Fully funded studentship opportunities in Information Engineering

The following studentships will be available to start in October 2018. Full funding for fees and maintenance is available via EPSRC funds for UK and some EU students (see eligibility criteria here https://www.epsrc.ac.uk/skills/students/help/eligibility/).

Supervisor	Project
Dr Fulvio Forni Control Group ff286@cam.ac.uk	**Analysis and control of soft-robotics acutators**
Prof Mark Gales Speech Group, Machine Intelligence Laboratory mjfg@eng.cam.ac.uk	**Incorporating Uncertainty in Deep Learning**
Prof Simon Godsill Signal Processing and Communications Group sjg30@cam.ac.uk	**Behavioural models in sequential inference about spatio-temporal structures** The project will involve new models and scalable inference methods for dynamic learning of behaviours and intentionality in multiple interacting objects, e.g. animals hunting prey, sea mammals/fish interacting in schools/ shoals, aircraft or birds interacting in formation and high frequency financial modelling of multiple order books. The methodology will use multiple dimensional stochastic processes in continuous time. The underlying principles will be Bayesian updating of dynamically evolving objects, implemented using novel scalable combinations of Sequential Monte Carlo, message passing and machine learning algorithms. We will provide new methodologies for scientists and zoologists wishing to test/ develop hypotheses about behavioural interactions, new methods for improved situational awareness/intent prediction in general tracking applications (civilian or military), and scalable inference in larger scale problems than currently manageable. This project has applications in many domains of national and international importance, including the monitoring of wildlife (changes in arctic seal behaviours/ populations, sea mammals, fish), monitoring of large scale spatio-temporal effects in climate change, enhanced situational awareness in defence applications. The candidate should have, or be expected to gain a 1st class honours degree in Engineering, Mathematics or Statistics. A good knowledge or experience of probability theory, state space models, tracking algorithms and parallel computer architectures would be beneficial.

Dr Ioannis Lestas Control Group icl20@cam.ac.uk	**Highly distributed mechanisms for demand side management in power systems and smart grids**
Dr Miguel Hernandez Lobato, Machine Learning Group jmh233@cam.ac.uk	**Semi-supervised Bayesian optimization** This project aims at creating new Bayesian optimization (BO) algorithms that use semi-supervised learning for making better predictions in high-dimensional structured spaces, enabling the solution of complex optimization problems in engineering design. The project outcomes will be a) novel models (based on deep neural networks) and approximate inference methods for full Bayesian semi-supervised learning, b) new semi-supervised Bayesian optimization methods and b) a practical solution to challenging optimization problems in high-dimensional structured spaces.
Dr Fumiya Iida, Biologically Inspired Robotics Laboratory fi224@cam.ac.uk Please contact Dr Iida for more information	**Reconfigurable modules for rapid design iteration of soft robot applications** This project aims to establish a developmental framework of reconfigurable robotic modules that can significantly speed up the design iterations of soft robot applications. The reconfigurable robotic modules should be comparatively small and flexible, such that they can be quickly applied to many variations of soft mechatronics devices by employing rapid fabrication methods such as 3D Printing and silicon moulding. The modules should also be supported by a software library and/or middleware for rapid development of controllers. The developed framework will be used for the case study of developing dextrous robotic hands for manipulation of unknown/unstructured objects.
Dr Timothy O'Leary, Control Group tso24@cam.ac.uk	**Flexible modulation of rhythmic circuits across scales**
Dr Ramji Venkataramanan, Signal Processing and Communications Laboratory Interested applicants may contact Dr Venkataramanan with a CV rv285@cam.ac.uk	**Information-theoretic performance limits for statistical machine learning algorithms** This project will investigate the fundamental limits of statistical learning algorithms. For canonical tasks such as classification and high-dimensional regression, the goal is to answer questions such as: "How fast can the accuracy of any algorithm improve as the number of available data samples grows?" The project will also explore the design of efficient algorithms that approach the optimal performance limits.