***Title of studentship**	Novel Delivery Systems for Transdermal and Intradermal Drug Delivery
Value / what is covered?	Fully funded 100% of UK/EU tuition fees paid and an annual stipend for UK residents only (living expenses), currently at £14,777.
Awarding body	DFE
Number of studentships	1
***Summary descriptive text / Example of research project**	Progress in drug design has led to the development of new peptides, proteins, and drug molecules. However, the limited ability to deliver selectively these molecules at well-defined dosing regimens and without invoking drug-resistance remains a significant challenge. Therefore, the development of effective therapies relies on the development of effective carriers. Pain, skin thickening due to recurring injections, needle phobia and pharmaceutical leakages on the skin surface have motivated vigorous research on technologies for local, transdermal, and intradermal delivery. The aim of this Ph.D. project which includes materials characterisation, computational modelling and *in vitro* studies, is to develop the new generation systems for transdermal and intradermal delivery. Aims to develop and optimise a method to successfully delivering a range of molecules using novel technologies. Therefore, 3D printed Microneedle (MN) arrays and Electrospun Polymeric patches, featuring different designs will be designed and manufactured by employing a variety of printers and biocompatible polymers. These systems will be designed using computer-aided design (CAD) software followed by Finite Element Modelling (FEM). Numerical analysis technique, such as FEM, will be employed in order to study complex geometries and response to various body conditions prior to the *in vitro* evaluation. The specific objectives of this work are as follows: (i) To develop a rapid manufactured release system. (ii) To determine the best combination of materials (e.g. polymers, sugars, plasticisers) for the development of the next generation transdermal and intradermal systems using 3D printers and electrospinners. (iii) To characterise the developed systems using standard and advanced physicochemical characterisation techniques. (iv) To evaluate the systems *in vitro*.

***Supervisor(s)**	• Dr Dimitrios A. Lamprou (https://pure.qub.ac.uk/portal/en/persons/dimitrios-lamprou(b349022a-2087-46d6-a727-f180d16be470).html) • Prof Ryan F. Donnelly (https://pure.qub.ac.uk/portal/en/persons/ryan-donnelly(7f46a524-c3a4-46a9-b347-834f0a3640f2).html)
***Eligibility / residence Status**	UK/EU only
Country	Northern Ireland
***Start date and duration**	1 October 2019 Funding covers a three-year full-time PhD.
***Faculty**	MHLS
***Research centre / School**	Pharmacy
Subject area	Pharmaceutical Technology, Pharmaceutics, Formulation, 3D Printing.
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.
***Deadline for applications**	7th January 2019
***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, Electrospinning, Formulation, Pharmaceutics, Transdermal.
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. Techniques to be used include: Atomic Force Microscope (AFM), Contact Angle Goniometry (CAG), Differential Scanning Calorimetry (DSC), Nuclear Magnetic Resonance (NMR) Spectroscopy, Rheology, Scanning Electron Microscope (SEM), X-Ray Powder Diffraction (XRPD), Polymer Characterisation Techniques, Electrospinning, 3D Printing equipment and software, and *In Vitro* Release Studies.
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.