Newcastle University PhD Studentship award

Title
Security and resilience of infrastructure systems: threat and risk modelling

Value of award
Full UK/EU fees (eligibility criteria applies to EU students) and annual living allowance of £14,777 (at the 2018/19 UKRI rate)

Number of awards
1

Start date and duration
September 2019 for 3.5 years

Application closing date
31st January 2019

Overview
The number and complexity of Information Technologies (IT) networks have exponentially grown, and so have the number and complexity of attacks against these networks. In response, network specialists have been developing sophisticated techniques to analyse and improve the security and resilience of IT networks, such as network hardening, automated vulnerability discovery, dynamic reconfiguration, redundancy.

In parallel, infrastructure networks, which are pivotal for connecting cities and communities, are under an increasing pressure due to natural hazards, such as flooding, whose frequency is increasing with climate change, and man-made hazards. Traditional engineering techniques are currently used to improve the resistance of the infrastructure, but they do not always capture the interdependency of the network. For instance, bridges ensure transport and connections, while also carrying pipes, cable and other utilities.

This raises an exciting research question: “Is it possible to improve urban resilience by transferring security and resilience techniques developed for IT networks to urban networks?”

The aim of this PhD project is to investigate this research question, and to apply IT security concepts to urban resilience in the context of environmental pressures. These pressures include extreme hazard events as well as cascading effects that propagate through the infrastructure systems on which a city rely on.

The intended outcome of this project is a parameterized executable model, which can be instantiated for a given urban infrastructure, and analysed to suggest modifications based on IT security and resilience techniques. This project is fundamentally inter-disciplinary, as it will integrate a range of disciplines such as computer science, engineering, IT security, transferring computing methods of security in computer and communications systems to engineering assets and structure.

We particularly welcome applicants with either a good background in computing and security, or in infrastructure and urban engineering; female candidates will be particularly encouraged to
apply. Applicants with no specific background in security can already look at the Cyber Security MOOC: https://www.futurelearn.com/courses/cyber-security

**Sponsor**
Engineering and Physical Sciences Research Council (EPSRC)

**Name of supervisor(s)**
- Dr Charles Morisset
- Dr Maria Pregnolato
- Professor Chris Kilsby
- Professor Richard Dawson

**Eligibility Criteria**
UK/EU citizens with a first-class or 2.1 degree, or equivalent qualifications and/or experience. Ideally, students should have a BSc or MSc degree in computing or a related discipline.

**How to apply**
You must apply through the University’s online postgraduate application system. To do this please ‘Create a new account’.

The following information will help us to process your application. You will need to:
- Select ‘PhD Computer Science - (Computing Science) as the programme of study
- Insert the programme code 8050F in the programme of study section
- Insert the studentship code COMP011 in the studentship/partnership reference field
- Attach a covering letter and CV. The covering letter must state the title of the studentship, quote reference code COMP011 and state how your interests and experience relate to the project
- Attach degree transcripts and certificates and, if English is not your first language, a copy of your English language qualifications

Please also send a copy of your CV and covering letter to computing.phd@ncl.ac.uk

**Contact**
Charles.morisset@ncl.ac.uk