



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Three PhD Positions in the ERC Project

ChemLife - Artificial micro-vehicles with life-like behaviour

Application Deadline: 15/09/2018

ERC project

The European Research Council (ERC) project **ChemLife**, hosted at AMBER, Trinity College Dublin, invites applications for up to three doctoral fellowships. The PhD fellows will be supervised by Dr. Larisa Florea (principal investigator) and will be registered for the doctoral programme within TCD's School of Chemistry.

ChemLife will develop highly innovative, motile smart micro-vehicles with ground breaking capabilities such as chemotaxis, cargo-transport, sensing, reporting, diagnosis and repair via multidisciplinary research combining materials science, chemistry, nanotechnology and 3D fabrication technologies. The role of ChemLife is to stimulate a radical re-think and a move towards biomimetic principles as the route to delivering fundamental breakthroughs in clinical devices and environmental chem/bio-sensors, microfluidic devices and micro-robotics.

Role Description

The three successful candidates will be part of an interdisciplinary, multinational team engaging in an in-depth research program in the realm of soft materials.

PhD 1 – This position will focus on the synthesis of selected functional materials drawn from ionic liquids, poly(ionic liquids), molecular switches, hydrogels and conductive polymers for the realisation of sensors and actuators. One of the goals will be the realisation of stimuli-responsive polymers and gels with controlled hydration, optical and electrochemical properties. Special attention will be given to the primary characterisation of these materials, their biocompatibility, and suitability for 3D micro-fabrication processes.

PhD 2 – This position will focus on the design and fabrication of bio-inspired vehicles using advanced 3D fabrication technologies. High-resolution mechanical and structural characterisation of these structures will be carried out. Practical realisation of functional structures, based on simulated 3D models, will be achieved through integration within microfluidic devices.

PhD 3 – This position will focus on the development of smart droplets and vesicle-type units. Special focus will be placed on the synthesis and incorporation of responsive units into the structure of the droplet vehicle, for the demonstration of advanced functionalities such as uptake, transport and release of relevant units (e.g. selected biomolecules, pharmaceuticals).

The successful candidates will play a substantial role in the design and fabrication of the motile smart micro-vehicles at the core of ChemLife. They will join a multidisciplinary team with expertise spanning organic chemistry, materials science, 3D design, mechanical engineering, and analytical chemistry. The successful candidates will report directly to the PI, Dr. Florea, and will liaise with the other team members, AMBER researchers, and external collaborators, as necessary. Additionally, all members of the group will have the opportunity to define and shape their own research within the overall remit of the project.



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Host Institution

Trinity College Dublin, the University of Dublin

Trinity is Ireland's premier university, with a proud tradition of excellence stretching back to its foundation in 1592. The oldest university in Ireland, and one of the oldest in Europe, today Trinity sits at the intersection of the past and the future, and is ideally positioned as a major university in the European Union. Our 47-acre campus is located in the heart of Dublin city centre and is home to historic buildings dating from the University's establishment, as well as some of the most cutting-edge teaching and research facilities in Ireland. Students at Trinity benefit from a unique educational experience across a range of disciplines in our three faculties – Arts, Humanities, and Social Sciences; Engineering, Mathematics and Science; and Health Sciences. The pursuit of excellence through research and scholarship is at the heart of a Trinity education, and our researchers have an outstanding publication record and strong record of grant success.

AMBER (Advanced Materials and BioEngineering Research) is an internationally-leading research centre funded by Science Foundation Ireland that provides a partnership between leading researchers in materials science and industry. AMBER brings together Ireland's leading material science researchers working across the disciplines of Physics, Chemistry, Bioengineering and Medicine; with an international network of collaborators and companies.

The clustering of material science research expertise, state of the art infrastructure and a team of professional support staff has enhanced Ireland's international reputation in materials science research and driven increased investment from industry. Ireland's International ranking in the areas of nanoscience and materials science has increased from 6th and 8th respectively in 2013 when the Centre was established to 1st and 3rd in 2017. This ranking is based on publications and citations.

Eligibility Criteria

Applicants should hold a minimum of an honours bachelor's degree at 2:1 level or equivalent in a discipline relevant to the project, such as Chemistry/Materials Science.

Excellent first-hand knowledge of chemical techniques and characterisation methods.

Preference is given to candidates with a knowledge of 3D fabrication methods.

Applicants must provide evidence of competence in English language by achieving the minimum standard in a recognised English language test, as outlined at the following link:

<https://www.tcd.ie/Education/programmes/doctoral/application-information/english-language-requirements/>

Stipend

The PhD student will be paid a stipend of €18,000 per annum and receive full fees remission for a maximum duration of four years.

Application Process

Required documents: a CV; a cover letter briefly describing how your interests and expertise align with this project and the preferred PhD position; an example of your written academic work such as an article, master thesis chapter, final year project or term paper.

Please send the application compiled into a single PDF file to Larisa.Florea@dcu.ie by **15/09/2018** (with "PhD ChemLife" in the subject line).

Shortlisted candidates will be asked to nominate two academic referees. Interviews will be held by the end of September 2018.

The successful candidate will ideally start in one of the following PhD intakes:
October 2018 or March/April 2019.