***Title of studentship**	Stimuli-responsible implantable drug delivery systems based on nanocomposites produced by additive manufacturing
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**	The oral route is a popular and convenient means of drug delivery. However, despite its advantages, it also has challenges. Many drugs are not suitable for oral delivery and this route relies heavily on patient compliance. Implantable drug delivery devices are an alternative system that can achieve effective delivery with lower drug concentrations, and as a result, minimise side effects whilst increasing patient compliance. Accordingly, new technologies are currently being developed to expand the capabilities of this type of medical devices. The aim of this PhD project is to develop new types of implantable drug delivery devices that respond to external stimulus to provide on demand drug release. For this purpose, active materials containing nanoparticles sensitive to magnetic or near infrared radiation stimulus will be developed. This set of new materials will be characterised using techniques such as IR/Raman spectroscopy, electron microscopy, atomic force microscopy, X-ray diffraction and thermal analysis. Subsequently, 3D printing methods will be used to develop the implantable systems using biocompatible polymers such as poly(lactic acid) or poly(caprolactone). These implants will be prepared, characterised and tested using *in vitro* models. The specific objectives of this work are as follows: 1. Development of new nanocomposites responsive to external stimuli (IR radiation/magnetic fields) 2. Physicochemical characterisation of the resulting nanocomposites 3. Manufacturing of implantable materials based on stimuli-responsive nanocomposites using 3D printing techniques 4. Evaluation of the systems *in vitro*
***Supervisor(s)**	• Dr. Eneko Larrañeta (https://pure.qub.ac.uk/portal/en/persons/eneko-larraneta(1c534bf8-7a14-4d94-8192-67fecd8c00e3).html) • Prof. Biqiong Chen (https://pure.qub.ac.uk/portal/en/persons/biqiong-chen(82f59e81-c70a-4f21-bdde-488da5c82db9).html) • Prof. Steven Bell (https://pure.qub.ac.uk/portal/en/persons/steven-bell(4b079142-2d45-4c75-aff5-0087ccd5c2ad).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 / EPS
***Research centre / School**	School of Pharmacy / School of Mechanical and Aerospace Engineering/ School of Chemistry and Chemical Engineering
Subject area	Nanocomposites, Stimuli-responsive materials, Pharmaceutics, Medical Devices, 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	Nanocomposites, Implantable Devices, 3D Printing, Medical Devices, Drug Delivery
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: scanning electron microscopy (SEM), atomic force microscope (AFM), infrared spectroscopy, Raman spectroscopy, high Performance liquid chromatography (HPLC), differential scanning calorimetry (DSC), nuclear magnetic resonance (NMR) spectroscopy, X-Ray Powder Diffraction (XRPD), polymer characterisation techniques, 3D printing.
Expected impact activities	The PhD student will participate in a wide variety of impact activities such as: national and international conferences, public talks and QUB showcase events. Some examples of impact activities include: social media posts, visit to primary and secondary schools, poster and oral presentations in conferences, publication of scientific research in high impact peer reviewed journals and in public engagement journals for the general public.