***Title of studentship**	Evaluation of a Novel Drug Delivery System to Deliver Gene Therapy to Cystic Fibrosis
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 £16,777
Awarding body	DfE CAST Studentship with pHion Therapeutics
Number of studentships	1
***Summary descriptive text / Example of research project**	Cystic fibrosis (CF) is an autosomal recessive disorder caused by mutations in a cAMP-dependent chlorine channel (cystic fibrosis transmembrane regulator; CFTR). A lack of functioning CFTR leads to abnormal fluid secretions in a number of organ systems e.g. lung, gastrointestinal tract, liver, male reproductive tract and pancreas. Morbidity and mortality is however associated primarily with thickened airway secretions and impaired mucociliary clearance which results in chronic airways obstruction, and predisposes the individual to recurrent lung injury as a result of devastating cycles of infection and inflammation. There are currently 90,000 people worldwide living with CF. Although significant advances have been made over the last number of decades to improve the treatment and management of people with CF (PWCF), the average life expectancy is still only 42 years. A major advance for CF has been the development of Ivacaftor (CFTR potentiator, Vertex), however this drug is only effective in 4-5% of the population (at £182,625 pa per patient). Recent combination therapies with CFTR correctors (Orkambi® and Symdeko®) may help a larger population however the clinical and cost effectiveness of these treatments remains controversial. The CFTR gene was identified in 1989 and gave PWCF great hope that there would be a cure within their lifetime. Unfortunately, even after huge investments in both time and funding (i.e. a near 30 year endeavour by both US and UK researchers, primarily looking liposome and adenoviral associated drug delivery systems (DDS); the UK Cystic Fibrosis Gene Therapy Consortium was set up in 2001), consistent and sustained gene therapy has not been achieved. Other novel delivery systems such as nanoparticles and lentiviruses are at early stages of development. Uniquely, we have access to a transformative drug delivery technology which is currently being commercialised by QUB spin-out, pHion Therapeutics. The RALA technology, which was developed by Prof. McCarthy is an anionic drug delivery system, has high cell transfection without any associated toxicity and delivers cargo with precision and accuracy. Prof. Martin has over 20 years' experience in CF airways research. The objective of this study is therefore to evaluate the RALA peptide nanoparticles as a means to deliver gene therapy and potentially other disease-modifying therapies to PWCF. Initial studies will optimise the DDS using fully differentiated primary human CF bronchial epithelial cells, grown at air-liquid interface

	(ex vivo model) before moving on to encapsulation of the therapeutic cargo for delivery to cells. Assessments will include cytotoxicity and protein expression studies with ion channel functionality investigated by electrophysiology, airways surface liquid height (by confocal microscopy) and mucociliary function studies. These studies directly align to the strategic research interests of both the Martin and McCarthy research group's and provides opportunity for the successful applicant to benefit from the significant expertise of pHion Therapeutics. Working together we aim to develop a potentially ground-breaking, impact-driven, translational drug delivery programme for CF.
***Supervisor(s)**	Professors Lorraine Martin and Helen McCarthy (School of Pharmacy) and Dr Damian Downey (Clinical Senior Lecturer, Centre for Experimental Medicine & Consultant in Respiratory Medicine, Belfast Trust)
***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	Cystic fibrosis, nanomedicine and novel therapeutic strategies to include gene therapy.
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, Molecular Biology, Pharmaceutical Sciences, Biochemistry, Biological/Biomedical Sciences 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**	8th March 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	Professor Lorraine Martin School of Pharmacy, QUB Professor Helen McCarthy School of Pharmacy, QUB http://www.qub.ac.uk/schools/SchoolofPharmacy/Research/PostgraduatePositions/ http://www.qub.ac.uk/schools/SchoolofPharmacy/Research/

Keywords for search filters	Cystic fibrosis, gene therapy, CFTR modulators, nanomedicine, cell biology, molecular biology, biochemistry, chronic airways diseases
Training provided through the research project	The successful applicant will join a well-resourced, multi-disciplinary team focussed on collaborative, translational research. The project will entail culture of primary airways epithelial cells at air-liquid interface and will offer expert training in a wide range of nanomedicine, genomic, electrophysiological, protein biochemistry and imaging techniques.
Expected impact activities	Students are expected to present at a minimum of one national and international meeting during their training and make a contribution to internationally excellent research outputs. Engagement with industry partners and participation in our on-going school's outreach programme on lung health and/or science festivals will be encouraged.