Institute for the Physics of Living Systems
Department of Physics and Astronomy
University College London
Gower Street, London WC1E 6BT

Title	Summer Research Studentship in Biophysics
Institution	University College London
Departments	Institute for the Physics of Living Systems Department of Physics and Astronomy
Supervisor	Dr. Shiladitya Banerjee
Start Date	July 1, 2018
End Date	August 31, 2018
Closing Date	May 17, 2018
Location	Department of Physics & Astronomy, UCL

We are pleased to invite applications for an 8-week summer research studentship in the area of Theoretical and Computational Biophysics at the University College London (UCL). The studentship will be based at the Department of Physics and Astronomy and the Institute for the Physics of Living Systems (IPLS) at UCL. IPLS is a cross-faculty institute with a mission to promote interdisciplinary research at the interface of physics and biology for a fundamental understanding of the complex behaviors of living systems.

The project will be carried out in the research group of Dr. Shiladitya Banerjee at IPLS. The research group uses theoretical and computational methods in physics and applied mathematics to develop quantitative models of living systems. We seek to recruit a highly motivated 3rd or 4th year undergraduate student who will theory and computational models of bacterial growth control and antibiotic resistance. The goal is to understand how bacteria coordinate growth and division to resist antibiotics by transforming their size and shapes.

Control of cell size is a fundamental adaptive trait that underlies the coupling between cell growth and division. Here we propose to investigate the fundamental quantitative principles by which single bacterial cells coordinate their growth, shape and division statistics under steady and perturbative conditions. Our study will utilize multigenerational imaging data on the growth of single bacterial cells, which provides high-statistical precision measurements of single cell shape and size. Using theory and simulations we seek to relate the mechanism of cell size control to spatiotemporal evolution of cell wall growth and shape. In particular, we aim to investigate the robustness and adaptability in bacterial growth under antibiotic treatments. The student will gain knowledge on bacterial biophysics, non-equilibrium statistical mechanics, continuum mechanics as well as big data analysis.

Candidates should have at least the equivalent of a UK upper second class MSci or Master's degree (or equivalent) in Physics, Natural Sciences, Applied Mathematics, Engineering or a closely related discipline, and have affinity towards biological sciences. The successful candidate will gain expertise in theoretical and computational modeling in biology as well as acquire knowledge of soft matter, cellular biophysics and statistical mechanics. Previous exposure to research is desirable.

Studentships are available to any UK/EU or international student studying at a UK university. Students will be provided a bursary of £2000 to cover their expenses during the studentship.

Suitably qualified candidates interested in performing innovative research at the interface of physics and biology should send their CV, a brief research statement (optional) to Dr. Shiladitya Banerjee (shiladitya.banerjee@ucl.ac.uk). Closing date is May 17, 2018. Successful applicant will be notified by the end of May 2018.