Newcastle University PhD Studentship award

Title
Secure Computation Techniques for Big Data

Value of award
100% of International tuition fees paid

Number of awards
1

Start date and duration
September 2019 for 3 years

Application closing date
8th February 2019

Overview
How to utilize data without compromising privacy thus becomes a pressing research question. An important transformative technology that allows for privacy preserving data processing is secure computation. In secure computation, one computes arbitrary functions directly on encrypted data. It hides all information about the data against untrusted parties, even if the untrusted parties are involved in the computation. Achieving secure computation is challenging, but if feasible it would benefit many domains. For example, two online retailers want to find correlations between products bought by their common customers to boost sales, without revealing customer or unnecessary sales information; policy makers want to link healthcare data held by public hospitals and private healthcare providers without leaking patient data, and geneticists want to compare DNA samples held by them and others to identify mutations that may cause cancers, again without loss of patient privacy. Secure computation addressed the tension between data utilization and privacy in all those scenarios.

The most important challenge in secure computation is to achieve efficient scalability. That is, how to design protocols that are efficient enough to scale to large datasets, as is needed in most real world applications? A secure computation protocol is often tens of thousand times slower than computing in the clear. Such loss of computational efficiency is not acceptable for most application.

The goal of this proposed research is to strike the right balance between security and scalability, and design, prove, implement and evaluate practical secure computation protocols that allow the processing huge volumes of data belonging to different parties in reasonable time.

Sponsor
Faculty of Science Agriculture and Engineering and Chinese Scholarship Council (CSC)

Name of supervisor(s)
Dr Changyu Dong
Prof. Aad van Moorsel
Eligibility Criteria
You must be a citizen and permanent resident of the People’s Republic of China at the time of application. You must be fluent in spoken and written English. You should also have:

- A strong academic background in computer science, mathematics or another relevant area.
- A bachelor degree (equivalent to a UK 2:1 honours degree, and/or a master’s degree (equivalent to a UK merit or distinction degree).
- A strong interest, and preferable some knowledge and experience, in cyber security and cryptography.
- Good programming skills (C++/Java or other languages).
- Good communication and time management skills.

How to apply
You must apply through the University’s online postgraduate application system. Apply here. To do this please ‘Create a new account’. All relevant fields marked with a red asterisk must to be completed.

The following information will help us to process your application. You will need to:

- Insert the programme code 8050F in the programme of study section
- Select PhD Computer Science (full time) – Computing Science as the programme of study
- Insert the studentship code CSC1802 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 CSC1802 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

Contact
For further details, please email Dr Changyu Dong (changyu.dong@ncl.ac.uk)