Job Description

Nuffield Division of Clinical Laboratory Sciences

Summary

Job title	Postdoctoral Research Assistant in Machine Learning and Multimodal Clinical AI
Division	Nuffield Division of Clinical Laboratory Sciences
Department	Radcliffe Department of Medicine (RDM)
Location	John Radcliffe Hospital, Oxford, OX3 9DU
Grade and salary	Grade 7: £40,178 - £48,700 per annum
Hours	Full time
Contract type	Fixed-term for 24 months
Reporting to	Associate Professor Daniel Royston
Vacancy reference	189626
Additional information	Externally funded by the MPN Research Foundation, Blood Cancer UK, Cancer Research UK and Wellcome

The project

Myeloproliferative neoplasms (MPNs) are chronic blood cancers with highly variable clinical courses. Some patients remain stable for many years, whereas others develop vascular complications, progressive myelofibrosis or transformation to acute leukaemia. A major barrier to more personalised care is the limited availability of large, deeply characterised patient cohorts that combine routine clinical information with molecular and imaging data.

The two posts form part of a multidisciplinary programme in computational pathology and clinical AI within the Spatial and Translational Pathology Group, supported by the MPN Research Foundation, Blood Cancer UK, Cancer Research UK and Wellcome. One post will have a particular focus on the MPN Research Foundation 2026 MPN Challenge, establishing a large multimodal MPN data resource using routinely collected NHS data from the Thames Valley and Surrey Secure Data Environment. This resource is expected to include approximately 5,000 patients and will bring together longitudinal electronic health records, routine laboratory measurements, molecular and genomic results, radiology, digital whole-slide pathology images and derived tissue features. Both postholders will contribute machine-learning expertise to closely aligned projects across the group.

The central computational objective is to develop and validate advanced AI/ML models that integrate these heterogeneous data modalities to improve personalised prediction of clinically important outcomes, including disease progression and transformation, vascular events, treatment response and survival. The work has a clear translational focus and will be undertaken in close collaboration with clinician scientists, pathologists, biomedical engineers, data scientists and NHS partners.

Role

We are seeking two postdoctoral researchers with strong machine-learning, computer-science or engineering backgrounds who are motivated by the challenge of developing robust AI methods for large-scale, real-world clinical and biomedical data. The successful candidates will lead computational development of multimodal AI models, from data representation and harmonisation through model development, evaluation, validation and reproducible implementation.

The roles will involve working with large, complex and partially incomplete datasets, including longitudinal data within secure NHS computing environments. Depending on the research question, data may include structured clinical and laboratory variables, free-text clinical information, molecular/genomic data, radiological imaging, digital pathology whole-slide images and computationally derived tissue features. The postholders will be expected to select and develop technically appropriate ML approaches rather than apply a single predetermined modelling framework.

A central part of the programme will be close working with the Thames Valley and Surrey Secure Data Environment (TVS SDE) team. The postholders will develop effective working relationships with SDE data and technical specialists, contribute to secure and reproducible approaches for large-scale clinical AI research, and participate in shared learning, knowledge exchange and training with the SDE team. This collaboration will support delivery of the MPN programme and develop transferable expertise in the use of secure NHS data for machine-learning research.

Both postholders will also provide machine-learning expertise across the Spatial and Translational Pathology Group, contributing to closely aligned projects that benefit from shared methods, software, model architectures and computational infrastructure. This will include advising colleagues and research students on ML study design and implementation, promoting reproducible engineering practice, and helping to develop reusable computational capability across the group.

Responsibilities

- Lead the design, development and validation of machine-learning models that integrate multimodal clinical, laboratory, molecular/genomic, imaging and pathology-derived data for diagnostic and prognostic applications.
- Develop robust pipelines for data extraction, representation, harmonisation, quality control and linkage across large-scale longitudinal NHS datasets within approved secure data environments.
- Work closely with the Thames Valley and Surrey Secure Data Environment (TVS SDE) team, participating in shared learning, knowledge exchange and training, and helping to develop robust, secure and reproducible computational workflows for research using NHS clinical data.
- Develop and evaluate appropriate multimodal learning strategies, including methods for heterogeneous, incomplete and temporally structured data, with rigorous comparison against relevant clinical and statistical baselines.
- Implement reproducible and scalable ML workflows using modern software-engineering practices, including version control, testing, documentation, experiment tracking and efficient use of CPU/GPU computing infrastructure.

- Undertake rigorous model evaluation and validation, including assessment of calibration, discrimination, robustness, generalisability, missingness, potential bias and clinically meaningful endpoints.
- Work closely with clinician scientists, pathologists, biomedical engineers, bioinformaticians and data scientists to translate clinical questions into tractable computational problems and interpret model outputs in their biological and clinical context.
- Contribute ML expertise to other closely aligned research projects within the group, including technical advice, development of reusable code and pipelines, and support for research students and colleagues using AI/ML methods.
- Manage multiple strands of computational research to agreed milestones and maintain clear technical documentation suitable for collaborative research, audit and subsequent translation.
- Prepare and contribute to high-quality peer-reviewed publications, research reports and presentations, and present findings at internal meetings and national and international conferences.
- Contribute original methodological ideas, identify opportunities for new research, and participate in grant applications and collaborative activities that extend the group's programme in computational pathology and clinical AI.

Selection Criteria

Essential selection criteria

- Hold, or be close to completion of PhD/ DPhil in a discipline of direct relevance in machine learning, computer science, engineering or a related quantitative discipline.
- Strong programming skills in Python.
- Experience developing and evaluating machine-learning or deep-learning models.
- Experience working with large, complex and/or multimodal datasets.
- Ability to work effectively and communicate within a multidisciplinary research team.

Desirable selection criteria

- Experience working with clinical, healthcare or other real-world data.
- Experience in multimodal machine learning.
- Experience in biomedical AI, digital pathology or secure data environments.

Benefits of working at the University

Employee benefits

University employees enjoy 38 days' paid holiday, generous pension schemes, flexible working options, travel discounts including salary sacrifice schemes for bicycles and electric cars and other discounts. Staff can access a huge range of personal and professional development opportunities. See https://hr.admin.ox.ac.uk/staff-benefits

Employee Assistance Programme

As part of our wellbeing offering staff get free access to a confidential employee assistance programme, available 24/7 for 365 days a year. Find out more at https://staff.admin.ox.ac.uk/thriving-at-oxford

University Club and sports facilities

Membership of the University Club is free for University staff. It 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 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 dependants. See https://staffimmigration.admin.ox.ac.uk/visa-loan-scheme

Family-friendly benefits

We are a family-friendly employer with one of the most generous family leave schemes in the Higher Education sector (see https://hr.web.ox.ac.uk/family-leave). Our Childcare Services team provides guidance and support on childcare provision, and offers a range of high-quality childcare options at affordable prices for staff. In addition to 5 University nurseries, we partner with a number of local providers to offer in excess of 450 full time nursery places to our staff. Eligible parents are able to pay for childcare through salary sacrifice, further reducing costs. See https://childcare.admin.ox.ac.uk/.

Supporting disability and health-related issues (inc menopause)

We are committed to supporting members of staff with disabilities or long-term health conditions, including those experiencing negative effects of menopause. Information about the University's Staff Disability Advisor, is at https://edu.admin.ox.ac.uk/disability-support. For information about how we support those going through menopause see https://hr.admin.ox.ac.uk/menopause-guidance

Staff networks

The University has a number of staff networks including for research staff, BME staff, LGBT+ staff, disabled staff network and those going through menopause. Find out more at https://edu.admin.ox.ac.uk/networks

The University of Oxford Newcomers' Club

The University of Oxford Newcomers' Club is 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.

Research staff

The Researcher Hub supports all researchers on fixed-term contracts. They aim to help you settle in comfortably, make connections, grow as a person, extend your research expertise and approach your next career step with confidence. Find out more https://www.ox.ac.uk/research/support-researchers/researcher-hub

Oxford's Research Staff Society is a collective voice for our researchers. They also organise social and professional networking activities for researchers. Find out more https://www.ox.ac.uk/research/support-researchers/connecting-other-researchers/oxford-research-staff-society