

## **IMPEE PhD Opportunity**

Project title: Bio-inspired design and engineering applications  
Supervisor(s): T. Lim, J.M. Ritchie

### **Abstract**

Design-by-Nature has been studied since the early 80's with the intention to extrapolate from Nature the building blocks of life and structural integrity. This research aims to define a new generation of virtual design environments for product development and prototyping. One approach is to structure the ontology of natural evolution in the survival of species. This knowledge can then be used to develop a new paradigm for engineering design across the domains of robotics, medical devices, living spaces, smart materials, etc. Topics of interest (but not limited to) are as follows:

- Nature and architecture
- Mechanics in nature
- Natural materials and processes
- Solutions from nature
- Biomimetics
- Biocapacity
- Education in design and nature

R&D interests: novel interfaces and tools to support product design, medical applications, intelligent mechanical material removal/assembly/repair operations, shape compliant robotics, autonomous systems. The research in this area also visualisation and kernels to model the human/animal/insect body parts given volumetric data and meta data (e.g. patient, genome) to assist medical diagnostics and surgery.

### **Requirement**

BEng 1<sup>st</sup> Class, MEng. Core skills required will be programming (e.g. C++), computer aided engineering and knowledge of virtual engineering environments. Any experience and knowledge of bioinformatics, computational biomodels for biomechanical, biophysiological, computational geometry, physics-based modelling, simulation and biology and signal processing methods will be beneficial.