

## Candidate Information

**Position:** Research Fellow in Autonomous Systems  
**School/Department:** Energy, Power and Intelligent Control  
**Reference:** 22/109643  
**Closing Date:** Monday 21 March 2022  
**Salary:** £34,304 per annum  
**Duration:** 24 months or until 31/01/2024 (whichever is soonest)

### JOB PURPOSE:

To be a highly productive, ambitious and collaborative member of an exciting UKRI-funded project, part of the Belfast Maritime Consortium to investigate, develop and implement autonomous collision avoidance strategies for maritime vehicles working closely with industrial collaborators.

The post is a critical role, and as such, successful applicants will have responsibilities in independent research, supervision, planning, day-to-day management, collaborations, and outreach. The Research Fellow will be an active member of the Energy, Power and Intelligent Control research cluster as well as the Centre for Intelligent Autonomous Manufacturing Systems assisting in the planning and delivery of ground-breaking research within the area of systems and control theory.

### MAJOR DUTIES:

1. Undertake research under supervision within the specific research project to investigate and develop various robust path planning algorithms for unmanned marine vehicles with a view to implement them in real time.
2. Design, develop and refine research using a range of experimental models. This includes the development of a formal framework for modelling and analysis of safe planning algorithms with provably correct behaviour such as safety, stability, robustness to uncertainties, disturbances, and subject to computation and communication constraints.
3. Carry out analyses, critical evaluations, and interpretations of experimental data and the literature using methodologies and other techniques appropriate to area to extensively test and verify the above algorithms for real-case scenarios. This will include the requirement to investigate and develop risk assessment and decision-making strategies to determine and mitigate the risk of collision with other vessels and an in-depth study and incorporation of marine collision regulations (COLREGs) as an integral part of the path planning algorithms developed above.
4. Produce high quality research outputs consistent with project aims and commensurate with career stage. This will include collaborating and co-authoring with PI and project team (as appropriate) on outputs.
5. In consultation with the project team, promote research milestones and outputs at national and international conferences and through social media (where applicable).
6. Assist grant holder in the preparation of funding proposals and applications to external bodies.
7. Carry out occasional educational supervision, demonstrating or lecturing duties within the post holder's area of expertise and under the direct guidance of a member of academic staff.
8. Undertake supplementary duties relevant to the success of the project including administrative duties and additional training and development activities as required.

### ESSENTIAL CRITERIA:

1. Minimum of 2:1 Honours degree in Engineering/Computer Science/Mechatronics/Applied Mathematics, or related discipline.
2. Have or be about to obtain a relevant PhD. (PhD thesis must be submitted, candidates are required to demonstrate this on their application).

3. At least 3 years relevant research experience to include:
  - Track record of undertaking research in the area of autonomous systems (relevant to the project)
  - Track record of work on dynamical systems (theoretical or experimental)
  - Proven experience of working in programming languages such as Matlab/Simulink, Python, Julia etc.
  - Working effectively as part of a research team in the development and promotion of the research theme.
4. Strong publication record commensurate with stage of career.
5. Ability to contribute to broader management and administrative processes.
6. Contribute to the School's outreach programme by links with industry, community groups etc.
7. Practical problem solving skills, independence of thought and initiative.
8. Ability to assess and organise resources.
9. Ability to communicate complex information in English effectively in oral and written format.
10. Ability to build relationships to develop internal and external networks.
11. Commitment to continuous professional development.
12. Willingness and ability to meet the mobility requirements of the post ie. attendance at conferences / networking events as required.

**DESIRABLE CRITERIA:**

1. Demonstrable expertise in robotic navigation and path planning algorithms, preferably in marine vehicles.
2. Demonstrable experience of working in real-time algorithmic implementation.
3. Demonstrable programming skills in Java, C++, or other languages to develop and implement real-time algorithms.
4. Track record of work in modern control theory, for example: set-based methods, hybrid systems, formal verification in control.
5. Willingness to carry out occasional teaching/supervision duties under the direct guidance of a member of academic staff.
6. Evidence of contribution in the preparation of grant proposals.