Job Description

Summary

Job title	Postdoctoral Research Assistant in AI-assisted Ultrasound Guidance
Division	Mathematical, Physical and Life Sciences Division
Department	Engineering Science
Location	Institute of Biomedical Engineering, Old Road Campus, Headington
Grade and salary	Grade 7: £38,674 - £46,913 per annum
Hours	Full time
Contract type	Fixed-term for 2 years in the first instance
Reporting to	Professor Alison Noble FRS
Vacancy reference	179871

Research topic	Ultrasound, robotics, computer vision
Principal Investigator / supervisor	Professor Alison Noble FRS
Funding partner	The funds supporting this research project are provided by the UKRI
Recent publications	See laboratory website

The role

We are looking for a creative and highly motivated postdoctoral researcher to join the Turing AI World-Leading Fellowship research programme led by Professor Alison Noble. This exciting and ambitious research aims to develop new AI for shared human-AI decision-making in healthcare imaging. Topics in the research programme include single- and multi-modal video-based human-AI collaboration, federated learning for healthcare collaboration and partnership, and applied research to understand human skill in healthcare settings and AI to support healthcare professional skills training.

The successful candidate will be a technical researcher on the human-AI collaboration strand of the research programme and specifically building on prior work of the group on video and multi-modality AI-assisted ultrasound guidance towards building an ultrasound AI instructor. The research sits at the interfaces of medical imaging, computer vision and medical robotics. It will involve collaborating with clinical research partners to evaluate developed methodology in real-world scenario settings to demonstrate its potential impact.

Responsibilities

Specific Duties

We already have pilot data for this specific project, and an extensive database of research ultrasound video and annotations to inform model training. You will be responsible for the design and testing of original machine-learning based algorithms and models for multi-modal ultrasound guidance that are intuitive for a non-specialist to use while scanning and trustworthy. You will work with clinical domain experts to acquire further bespoke training and testing data, develop prototype solutions informed by the latest ideas in medical imaging AI, computer vision and robotic guidance, and evaluate models in simulated and real clinical scenarios. Evaluation may involve quantitative studies (model performance) and quality studies (human factors assessment).

Additional Duties

- Manage own academic research and administrative activities. This involves small scale project management, to co-ordinate multiple aspects of work to meet deadlines
- Adapt existing and develop new scientific techniques and experimental protocols
- Test hypotheses and analyse scientific data from a variety of sources, reviewing and refining working hypotheses as appropriate
- Contribute ideas for new research projects
- Develop ideas for generating research income, and present detailed research proposals to the principal investigator
- Collaborate in the preparation of scientific reports and journal articles and occasionally present papers and posters
- Act as a source of information and advice to other members of the group on scientific protocols and experimental techniques
- Represent the research group at external meetings/seminars, either with other members of the group or alone
- Carry out collaborative projects with colleagues in partner institutions, and research groups
- There may be an opportunity to undertake ad-hoc paid teaching at the university (this includes lecturing, demonstrating, small-group teaching, tutoring of undergraduates and graduate students and supervision of masters projects in collaboration with principal investigator). Permission must be sought in advance for each opportunity.
- Any other duties appropriate with the role.

Selection criteria

Essential selection criteria

- Hold a relevant PhD/DPhil or be near completion* in machine learning, computer vision, robotics or biomedical image analysis together with relevant experience
- Publications/presentations in top conferences and journals in the discipline of work including as a first author.
- Experience of original deep learning in imaging architecture design and evaluation on public data challenge and real-world data.
- Experience of working collaboratively with application domain experts.
- Experience of validation of deep learning-based image analysis models on real-world data.
- Excellent understanding of AI and ethical research.
- Excellent programming skills and experience with deep learning toolkits.
- Evidence of ability to work in a team.
- Ability to manage own academic research and associated activities
- Ability to contribute ideas for new research projects and research income generation

- Excellent communication skills, including the ability to write for publication, present research proposals and results, and represent the research group at meetings

**please note that 'near completion' means that your PhD thesis has been submitted and your viva has been held.*

Desirable selection criteria

- Experience of independently managing a discrete area of a larger research project
- Experience of co-authoring inter-disciplinary papers.
- Knowledge of basic principles and requirements of sensitive data governance and processing.

Pre-employment screening

Standard checks

If you are offered the post, the offer will be subject to standard pre-employment checks. You will be asked to provide: proof of your right-to-work in the UK; proof of your identity; and (if we haven't done so already) we will contact the referees you have nominated. You will also be asked to complete a health declaration so that you can tell us about any health conditions or disabilities for which you may need us to make appropriate adjustments.

Please read the candidate notes on the University's pre-employment screening procedures at: https://www.jobs.ox.ac.uk/pre-employment-checks

About the University of Oxford

Welcome to the University of Oxford. We aim to lead the world in research and education for the benefit of society both in the UK and globally. Oxford's researchers engage with academic, commercial and cultural partners across the world to stimulate high-quality research and enable innovation through a broad range of social, policy and economic impacts.

We believe our strengths lie both in empowering individuals and teams to address fundamental questions of global significance, while providing all our staff with a welcoming and inclusive workplace that enables everyone to develop and do their best work. Recognising that diversity is our strength, vital for innovation and creativity, we aspire to build a truly diverse community which values and respects every individual's unique contribution.

While we have long traditions of scholarship, we are also forward-looking, creative and cutting-edge. Oxford is one of Europe's most entrepreneurial universities and we rank first in the UK for university spin-outs, and in recent years we have spun out 15-20 new companies every year. We are also recognised as leaders in support for social enterprise.

Join us and you will find a unique, democratic and international community, a great range of staff benefits and access to a vibrant array of cultural activities in the beautiful city of Oxford.

For more information, please visit www.ox.ac.uk/about/organisation.

Institute of Biomedical Engineering, Noble Group

Professor Noble's group works in healthcare imaging artificial intelligence (AI). The research group's interests sit at the interfaces of AI with computer vision and clinical medicine. In recent years, the Noble group has been at the forefront of international thinking in how to bring AI to ultrasound working closely with clinical research groups in Oxford (particularly the group of Prof. Aris Papageorghiou, Nuffield Department of Women's & Reproductive Health) and overseas. Current research includes a major project associated with the Hong Kong COCHE Centre aimed at early detection of fetal congenital heart conditions, a collaboration with the Oxford Visual Geometry Group, University of Bristol and University of Edinburgh on audio-visual computer vision and computer vision translational applications, and the Turing AI World-Leading Research programme of which this post is associated. The Turing AI award has a multi-modal medical imaging theme, looking at next generation methodology in human-AI collaboration for healthcare, understanding human skill via AI-based modelling, as well as how international groups can partner together to build rich video-based and multi-modal models with federated learning and/or related privacy-enhancing technologies, and thus without a requirement of data exchange. The group also has several on-going small global health projects with partners in Africa and India co-creating and evaluating AI-assisted ultrasound and imaging methods for low-resource healthcare settings.

For more information please visit: https://eng.ox.ac.uk/biomedical-image-analysis/noble-group

Engineering Science Department

Engineering teaching and research takes place at Oxford in a unified Department of Engineering Science whose academic staff are committed to a common engineering foundation as well as to advanced work in their own specialties, which include most branches of the subject. We have especially strong links with computer science, materials science, and medicine. The Department employs 140 academic staff and has around 770 research students, 700 undergraduates and 200 researchers at any one time. Our research and education activities are supported by over 230 Professional and Technical staff.

Direct funding of research grants and contracts, from a variety of sources, amounts to an annual turnover of approximately £73m, of which research grant income is approximately £34m. Research activities fall into 8 broad headings, though there is much interdisciplinary research in practice: Information Engineering (Robotics, Computer Vision and Machine Learning); Control; Thermofluids; Materials and Mechanics; Civil and Offshore; Electrical and Optoelectronic; Chemical and Process; and Biomedical.

Research Excellence

The results of the seven-yearly UK-wide assessment of university research, REF2021, published on 12th May 2022, demonstrate that the University of Oxford made the highest volume of world-leading research submissions. The Department of Engineering Science had 71% of submissions which met the requirements for the highest grading of 4*(research that is world-leading in terms of originality, significance, and rigour).

Teaching

Each year 170-180 new undergraduates start the 4-year course leading to the MEng degree in Engineering Science. The course is accredited at MEng level by the major engineering institutions. The syllabus has a common core extending through the first two years, with specialist options introduced in the third year, and the fourth year offering further specialist material and a major project.

Working for the Department
The Department of Engineering Science is a diverse, inventive, and dynamic place to work. There are many benefits to working for the University of Oxford, including flexible working arrangements, competitive benefits including a contributory salary scheme, travel discounts, and attractive family policies, as well as many training and self-development opportunities and a wealth of support for mental health and work-life balance.

The Department holds a bronze Athena Swan award to recognise advancement of gender equality: representation, progression and success for all. We have an active Equality and Diversity Committee who evaluate our position and help formulate plans to take us forward.

Researchers are supported via training, a researcher committee, regular events, career development support and opportunities to develop science communication and other useful skills. We have a well-established and active Women in Engineering network which fosters a supportive community for women engineers across various disciplines, organizes engaging and inspiring events for all.

Further information about the Department is available at www.eng.ox.ac.uk/about/.

The Mathematical, Physical, and Life Sciences Division

The Mathematical, Physical, and Life Sciences (MPLS) Division is one of the four academic divisions of the University. In the results of the six-yearly UK-wide assessment of university research, REF2014, the MPLS division received the highest overall grade point average (GPA) and the highest GPA for outputs. We received the highest proportion of 4* outputs, and the highest proportion of 4* activity overall. More than 50 per cent of MPLS activity was assessed as world leading.

The MPLS Division's 10 departments and 3 interdisciplinary units span the full spectrum of the mathematical, computational, physical, engineering and life sciences, and undertake both fundamental research and cutting-edge applied work. Our research addresses major societal and technological challenges and is increasingly focused on key interdisciplinary issues. MPLS is proud to be the home of some of the most creative and innovative scientific thinkers and leaders working in academe. We have a strong tradition of attracting and nurturing the very best early career researchers who regularly secure prestigious fellowships

We have around 6,000 students and play a major role in training the next generation of leading scientists. Oxford's international reputation for excellence in teaching is reflected in its position at the top of the major league tables and subject assessments.

MPLS is dedicated to bringing the wonder and potential of science to the attention of audiences far beyond the world of academia. We have a strong commitment to supporting public engagement in science through initiatives including the Oxford Sparks portal (http://www.oxfordsparks.net/) and a large variety of outreach activities. We also endeavour to bring the potential of our scientific efforts forward for practical and beneficial application to the real world and our desire is to link our best scientific minds with industry and public policy makers.

For more information about the MPLS division, please visit: http://www.mpls.ox.ac.uk/

How to apply

Applications are made through our online recruitment portal. Information about how to apply is available on our Jobs website https://www.jobs.ox.ac.uk/how-to-apply.

Your application will be judged solely on the basis of how you demonstrate that you meet the selection criteria stated in the job description.

As part of your application you will be asked to provide details of two referees and indicate whether we can contact them now.

You will be asked to upload a CV and a supporting statement. The supporting statement must explain how you meet each of the selection criteria for the post using examples of your skills and experience. This may include experience gained in employment, education, or during career breaks (such as time out to care for dependants)

Please upload all documents **as PDF files** with your name and the document type in the filename.

All applications must be received by **midday** UK time on the closing date stated in the online advertisement.

Information for priority candidates

A priority candidate is a University employee who is seeking redeployment because they have been advised that they are at risk of redundancy, or on grounds of ill-health/disability. Priority candidates are issued with a redeployment letter by their employing department(s).

If you are a priority candidate, please ensure that you attach your redeployment letter to your application (or email it to the contact address on the advert if the application form used for the vacancy does not allow attachments).

If you need help

Application FAQs, including technical troubleshooting advice is available at: https://staff.web.ox.ac.uk/recruitment-support-faqs

Non-technical questions about this job should be addressed to the recruiting department directly: recruitment@eng.ox.ac.uk

To return to the online application at any stage, please go to: www.recruit.ox.ac.uk.

Please note that you will receive an automated email from our online recruitment portal to confirm receipt of your application. **Please check your spam/junk mail** if you do not receive this email.

Important information for candidates

Data Privacy

Please note that any personal data submitted to the University as part of the job application process will be processed in accordance with the GDPR and related UK data protection legislation. For further information, please see the University's Privacy Notice for Job Applicants at: https://compliance.admin.ox.ac.uk/job-applicant-privacy-policy. The University's Policy on Data Protection is available at: https://compliance.admin.ox.ac.uk/data-protection-policy.

The University's policy on retirement

The University operates an Employer Justified Retirement Age (EJRA) for very senior research posts at **grade RSIV/D35 and clinical equivalents E62 and E82**, which with effect from 1 October 2023 will be 30 September before the 70th birthday. The justification for this is explained at: https://hr.admin.ox.ac.uk/the-ejra.

For **existing** employees on these grades, any employment beyond the retirement age is subject to approval through the procedures: https://hr.admin.ox.ac.uk/the-ejra.

There is no normal or fixed age at which staff in posts at other grades have to retire. Staff at these grades may elect to retire in accordance with the rules of the applicable pension scheme, as may be amended from time to time.

Equality of opportunity

Entry into employment with the University and progression within employment will be determined only by personal merit and the application of criteria which are related to the duties of each particular post and the relevant salary structure. In all cases, ability to perform the job will be the primary consideration. No applicant or member of staff shall be discriminated against because of age, disability, gender reassignment, marriage or civil partnership, pregnancy or maternity, race, religion or belief, sex, or sexual orientation.

Benefits of working at the University

Employee benefits

University employees enjoy 38 days' paid holiday, generous pension schemes, travel discounts, and a variety of professional development opportunities. Our range of other employee benefits and discounts also includes free entry to the Botanic Gardens and University colleges, and discounts at University museums. See https://hr.admin.ox.ac.uk/staff-benefits

University Club and sports facilities

Membership of the University Club is free for all University staff. The University Club offers social, sporting, and hospitality facilities. Staff can also use the University Sports Centre on Iffley Road at discounted rates, including a fitness centre, powerlifting room, and swimming pool. See www.club.ox.ac.uk and https://www.sport.ox.ac.uk/.

Information for staff new to Oxford

If you are relocating to Oxfordshire from overseas or elsewhere in the UK, the University's Welcome Service website includes practical information about settling in the area, including advice on relocation, accommodation, and local schools. See https://welcome.ox.ac.uk/

There is also a visa loan scheme to cover the costs of UK visa applications for staff and their dependents. See https://staffimmigration.admin.ox.ac.uk/visa-loan-scheme

Family-friendly benefits

With one of the most generous family leave schemes in the Higher Education sector, and a range of flexible working options, Oxford aims to be a family-friendly employer

The University has excellent childcare services, including five University nurseries as well as University-supported places at many other private nurseries.

For full details, including how to apply and the costs, see https://childcare.admin.ox.ac.uk/

Disabled staff

We are committed to supporting members of staff with disabilities or long-term health conditions. For further details, including information about how to make contact, in confidence, with the University's Staff Disability Advisor, see https://edu.admin.ox.ac.uk/disability-support

Staff networks

The University has a number of staff networks including the Oxford Research Staff Society, BME staff network, LGBT+ staff network and a disabled staff network. You can find more information at https://edu.admin.ox.ac.uk/networks

The University of Oxford Newcomers' Club

The University of Oxford Newcomers' Club is an organisation run by volunteers that aims to assist the partners of new staff settle into Oxford, and provides them with an opportunity to meet people and make connections in the local area. See www.newcomers.ox.ac.uk.