

Optical manipulation of biomimetic soft interfaces

Possible start dates: April, July, October 2020

Keywords:

Optical tweezers, Microfluidics, Soft Matter, Ultralow Interfacial Tension, Lipid membranes

Project Description

A PhD studentship is available at Loughborough University to create biomimetic structures, based on liquid-liquid interfaces and lipid membranes, and investigate their physical-chemistry and nanofluidic properties using optical tweezers.

Biomimetic structures, based on multiple compartments delimited and interconnected by soft interfaces, have shown a great potential as minimal cells in synthetic biology, simplified model systems for biophysical and biochemical studies and smart containers for drug delivery and microreactor technologies. Consequently, there is a great interest in developing new strategies for the manufacturing of such soft structures as well as exploiting their properties for a wide range of applications, especially in healthcare and pharmaceutical industries.

This research project aims to develop new synthetic biomimetic systems, made of cell-like micro-compartments connected by nanotubular structures, and investigate liquid and particle transfer processes occurring therein. The successful candidate will produce and characterise these multiscale structures by using a range of optical techniques, including fluorescence/confocal microscopy and optical tweezers. He/she will also develop analytical and numerical models to interpret the experimental results and unveil the fundamental physical and chemical mechanisms governing the functions and properties of these structures. This research will be performed in collaboration with partners based at other UK institutions, including Imperial College London, University of Sheffield and the Central Laser Facility (STFC).

Entry requirements:

Applicants should have, or expect to achieve, at least a 2:1 Honours degree (or equivalent) in Mechanical or Chemical Engineering, Physics, Chemistry or a related subject. A relevant Master's degree and/or experience will be an advantage.

Supervisors:

Dr Guido Bolognesi (Dept. of Chem. Eng.), Dr Francois Nadal (Wolfson School of MEME) and Dr Goran Vladislavjevic (Dept. of chem. Eng.)

How to apply:

Send an email with your CV to Dr Guido Bolognesi, g.bolognesi@lboro.ac.uk

Funding information:

Please note that studentships will be awarded on a competitive basis to applicants who have applied to this project and other advertised projects starting with advert reference 'WSS' for the School of Mechanical, Electrical and Manufacturing Engineering. If awarded, each 3-year studentship will provide a tax-free stipend of £14,777 p/a, plus tuition fees at the UK/EU rate (currently £4,260 p/a). While we welcome applications from non-EU nationals, please be advised that it will only be possible to fund the tuition fees at the international rate and no stipend will be available.