



Waterford Institute of Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

ESR Project Information Sheet

Project title	Development of Nanomaterials for Ocular Drug Delivery
Reference number	ORBITAL_ESR_2019_Project 8
Host Institution/University	Waterford Institute of Technology, Ireland
Supervisor(s)	Dr. Laurence Fitzhenry (PI), Dr. Niall O'Reilly, Prof. Anuj Chauhan, Prof Hákon Hrafn Sigurdsson, Dr. Tamuna Bolkvadze (non-academic supervisor)
Research Group	Ocular Therapeutics Research Group (OTRG), PMBRC
Department / School	Department of Science, School of Science and Computing
Duration	36-month employment contract provided and ESR enrolled on 4-year structured PhD. ESR will be required to self-fund after the initial 36 months
Status: Full-time / part-time	Full time
Funding information	Funding agency: H2020-MSCA-ITN-2018
Early Stage Researcher Allowances:	Living allowance: €45,361 p/a + mobility allowance of €7,200 p/a + family allowance where applicable (all values before tax and social security payments) Fees: € 4,500 - 6,500 (paid from funding for 36 months)
Closing date and time	5 p.m. (CET) Friday 28 th June, 2019
Commencement date	2 nd September 2019

Post summary

Diseases of the posterior segment of the eye are increasing considerably, in part due to an ageing population. One such disease, Age-related macular degeneration (AMD), the most common cause of blindness in patients over sixty, accounts for almost 10% of blindness worldwide. Its predicted global incidence for 2020 is 196M, rising to 288M in 2040. Typical treatment involves regular injections into the eye, which is associated with significant patient discomfort and potentially serious side effects, including bleeding, infection and retinal detachment. As such, there is an unmet clinical need for the development of new and improved drug delivery techniques to treat this and similar diseases of the posterior segment of the eye. This project aims to address this challenge through the development of novel drug-loaded nanomaterials designed for targeted and controlled release of therapeutics for AMD and other posterior segment disease treatment. Novel delivery platforms such as these could greatly improve patient comfort and outcomes by negating or reducing the need for ocular injections. Research and experimental work will involve the synthesis, characterization and evaluation of novel nano-enhanced delivery systems, capable of attenuating the release profile as dictated by the clinical need. The project is transdisciplinary in nature, incorporating chemical, biomedical, polymeric, industrial and clinical expertise, as well as being highly relevant to patients and industry.

This project will include three international secondments, to a total of 9 months over the project lifetime. The secondments are to the University of Iceland (Iceland), Colorado School of Mines (USA) and an industrial secondment to Experimentica (Finland)

The main phases of the research can be summarised as follows:

- Formulation and characterisation of drug-encapsulating/drug-complexing nanomaterials designed to act as a drug depot for posterior segment ocular drug delivery. Here, innovative nanomaterials will be formulated to encapsulate/complex the specific model drug compounds.

- In vitro* and *ex vivo* characterisation of the resultant formulations will be investigated and biological evaluation of these nanomaterials will be carried out on ocular cell lines and cytotoxicity evaluation will be fully determined

- In vivo* studies will be carried out where appropriate and necessary and the suitability of these materials for future development will be determined

- Incorporation of nanoparticles into drug delivery systems (e.g. contact lens materials)

The successful nanomaterial will be incorporated into the most suitable delivery system composition and after subsequent confirmation of retention of optical properties, drug release will be determined.

Standard duties and responsibilities of the ESR

For the 36 months of employment contract the ESR will be required to work exclusively on the MSCA programme.

In all cases, all duties and responsibilities will be clearly outlined in the researchers Personal Career Development Plan, as determined in the early stages of the project between the ESR and their supervisory committee.

Person specification

Qualifications

Essential

Applicants should hold or expect to attain, as a minimum a 2:1 Honours degree, or equivalent, in Chemistry, Materials Science, Analytical Chemistry, Organic Chemistry, Biomedical Science, Polymer Chemistry or related area.

Knowledge & Experience

Essential

- Research project carried out in one of the above disciplines
- A demonstrated knowledge of at least three of the following: pharmaceutical formulation development, drug delivery, cell culture/molecular biology, nanotechnology, polymerisation techniques

Desirable

Work placement undertaken in an industry related to the above disciplines

Skills & Competencies

Essential

- Applicants whose first language is not English must submit evidence of competency in English, please see [WIT's English Language Requirements](#) for details.
- Evidence of interest, aptitude and research experience in the above disciplines

Further information

For any informal queries, please contact Dr. Laurence Fitzhenry on +353 51 302624 or by email at lfitzhenry@wit.ie

For queries relating to the application and admission process please contact Dr Laurence Fitzhenry at orbital@wit.ie or by telephone at +353 (0)51 302624.

Website: www.orbital-itn.eu

The Institute may decide to interview only those applicants who appear from the information available, to be the most suitable, in terms of experience, qualifications and other requirements of the position.



HR EXCELLENCE IN RESEARCH