



Candidate Information

Position:	Research Fellow - Secure Embedded Systems
School/Department:	Centre for Secure Information Technologies
Reference:	22/109917
Closing Date:	Monday 27 June 2022
Salary:	Research Assistant - £28,756 to £33,309 per annum. Research Fellow - £34,304 to £36,382 per annum.
Anticipated Interview Date:	Friday 1 July 2022
Duration:	Available until 31 December 2023

JOB PURPOSE:

To play a key role within QUB's strategic Centre for Secure Information Technology (CSIT) and engage in challenging cyber security related research projects with national and international academic and industrial partners. To contribute to CSIT's research as part of the UK's national Research Institute in Trustworthy Inter-connected Cyber-physical Systems (RITICS), to prototype new network technologies for secure communications in embedded Industrial IoT devices and contribute to a major €5M European Union (H2020-ICT-2018-20) collaborative project between leading European universities and world class industrial partners to enhance safety, security and reliability of next-generation autonomous & distributed real-time embedded systems. To participate with the industrial partners, such as BMW, German Space Agency (DLR), Vector Informatik GmbH and FentISS, in the development of Proof-of-Concept demonstrators.

MAIN ACTIVITIES/RESPONSIBILITIES:

Conduct research relating to (Research Fellow) or assist in research relating to (Research Assistant):

1. Safety and security threats to distributed real-time embedded systems and networks.
2. Threat modelling processes for safety and security of critical embedded systems including STRIDE, Trike and hybrid modelling approaches, with a focus on application to cyber-physical systems.
3. Develop (Research Fellow)/ assist in the development of (Research Assistant) of a new modelling process for capturing safety and security related requirements of distributed real-time embedded systems and derive patterns for code generation.
4. In collaboration with the project partners plan, design and develop proof-of-concept prototypes to demonstrate the viability and effectiveness of X-by-Construction for safety and security critical distributed real-time embedded systems.
5. Develop (Research Fellow)/ assist in the development of (Research Assistant) of testbeds to experiment with Named-Data-Networking software libraries, applied to low-power embedded devices (e.g. using ARM-based single-board computers), to investigate provision of security mechanisms such as certificate fetching, symmetric key authentication, etc. as well as threat modelling and pen-testing.
6. Present regular progress reports on research to members of the research group or to external audiences to disseminate and publicise research findings.
7. Prepare, in consultation with supervisor, material for publication in national and international journals and presentations at international conferences.
8. Assist grant holder in the preparation of funding proposals and applications to external bodies.
9. Carry out routine administrative tasks associated with the research project/s to ensure that projects are completed on time and within budget.
10. Carry out occasional undergraduate project supervision within the post holder's area of expertise and under the direct guidance of a member of academic staff.
11. Any other duties that may reasonably be requested by the programme supervisor.

ESSENTIAL CRITERIA:

Research Assistant (AC1):

1. 2:1 Honours degree in Electrical and Electronic Engineering(EEE)/Computer Science(CS)/Mathematics (or related discipline).

2. At least 1 years' demonstrable experience of:

- Software development skills at the systems or embedded level (preferably in C/C++/Python).
 - Experience of IoT device or industrial control (SCADA) security, network security or embedded system security.
3. Evidence of understanding of cyber security principles in the context of cyber-physical systems (real-time & safety critical).

Research Fellow (AC2)(in addition to above):

1. Have, or be about to obtain, a PhD degree in EEE/CS/cyber security.

2. At least 3 years experience of:

- Embedded systems, IoT, industrial control, cyber security, risk analysis and threat modelling preferably of embedded systems.
 - Experience of risk assessment (DREAD), threat modelling (STRIDE, PASTA), attack models (MITRE ATT&CK, Cyber Kill Chain) and related frameworks.
 - Experience in product development lifecycle and secure development practices.
3. Evidence of undertaking and successfully delivering cyber security related research projects.

Research Assistant (AC1) & Research Fellow (AC2)

1. Proven ability to contribute to broader management and administrative processes.

2. Excellent interpersonal skills with the ability to communicate complex information to a range of audiences and to develop and participate in internal and external networks

3. Proven ability to assess and organise resources.

DESIRABLE CRITERIA:

Research Assistant (AC1) & Research Fellow (AC2)

1. Experience of commercial software development.

2. Experience of academic research experience in malware, network security.

3. Experience of working to industry standards.

4. A proven publication record in the area of cyber security and embedded systems.