PhD Studentship: Control, Safety and Security of Dynamical Network Systems

A fully funded four-year PhD studentship is available to UK / EU students

Duration of study: Full Time- four years fixed term

Starting date: October 2019 (or as soon as possible)

Application deadline: 28th February 2019 (or until filled)

Supervisor: Dr Francesca Boem

A fully-funded four-year PhD studentship is available to UK / EU students to develop novel methods for control and monitoring of dynamical network systems. The student will work under the supervision of Dr Francesca Boem within the Department of Electronic and Electrical Engineering, University College London.

Modern systems are complex and composed of networks of coupled subsystems. Examples include water distribution networks, innovative transportation systems, power networks, smart buildings and even social networks. In these systems, everything is interconnected and possibly connected to the Internet. This opens the way to exciting technological opportunities, but represents also a fundamental challenge in terms of safety and security. In fact, when these systems fail, due to human errors, accidents, faults or intentional malicious attacks, the consequences can be tremendous. Safety and security are therefore key requirements.

The candidate will conduct multi-disciplinary research on complex dynamical systems characterized by i) a large number of states and input points, spatially distributed; ii) an interconnected structure that can be modelled as a network of agents or subsystems; iii) the presence of communication networks at different levels. The PhD student will develop new methods to analyse and control the behaviour of network systems, especially in the case that the presence of unexpected anomalies, such as faults or cyber-attacks, are deviating it from the nominal one. The PhD student will investigate the opportunity to integrate automatic control techniques with statistical and machine learning tools, exploiting the network structure of the systems.

Applicants must hold, or be near completion of a first or upper-second class degree in Engineering, Computer Science, Applied Mathematics, or a related subject, with theoretical background and interest in Control Engineering / Automatic Control and Systems Theory. The ideal candidate will show understanding of machine learning and optimisation. The candidate must show a strong interest to engage in innovative high-profile research. Fluency in English is also required.

The candidate is expected to:

- Have excellent analytical and engineering skills
- Have excellent reporting and communication skills
- Be motivated, independent and team player
- Have genuine enthusiasm for the subject and technology
- Have the willingness to author and publish research findings in international high-profile journals
- Be eligible: https://www.epsrc.ac.uk/skills/students/help/eligibility/

The studentship is available for four years and covers tuition fees at the UK rate, plus a stipend at £16,777 pa (tax free, increasing with inflation).

Informal enquiries should be addressed to Dr Francesca Boem (f.boem@ucl.ac.uk) by 30th January 2019 (or until filled).

Formal applications should be submitted with a CV, a brief statement of motivation and research interests, and with names and email addresses of two referees to f.boem@ucl.ac.uk