Research Associate

Department: Computer Science
Hours of work: 37 hours per week
Contract type: Fixed term, up to 30 months
Salary: Grade 6, £32,817 - £40,322 a year
**Introduction**

The project ‘Trustworthy Autonomous Systems Node in Verifiability’, funded by the EPSRC as part of the UK Research and Innovation’s £34 million research programme on Trustworthy Autonomous Systems (TAS), offers a 30-month Research Associate position focused on model based design and formal verification.

The project is a highly interdisciplinary research effort to deliver a step change in the verifiability of autonomous systems, including robots and software systems. The project will develop a mathematical framework that enables a common understanding of the diverse practices and concepts involved in verification of autonomy. Our framework will provide the mathematical underpinning, required by any engineering effort, to accommodate the notations used by the various disciplines. With this common understanding, we will justify translations between languages, compositions of artefacts (engineering models, tests, simulations, and so on) defined in different languages, and system-level inferences from verifications of components. This ambitious vision will be delivered through the close collaboration of 20+ Computer Science, Engineering, Mathematics, Robotics researchers at the University of Leeds, the University of Leicester, the University of Manchester, the University of Sheffield, and the University of York. The fundamental research advances generated by the project will be validated and adopted in domains ranging from autonomous vehicles to healthcare, with the support of 15 UK and international partners from industry, academia, government and third-party organisations.

We are seeking an enthusiastic researcher capable of making significant contributions to the development of verification notations that are useful for a variety of techniques and accessible to practitioners. You will develop metamodel and well-formedness restrictions, and a formal semantics for the notations. You will develop tools that demonstrate usability of the approach. You will work closely with researchers from the RoboStar group (https://www.cs.york.ac.uk/robostar/) and build on the experience with RoboStar notations and tools. You will also work closely with researchers from the other project disciplines at all our universities to deliver, validate and disseminate the planned research advances, and you will collaborate with other UKRI TAS programme researchers to maximise the impact of these advances.

Informal enquires to Ana Cavalcanti (email: Ana.Cavalcanti@york.ac.uk).

**Main purpose of the role**

- To conduct research under the supervision of senior colleagues and to contribute to the production of research
- To assist in the identification and development of potential areas of research and the development of proposals for independent or collaborative research projects

**Key responsibilities**

(Role holders will be required to undertake some or all of the duties below)

- To conduct individual and collaborative research projects, duties to include: analysis and interpretation of research data; use of appropriate research techniques and methods; writing up of research results and dissemination through publications, seminar and conference presentations and public engagement and outreach activities; contributing to the identification of possible new areas of research
- To contribute to the preparation of research proposals and applications to external bodies
• To undertake appropriate organisational and administrative activities connected to the research project, including conference organisation, and the development of promotional or educational material including website maintenance and development

• To develop and initiate collaborative working internally and externally, duties to include: the building of internal contacts and participation in internal networks; collaboration with colleagues on joint projects as required; participation in and identification of external networks in order to share information and identify potential opportunities for collaboration and possible sources of funding; attendance at and contribution to relevant meetings

• To provide guidance to other staff and students, as required, as well as coordinating the work of small research teams

• To assist with undergraduate teaching in own area of expertise.
### Person specification

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<th>Qualifications</th>
<th>Essential / Desirable</th>
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<tr>
<td>First degree in Computer Science</td>
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<td>PhD in formal methods or equivalent experience</td>
<td>Essential</td>
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<th>Knowledge</th>
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<td>Knowledge in software engineering and verification to engage in high quality research</td>
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<td>Knowledge of a range of research techniques and methodologies</td>
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<td>Has research expertise in an area that will complement and enhance the department's research strategy and goals</td>
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<td>Knowledge of language design and semantics</td>
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<td>Knowledge of diagrammatic and controlled natural languages for modelling and design</td>
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<td>Knowledge of mathematical semantics</td>
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<td>Process algebra and CSP</td>
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<td>Relational semantics</td>
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<td>Object-oriented design and Java</td>
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<td>Functional programming</td>
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<th>Skills, abilities and competencies</th>
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<td>Highly developed communication skills to engage effectively with a wide ranging audience, both orally and in writing, using a range of media</td>
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<td>Ability to write up research work for publication in high profile journals and engage in public dissemination</td>
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<td>Ability to develop research objectives, projects and proposals for own and joint research, with the assistance of a mentor if required</td>
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<td>Competency to conduct individual and collaborative research projects</td>
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<td>Ability to identify sources of funding and contribute to the process of securing funds, with collaborators if required</td>
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<td>Competency to make presentations at conferences or exhibit work in other appropriate events</td>
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<td>Programming skills (design, coding, testing, ...)</td>
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<tr>
<td>Experience</td>
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<td>Experience of carrying out both independent and collaborative research</td>
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<td>Experience of writing up research work for publication</td>
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<td>Ability to work as part of a team and also to work independently using own initiative</td>
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<td>Experience in tool development</td>
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<td>Experience in the application of a variety of verification techniques, ranging over proof, model checking, testing, and simulation.</td>
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<td>Experience in modelling using UML and/or derivatives</td>
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<td>Experience in the development of autonomous systems</td>
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<td>Experience in language implementation</td>
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<td>Personal attributes</td>
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<td>Attention to detail and commitment to high quality</td>
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<td>Collaborative ethos</td>
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<td>Interest in and enthusiasm for the subject matter of the project(s)</td>
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<td>Positive attitude to colleagues and students</td>
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<td>Willingness to work proactively with colleagues in other work areas/institutions</td>
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<td>Ability to plan and prioritise own work in order to meet deadlines, including using initiative to plan research programmes</td>
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<td>Commitment to personal development and updating of knowledge and skills</td>
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