Job title	Postdoctoral Research Assistant in Quantitative Spatial Data Analysis for Colorectal Precancer
Division	Medical Sciences
Department	Nuffield Department of Medicine
Location	Centre for Human Genetics, Building for Genomic Medicine, Old Road Campus, Roosevelt Drive, Headington, Oxford, OX3 7BN
Grade and salary	Research Grade 7: salary in range £38,674 - £46,913 p.a. This is inclusive of a pensionable Oxford University Weighting of £1,500 per year
Hours	Full time
Contract type	Fixed-term contract until 31 December 2027 Funding is provided by GSK
Reporting to	Eoghan Mulholland, Spatial Biology Informatics Team Leader
Vacancy reference	178283

Additional information	This role meets the eligibility requirements for a Skilled Worker Certificate of Sponsorship under UK Visas and Immigration legislation.
About us	• University of Oxford - www.ox.ac.uk/about/organisation • Nuffield Department of Medicine (NDM) - https://www.ndm.ox.ac.uk • Unit - https://www.chg.ox.ac.uk/
What we offer	https://hr.admin.ox.ac.uk/staff-benefits • An excellent contributory pension scheme • 38 days annual leave • A pensionable Oxford University Weighting allowance of £1,500 per annum (pro rata) • A comprehensive range of childcare services • Family leave schemes • Cycle loan scheme • Discounted bus travel and Season Ticket travel loans • Membership to a variety of social and sports clubs • A welcoming and diverse community

Research topic	Spatial Analysis of Spatial Transcriptomics for Colorectal Precancer
Principal Investigator / supervisor	PIs: Simon Leedham / Helen Byrne Co-Supervisors: Joshua Bull / Eoghan Mulholland
Project team	GO-PRECISE team

Project web site	https://www.chg.ox.ac.uk/people/simon-leedham https://www.maths.ox.ac.uk/people/helen.byrne
Funding partner	The funds supporting this research project are provided by GSK
Recent publications	EJM Mulholland et al (2024), bioRxiv 2024. 04.28.591245 JA Bull et al (2024), bioRxiv 2024.12.06.627195 JA Bull et al (2024), bioRxiv 2024.06.02.597010 BJ Stolz et al (2024). Bull Math Biol 86(11): 128. JA Bull et al (2024). Biological Imaging 4, e2.

The role

We invite applications for a Postdoctoral Research Assistant to work within the multidisciplinary GO-PRECISE colorectal precancer team. This is a fixed term position until 31 December 2027, funded by GlaxoSmithKline (GSK). The work will be jointly supervised by Professor Simon Leedham (NDM), Professor Helen Byrne (Mathematical Institute, MI), Dr Joshua Bull (MI) and Dr Eoghan Mulholland (NDM).

GlaxoSmithKline and Oxford University (GO) launched the PRECISE Alliance (Pre-Cancer Biology and Immunoprevention) in 2024, with the aim of conducting deep exploration of cancer precursors (precancers) to identify their molecular vulnerabilities and developing methods to intercept them. The alliance is directed by Professor Sarah Blagden. Within Oxford, the alliance spans multiple departments and brings together expertise in basic science (including spatial biology), immunology (including machine learning, bioinformatics, preclinical validation) and clinical development (including trial design, delivery and regulatory approval) as well as community engagement. This truly multi-disciplinary initiative aims to transform cancer by actively preventing its development, initially in people at highest risk of the disease and later in the wider population. This post is within the colorectal precancer theme which is jointly led by Simon Leedham and David Church.

You will work as part of the Applied Spatial Biology Oxford group, a large multidisciplinary team of mathematicians, computational biologists, experimentalists and clinicians, and in collaboration with the research groups of Leedham and Byrne and the GO-PRECISE team. You will be responsible for developing and using cutting-edge mathematical methods to describe the spatial characteristics and cellular interactions that characterise colorectal precancer, identifying novel spatial biomarkers from spatial transcriptomics data, and exploring neoantigens or therapeutic targets that could be used for novel interception strategies.

The generation of spatial data in biology has been transformed by multiplex imaging and spatial-omics technologies, such as single cell spatial transcriptomics. These approaches permit detailed mapping of phenotypic information about individual cells and their spatial locations within tissue sections. To aid in mathematical analysis of spatial data, you will use MuSpAn, a Python toolbox for multiscale analysis of spatial data which includes techniques drawn from spatial statistics, topological data analysis and networks (www.muspan.co.uk), to develop pipelines for high-throughput data analysis of spatial transcriptomics imaging. Your research will involve the theoretical development and practical application of new mathematical methods which expand this toolbox, using a new precancer dataset.

Responsibilities

You will:

- Manage your own academic research and administrative activities.
- Adapt existing mathematical and statistical methods for analysis of high-dimensional imaging data, and develop new ones.
- Analyse quantitative imaging data from a variety of sources, including Spatial Transcriptomics and multiplex Spatial Proteomics platforms.
- Develop skills in computational biology and mathematical spatial analysis via independent study and training courses.
- Collaborate with colleagues from the Mathematical Institute, Centre for Human Genetics, and the PRECISE Alliance.
- Collaborate on the preparation of scientific reports and journal articles, present papers and posters at conferences/workshops.
- Follow and promote best practices for research software engineering and reproducible research within the University of Oxford and the wider UK and international research community.
- Contribute to community activities such as seminars and networking events.
- Participate in and support the public engagement and widening access activities of the Department and the University. This is anticipated to be not more than 2 days per year.
- Undertake mandatory training as required by the University, Division and Department. The specific list of training courses may change from time-to-time, in response to both legal and internal University requirements.

Selection criteria

Essential

- Hold a PhD/DPhil (or close to completion) in mathematics, statistics, physics, engineering, data science or a related discipline.
- Demonstrated ability to analyse and interpret complex multidimensional data.
- Experience of programming in Python, or demonstrated ability to rapidly acquire fluent knowledge of new programming languages, libraries, and platforms.
- Have a strong interest in interdisciplinary research in the biological and medical sciences.
- Excellent communication skills, including the ability to communicate effectively with biomedical researchers, write for publication and present research proposals and results, and represent the research group at meetings.
- Demonstrated enthusiasm for working across disciplinary boundaries.
- The ability to work independently and to pursue research as part of an interdisciplinary team.
- A good publication record, for your career stage.

Desirable

- Experience of applying software engineering best practices (e.g. issue tracking, code review, testing, documentation and continuous integration)
- Experience of close collaboration with researchers in the biological or medical sciences.
- Experience of working with biomedical datasets, particularly cancer data and/or spatial data.
- Good organisational skills.

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

Hazard-specific / Safety-critical duties

This job includes hazards or safety-critical activities. If you are offered the post, you will be asked to complete a health questionnaire which will be assessed by our Occupational Health Service, and the offer of employment will be subject a successful outcome of this assessment.

The hazards or safety-critical duties involved are as follows:

- Lone Working
- Regular manual handling
- Travel outside of Europe or North America on University Business

How to apply

Applications are made through our e-recruitment system and you will find all the information you need about how to apply on our Jobs website https://www.jobs.ox.ac.uk/how-to-apply.

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.

As part of your application you will be asked to provide details of two 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). 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. Please note using a long file name may prevent you from uploading your documents.

- http://www.ox.ac.uk/about_the_university/jobs/research/

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

If you currently work for the University please note that:

- As part of the referencing process, we will contact your current department to confirm basic employment details including 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.

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@ndm.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.