

PhD Studentship: Learning, Prediction and Decision Control in Complex Systems, University of Surrey, United Kingdom.

Department of Computer Science

Location: Guildford

Fixed Term

Post Type: Full Time

Advert Placed: Tuesday 16 October 2018

Closing Date: Friday 31 May 2019

Reference: 080918

The project will focus on the development of machine learning techniques, including rule-based machine learning and evolutionary learning, for controlling complex networks. The aim of this PhD is to develop a computational framework for steering complex systems and doing so in a predictable and trusted manner. It involves designing effective external interventions to control the system and/or enhance its resilience. Complexity in such systems arises due to

- scale (lots of things)

- diversity (different kind of things), and

- relationships (inter-related and inter-dependent things interacting with each other and their environment in many different ways, and the relationships change over time).

The research will build on existing work with learning classifier systems for making personalised recommendations to rail passengers for their onward journey options (OJPA funded by Innovate UK) as well as control theory and network analysis which is being applied to policy making (funded by EPSRC; <http://cctool.co.uk>) and security - cyber-fraud scenarios, risk assessment and mitigation (part funded by H M Government).

The PhD will be supervised by **Dr Sotiris Moschoyiannis** whose current research projects include:

- PI on Real-Time Flow, funded by EIT Digital
- PI on AGELink, funded by EPSRC IAA
- PI on Onward Journey Planning Assistant (OJPA), funded by Innovate UK
- CI on SAFRON, funded by Innovate UK
- PI on KTP with Clearswift, funded by KTN, Innovate UK

Co-supervision by **Dr Yunpeng Li** whose research projects include:

- HumBug
- Invertible particle flow for nonlinear filtering
- Microwave breast cancer detection
- Radio frequency (RF) tomographic tracking

To apply you should have at least an upper second class honours degree (or overseas equivalent) in Computer Science or Mathematics, or a suitable technical science or engineering subject such as Computer Engineering and Electronic Engineering. Preference will be given to those with appropriate MSc or equivalent research/industrial experience in relevant areas. Experience in a relevant area is not required, but advantageous.

The candidate is expected to have demonstrable programming skills and solid mathematical knowledge. Hands-on skills in one of the programming languages is expected, such as Python, Java, or C/C++. In addition, the applicant must have good communication skills and be fluent in English. We look for a candidate that is self-motivated, engaging, and is a team player.

Entry Requirements:

Essential:

- Bachelor degree in Computer Science (UK equivalent 2:1 classification or above)
- Interest in computational methods for complex systems; machine learning, prediction, decision control
- Programming experience (any language)
- Analytical skills: knowledge of foundations of computer science; ability to think independently
- Strong verbal and written communication skills, both in plain English (see plainenglish.co.uk), and scientific language for publication in relevant journals and presentation at conferences.

Desirable:

- Master's degree (UK equivalent of Merit classification or above)
- Experience in machine learning and/or evolutionary computation
- Experience in network theory and graph technology
- Experience of implementation and/or experimentation with analytical tools
- Knowledge of complex networks (e.g., random Boolean networks) and/or system dynamics models
- Proficiency in Python and/or Java / C++
- Experience with data pre-processing, classification, segmentation
- Experience with microservices

How to apply

Please click the 'Apply' button at: <http://www.surrey.ac.uk/postgraduate/computer-science-phd>.

Please prepare to submit : Your CV; All degree certificates and transcripts; Names of 2 referees and ideally both references (if these are not uploaded, offers cannot be made); Cover letter explaining your interests, computer-science and research experience (including examples of previous project work).

Funding Notes

- Duration of studentship: 3 years
- Stipend: £16,000 p.a, subject to nationality and residence status (see below)
- Eligibility: Fees are covered for UK/EU students (in value of £4,260).

Application enquiries:

- Name: Dr Sotiris Moschoyiannis
- Email: s.moschoyiannis@surrey.ac.uk
- Application Tel- 01483 689130