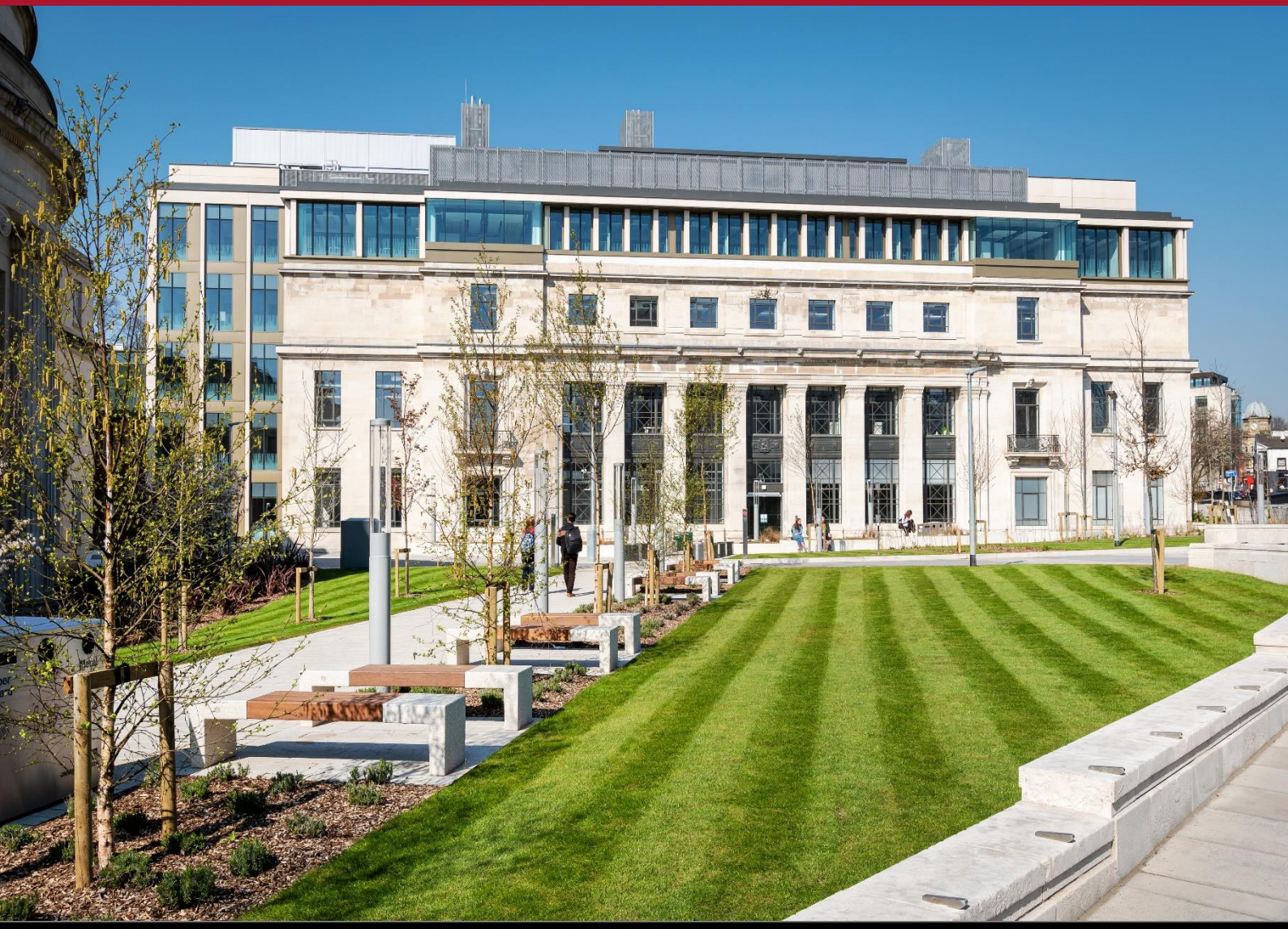
UNIVERSITY OF LEEDS

CANDIDATE BRIEF

Research Fellow in Augmented Reality and Multi-Physics Imaging for First Person Navigation, Faculty of Engineering and Physical Sciences



Salary: Grade 7 (£39,105 – £46,485 p.a.) Due to funding restrictions, an appointment will not be made higher than £40,247 p.a.

Reference: EPSPA1122

Location: Leeds Main Camps, University of Birmingham, and Durham University

Closing date: Wednesday 15 January 2025

Fixed-term for up to 3 years

We are open to discussing flexible working arrangements

Research Fellow in Augmented Reality and Multi-Physics Imaging for First-Person Navigation, School of Physics and Astronomy.

Are you an early career researcher looking for your first challenge? Do you have a background to undertake multidisciplinary research across the interface of physics and engineering? Do you want to further your career in one of the UK's leading research-intensive universities in collaboration with other leading universities?

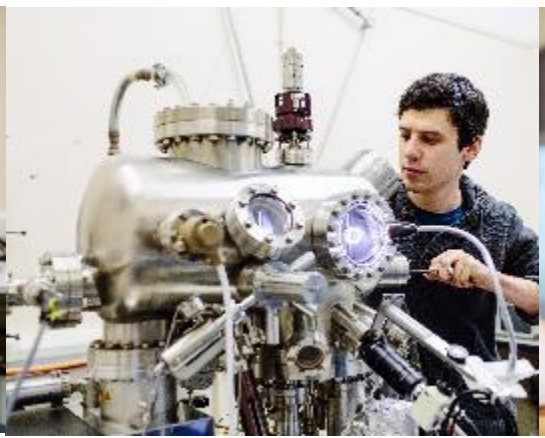
We are seeking a highly motivated and skilled Research Fellow to join our multi-institutional (University of Leeds, University of Birmingham, and Durham University) and multi-disciplinary research team working on an innovative project to develop a novel sensing solution. In particular, you will enhance first-person navigation and action in challenging environments of low or no visibility through sensing via ultrasound and/or infrasound and digital information processing via augmented reality (AR). The project focuses on developing an AR system that provides a wireframe first-person view of a space, facilitating navigation for teams such as firefighters in complex, hazardous environments relevant to defence and security.

All staff recruited to this project are required to undergo security checks to be carried out by the National Security Technology Innovation Exchange (NSTIx) before being employed.

What does the role entail?

As a Research Fellow, your main duties will include:

- Developing and implementing algorithms for Simultaneous Localization and Mapping (SLAM) using sonar, lidar, and light amplification imaging, with a particular focus on sonar technology;
- Undertaking sensor and transducer modelling, using multiphysics;
- Designing and integrating a multi-physics imaging system to create an augmented reality heads-up display (HUD) that can see through walls and visualize rooms in wireframe;

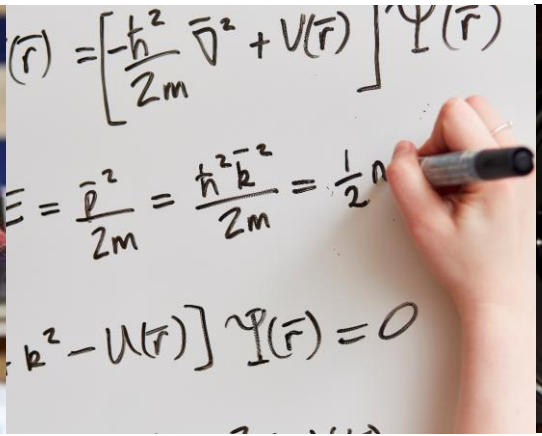

- Collaborating with a second team on the same project to develop low-frequency sonar (infrasound) mapping techniques to overlay volumetric maps onto the AR system;
- Adjusting the AR view in real-time based on head position and movement to provide an accurate reconstructed view of the environment;
- Conducting experiments and field tests to validate the effectiveness and reliability of the developed AR system;
- Generating and pursuing independent and original research ideas in the appropriate subject area;
- Developing research objectives and proposals and contributing to setting the direction of the research project and team including preparing proposals for funding in collaboration with colleagues;
- Evaluating methods and techniques used and results obtained by other researchers and to relate such evaluations appropriately to your own research;
- Making a significant contribution to the dissemination of research results by publication in leading peer-reviewed journals and by presentation at national and international meetings;
- Working independently and as part of a larger team of researchers, both internally and externally, to develop new research links and collaborations and engage in knowledge transfer activities where appropriate;
- Maintaining your own continuing professional development and acting as a mentor to less experienced colleagues as appropriate;
- Contributing to the training of both undergraduate and postgraduate students, including assisting with the supervision of projects in areas relevant to the project.

These duties provide a framework for the role and should not be regarded as a definitive list. Other reasonable duties may be required consistent with the grade of the post.

What will you bring to the role?

As a Research Fellow, you will have:

- A PhD (or have submitted your thesis before taking up the role) in Physics, Computer Science, Electrical Engineering, Robotics, Applied Mathematics, or a related field;
- Proficiency in programming languages such as Python, C++, or MATLAB;


- Experience with appropriate experimental techniques;
- Good time management and planning skills, with the ability to meet tight deadlines and manage competing demands effectively without close support;
- A developing track record of peer-reviewed publications in international journals;
- Excellent communication skills both written and verbal, and the ability to communicate your research at national and international conferences;
- A proven ability to work well both independently and in a team;
- A strong commitment to your own continuous professional development.

You may also have:

- Experience of pursuing external funding to support research;
- Experience with:
    - AR/VR technologies and head-mounted displays;
    - low-frequency sonar (infrasound) imaging and its applications;
    - developing navigation systems for first responders or similar applications;
- An understanding of SLAM algorithms and multi-sensor data fusion, particularly using sonar and lidar;
- Knowledge of real-time systems and hardware integration;
- Familiarity with machine learning techniques and their application in SLAM and AR systems.

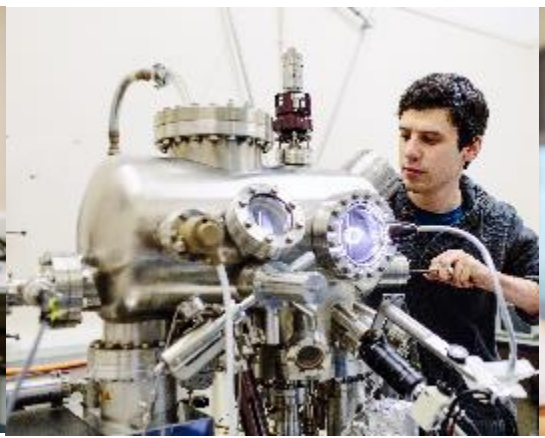
How to apply

You can apply for this role online; more guidance can be found on our How to Apply information page. Applications should be submitted by **23:59** (UK time) on the advertised closing date.

Contact information

To explore the post further or for any queries you may have, please contact:

Professor Ben Varcoe, Professor of Quantum Information Science
Tel: +44 (0)113 343 8290
Email: B.Varcoe@leeds.ac.uk


Additional information

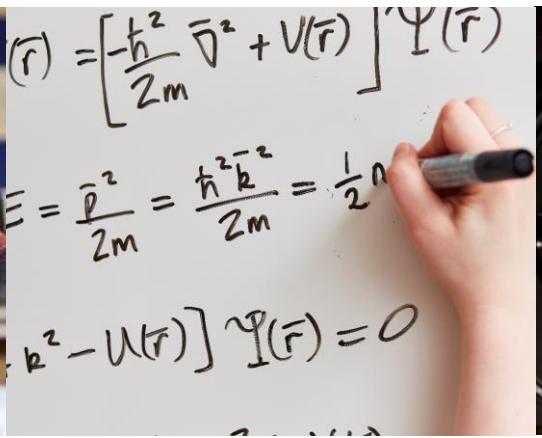
Faculty and School Information
Further information is available on the research and teaching activities of the Faculty of Engineering & Physical Sciences, and the School of Physics and Astronomy.

Working at Leeds
We are a campus-based community and regular interaction with campus is an expectation of all roles in line with academic and service needs and the requirements of the role. We are also open to discussing flexible working arrangements. To find out more about the benefits of working at the University and what it is like to live and work in the Leeds area visit our Working at Leeds information page.

A diverse workforce
As an international research-intensive university, we welcome students and staff from all walks of life and from across the world. We foster an inclusive environment where all can flourish and prosper, and we are proud of our strong commitment to student education. Within the Faculty of Engineering and Physical Sciences we are dedicated to diversifying our community and we welcome the unique contributions that individuals can bring, and particularly encourage applications from, but not limited to Black, Asian and ethnically diverse people; people who identify as LGBT+; and people with disabilities. Candidates will always be selected based on merit and ability.

The Faculty of Engineering and Physical Sciences are proud to have been awarded the Athena SWAN Silver Award from the Equality Challenge Unit, the national body that promotes equality in the higher education sector. Our equality and inclusion webpage provides more information.

Information for disabled candidates
Information for disabled candidates, impairments or health conditions, including requesting alternative formats, can be found under the 'Accessibility' heading on our How to Apply information page or by getting in touch by emailing HR via hr@leeds.ac.uk.



Criminal Record Information
Rehabilitation of Offenders Act 1974 (Exceptions) Order 1975
This post may require an enhanced criminal record check from the Disclosure and Barring Service (DBS), and any equivalent overseas authorities where relevant. The successful candidate would therefore be required to give consent for the University to check their criminal record status. All applicants are required to make a self-declaration where applicable.

Any offer of appointment will be subject to the University being satisfied with the outcome of these checks, in accordance with our Criminal Records policy. You can find out more about required checks and declarations in our Criminal Records information page.

Salary Requirements of the Skilled Worker Visa Route
Please note that this post may be suitable for sponsorship under the Skilled Worker visa route but first-time applicants might need to qualify for salary concessions. For more information, please visit the Government's Skilled Worker visa page.

For research and academic posts, we will consider eligibility under the Global Talent visa. For more information, please visit the Government's page, Apply for the Global Talent visa.