

UNIVERSITY OF OXFORD

DEPARTMENT OF COMPUTER SCIENCE

Senior Researcher in Next Generation Foundation Models

Computer Science, Mathematical, Physical, and Life Sciences

Summary

Job title	Senior Researcher in Next Generation Foundation Models (2 posts)
Division	Mathematical, Physical, and Life Sciences
Department	Computer Science
Location	Wolfson Building, Parks Road, Oxford, OX1 3QD.
Grade and salary	Grade 10: £66,608 - £70,547 per annum inclusive of Oxford University weighting
Hours	Full-time
Contract type	Fixed-term contract until 15 December 2027
Reporting to	Prof Yarin Gal
Vacancy reference	189728
Additional information	Whilst the role is a Grade 10RS 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 9RS with the responsibilities adjusted accordingly.

Research project details

Research topic	Next generation foundation models
Principal Investigator / supervisor	Prof Yarin Gal
Project team	Science of Fundamental AI Research Lab (SOFAIR)
Project website	https://oatml.cs.ox.ac.uk
Funding partner	The funds supporting this research project are provided by UKRI
Co-Investigators	Prof Michael Bronstein, Prof Mark van der Wilk, Prof Michael Wooldridge

Athena Swan Silver Award — Gender Charter

Race Equality Charter Bronze Award — ECU Race Charter

Stonewall Silver Employer 2022

Oxford Living Wage

We are a Living Wage Employer

The role

We are pleased to offer two Senior Researcher positions on a fixed-term contract until 15 December 2027, with the possibility of extension, to lead research on next-generation foundation models within the Science of Fundamental AI Research (SOFAIR) Lab. SOFAIR is an ambitious Science of AI research programme focused on discovering and validating next-generation AI paradigms, combining academic depth and independent thinking with research practices including a top-down research agenda, focused sprints, and progressive model validation.

These posts unite interdisciplinary academic expertise to pursue fundamentally new foundation models, moving beyond incremental refinement of existing models. The successful applicants will help advance open, distributed, and trustworthy AI systems, positioning the UK at the centre of global efforts to shape the future of open AI. A defining principle of SOFAIR is that ideas alone are not enough: promising concepts must be implemented and tested at scale to establish their utility. Ideally, successful applicants will also be interested in innovation and spinouts.

The post holders will work within an interdisciplinary, collaborative research environment and will be expected to contribute to SOFAIR's working-group model. During Phase 1, the programme is organised initially around UK-MLM, Novel Architectures and Distributed Compute, with flexibility for the programme to evolve as research progresses. Researchers will report progress, engage with the wider team and Science Committee, and adapt their focus towards the most promising directions.

In addition to research, the post holders will lead day-to-day supervision of DPhil students and research associates, and lead grant applications.

All posts are part of the new Science of Fundamental AI Research (SOFAIR) Lab, a major UKRI-funded research initiative. The lab is led by Prof David Barber at University College London. The Oxford Principal Investigator is Prof Yarin Gal, with co-Investigators Prof Michael Bronstein, Prof Mark van der Wilk, and Prof Michael Wooldridge.

Flexible working

The successful candidate will work onsite in the Department of Computer Science buildings in central Oxford, however remote and flexible working can be considered subject to the agreement with the line manage and the Department.

Responsibilities

- Manage own academic research and administrative activities. This involves small scale project management, to co-ordinate multiple aspects of work to meet deadlines, including coordinating research sprints, experiments and model-validation milestones within SOFAIR's wider programme.
- Adapt existing and develop new scientific techniques and experimental protocols, particularly for evaluating novel architectures, training paradigms, reasoning methods and distributed training approaches at scale.
- Test hypotheses and analyse scientific data from a variety of sources, reviewing and refining working hypotheses as appropriate, using evidence from controlled experiments and large-scale model training to decide which research directions merit further development.
- Contribute ideas for new research projects, including ambitious, non-incremental approaches to next-generation foundation models and heterogeneous distributed training.
- Develop ideas for generating research income, and present detailed research proposals to senior researchers, including opportunities that extend SOFAIR's foundational research agenda, large-scale compute programme and future application verticals.
- Collaborate in the preparation of scientific reports and journal articles and occasionally present papers, communicating results from SOFAIR research to academic, technical and wider research communities.
- Use and contribute to specialist computational infrastructure for large-scale AI experimentation, including GPU-based and heterogeneous distributed compute environments.

- Act as a source of information and advice to other members of the group on scientific protocols and experimental techniques, including advice on machine-learning methodology, experimental design, model evaluation, large-scale training and reproducible computational practice.
- Represent the research group and SOFAIR at external meetings, seminars, workshops and scientific events, either with other members of the group or independently, and communicate progress on frontier-model research.
- Carry out collaborative projects with colleagues in partner institutions and research groups, including cross-working with SOFAIR's Novel Architectures, UK-MLM and Distributed Compute activities.

Selection criteria

Essential selection criteria

- Hold a relevant PhD/Dphil, together with relevant experience in machine learning, artificial intelligence, computer science, mathematics or a closely related discipline, with experience relevant to foundational or large-scale AI research.
- Recognised international authority within the specialism
- Possess sufficient specialist knowledge in machine learning and AI to work within established research programmes, including strong understanding of principled machine-learning methods and current frontier-model approaches.
- Experience of managing research projects and staff
- Provide evidence of an established international publication record
- Possess sufficient expertise to lead research programmes and develop new avenues of research
- Previous experience of contributing to high-quality publications and/or presentations in machine learning, artificial intelligence or a closely related field.
- Experience of independently managing a discrete area of a research project, ideally involving large-scale machine-learning experimentation, foundation models or distributed/heterogeneous compute.
- Experience of actively collaborating in the development of research articles for publication and working effectively across interdisciplinary or multi-institution research teams.
- Experience implementing and evaluating modern deep-learning or foundation-model systems, preferably using PyTorch and GPU-based compute.
- Experience with one or more areas relevant to SOFAIR's research agenda, such as novel neural architectures, efficient reasoning and planning, novel training paradigms, interpretability, robustness, scaling laws, continual learning or neural-symbolic methods.
- Excellent communication skills, including the ability to write for publication, present research proposals and results, explain complex technical findings clearly, and represent the research group at meetings and collaborative forums.

Desirable selection criteria

- Experience of large-scale, distributed or heterogeneous model training, or of designing methods that improve computational or memory efficiency.
- Ability to contribute ambitious ideas for new research projects and research income generation, with an emphasis on non-incremental advances in next-generation foundation models.
- Interest in open AI, research translation, innovation and the potential creation of research-led spinouts.
- Experience of leading research programmes, including setting the strategic direction
- Experience of providing specialist advice to external industry, university, or research councils

Pre-employment screening

Standard checks

If you are offered the post, the offer will be subject to standard pre-employment checks. These include:

- **right to work and identity checks -** you will be asked to provide proof of your right-to-work in the UK and proof of your identity;
- **references, -** if we have not already done so, we will contact the referees you have nominated;

- **previous University employment -** if you have previously worked for the University, we will verify key employment information with the relevant department or unit, including your dates of employment and reason for leaving and;
- **health declaration -** you will 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.

For more information about the University's pre-employment screening, please read the candidate guidance https://www.ox.ac.uk/about/jobs/explore-our-careers/applications-process/pre-employment-screening

About the University of Oxford

We are the University of Oxford, the world's oldest and top-ranked university, sitting in the heart of one of the UK's most dynamic and diverse cities. 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.

Our people are central to our success, and we are committed to fostering an inclusive environment where everyone can thrive. We recognise that diversity is a strength and is vital for innovation and creativity. We aspire to build a truly diverse community which values and respects every individual's unique contribution.

Join us and you will become part of a unique, democratic and international community, with a great range of staff benefits and access to a vibrant array of cultural activities in the beautiful city of Oxford. Further information regarding the staff benefits can be found on the final page.

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

Department of Computer Science

The Department of Computer Science is consistently recognised as the internationally leading centre of research and teaching across a broad spectrum of computer science. We are proud of our history as one of the longest-established computer science departments in the country, as we continue to provide first-rate undergraduate and postgraduate teaching to some of the world's brightest minds.

Our world-class research is conducted across our research themes, which span the broad spectrum of computer science, ranging from foundational discoveries to interdisciplinary work with significant real-world impact. A significant majority of our staff are active in externally sponsored research, with both government and industrial funding. Our 2021 Research Excellence Framework submission saw 81% of our research activity ranked as world-leading (4*), with the rest ranked as internationally excellent (3*). We have had 19 ERC Fellowships in the last decade (including 7 Advanced) and we have 6 Fellows of the Royal Society, 4 Turing/Turing AI Fellows, a Fellow of the Royal Academy of Engineering and a Fellow of the Institute of Electrical and Electronics Engineers.

We enjoy close links with other Oxford University departments (Mathematics, Engineering, Physics, Statistics and Life sciences) and work collaboratively with Oxford research groups and institutes (including the Oxford Internet Institute and the Oxford e-Research Centre). At present, the department has 71 faculty members and 98 researchers housed across multiple sites within the University's South Parks Road Science Area and the neighbouring area. Through a programme of continuous improvement, the department is committed to promoting and nurturing a diverse, inclusive and equal culture, with a particular focus on growth in gender equality (from our students to our staff).

The department holds over £75m of external funding of which £58m is research. Research in the department is currently managed in ten themes:

- *Algorithms & Complexity Theory, led by Professor Leslie Ann Goldberg,* 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, led by Professor Michael Wooldridge,* focuses on theoretical foundations of AI, multi-agent systems, deep learning, reinforcement learning, and computational linguistics;

- *Automated Verification, led by Professor Ben Worrell, investigates* theory and practice of formal verification and correct-by-construction synthesis for software and hardware systems;
- *Computational Biology & Health Informatics, led by Professor Blanca Rodriquez,* is concerned with computational approaches for biomedical research and healthcare innovation;
- *Human-Centred Computing, led by Professor Nigel Shadbolt, includes* human-computer interaction, social computing, and the worldwide web;
- *Data and Knowledge & Action, led by Professor Ian Horrocks, includes* databases, knowledge representation and reasoning;
- *Programming Languages, led by Professor Nobuko Yoshida,* includes functional programming, program analysis, and programming language foundations;
- *Quantum, led by Professor Jonathan Barrett,* focusses on quantum computing including quantum software, causality in quantum theory, quantum cryptography and foundations of quantum computing;
- *Security, led by Professor Ivan Martinovic,* specialises in cybersecurity, protocol analysis, systems security, trusted computing, and networking.
- *Systems, led by Professor Niki Trigoni,* focusses especially on cyber physical systems. We plan to substantially broaden our research in systems to complement our existing research areas.

Our greatest asset is our people. We consistently attract the best staff and students, and thanks to them, we have been ranked as the world's leading university for Computer Sciences for eight years in a row by the *Times Higher Education*. We have held an Athena Swan Bronze Award since 2014, reflecting our longstanding commitment to promoting and supporting gender equality.

Find out more information on our website https://www.cs.ox.ac.uk/

Mathematical, Physical, and Life Sciences Division

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 and the MPLS Division is home to our non-medical sciences, with 9 academic departments that span the full spectrum of the mathematical, computational, physical, engineering and life sciences, and undertake both fundamental research and cutting-edge applied work.

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

How to apply

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

Your application will be assessed solely on the basis of your ability to meet the selection criteria stated in the job description.

As part of your application, you will be asked to provide:

- your CV;
- a supporting statement explaining how you meet each of the selection criteria, 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); and
- details of two referees, including whether we may contact them at this stage.

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

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

Additional information for applicants

If you currently work at the University

If you are a current University employee, please note that:

- as part of the referencing process, we will contact an appropriately senior member of your current department to confirm basic employment details, including your reason for leaving;
- although employees may hold multiple part-time posts, they may not hold more than the equivalent of a full-time post. If you are offered this post, and accepting it would take you over the equivalent of full-time hours, you will be expected to resign from, or reduce hours in, your other posts(s) before starting work in the new post.

If you currently work at the University and are a priority candidate:

- Please 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

For application FAQs and technical support, visit: https://www.ox.ac.uk/about/jobs/explore-our-careers/applications-process/support-with-online-applications

For questions about the role, please contact: *recruitment@cs.ox.ac.uk*

You can return to your online application at any time via: https://www.ox.ac.uk/about/jobs/explore-our-careers/applications-process/how-to-apply

You will receive an automated email confirming receipt of your application. If you do not receive this, please check your spam or junk folder.

Important information for candidates

Data privacy

Personal data submitted 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://www.ox.ac.uk/about/how-we-are-run/policies-and-statements/policy-hub/job-applicant-privacy-policy.

The University's Policy on Data Protection is available at: https://www.ox.ac.uk/about/how-we-are-run/policies-and-statements/policy-hub/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** of 30 September before the 70th birthday.

For **existing** employees on these grades, any employment beyond the retirement age is subject to approval.

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

Equal opportunity

The University of Oxford is committed to equal opportunity, and to being a place where everyone belongs and is supported to succeed. We recognise how the diversity of our community enriches our ability to deliver on our academic mission.

We welcome applications from individuals from all backgrounds, including those under-represented within higher education. No applicant or members of staff shall be unlawfully discriminated against on the basis of age, disability, gender reassignment, marriage or civil partnership, pregnancy or maternity, race, religion or belief, sex, or sexual orientation.

Appointment and progression are based on personal merit and the application of criteria relevant to the duties and requirements of the post. In all cases, the primary consideration will be the ability to perform the job.

As stated in the University's Equality Policy and Equality, Diversity and Inclusion Strategic Plan, our commitment to equality and diversity goes hand in hand with our commitment to academic freedom and free speech.

Working at Oxford - Benefits

Join an international community where you can do meaningful work, develop your career and be supported to do your best.

38 days	24/7	6 nurseries
paid holiday	confidential wellbeing support	plus 380+ full-time places

Work-life balance

We recognise the importance of balancing work with your personal life and offer a variety of flexible working options.

Staff benefits at the University of Oxford | Oxford University

Your wellbeing

Free, confidential Employee Assistance Programme available 24 hours a day, 365 days a year, alongside wider health and wellbeing support. We are also committed to supporting colleagues with disabilities or long-term health conditions.

Health and wellbeing

Family-friendly benefits

Extensive family leave and childcare support, including six University nurseries, more than 450 full-time nursery places and salary-sacrifice childcare.

Family benefits and childcare

Belonging and community

Be part of a welcoming and inclusive community, with staff networks, recognised trade unions, opportunities to connect across the University, and the Newcomers' Club for partners of new staff.

Trade unions and employee representation | Oxford University

Pension and financial benefits

If eligible, you will be automatically enrolled into an appropriate pension scheme. Other financial benefits include access to a relocation scheme for eligible new staff, and a Give As You Earn charitable giving scheme.

Staff benefits at the University of Oxford | Oxford University

Travel and commuting

The University offers a range of travel discounts and schemes for University staff.

Transport | Oxford University

Life in Oxford

Free University Club membership, discounted access to the University Sports Centre, and practical support for relocating and settling into Oxford, including a visa loan scheme to help cover UK visa application costs for staff and their dependants.

Life in Oxford

Grow your career

The University offers many opportunities for training and career development. Find out more and access personal and professional development opportunities.

Learning & Organisational Development

For researchers on fixed-term contracts, the Researcher Hub supports career development, connections and next steps.

Researcher Hub

Discover more

Find out more about working at Oxford, our benefits and life in the city: Staff benefits at the University of Oxford | Oxford University