

Candidate Information

Position:	Research Fellow in CPS Analysis and Control
School/Department:	Energy, Power and Intelligent Control
Reference:	20/108150
Closing Date:	Monday 23 March 2020
Salary:	£33,797 to £40,322 per annum.
Anticipated Interview Date:	Monday 6 April 2020
Duration:	This post is available for 29 months with a possibility for extension.

JOB PURPOSE:

To contribute to the research project entitled 'Edge Computing Resource Allocation for Dynamic Networks' (DRUID-NET), funded by the Engineering and Physical Sciences Research Council (EPSRC) and internationally by the CHIST-ERA programme for The European Coordinated Research on Long-term Information and Communication Technologies and ICT-based challenges. The research at QUB is focused on: (i) developing new theoretical and algorithmically practical solutions to dynamic resource allocation problems in edge computing and dynamic networks, as well as (ii) proposing new co-design strategies in control synthesis of cyber-physical systems. The researcher will work closely with our partners in France (Inria), Belgium (UCLouvain), Canada (ETS Montreal) and Greece (NTUA) that have diverse skillsets within Control Theory, Computer Science, Communications and Network Theory, Applied Mathematics, and Software Engineering. The successful candidate will become an active member of the Centre for Intelligent Autonomous Manufacturing Systems (i-AMS) within the School of EECS at QUB, contributing world leading research outputs and completely new research initiatives in the broader area of control theory and cyber-physical systems.

MAJOR DUTIES:

1. Develop a systems framework in dynamic networks, modelling the availability of computation, communication and storage resources as well as key performance metrics as a hybrid dynamical system.
2. Perform theoretical research in resource allocation / analysis and control design with formal guarantees, in dynamic networks that include edge /cloud clusters, IoT devices and sensor/actuator networks.
3. Perform theoretical research and propose new co-design methods for simultaneous resource allocation and controller design in control applications.
4. Evaluate the performance of the proposed solutions (i) in a software environment and (ii) in a laboratory experiment, either in the Inria IoT-LAB or the QUB Autonomous Systems Lab.
5. Work closely with all project partners, attend project meetings and cross-leverage their complimentary expertise.
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 often in collaboration with the supervisor the material for publication in national and international journals and presentations at international conferences.
8. Develop and plan an area of personal research and expertise, and/or undertake research under supervision within a specific research project or as a member of a research team.
9. Carry out routine administrative tasks associated with the research project/s to ensure that project is completed on time and within budget. These might include organisation of project meetings and documentation, risk assessment of research activities.
10. Carry out occasional undergraduate (MEng/MSc) supervision, demonstrating or lecturing duties within the post holder's area of expertise and under the guidance of a member of academic staff.
11. Read academic papers, journals and textbooks to keep abreast of developments in own specialism and related disciplines.

Planning and Organising:

1. Plan for the use of research resources, laboratories and workshops.
2. Plan own day-to day activity within the framework of the agreed research programme.
3. Plan and meet deadlines for journal publications, prepare presentations and papers for conferences.

4. Coordinate and liaise with other members of the research group 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 any students who may be assisting with research.

Internal and External Relationships:

1. Liaise on a regular basis with colleagues and students in i-AMS, EPIC, the School of EECS and faculties in QUB to build research collaborations.
2. Build internal contacts and participate in internal networks for the exchange of information and to form relationships for future collaboration.
3. Join external networks to share information and ideas.

ESSENTIAL CRITERIA:

1. Hold, or be about to obtain, a PhD in Control, Electronic/Electrical Engineering, Applied Mathematics, Computer Science, or closely related discipline.
2. A minimum of 3 years relevant research experience in the broad area of systems and control theory, and/or analysis of cyber-physical systems.
3. Have a record of publishing (commensurate with career stage) in the proceedings of high quality international conferences and journals (for example IEEE, ACM).
4. Able to contribute to broader management and administrative processes at a level commensurate with stage in career.
5. Sufficient breadth and depth of specialist knowledge in the discipline and of research methods and techniques.
6. Good programming skills.
7. Strong oral and written English communication skills.
8. Good presentation skills.
9. Able to communicate complex information clearly.
10. Able to develop contacts and participate in internal and external networks.
11. Demonstrable intellectual ability and a passion for research.
12. Be a team player with good interpersonal skills.
13. Open minded, willing to acquire new skills.
14. Ability to meet the mobility requirements of the post which may include to travel and present at project meetings, international conferences and spend time conducting experiments abroad.

DESIRABLE CRITERIA:

1. A PhD in Control.
2. Strong background in some of the areas in stability analysis of dynamical systems, Lyapunov methods, hybrid / switching systems, graph theory, reachability analysis, set based methods, optimization, resource allocation problems.
3. Experience working with several different academic partners.
4. Experience of conducting meetings.
5. Experience of organising workshops.
6. Experience in meeting deadlines in producing technical documents.
7. Ability to help apply and secure grants/contracts .
8. Experience of presenting at conferences, workshops, seminars, tutorials etc.