Summary

Job title	Postdoctoral Research Assistant in Interconnect for AI Systems
Division	Mathematical, Physical and Life Sciences Division
Department	Engineering Science
Location	Parks Road, Oxford, OX1 3PJ
Grade and salary	Grade 7: £38,674 - £46,913 per annum
Hours	Full time
Contract type	Fixed term (for up to 2 years), externally funded
Reporting to	Professor Noa Zilberman
Vacancy reference	178302
Additional information	Whilst the role is a grade 7 position, we would be willing to consider candidates with potential but less experience who are seeking a development opportunity, for which an initial appointment would be at grade 6 (£34,982 - £40,855 per annum) with the responsibilities adjusted accordingly. This would be discussed with applicants at interview/appointment where appropriate. The project covers visa cost, immigration health surcharge and up to £1,000 relocation costs.
Research topic	Novel Interconnect for Scalable AI Systems
Principal Investigator / supervisor	Prof Noa Zilberman
Project web site	www.ox.ac.uk/computing/glass
Funding partner	The funds supporting this research project are provided by the Advanced Research+Innovation Agency (ARIA)

The role

GLASS is a revolutionary new project, rethinking the way we build AI systems The goal of the project is to develop an AI training system at 1/1000 of the cost. It aims to fit an AI system with 100's to 1000's of AI accelerators within a single server.

Reporting to Prof Noa Zilberman and working closely with Prof Nick McKeown, the postdoctoral researcher will work within the Computing Infrastructure research group and contribute to the GLASS project. The post holder will be involved in the design, implementation and evaluation of a novel

interconnect for the AI system. They will explore interconnect aspects such as routing, protocols, congestion control and resilience, and collaborate with other researchers in the project, providing innovation across multiple domains.

The successful candidate will have a PhD/DPhil in Computer Science, Engineering or a related scientific discipline. They will have knowledge and experience in wired computer networks, with a focus on low latency interconnect or related areas. Prior experience of either python and/or C/C++ software development is essential. The candidate is expected to have publications at related top-tier venues such as NSDI, SIGCOMM, CoNEXT and ASPLOS.

Responsibilities

Specific Duties

- Contribute to the design and development of a novel high-performance interconnect.
- Contribute to the design and development of protocols, routing and congestion control algorithms, in support of the developed interconnect.
- Develop, implement and conduct tests for the evaluation of the developed solutions.
- Integrate the developed solutions with other researchers' contributions.
- Work towards project's milestones and contribute to the reporting of the project.
- Liaise with collaborators to the project within and outside the project's consortium.
- Participate in the dissemination of outcomes via conference presentations, writing of papers and outreach events.

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 senior researchers
- Collaborate in the preparation of scientific reports and journal articles and occasionally present papers and posters
- Use specialist scientific equipment in a laboratory environment
- 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
- The researcher may have the opportunity to undertake ad-hoc paid teaching (this includes lecturing, demonstrating, small-group teaching, tutoring of undergraduates and graduate students and supervision of master's projects in collaboration with principal investigators). Permission must be sought in advance for each opportunity.
- Any other duties appropriate with the role.

Selection criteria

Essential selection criteria

- Hold a PhD/DPhil in Engineering, Computer Science or a related field, or be near completion* together with relevant experience.
- Strong publication record with publications at relevant top tier venues (e.g., NSDI, SIGCOMM, ToN) and familiarity with the existing literature and research in the field.
- An excellent knowledge/expertise in wired computer networks.
- An excellent knowledge of interconnects and related technologies (e.g., RDMA, RoCE, NVLINK).
- Have significant coding experience in Python and C/C++.
- Have experience working in a Linux environment and related scripting languages.
- Excellent communication skills and the ability to work effectively as part of a team.

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

Desirable selection criteria

- A good working knowledge of network simulators such as NS3.
- Have experience working on high performance networks for cloud computing or AI systems.
- A good working knowledge of hardware accelerators.
- Have experience in hardware development (e.g., verilog).

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.

Computing Infrastructure Research Group

The Computing Infrastructure group is engaged in a wide range of research projects related to Computer Engineering, with a focus on building Scalable, Sustainable and Resilient computing infrastructure. The group's focus is on using micro-architectures to improve system-scale and application level performance. Examples include using programmable devices to design new data driven accelerator platforms, building high-performance networked-systems, improving power-efficiency in cloud environments, developing carbon-aware networks, and more. All the research is implementation-driven, producing working prototypes.

The research group is centred at the Department of Engineering Science and has connections to many other research groups across in the United Kingdom and internationally, and is also closely linked to industry.
Open source research is at the heart of the group's work, and it is active in several open source communities. The code developed under different projects, as well as collected datasets, is made available online.

For more information please visit: https://eng.ox.ac.uk/computing/

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/three 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. We also subscribe to the Work+Family Space, a service that provides practical advice and support for employees who have caring responsibilities. The service offers a free telephone advice line, and the ability to book emergency back-up care for children, adult dependents and elderly relatives. See https://hr.admin.ox.ac.uk/my-family-care

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.