Software Programming Abstractions for High Assurance Secure System on Chip Devices

**Type of award**  PhD Research Studentship

**Department**  Computer Science

**Scholarship Details**  Minimum £18,800 p.a. plus a £2,500 p.a. Research Support Grant and tuition fees at the UK student level

**Duration**  4 years

**Eligibility**  Home (UK) and EU citizens who have confirmation of UK settlement or pre-settlement status under the EU Settlement Scheme.

**Start Date**  Available Now

**PhD Topic Background/Description**
Modern Industrial IoT devices will offer an emerging set of security capabilities underpinned by innovations in hardware support for introspection, obfuscation, and attestation. These Secure System on Chip (SoC) Devices must communicate with management services which manage device lifecycle through the use of attestation and provisioning services. Secure Device Firmware accesses local and management services through defined secure service APIs and is composed of a number of packages and libraries. Software programming, maintenance, and assurance throughout the device lifecycle from design inception to retirement requires composition of the modular software, the APIs and their associated integration into software development methods and tools. This needs to be thoughtfully designed to meet the twin objectives of programming effectiveness and improved device assurance across the secure hardware-firmware boundaries.

The proposed PhD will define metrics for programming, debugging and code maintenance effectiveness together with security assurance and explore the definition and merits of different abstraction mechanisms for their optimisation. The work will be based on a commercially available hardware platform which features an integrated extensible security engine. This will allow new capabilities to be quickly prototyped and evaluated for their potential for integration and deployment into the relevant software developer ecosystem and toolchains.

URL for further information:  [https://www.bristol.ac.uk/ctd/cyber-security/](https://www.bristol.ac.uk/ctd/cyber-security/)

**Further Particulars**

**Candidate Requirements**
Applicants must hold/achieve a minimum of a Masters degree (or international equivalent) in Computer Science, Software Engineering, Computer Engineering or Electronics Engineering. Applicants without a Masters qualification may be considered on an exceptional basis, provided they hold a first-class undergraduate degree. Please note, acceptance will also depend on evidence of readiness to pursue a research degree.
Basic skills and knowledge required:

- **Essential:**
  Excellent analytical skills and experimental acumen. Strong software development skills especially in languages such as C.

- **Desirable:**
  A background understanding in one or more of the following:
  - Software for embedded systems
  - Knowledge of hardware security

If English is not your first language, you need to meet this profile level:

**Profile E**

Further information about [English language requirements and profile levels](https://research-information.bris.ac.uk/en/persons/awais-rashid).

**Scholarship Details**

This studentship offers a minimum tax-free stipend of £18,800 from September 2021 and is expected to rise slightly in line with the annual UKRI minimum tax-free stipend rate.

Tuition fees and a generous research grant are also covered by this studentship.

To be treated as a home student, candidates must meet one of these criteria:

- be a UK national (meeting residency requirements)
- have settled status
- have pre-settled status (meeting residency requirements)
- have indefinite leave to remain or enter.

**Informal enquiries**

For questions about the research topic please contact Prof Awais Rashid at awais.rashid@bristol.ac.uk
[https://research-information.bris.ac.uk/en/persons/awais-rashid](https://research-information.bris.ac.uk/en/persons/awais-rashid).

For questions about eligibility and the application process please contact SCEEM Postgraduate Research Admissions sceem-pgr-admissions@bristol.ac.uk

**Application Details**

Prior to submitting your application, please contact the academic listed to discuss your research proposal and see if it aligns with their current research. No indication of an offer can be made until we receive your completed application.

To apply for this studentship, submit a PhD application using our [online application system](http://www.bristol.ac.uk/pg-howtoapply)

Please ensure that in the Funding section you tick “I would like to be considered for a funding award from the Computer Science Department” and specify the title of the scholarship in the “other” box below along with the name of the supervisor. Interested candidates should apply as soon as possible.