

## Candidate Information

<b>Position:</b>	Research Fellow - Cell-Free Massive MIMO
<b>School/Department:</b>	Centre for Wireless Innovation
<b>Reference:</b>	20/108371
<b>Closing Date:</b>	Monday 19 October 2020
<b>Salary:</b>	£33,797 per annum
<b>Anticipated Interview Date:</b>	Wednesday 4 November 2020
<b>Duration:</b>	24 months or until 30 April 2023 (whichever is soonest)

### JOB PURPOSE:

To contribute to the project, funded by UK Research and Innovation (UKRI), entitled "Analysis and Design for Cell-Free Massive MIMO" by developing a complete, useful, and practical cell-free massive MIMO system. The successful candidate will work mainly on performance analysis, channel estimation aspects, and resource allocations of cell-free massive MIMO. The candidate will become active members of the Centre for Wireless Innovation and the School of EEECS at QUB, assisting in the production of world leading research output and the development of new research initiatives in the broader area of cell-free massive MIMO research.

### MAJOR DUTIES:

1. Propose new system designs and resource allocations to improve the performance of cell-free massive MIMO.
2. Combine cell-free massive MIMO with machine learning.
3. Exploit the effects of inter-user interference and pilot contamination in cell-free massive MIMO with different setups such as network density, channel models, and signal processing techniques.
4. Analyse the performance of cell-free massive MIMO with hardware impairments.
5. Design novel pilot sequences and low-complexity estimators for cell-free massive MIMO to reduce the channel estimation overhead, the pilot contamination effect taking into account hardware impairments.
6. Evaluate the performance of the proposed solutions in MATLAB.
7. 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.
8. Work closely with all project collaborators, attend project meetings and cross-leverage their complimentary expertise.
9. Carry out analyses, critical evaluations, and interpretations using methodologies and other techniques appropriate to experimental computing systems research.
10. Present regular progress reports on research to members of the research group or to external audiences to disseminate and publicise research findings.
11. Prepare, often in consultation with the supervisor, material for publication in national and international journals and presentations at international conferences.
12. Assist grant holder in the preparation of funding proposals and applications to external bodies.
13. Carry out routine administrative tasks associated with the research project/s to ensure that project/s are completed on time and within budget.
14. Carry out occasional undergraduate (final year, MEng) project supervision, demonstrating or lecturing duties within the post holder's area of expertise and under the direct guidance of a member of academic staff.
15. 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 where appropriate.
2. Plan own day-to day activity within framework of the agreed research programme.
3. Plan in advance to meet deadlines for journal publications and to prepare presentations and papers for conferences.
4. Coordinate and liaise with other project collaborators 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 the Centre for Wireless Innovation, the School of EECS and faculties in Queen's University Belfast 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. PhD or nearly completion of a PhD in Electronics, Electrical Engineering, or closely related discipline.
2. At least 3 years research experience in wireless communications, signal processing and information theory.
3. Ability to contribute to research management and administrative processes.
4. Contribute to the School's outreach programme by links with industry, community groups etc.
5. Sufficient breadth and depth of specialist knowledge in the discipline and of research methods and techniques to work within established research programmes.
6. Ability to communicate complex information clearly.
7. Ability to build contacts and participate in internal and external networks.
8. Demonstrable intellectual ability.
9. Ability to assess and organise resources.

**DESIRABLE CRITERIA:**

1. At least 2:1 honours degree in Electronics, Electrical Engineering, or closely related discipline.
2. Demonstrably strong background in communication theory, signal processing, and optimization for massive MIMO.
3. Demonstrable experience applying machine learning technologies/techniques for wireless communications.
4. Experience in research projects, in particular in project task management and reporting through periodic deliverables.
5. Experience working with external industrial or academic partners.
6. Experience in producing timely technical documentation on research projects (deliverables, reports).
7. Experience with presentations of research outputs in conferences, workshops, or seminars.