewed journal articles and over 180 conference publications. Prof. Buckley also founded the Med3DP initiative (www.med3dp.com) to develop medical devices for humanitarian healthcare using 3D printing technology. Buckley is also PI on several commercial projects developing biomaterials for peripheral nerve repair (Integra Life Sciences) and bioprinting for next generation implantable devices and tissues for orthopaedic applications (Johnson & Johnson). He recently received a European Research Council (ERC) Consolidator award to develop personalised medicine approaches to regenerating the intervertebral disc

The Kelly Lab: Dr Daniel Kelly is the Professor of Tissue Engineering at Trinity College Dublin. He is also the leader of the biomaterials platform in AMBER, the Science Foundation Ireland funded materials science centre based in Trinity College Dublin. He is a past recipient of a Science Foundation Ireland President of Ireland Young Researcher Award, a Fulbright Visiting Scholar grant (at the Department of Biomedical Engineering in Columbia University, New York) and three European Research Council awards (Starter grant 2010; Consolidator grant 2015; Proof of Concept 2017). His lab focuses on developing novel tissue engineering and 3D bioprinting strategies to regenerate damaged and diseased musculoskeletal tissues. More information can be found here: <https://www.tcd.ie/biomedicalengineering/regenerative/kellylab/>

About the Advanced Materials and Bioengineering Research Centre (AMBER): AMBER is a Science Foundation Ireland funded centre that provides a partnership between leading researchers in materials science and industry. More information can be found at <http://ambercentre.ie/>

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.

About the Trinity Centre for Biomedical Engineering (TCBE): TCBE is a key research centre in Trinity College combining fundamental research with translation to clinical practice. TCBE provides a structure to bring bioengineers, basic scientists and clinicians together to focus on important clinical needs and has four key research themes: Medical Devices & Advanced Drug Delivery, Neural Engineering, Biomechanics & Mechanobiology, Tissue Engineering & Regenerative Medicine. The project work will be carried out in our state-of-the-art facilities located in the Trinity Biomedical Sciences Institute. The successful applicant will join a dynamic, multidisciplinary lab consisting of 20 postdoctoral researchers and PhD students based in the Trinity Centre for Bioengineering. More information can be found at <https://www.tcd.ie/biomedicalengineering/>