Project title: Designing nanomachines using computer simulations and artificial intelligence

We are looking for highly motivated students to join our interdisciplinary team for an exciting project at the interface of physics, computer science, and biology. The project seeks to design nanomachines that can perform desired functions using a combination of computer simulations and methods of artificial intelligence.

Project: Nature has evolved remarkable structures that are able to perform work at the nanoscale and create living organisms from bare molecules. Unraveling the design rules behind these structures is highly non-trivial, and computer simulations can be of great help in identifying the possible solutions. Here we are looking to develop a framework that combines machine learning with minimal coarse-grained computer models (molecular dynamics, Monte Carlo) to evolve the design of structures that yield a desired function. These include, but are not limited to, reshaping of cell membranes, forming filaments and networks of certain mechanical properties, and creating vehicles for delivery of materials to cells. This approach will enable us to identify the design rules behind the existing biological systems, as well as to propose novel functional synthetic soft materials. The project involves collaboration with several experimental groups in London and Cambridge.

About us: We are an interdisciplinary group that develops computer models of collective phenomena in living systems. Our team involves physicists, chemists, computer scientists, and biologists and features close collaboration between theory and experiments. We are based at the UCL Department of Physics and Astronomy and the Institute for the Physics of Living Systems (IPLS), in central London. IPLS is a lively cross-faculty institute with a mission to promote research at the interface of physical and life sciences.

About you: The successful applicant should have (or expect to achieve) at least the equivalent of a UK upper second class MSci or Master's degree (or equivalent) in Physics, Computer Science, Chemistry, Engineering, or a relevant subject. High level of self-motivation and enthusiasm is essential, and some experience in programming is desired. No prior knowledge of biology is necessary.

How to apply: The position is fully funded by the Royal Society, and will be for four years starting at any point after October 1st 2019. If you have any queries about this studentship, please contact Dr. Andela Saric (a.saric@ucl.ac.uk) who will be supervising the research. Informal enquiries are welcome.

Please send electronic applications to a.saric@ucl.ac.uk in the following format:

• A CV, including full details of all University course grades to date.
• Contact details for two academic or professional referees (at least one academic).
• A personal statement (750 words maximum) outlining (i) your academic excellence, (ii) suitability for the project (iii) what you hope to achieve from the PhD and (iv) your research experience to-date.

The evaluation of applications will begin 10th September 2019 until the position is filled.