# PGR Studentship Information Template 2021 entry

* Please complete the template with as much information as possible.
* \*fields are essential.
* If you have information that does not have a label, please create a new row in the table for it.

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| **\*Title of studentship** | 3D Printing & Bioprinting in vascular access for haemodialysis |
| **Value / what is covered?** |  |
| **Awarding body** |  |
| **Number of studentships** |  |
| **\*Summary descriptive text / Example of research project** | Over the last 50 years, the provision of chronic dialysis has steadily increased with over 2 million people worldwide being treated with dialysis. Dialysis is a procedure used to remove waste products and excess fluid from the blood when there is decreased kidney function. The two most common types of dialysis include Haemodialysis (HD) and peritoneal dialysis (PD). The number of patients with end-stage kidney disease keeps steadily raising, with a vascular access been a HD patient’s lifeline. A vascular access (VA) lets large amounts of blood flow continuously during HD treatments to filter as much blood as possible per treatment. A well-functioning VA, is a mainstay to perform an efficient HD procedure. There are three main types of access: native arteriovenous fistula (AVF), arteriovenous graft (AVG), and central venous catheter (CVC), with AVF remains the first choice for chronic HD. Once autogenous options have been exhausted, prosthetic fistulae become the second option of maintenance HD access alternatives. The native AVF remains the first choice for VA, especially because of the infectious and thrombotic complications more frequently associated with AVGs and CVCs. The aim of this project is to develop the next generation of the two types of vascular access that currently are used for long-term, AVF and AVG, by using additive manufacturing technologies. The vascular grafts, will be prepared by 3D Printing and Bioprinting, and will be incorporated with a variety of drug agent(s) for sustained and controlled release. The surgeons will also be able to demand bespoke production in the hospital. Eventually, the quality of life of patients will be substantially improved.  The specific objectives of this work are as follows:   1. Vascular grafts Designs and Modeling. 2. Physicochemical properties / assessment of polymers. 3. Manufacturing & characterisation. 4. *in vitro* release, cytotoxicity and antimicrobial studies. 5. Sterilization and Packaging / Process Validation. |
| **\*Supervisor(s)** | Dr Dimitrios A. Lamprou (<https://pure.qub.ac.uk/en/persons/dimitrios-lamprou>) |
| **\*Eligibility / residence Status** |  |
| **Country** | Northern Ireland |
| **\*Start date and duration** | 1 October 2021 |
| **\*Faculty** | MHLS |
| **\*Research centre / School** | Pharmacy |
| **Subject area** | 3D Printing, Bioprinting, Drug Delivery, Medical Devices, Pharmaceutical Technology. |
| **Candidate requirements / Key skills required for the post** | Applicants should have a 1st or 2.1 honours degree (or equivalent) in a relevant subject. Relevant subjects include Pharmacy, Pharmaceutical Sciences, Biochemistry, Biological/Biomedical Sciences, Chemistry, Engineering, or a closely related discipline. Students who have a 2.2 honours degree and a Master’s degree may also be considered, but the School reserves the right to shortlist for interview only those applicants who have demonstrated high academic attainment to date |
| **\*Deadline for applications** |  |
| **\*How to apply / contacts** | Postgraduate Research applicants for Pharmacy who are interested in applying for a fully funded DFE studentship must have applied to Queen’s, via the Direct Applications Portal, and submitted all required supporting documents by the closing date, which will be announced later in the Academic year.  <https://dap.qub.ac.uk/portal/user/u_login.php> |
| **Relevant links / more information** | <http://www.qub.ac.uk/schools/SchoolofPharmacy/Research/PostgraduatePositions/>  <http://www.qub.ac.uk/schools/SchoolofPharmacy/Research/> |
| **Keywords for search filters** | 3D Printing, 3D Bioprinting, Drug Delivery, Vascular grafts, kidney, Haemodialysis |
| **Training provided through the research project** | The successful applicant will be integrated into QUB research groups of experienced researchers with access to world-leading facilities. The techniques that will be used during the project cover a wide-range and include: Atomic Force Microscope (AFM), Computed Tomography (CT), Contact Angle Goniometry (CAG), Differential Scanning Calorimetry (DSC), Fourier-Transform Infrared (FTIR) Spectroscopy, Rheology, Scanning Electron Microscopy (SEM), 3D Printing equipment and software, *In Vitro* Release Studies, and modeling. |
| **Expected impact activities** | The PhD student would be encouraged to engage in a variety of impact activities, disseminate the research project findings through public talks, and participate in QUB showcase events. Examples of impact activities includes: Blogs or web articles, Magazine articles, Public lectures, School visits, oral & poster Presentations (at local, national and international conferences), and Publication of scientific papers in peer reviewed journals. |