Candidate Information

Position:	Research Fellow - Deep Learning in Microwave and Millimetre-wave Imaging
School/Department:	Centre for Wireless Innovation
Reference:	22/110533
Closing Date:	Monday 9 January 2023
Salary:	£35,333 per annum
Anticipated Interview Date:	Tuesday 24 January 2023
Duration:	2 years or until November 2025, whichever is sooner.

JOB PURPOSE:

Development and implementation of machine learning and deep learning-based physical models for microwave and millimetre-wave imaging applications. The position is offered within the project "Developing Solutions to Acute Threats: Compressive Imaging for Real-Time Security Screening" funded by a Leverhulme Trust Research Leadership Award. This research at QUB will focus on developing machine learning and deep learning methods for compressive microwave and millimetre-wave imaging systems and technology. Particularly, we will be developing solutions to address processing-layer challenges, such as super-resolution, classification, automated threat detection (ATD) and learning-based approaches to solve inverse-problems. This research will develop the next-generation millimetre-wave imaging infrastructure with real-time radar imaging capabilities. Successful implementation of this technology will transform the state of the art in millimetre-wave imaging.

MAJOR DUTIES:

1. Develop machine learning and deep learning-based methods for microwave and millimetre-wave imaging to perform image reconstruction, detection and processing.
2. Solve radar imaging inverse problems leveraging deep learning models.
3. Evaluate the performances of the developed models in terms of performance, accuracy, false alarm rate, and computational time.
4. Verify the operation of the developed models with simulations and measurements.
5. Compare the developed models with conventional machine learning and deep learning-based models.
6. Liaise with others in the research consortium to carry out system integration.
7. Present regular progress reports to members of the research team.
8. Prepare, in consultation with line manager, material for publication in prestigious leading journals and presentations at major international conferences to disseminate and publicise research findings.
9. Contribute to undergraduate and postgraduate supervisions, within the post holder's area of expertise and under the direct guidance of a member of academic staff.
10. Identify new funding opportunities and assist in the preparation of funding proposals.
11. 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, risk assessment of research activities, etc.
12. Keep abreast of new developments in own specialism and related research areas/disciplines.

ESSENTIAL CRITERIA:

1. Normally have or be about to obtain (within 3 months) a PhD in Electrical/Electronic Engineering or Computer Science.
2. At least 3 years relevant research experience to include:
   • Designing and developing deep-learning models for microwave and millimetre-wave imaging (possible applications include: image reconstruction, super-resolution, classification, automated threat detection, etc).
   • Experience with using Python and MATLAB.
   • Developing deep learning models using TensorFlow or PyTorch platforms
   • Demonstrable experience of microwave & millimetre-wave imaging and relevant image reconstruction algorithms.
3. Ability to contribute to broader management and administrative processes.

4. Contribute to the School's outreach programme by links with industry, community groups etc.
5. A publication record in line with stage of career in prestigious leading journals and presentations at major international conferences.
6. Practical problem solving skills, independence of thought and initiative.
7. Ability to communicate complex information effectively in oral and written format.
8. Ability to build relationships to develop internal and external networks.
9. Ability to assess and organise resources.

DESIRABLE CRITERIA:
1. Knowledge in computational imaging and compressive sensing.
2. Experience in managing a research project.
3. Experience in writing a funding proposal.
4. Experience in supervising at postgraduate level.