Wolfson School of Mechanical, Electrical and Manufacturing Engineering

Research Associate in Network Security

Job Ref: REQ17319

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

School/Department summary

The Signal Processing and Networks Research Group within the Wolfson School of Mechanical, Electrical and Manufacturing Engineering at Loughborough University (LU) is looking for an exceptional individual to strengthen research in the field of Network Security in Software Defined Networks.

Loughborough is a progressive and distinctive University with a proud tradition of being research-intensive. It has been shown through successive National Student Surveys, excellent league tables and seven Queen's Anniversary Prizes, to be one of the UK's leading Higher Education Institutions.

The Wolfson School of Mechanical, Electrical and Manufacturing Engineering is one of the largest of its kind in the UK and has an international reputation for being at the forefront of technological innovation and for maintaining extensive links with industry. Research grants (predominantly from the UK Research Councils and the EU), as well as extensive industrial sponsorship, support a range of research posts and enable the purchase of state of the art equipment.

The Signal Processing and Networks Research Group is one of the largest research groups within the Wolfson School of Mechanical, Electrical and Manufacturing Engineering. The group has an established reputation in the areas of signal processing and communication networks and is a member of one of the two DSTL/EPSRC funded consortia in the UK on University Defence Research Collaboration in Signal Processing.

Job Description

Job Grade: Specialist and Supporting Academic Grade 6, fixed term

Job Purpose

To conduct research in the area of Computer Network Security within the Signal Processing and Networks research group. The focus will be on the development of Network Intrusion Detection Systems within Software Defined Networks. In particular, the research associate will be expected to perform research and develop algorithms which will include distributed, anomaly-based Intrusion Detection Systems for detection, identification and prevention of multi-stage attacks in various applications including internet of things. The research associate will also be expected to develop signal processing algorithms based on machine learning, convex optimizations and game theory and work with OpenFlow in simulated and real hardware test-beds. The research associate should collaborate and visit the project partner in King Saud University (KSU) among other potential partners and organisations.

Job Duties

The work entails, primarily, the following activities under the direction and supervision of Professor Sangarapillai Lambotharan and Dr. Konstantinos Kyriakopoulos or a nominee:

Specific, technical

- To propose and develop algorithms for handling distributed anomaly and signature based intrusion detection systems.
- To evaluate algorithms either by using public data sets and/or implementing multi-stage attack scenarios.

- To perform implementations on OpenFlow based Software Defined Networks in simulations and/or in real hardware equipment and collect measurements.
- To implement algorithms in an appropriate programming language.
- To develop game theoretic decision making algorithms in distributing functions in Software Defined Networks.
- To use scripting languages for automating result generation.
- Develop a publication profile targeting high profile journals and conferences.
- To work with other academic and industrial partners of this project to implement and evaluate the performance of the algorithms on various hardware/software platforms and using real field measurements.
- Collaborate with and support other members (PhDs, RAs) encouraging higher impact research and strengthening the research output of the group.
- To carry out other specific duties as may be reasonably requested by the project leader and that are commensurate with the nature and grade of the post.

General, technical:

- To formulate detailed plans for the project based on broad guidance from the project team.
- To feed back to the project team on progress, to make recommendations for next steps and to prepare interim and final project reports.
- To travel to the partner King Saud University in Saudi Arabia, for workshops, short term visits, and for forging collaboration ties.
- To collaborate with co-workers within the Signal Processing and Networks research group and, possibly, with other Higher Education Institutions and relevant bodies.
- To support the project team by enhancing relationships with existing collaborators and by assisting the establishment of relationships with new collaborators.
- To write research papers suitable for publication in high quality academic journals and for presentation at specialist scientific conferences.
- To attend and contribute to scientific conferences.

Teaching:

- To assist the academic staff in the project team with the supervision of undergraduate and postgraduate students.

Other Related Activities and Functions

- To engage in training programmes in the University (e.g. through Professional Development) and elsewhere as required.
- To undertake such other duties as may be reasonably requested and that are commensurate with the nature and grade of the post.

Points to Note

The purpose of this job description is to indicate the general level of duties and responsibility of the post. The detailed duties may vary from time to time without changing the general character or level of responsibility entailed.

Special Conditions

All staff have a statutory responsibility to take reasonable care of themselves, others and the environment and to prevent harm by their acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Policy & Procedures.

All staff should hold a duty and commitment to observing the University's Equality & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equality & Diversity legislation and University policies/procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Respecting Diversity and, where appropriate, Recruitment and Selection.

Organisational Responsibility

Reports to the project investigators named above.

Person Specification

Your application will be reviewed against the essential and desirable criteria listed below. Applicants are strongly advised to explicitly state and evidence how they meet each of the essential (and desirable) criteria in their application. Stages of assessment are as follows:

1 – Application
2 – Test/Assessment Centre/Presentation
3 – Interview

Essential Criteria

Area	Criteria	Stage
Experience	Significant research experience in Computer Networks or Network Security	1,3
	Experience in programming with a scripting language like Python and in C	1,3
	Experience of publishing research results in international journals or conference proceedings	1,3
	Experience of having produced technical reports and / or guidance materials on engineering or science topics	1,3
Skills and abilities	Excellent written and oral communication, and IT skills	1,3
	Excellent analytical skills	1,3
	Self-motivated with ability to meet deadlines	3
	Ability to work independently and as part of a team, interacting with different academic and industrial partners	3
	Excellent interpersonal, and organisational skills	3
Training	Willingness to undertake appropriate further training and to adopt new procedures as and when required	3
Qualifications	First or upper-second class BSc or BEng degree in Computer Networks, Network Security or similar related field in Electronic Engineering, Computer Science or in relevant Engineering field.	1
	PhD degree (or about to complete) in Computer Networks, Network Security or similar related field in Electronic Engineering, Computer Science or in relevant Engineering field.	1
Other	Commitment to maintain confidentiality at all times	3
	Willingness to travel to the partner institution, King Saud University, Saudi Arabia	3

Desirable Criteria

Area	Criteria	Stage
Experience	Experience in anomaly based Intrusion Detection Systems.	1,3
	Experience in a Linux environment.	1,3
	Practical experience with OpenFlow and hardware implementations.	1,3
Skills and abilities	Ability to assist in teaching of undergraduate or postgraduate students	1,3

	Knowledge of convex optimizations, machine learning, game theory, or data fusion.	1,3
	Knowledge of distributed, on-line Machine Learning techniques.	1,3
Qualifications	PhD degree in Network Security or similar field	1
	PhD degree in Game Theory or similar field	1

Conditions of Service

This position is full time and fixed term until 31 March 2019 in the first instance. Salary will be on Specialist and Supporting Academic Grade 6, £29,301 - £33,943 per annum, plus pay award effective from 1 August 2017, at a starting salary commensurate with experience and qualifications and to be confirmed on offer of appointment.

The appointment will be subject to the University's normal Terms and Conditions of Employment for Academic and Related staff, details of which can be found here.

The University is committed to enabling staff to maintain a healthy work-home balance and has a number of family-friendly policies which are available at http://www.lboro.ac.uk/services/hr/a-z/family-leave-policy-and-procedure---page.html.

We also offer an on-campus nursery with subsidised places, subsidised places at local holiday clubs and a childcare voucher scheme (further details are available at: http://www.lboro.ac.uk/services/hr/a-z/childcare-information---page.html

In addition, the University is supportive, wherever possible, of flexible working arrangements.
We also strive to create a culture that supports equality and celebrates diversity throughout the campus. The University holds a Bronze Athena SWAN award which recognises the importance of support for women at all stages of their academic career. For further information on Athena SWAN see http://www.lboro.ac.uk/services/hr/athena-swan/

Informal Enquiries

Informal enquiries should be made to Dr. Konstantinos Kyriakopoulos, Lecturer in Networks, Wolfson School of Mechanical, Electrical and Manufacturing Engineering by email at k.kyriakopoulos@boro.ac.uk or by telephone on +44 (0)1509 227542.

Applications

The closing date for receipt of applications is **15 May 2017.**