Studying the emergence of collective behaviours in microscopic bioinspired active materials

Applications are invited for a 36-month PhD Studentship (Early Stage Researcher) fully funded by the H2020 Marie Sklodowska-Curie Action ACTIVEMATTER and available from September 2019. The successful candidate will be based in Dr Giorgio Volpe’s group in the Department of Chemistry at UCL and be registered as a PhD student at UCL. The successful candidate will also go on secondments (lasting 1 to 3 months) to different teams of the ACTIVEMATTER Consortium.

The specific goal for the PhD will be to study the emergence of spatial and temporal collective behaviours in the motion of a finite number of active microscopic particles (colloids) in an optically-induced potential landscape. The project will combine active colloids with engineered optical potentials to study how active particles move and develop collective synergistic or antagonistic behaviours in complex environments.

Please check this website https://bit.ly/2NhCRHs for eligibility

Nanomechanical characterisation of soft biomimetic materials

Applications are invited for a 3.5 year PhD studentship in collaboration with the Flow & Dynamics of Soft Matter Group lead by Dr Valeria Garbin in the Department of Chemical Engineering, Imperial College. The student will enrol in the CDT in Advanced Characterisation of Materials and have the opportunity to participate in the CDT training programme.

The project objective is to develop and utilise a suite of advanced analytical techniques, including optical tweezers and microfluidics, for characterising the (nano)mechanical properties of ‘soft’ biomimetic materials such as liposomes or biomembranes. The principal aims of this project are:

(i) to study the mechanical properties of biomimetic vesicles undergoing extreme deformations as a result of an applied external stress, e.g. optical, acoustic, or fluid shear forces;
(ii) to study phase separation and rupture in artificial vesicles under external forcing;
(iii) to use the result of the above studies to engineer membrane materials with properties optimised for applications including controlled drug release and microreactors.

During the project the student will acquire skills in microfluidics, microdevice fabrication, optics, modelling (including light scattering and transport phenomena), image analysis, and (micro)rheology.

Please check this website https://bit.ly/2X8kae5 for eligibility