

PhD Studentships in Artificial Cell Engineering

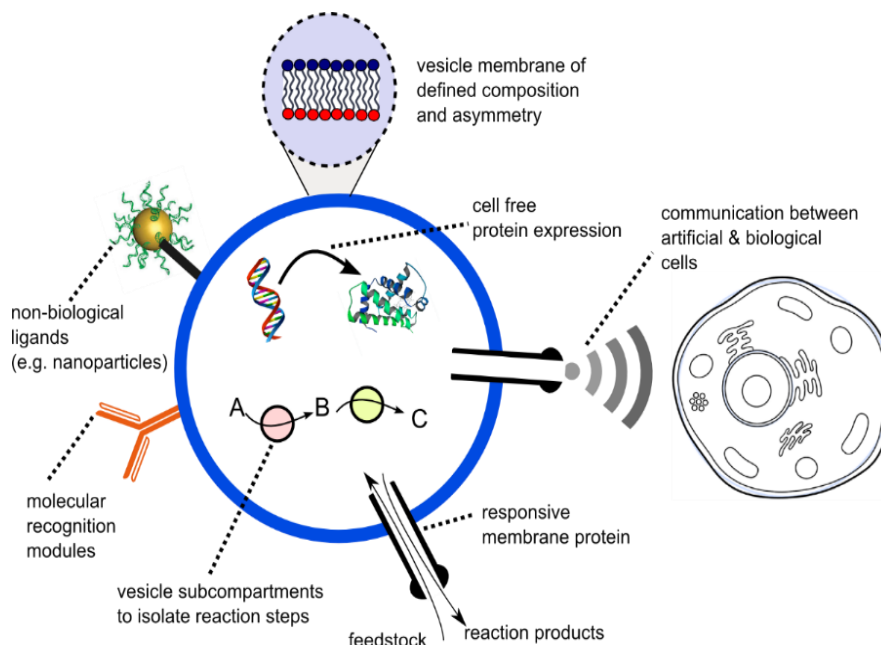
The [Elani Group](#) in the [Department of Chemical Engineering](#) at Imperial College London welcomes applications for PhD studentships to conduct work in the area of Artificial Cell Engineering and Bioinspired Technologies. We have secured two fully-funded positions to conduct research in any of the group's research areas. These scholarships are open to both home and international students, and cover stipend, tuition fees and consumables. The positions are for 3.5 years with an October start. Applicants should hold or expect to obtain a First-Class Honours or a high 2:1 degree at Master's level (or equivalent) in a relevant Science or Engineering degree.

About our research

Biological cells, at their core, are simply a complex web of interacting molecules. Given this, we can ask the questions: what if we could create entirely artificial cells from scratch? Can we make life from inanimate matter? And can we engineer artificial cells as micromachines that perform bespoke functions in industrial and clinical settings?

Answering these questions will pave the way for disruptive applications, transform our understanding of biology by building a new biology, and shed light on the philosophical question of what it means for something to be alive.

In recent years, the Elani group have been at the forefront of the emerging research area of artificial cell engineering. Instead of re-programming living cells, we engineer biology from the molecule up by controllably bringing together both biological and synthetic building blocks (lipids, enzymes, membrane channels, DNA, nanoparticles etc.; see Figure below). We are exploring the use of synthetic cells as smart drug delivery agents, biosensors, cell therapies and as tools in pharmacokinetic screens. We are increasingly interested in fusing living cells with synthetic ones, to construct hybrid 'cellular bionic' systems.



In this PhD, the candidate will develop new technologies to generate vesicle-based synthetic cells, and engineer them to possess the behaviours that are the hallmarks of life: motility, energy generation, communication, replication, decision making, and self-repair. This will involve designing and working with novel bio-membranes, cell-free protein expression systems, gene circuits, as well as microfluidic technologies. This will be a multi-disciplinary project which, depending on the applicant's background and research interest, will span across one or more of molecular bioengineering, chemical biology, synthetic biology, soft matter, membrane biophysics, and microfluidics.

Getting in touch

If you are interested in applying, please send a CV and a motivation letter to Yuval at y.elani@imperial.ac.uk. Feel free to get in touch or visit my [group](#) and [personal](#) websites if you would like more information.