Job Description

Job title	Postdoctoral Research Assistant in Statistical Genomics
Division	Mathematical, Physical and Life Sciences
Department	Statistics
Location	24-29 St Giles', Oxford, OX1 3LB
Grade and salary	Grade 7: £40,855 - £46,913 per annum (discretionary range to £51,059)
Hours	Full time
Contract type	Fixed term (3 years)
Reporting to	Professor Pier Palamara
Vacancy reference	*178739*

Research topic	Development of novel statistical and machine learning algorithms for complex trait analysis in high-dimensional genomic data sets.
Principal Investigator / supervisor	Professor Pier Palamara
Project web site	https://www.stats.ox.ac.uk/~palamara/
Funding partner	Danish National Research Foundation SMARTbiomed https://smartbiomed.dk/
Recent publications	Loya et al. A scalable variational inference approach for increased mixed-model association power, Nature Genetics, 2025, https://www.nature.com/articles/s41588-024-02044-7.
	Zhang et al. Biobank-scale inference of ancestral recombination graphs enables genealogical analysis of complex traits, Nature Genetics, 2023, https://www.nature.com/articles/s41588-023-01379-x.

Job description

Overview of the role

We invite applications for a Postdoctoral Research Assistant to join Pier Palamara's research group at the University of Oxford. The position is funded by the Pioneer Centre for Statistical and Computational Methods for Advanced Research to Transform Biomedicine (SMARTbiomed, https://smartbiomed.dk/), an international collaboration between the University of Oxford, Aarhus University, and the University of Copenhagen which combines large-scale, multimodal biomedical data with advances in statistical and machine learning methods to improve our understanding, treatment, and prevention of human disease.

The successful candidate will develop novel statistical and machine learning algorithms to address key open problems in human genomics and apply them to large-scale genomic datasets, which include millions of sequenced individuals and high-dimensional health-related information. The project will build on the group's recent work on large-scale analysis of complex traits, including Bayesian machine learning and linear mixed model approaches for trait prediction and association in high-dimensional genomic datasets [1], as well as methods for inferring genealogical structures such as ancestral recombination graphs (ARGs) and leveraging them to study heritable traits and human evolution [2,3,4].

While the development of statistical and computational methods will be central to the role, the postholder will also apply these algorithms to large datasets, such as the UK Biobank and other cohorts, to advance our understanding of genetic influences on human health, disease susceptibility, and evolutionary history. The project is likely to involve collaborations with other SMARTbiomed groups, including those based in Denmark. Additionally, the position offers opportunities to supervise research students within the PI's group and provides scope for pursuing independent research directions.

Applicants should hold or be near completion of a PhD or equivalent in a quantitative discipline such as computer science, statistics, machine learning, statistical or population genetics, or a related field. They should have experience in developing and applying novel statistical methods to large datasets and possess strong programming skills. The specific technical expertise required will depend on the direction of the project, which may involve developing methods for complex trait analysis (e.g., linear mixed models, polygenic prediction), scalable Bayesian and deep learning approaches (e.g., variational inference, representation learning, sequence- or graph-based models), or algorithms for inferring and analyzing large-scale graph data structures (e.g., ancestral recombination graphs). Previous research experience in statistical and population genetics or related fields is highly desirable but not essential.

[1] H. Loya, G. Kalantzis, F. Cooper, P. Palamara, A scalable variational inference approach for increased mixed-model association power, *Nature Genetics*, 2025. https://www.nature.com/articles/s41588-024-02044-7.
[2] B. C. Zhang, A. Biddanda, Á. F. Gunnarsson, F. Cooper, P. F. Palamara, Biobank-scale inference of ancestral recombination graphs enables genealogical analysis of complex traits,

Nature Genetics, 2023. https://www.nature.com/articles/s41588-023-01379-x. News and Views article: https://www.nature.com/articles/s41588-023-01389-9.

[3] J. Zhu, G. Kalantzis, A. Pazokitoroudi, Á. Gunnarsson, H. Loya, H. Chen, S. Sankararaman, P. Palamara, Fast variance component analysis using large-scale ancestral recombination graphs, *bioRxiv*, 2024. https://www.biorxiv.org/content/10.1101/2024.08.31.610262v1.

[4] Á. Gunnarsson, J., B. Zhang, Z. Tsangalidou, A. Allmont, P. Palamara, A scalable approach for genome-wide inference of ancestral recombination graphs, *bioRxiv*, 2024. https://www.biorxiv.org/content/10.1101/2024.08.31.610248v1.

Responsibilities/duties

The post holder will have the following responsibilities and duties:

- Manage academic research and administrative duties independently.
- Develop statistical and computational methodologies within the areas outlined above, and in line with the goals of SMARTbiomed https://smartbiomed.dk/.
- Publish research findings in high-profile international journals.
- Represent the research group at external conferences, workshops, and seminars.
- Participate in regular group meetings and activities. Provide guidance and mentorship to junior research group members, including DPhil students.
- Contribute to securing additional research funding by assisting with grant applications, where appropriate.
- Contribute to shaping the research priorities of SMARTbiomed and support its collaborative infrastructure, including research visits to Denmark and participation in the SMARTbiomed annual symposium in Denmark.

Selection criteria

Essential

- Holds or is near completion of a PhD/DPhil in a relevant quantitative scientific discipline (e.g., computer science, statistics, machine learning, statistical/population genetics, or related fields).
- Experience in developing and applying novel statistical methods to large datasets. Relevant areas of technical expertise may include methods for complex trait analysis (e.g., linear mixed models, polygenic prediction), scalable Bayesian and deep learning approaches (e.g., variational inference, representation learning, sequence- or graph-based models), or algorithms for inferring and analyzing large-scale graph data structures (e.g., ancestral recombination graphs).
- Proficiency in at least one programming language relevant to the project (e.g., Python, MATLAB, R, Julia, C/C++, Java).
- Strong motivation to work on research problems in human genetics.
- Ability to conduct and complete high-quality research both independently and in collaboration with the PI and project partners.
- Ability to effectively communicate scientific results, both in writing and verbally, as demonstrated by previous publications and oral presentations.
- Willingness to mentor and support junior researchers, including DPhil students in the research group.
- A commitment to promoting equality, diversity, and inclusion

Desirable selection criteria

- Familiarity with the existing literature and research in statistical genetics or a closely related field.
- A prior publication record in methods development within the broad area of medical, statistical, or population genetics.
- Experience with compiled programming languages (e.g., C/C++, Java) or machine learning libraries (e.g., PyTorch).

For further information about the position or about the project, please contact Professor Pier Palamara at palamara@stats.ox.ac.uk.

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.

The Department of Statistics

The Department of Statistics at Oxford is a world-leading centre for research with a broad portfolio that covers pure theory, the development of innovative methods to analyse and understand data, and their applications to scientific and societal problems. Research is loosely structured around seven interconnected research groups: Statistical Theory and Methodology; Computational Statistics and Machine Learning; the Oxford Protein Informatics Group; Probability; Statistical Genetics and Epidemiology; Economics and Population Statistics; and Computational Biology and Bioinformatics. The Department has recently undergone a period of rapid expansion, growing from 21 submitted researchers in the 2014 Research Excellence Framework exercise to 32 in REF 2021.

The Department relocated to a newly renovated building on St Giles' in the heart of the University of Oxford in 2015. The building provides state-of-the-art teaching facilities and modern space to facilitate collaboration and integration, creating a highly visible centre for Statistics in Oxford. Since moving to St Giles', Faculty have secured over £14m in research funding from a variety of funders including UKRI, the Wellcome Trust, the European Commission, NIH, and industrial partners from sectors ranging from services to pharma. Research from the Department of Statistics and the Mathematical Institute in Oxford was submitted together for the UK's most recent national research assessment exercise, the Research Excellence Framework (REF) 2021. Overall, 78% of our submission was judged to be

4* (the highest score available, for research quality that is world-leading in terms of originality, significance, and rigour). This outstanding result is a testament to the breadth, quality and impact of the research produced by colleagues in our two departments, and the outstanding environment in which they work, supported by our excellent professional services staff.

The Department's research excellence has been recognised both collectively, through success in REF 2021, and individually. Awards include Fellowships of the Royal Society to Christl Donnelly and Alison Etheridge; FMedSci and the Zoological Society of London's Frink Award to Christl Donnelly; the Royal Statistical Society Guy Medal in Bronze to Chris Holmes; the Weldon Memorial Prize, the Francis Crick Prize Lecture, and the Genetics Society Balfour Prize to Simon Myers. Alison Etheridge, Christina Goldschmidt, and Gesine Reinert are all Fellows of the Institute of Mathematical Statistics, and Alison Etheridge is a former President. Christl Donnelly is the Vice President for External Affairs of the Royal Statistical Society.

The Department is home to Oxford University Statistical Consulting, which provides comprehensive statistical consultancy services to both internal departments and external businesses. It operates across a wide range of sectors, and offers experience in all aspects of data-based research. The service includes two Research Software Engineers who take new and existing software platforms from the Oxford Protein Informatics Group, and provide support to industry to maximise their impact.

The Department of Statistics offers an undergraduate degree (BA or MMath) in Mathematics and Statistics and an MSc in Mathematical Science (OMMS), both joint with the Mathematical Institute, and an MSc in Statistical Science, as well as a lively and stimulating environment for postgraduate researchers (DPhil or MSc by Research). The Department is involved in four Centres for Doctoral Training (CDTs): the EPSRC CDT in Modern Statistics and Statistical Machine Learning (led by Imperial), the EPSRC CDT in Sustainable Approaches to Biomedical Science: Responsible and Reproducible Research, the EPSRC CDT in Mathematics of Random Systems (with the Mathematical Institute and Imperial), and the EPSRC CDT in Health Data Science (with the Big Data Institute). The Department is also part of the National Academy for PhD Training in Statistics, which provides training in fundamental areas of Statistics and Applied Probability. Our graduate students go on to varied careers, the most popular being academia (45%) and the technology (nearly 30%) and finance sectors.

The Department maintains close links with interdisciplinary centres such as the Wellcome Centre for Human Genetics and the Big Data Institute. Many Faculty have associations with the Alan Turing Institute (the Turing), the UK's national centre for data science, in which Oxford is a founding partner, and Chris Holmes is Programme Director for Health and Medical Sciences at the Turing.

The Department of Statistics holds a silver Athena Swan award to recognise advancement of gender equality: representation, progression and success for all.
For more information please visit: www.stats.ox.ac.uk.

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. 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 and the REF 2021 results highlighted the quality of its research, the environment in which it is conducted, and the impact it has.

The MPLS Division is home to the non-medical sciences at Oxford and its 10 academic departments 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 tackles major societal and technological challenges – whether developing new energy solutions or improved cancer treatments, understanding climate change processes, or helping to preserve biodiversity, 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 FREng) 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 ten Athena Swan Awards (3 Silver and 7 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 full and part-time students (including approximately 2,000 graduate 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 (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: 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.

Applicants should ask their referees to send their letters of reference directly to the HR Administrator by email to hr@stats.ox.ac.uk **by the closing date quoting the vacancy reference 178739.**

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 departments.

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 be notified of the progress of your application by automatic emails from our e-recruitment system. **Please check your spam/junk mail** regularly to ensure that you receive all emails.

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.