University of Oxford Department of Computer Science

Job description and selection criteria

Job title	Senior Research Associate on Ethical Web and Data Architectures
Division	MPLS
Department	Computer Science
Location	Wolfson Building, Parks Road, Oxford
Grade and salary	Grade 8: Salary £43,414 - £51,805 p.a. (Post may be under-filled at Grade 7 £34,308 - £42,155 p.a.)
Hours	Full Time
Contract type	Fixed term until 30 Nov 2024 starting from 1 April 2023
Reporting to	Professor Nigel Shadbolt
Vacancy reference	162313
Additional information	Whilst the role is a Grade 8 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 7 (Grade 7: £34,308 - £42,155 p.a.) with the responsibilities adjusted accordingly. This would be discussed with applicants at interview/appointment where appropriate**.**

The role

We are excited to offer this fixed-term Research Associate position at the University of Oxford, under the supervision of Professors Sir Nigel Shadbolt and Sir Tim Berners-Lee. The Research Associate will be part of a multi-million-pound research project – Ethical Web and Data Architectures in the Age of AI - supported by the Oxford Martin School. The successful candidate will be located in the Department of Computer Science and be a member of the Human Centred Computing Theme.

Reporting to Professor Sir Nigel Shadbolt, one of the Principal Investigators, the post holder will be responsible for elements of the design, development and deployment of decentralised computing architectures consistent with the aims of the EWADA project

(https://ewada.ox.ac.uk/). In particular, we are investigating the potential of the SOLID (https://solidproject.org/) architecture to offer a suitable platform for our requirements. The successful candidate will work collaboratively with the PIs and other members of the research team on the project, as well as independently leading and developing their own body of research in line with the project's aims. The post holder will be a member of the Human Centred Computing theme within the Department of Computer Science. The research group carries out world leading research relating to Human Computer Interaction, Human Centred AI, responsible innovation, and ethical data infrastructures. More information on Human Centred Computing can be found here: https://www.cs.ox.ac.uk/research/HCC/.

The successful candidate will also be part of the EWADA research programme, which brings together researchers from Oxford's Department of Computer Science, Faculties of Law and Philosophy, the Oxford Internet Institute, and the Blavatnik School of Government.

About the project

Thirty years ago, the World Wide Web launched as an open, common, universal infrastructure that anyone with a computer and a modem could use to communicate, publish and access information. In recent years, however, it has radically diverged from the values upon which it was founded, and it is now dominated by a number of platform companies, whose business models and services generate huge profits.

While an original ambition was to foster a Digital Enlightenment, what has developed is the large-scale collection of sensitive data about people's beliefs, interests, activities and ways of life. This data is used as the input to artificial intelligence (AI) analytics and machine learning (ML) and used to target advertising and direct us to particular content, groups and viewpoints. Individuals are treated as a means of value extraction, with no long-term control or agency over their personal data or many of the decisions made using it.

Ethical Web and Data Infrastructures in the Age of AI (EWADA) is an adventurous multidisciplinary research programme supported by the Oxford Martin School (https://www.oxfordmartin.ox.ac.uk) that aims to rebalance the concentration of power on the Web by developing and deploying new forms of technical and institutional infrastructure. To achieve this, the programme aims to investigate novel re-decentralisation architectures such as SOLID (https://solidproject.org/) and privacy-preserving AI methods and define new institutional and legal constructs that are required in this transformative approach we term "architectures for autonomy". A core part of the programme is to re-imagine and re-architect current elements of the Web, data, algorithms and institutions in a scalable, secure and sustainable way.

Research topic	**Ethical Web and Data Architectures**
Principal Investigator / supervisor	Professor Nigel Shadbolt
Funding partner	Oxford Martin School

It is anticipated that the balance of this post would be approximately 60% software development and 40% Research.

Responsibilities

- A lead designer and developer for the core technical platforms of the EWADA project, including working within our technical team contributing to the Social Linked Data OS (SOLID OS).
- Develop and manage research projects as part of the overall research agenda for the project, around the themes of data autonomy, data privacy, algorithmic accountability, and data sharing.
- Engage with the wider research and web technology communities relating to the project
- Manage own research and administrative activities, within guidelines provided by senior colleagues
- Contribute to wider project planning, including ideas for new research projects
- Contribute to scientific reports and journal articles and the presentation of data/papers at conferences
- Represent the research group at external meetings/seminars, either with other members of the group or alone
- Contribute to discussions and share research findings with colleagues in partner institutions, and research groups
- Assist in the supervision of post-graduate students working on related projects
- The postholder may also have the opportunity to teach. This may include lecturing, small-group teaching, and tutoring of undergraduates and graduate students.
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Selection criteria

Essential

- A doctoral degree in **Computer Science, Artificial Intelligence, Software Engineering**, OR a MSc/M.Eng in **Computer Science or Computer Engineering** and substantial post-graduate experience in software engineering and/or relevant research experience
- Expertise and experience with software and requirements engineering, especially around Web-based technologies, distributed architectures, database and system design
- Experience with web-based programming languages such as Javascript, Ruby, Python etc.

- Experience in full-stack web application development, and skill and enthusiasm for rapidly designing, prototyping, and usable systems
- Experience in conducting research independently as well as part of a team, ideally in human computer interaction, artificial intelligence
- Excellent communication skills, including the ability to engage with the wider community, represent the research group at meetings and contribute to research proposal preparations
- Willingness to collaborate with others and work effectively as a member of a team

Desirable

- Awareness of methods in Privacy Preserving Machine Learning, Distributed Machine Learning, AI Fairness and Explainability, and Interaction Design
- Awareness of approaches to data governance, data and AI ethics

Pre-employment screening

All offers of employment are made subject to standard pre-employment screening, as applicable to the post.

If you are offered the post, you will be asked to provide proof of your right-to-work, your identity, and 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 so that we can discuss appropriate adjustments with you), and a declaration of any unspent criminal convictions.

We advise all applicants to read the candidate notes on the University's pre-employment screening procedures, found at: www.ox.ac.uk/about/jobs/preemploymentscreening/.

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. Income from external research contracts in 2016/17 exceeded £564m and we rank first in the UK for

university spin-outs, with more than 130 companies created to date. 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

Department of Computer Science

The Department of Computer Science was established in 1957, making it one of the longest-established Computer Science departments in the country. It is one of the UK's leading Computer Science Departments (ranked first in a number of international rankings). The UK Research Excellence Framework (REF) in December 2014 resulted in 74 members of the Department having 53% of their research activity ranked in the top category of 4* (world-leading). Overall, we received an average of 3.34 across the Department (3* being internationally excellent). A significant majority of the Department are active in externally sponsored research, with both government and industrial funding. At present, there are 69 members of academic staff and almost 100 research staff.

The Department has close links with government, industry, and other departments within the University. Among the latter are Mathematics, Engineering, Physics, Statistics and a number of life sciences departments. The Department is housed across multiple sites within the University's South Parks Road Science Area, facilitating strong collaborative links with research groups and institutes in closely allied areas (including the Oxford Internet Institute and the Oxford e-Research Centre). This is an essentially inter-disciplinary activity which is at present attracting major funding from a number of sources. At present, the Department holds over £50m in external research contracts.

Research in the Department is currently managed in ten themes:

- *Algorithms & Complexity Theory* focusses on determining the inherent difficulty of computational problems, classifying problems according to this inherent difficulty, and designing and analysing algorithms that use computational resources as efficiently as possible;
- *Artificial Intelligence & Machine Learning* focuses on theoretical foundations, multiagent systems, deep learning and computational linguistics;
- *Automated Verification* investigates theory and practice of formal verification and correct-by-construction synthesis for software and hardware systems;
- *Computational Biology & Health Informatics* is concerned with computational approaches for biomedical research and healthcare innovation;
- *Cyber-Physical Systems* is focusing on intelligent and autonomous sensor systems with applications in positioning, healthcare, environmental monitoring and smart cities;
- *Data and Knowledge* covers databases and semantic technologies;

- *Foundations, Structures and Quantum* embraces interdisciplinary research, and has a particular interest in structural foundations of quantum computation;
- *Human-Centred Computing* covers human-computer interaction, social computing and world-wide web;
- *Programming Languages* covers functional programming, program analysis, and programming language foundations;
- *Security* specialises in cybersecurity, protocol analysis, systems security, trusted computing, human-centred security, and networking.

For more information, please visit: http://www.cs.ox.ac.uk/.

The Mathematical, Physical, and Life Sciences Division (MPLS)

The Mathematical, Physical, and Life Sciences (MPLS) Division is one of the four academic divisions of the University. Oxford is widely recognised as one of the world's leading science universities. The disciplines within the MPLS Division regularly appear at the highest levels in world rankings. 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. We collaborate closely with colleagues in Oxford across the medical sciences, social sciences and humanities, and with other universities, research organisations and industrial partners across the globe in pursuit of innovative research geared to address critical and fundamental scientific questions.

MPLS is proud to be the home of some of the most creative and innovative scientific thinkers and leaders working in academe. Our senior researchers have been awarded some of the most significant scientific honours (including Nobel prizes and prestigious titles such as FRS and FR.Eng) and we have a strong tradition of attracting and nurturing the very best early career researchers who regularly secure prestigious fellowships. The Division is also the proud holder of eight Athena Swan Awards (4 Silver and 4 Bronze) illustrating our commitment to ensure good practice and to encourage women in science at all levels in the division.

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 academics educate students of high academic merit and potential from all over the world. Through a mixture of lectures, practical work and the distinctive college tutorial system, students develop their ability to solve major mathematical, scientific and engineering problems.

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; these are crucial activities given so many societal and technological issues demand an understanding of the science that underpins them. 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

Before submitting an application, you may find it helpful to read the 'Tips on applying for a job at the University of Oxford' document, at www.ox.ac.uk/about/jobs/supportandtechnical/.

If you would like to apply, click on the **Apply Now** button on the 'Job Details' page and follow the on-screen instructions to register as a new user or log-in if you have applied previously. Please provide details of two referees and indicate whether we can contact them now.

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

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

All applications must be received by **midday** 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).

Should you experience any difficulties using the online application system, please email recruitment.support@admin.ox.ac.uk. Further help and support is available from www.ox.ac.uk/about_the_university/jobs/support/. 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 e-recruitment system 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: www.admin.ox.ac.uk/councilsec/compliance/gdpr/privacynotices/job/. The University's Policy on Data Protection is available at: www.admin.ox.ac.uk/councilsec/compliance/gdpr/universitypolicyondataprotection/.

The University's policy on retirement

The University operates an Employer Justified Retirement Age (EJRA) for all academic posts and some academic-related posts. The University has adopted an EJRA of 30 September before the 69th birthday for all academic and academic-related staff in posts at **grade 8 and above**. The justification for this is explained at: www.admin.ox.ac.uk/personnel/end/retirement/acrelretire8+/.

For **existing** employees, any employment beyond the retirement age is subject to approval through the procedures: www.admin.ox.ac.uk/personnel/end/retirement/acrelretire8+/.

There is no normal or fixed age at which staff in posts at **grades 1–7** 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 www.admin.ox.ac.uk/personnel/staffinfo/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 www.sport.ox.ac.uk/oxford-university-sports-facilities.

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 www.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 www.admin.ox.ac.uk/personnel/permits/reimburse&loanscheme/.

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 My Family Care, 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 www.admin.ox.ac.uk/personnel/staffinfo/benefits/family/mfc/.

Childcare

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 www.admin.ox.ac.uk/childcare/.

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 www.admin.ox.ac.uk/eop/disab/staff.

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 www.admin.ox.ac.uk/eop/inpractice/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.