



## Candidate Information

<b>Position:</b>	Research Fellow - Verification & Validation (V&V) of Embedded Software Systems
<b>School/Department:</b>	School Office (Elect, Elect Eng & Comp Sci)
<b>Reference:</b>	21/108645
<b>Closing Date:</b>	Monday 19 April 2021
<b>Salary:</b>	£33,797 to £40,322 per annum
<b>Anticipated Interview Date:</b>	Thursday 29 April 2021
<b>Duration:</b>	24 month fixed-term contract or until 31 December 2023, whichever is soonest.

### JOB PURPOSE:

The Postdoctoral Research Fellow will work under the supervision of a lead researcher (supervisor) in Queen's University Belfast (QUB) in relation to one of work-packages of the EU H2020 project:

XANDAR: X-by-Construction Design framework for Engineering Autonomous & Distributed Real-time Embedded Software Systems.

In the context of XANDAR, the 'X' in X-by-Construction includes the aspects of security, fail-safety, trustworthiness and real-time capability by construction.

The XANDAR project has eight partners from across Europe: five industry partners including BMW Group and others; and three academic partners, including Queen's University Belfast, UK.

The specific work-package focuses on Verification & Validation (V&V) and Quality Assurance (QA) of autonomous & distributed real-time embedded software systems.

The Postdoctoral Research Fellow will work alongside other researchers in QUB and several other universities across the EU on:

- Designing and applying V&V techniques to validate and verify functional and non-functional requirements of the X-by-Construction approach, to be developed in the projects, and the systems to be developed using the approach. Requirements of the systems will include entities such as correctness, trustworthiness, security and real-time properties.
- Developing a V&V toolset that will enable end-users of the XANDAR tools to carry out V&V activities
- Verifying and validating the XANDAR toolchain to ensure the envisioned XbC guarantees for the generated programs

This is a unique opportunity to build and test the next generation Autonomous & Distributed Real-time Embedded Software Systems and work at one of the leading institutions in the United Kingdom in the Software Engineering and Embedded Software technology, collaborating with an international team of researchers and industrial practitioners from across the EU.

### MAJOR DUTIES:

1. Design and apply V&V techniques to validate and verify functional and non-functional requirements of the X-by-Construction approach, to be developed in the projects, and the systems to be developed using the approach. Requirements of the systems will include entities such as correctness, trustworthiness, security and real-time properties.
2. Develop a V&V toolset that will enable end-users of the XANDAR tools to carry out V&V activities.
3. Verify and validate the XANDAR toolchain to ensure the envisioned XbC guarantees for the generated programs.
4. Liaise with others in the research team to carry out the research and development (R&D) tasks.
5. Present regular progress reports to the line manager (supervisor) and other members of the research team.
6. Prepare, in collaboration with the supervisor, papers for publication in prestigious leading journals and major international conferences to disseminate and publicise research findings.
7. Identifying new funding opportunities and assisting in the preparation of funding proposals in related areas.

8. Carry out, if required, occasional undergraduate and postgraduate supervisions, within the post holder's area of expertise and under the direct guidance of the line manager.
9. Carry out administrative tasks associated with the research project to ensure that project is completed on time and within budget, including organisation of project meetings and documentation, preparation of progress reports, risk assessment of research activities, etc.

**Planning and Organising:**

1. Plan details of research activities and carefully aligning them with the work packages carried out by the research team and line manager in order to achieve an effective and productive synergy.
2. Plan for the use of research resources, laboratories and workshops where appropriate, in order to ensure that facilities are available at required times.
3. Plan own day-to day activity within framework of the agreed research programme.
4. Plan in advance to meet deadlines for progress reports, conference and journal publications.
5. Coordination and liaison with other members of the research team over work progress.

**Resource Management Responsibilities:**

1. Ensure research resources are used in an effective and efficient manner.
2. Provide guidance as required to support staff and students who may be assisting with research.

**Internal and External Relationships:**

1. Liaise on a regular basis with colleagues and students.
2. Establish professional and good working relationships with technical and other support staff.
3. Build internal contacts and participate in internal networks for the exchange of information and to form relationships for future collaboration.
4. Join external networks at national and international levels to share information and ideas.

**ESSENTIAL CRITERIA:**

1. Hold or be about to obtain a PhD degree in software engineering, computer science, or a related field.
2. At least 3 years relevant research experience in software engineering.
3. Sufficient breadth and depth of knowledge in software engineering and embedded software systems.
4. Strong analytical and problem-solving skills.
5. Ability to communicate complex information clearly.
6. Ability to build contacts and participate in internal and external networks.
7. Ability to assess and organise resources.
8. Ability to meet the mobility requirements of the post, i.e. an ability and willingness to travel to attend meetings with other project partners across the EU, industry partners and conferences where applicable.

**DESIRABLE CRITERIA:**

1. A publication record in line with stage of career in prestigious leading journals (e.g. IEEE Transactions, IET, etc.) and presentations at major international conferences.
2. Experience in testing, verification & validation.
3. Experience in embedded systems.
4. Experience in writing periodic research progress reports.