



MATHEMATICAL INSTITUTE
ANDREW WILES BUILDING

Job Description and Selection Criteria

Job title	Research Software Engineer – Native RNA Analysis
Division	Mathematical, Physical and Life Sciences
Department	Mathematical Institute
Location	Andrew Wiles Building, Radcliffe Observatory Quarter, Woodstock Road, Oxford, OX2 6GG.
Grade and salary	Grade 7RS: £40,178–£48,700 per annum, pro rata.
Hours	Full-time, applications for part-time hours will also be considered.
Contract type	Fixed term for a maximum of 5 months (up to 30 April 2027) This post could be considered as a secondment opportunity.
Reporting to	Professor Terry Lyons (project lead); day-to-day coordination with the program manager and scientific collaborators. Technical mentoring and advice available from Dr Fergus Cooper and Oxford RSE colleagues.
Vacancy reference	190015
Additional information	Funded by UKRI/EPSRC: Building AI capability and datasets for native RNA science. **(PLEASE NOTE: Applicants are responsible for contacting two of their referees and making sure that their letters are uploaded to https://workflow.maths.ox.ac.uk/form/reference?vacancy_id=190015 by the interview date.)**

The role

Native direct-RNA sequencing makes it possible to study features of individual RNA molecules that are obscured by conventional transcript-level averages. This time-limited Oxford-led programme will apply and develop a model-free, IVT-calibrated analytical capability in a Huntington's disease benchmark, working with the Fowler laboratory at Oxford, UCL biomedical collaborators and mathematical/statistical researchers.

The project uses an established, substantial and functioning analytical platform for nanopore direct-RNA sequencing. The Research Software Engineer will take day-to-day technical responsibility for its end-to-











end operation: receiving and organising experimental data, running computational analyses and producing reproducible scientific outputs. Early priorities are to integrate the platform with agreed data-supply routes, consolidate its operational workflows and support sustained processing at scale, potentially involving around 100 TB of data.

Throughout the six-month programme, the RSE will operate, maintain and extend this system and produce informative analyses, figures and reports in dialogue with Professor Lyons, biostatisticians and molecular biologists at Oxford and UCL. The role requires sound statistical judgement, not the independent invention of new statistical methodology. Professor Lyons retains overall scientific direction; the RSE provides day-to-day technical stewardship within the project's agreed arrangements.

Responsibilities

The successful candidate will be expected to:

- Consolidate the established end-to-end workflow for regular project use: connect agreed sequencing-data supply routes to processing, analysis and reporting; maintain repeatable operations, clear configuration and dependable hand-offs between stages.

- Operate and monitor the full Snakemake-coordinated workflow from raw POD5 data through basecalling/alignment, signal-level analysis, unmodified IVT-reference comparison, quality control and summary outputs, using the project's agreed compute and storage facilities.

- Preserve the system's established reliability as volume grows: develop and maintain regression tests, versioned configuration, logs and provenance; detect and resolve failed or incomplete jobs; ensure that outputs and reports remain reproducible from recorded inputs and software versions.

- Implement extensions to the workflow and its output products as the project evolves, including new cohorts, targets, comparisons, agreed quality measures, plots and machine-readable summaries.

- Generate clear, reproducible analyses and reports through the workflow, including agreed comparisons with established tools such as Dorado and Modkit; work with the project lead and statistical and biological colleagues to establish which analyses are scientifically informative.

- Work with Professor Lyons, biostatisticians and biomedical collaborators at Oxford and UCL to convert agreed scientific questions into reliable data-processing tasks, and contribute constructively to team discussions.

- Plan and support dependable processing of potentially around 100 TB of scientific data across approved cloud and HPC facilities, including data receipt, staging, storage, transfers, workflow scheduling, resource use and cost-aware operation. Where time permits, explore performance improvements, including GPU-based processing of signal signatures, without compromising essential deliverables.

- Apply agreed research-data management arrangements in day-to-day operation: appropriate permissions, controlled sharing, provenance, traceability, retention and orderly handover. Maintain technical documentation and operational records so that the capability and its outputs remain usable beyond the fixed-term appointment, within applicable University agreements.

Current technical environment

The established controller environment uses Snakemake 9.22.0 and Python 3.13, with separate worker environments; analysis combines Python, Linux, Git, configuration files, Azure-based orchestration, Oxford HPC resources and reproducible scientific pipelines. Relevant data formats and tools include POD5, BAM, Dorado, UNCALLED4 and Modkit. The programme is expected to involve data volumes of the order of 100 TB. The precise software version numbers describe the current system rather than standalone eligibility requirements.

Selection criteria

Your application will be judged only against the criteria which are set out below. You should ensure that your application shows clearly how your skills and experience meet these criteria.

The University is committed to fairness, consistency and transparency in selection decisions. Members of the selection committee are aware of the principles of equality of opportunity, fair selection and the risks of bias.

If, for any reason, you have taken a career break, parental leave or have had an atypical career and wish to disclose this in your application, the selection committee will take this into account, recognising that the quantity of your experience may be reduced as a result.

Essential selection criteria

The successful candidate will be expected to meet the following criteria:

- A PhD/DPhil or equivalent experience in research software development, demonstrating substantial practical software engineering expertise in a research environment.
- Strong practical skills in Python and Linux/Unix, with substantial experience developing maintainable research software using established software engineering best practices, including Git version control, issue tracking, code review, automated testing, documentation and continuous integration.
- Experience with Snakemake or a comparable reproducible workflow system, and the ability to become productive quickly with the project's Snakemake 9.x environment.
- Demonstrated ability to design, implement, deploy and maintain complex research software systems, individually and collaboratively, including diagnosing problems, improving reliability and delivering robust software enhancements.
- Experience structuring large software projects using common software architecture paradigms.
- Demonstrated ability to rapidly acquire fluent knowledge of new programming languages, libraries and platforms.
- Good mathematical and statistical understanding, sufficient to recognise questions of uncertainty, calibration, reproducibility and the difference between technical measurements and independent biological samples.
- Ability to produce and critically check interpretable numerical summaries, tables and plots, and to discuss what they can and cannot establish.
- Clear communication and collaborative skills, including the ability to work with statisticians and experimental scientists and to seek guidance when scientific assumptions need resolving.
- Ability to organise work independently under a compressed timetable while maintaining careful records, reliable code and appropriately controlled handling of research data.
- Practical understanding of secure and organised research-data handling, including access permissions, data movement, traceability and storage at scale, with willingness to follow project and institutional arrangements.

Desirable selection criteria

- Substantial hands-on Snakemake experience, ideally including version 9.x, complex dependencies, resource scheduling, retries and workflow testing.
- Experience running scientific workflows on HPC or cloud infrastructure (for example Oxford ARC or Azure), including practical management of large datasets, efficient storage and transfers, and compute-resource planning.
- Familiarity with nanopore direct-RNA data, raw electrical-signal analysis or tools/formats such as POD5, BAM, Dorado, UNCALLED4 and Modkit.
- Experience in statistical computing, scientific visualisation, reproducible reporting, computational biology or GPU-based numerical pipelines.
- We particularly welcome applicants who bring strong scientific engineering skills and want to deepen their experience with high-volume research data, statistics and biology. Appointment on a secondment or part-time basis may be explored where compatible with the project's delivery requirements.

How to Apply

Applications are made through our online recruitment portal. Information about how to apply 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 judged solely on the basis of how you demonstrate that you meet the selection criteria stated in the job description.

You will also be required to upload the following:

- 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

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, quoting vacancy reference **190015**

Applicants are responsible for asking two of their referees to send upload their reference letters to https://workflow.maths.ox.ac.uk/form/reference?vacancy_id=190015 by the advertised interview date. Please note that only two references will be considered. Referees should preferably not all be from the same institution. Whenever possible one referee should be the applicant's current, or most recent, supervisor.

All applications must be received by **12.00 noon** UK time on **the advertised closing date for this post.** Interviews are anticipated to take place on December 4th 2026.

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.ox.ac.uk/about/jobs/explore-our-careers/applications-process/pre-employment-screening

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 and we rank first in the UK for university spin-outs, and in recent years we have spun out 15-20 new companies every year. 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

The Mathematical Institute

The Mathematical Institute, as Oxford's Department of Mathematics is known, is one of the leading mathematics departments in the world. Our mathematical research, impact and environment have twice been ranked first in the UK, in the 2021 and 2014 Research Excellence Framework exercises, a government review of research in all UK universities. The Mathematical Institute is the focus of research into both fundamental mathematics and its applications, and our inclusive nature and overall size are key factors in the provision of an outstanding research environment for our members. The large number of faculty, postdocs and students in the Mathematical Institute, all supported by excellent facilities, allows us to maintain a critical mass in research groups encompassing a wide spectrum of mathematics, while our integrated nature fosters collaboration between fields. We also host a large number of academic visitors. Our web pages (www.maths.ox.ac.uk) provide comprehensive information about all of our activities.

The research activities of the Institute as a whole can be gauged from the web pages of the research groups and centres within the Institute (www.maths.ox.ac.uk/research). The range of our research interests is well reflected by the profile of our faculty as listed at www.maths.ox.ac.uk/people. Many members of the Institute have received prestigious prizes and other special recognition for their work; some recent examples can be found at www.maths.ox.ac.uk/news.

The Mathematical Institute moved into the purpose-built Andrew Wiles Building in the University's Radcliffe Observatory Quarter in September 2013. As well as providing offices for all staff and graduate

students, it houses a range of other facilities available to members of the department, including the Whitehead Library, a large range of meeting rooms, teaching spaces, lecture rooms, and social spaces, and a small laboratory for carrying out table-top experiments. For more information, see www.maths.ox.ac.uk/about-us .

Teaching is central to the life of the Mathematical Institute and we have around 900 undergraduates on course, some on joint courses with other departments. We teach around 250 students each year across five taught master's degree courses, and have over 250 doctoral students in residence at any one time. Our doctoral programme always attracts the best research students from across the world, and we have a broad mentoring and training programme.

The Mathematical Institute strives to ensure that all staff and students are given the opportunities and support they need to achieve their potential. We are committed to equality of opportunities and to advancing women's careers. We support staff returning from long-term absence with teaching relief, offer flexible working arrangements, and the department sponsors University nursery places to support the priority allocation of childcare to our staff. Further information about family support can be found below under University Benefits, Terms and Conditions. Our Equality, Diversity & Inclusion Committee[1] contributes to many aspects of our work.

As part of the department's commitment to openness, inclusivity and transparency, we strongly encourage applications from all who consider they meet the requirements of the post, and particularly from women and ethnic minorities.

We have a number of family-friendly policies, such as the right to apply for flexible working, hybrid working, and support for staff returning from periods of extended absence. We are committed to ensuring an inclusive interview process and will reimburse up to £250 towards any additional care costs (for a dependent child or adult) incurred as a result of attending an interview for this position, which may not be applicable if the interviews are held remotely.

For more information on the Mathematical Institute, please visit: www.maths.ox.ac.uk

We proudly hold a departmental Athena SWAN Silver Award and an institutional Race Equality Charter Bronze Award.

The Mathematical, Physical and Life Sciences Division

Oxford is widely regarded as one of the world's leading science universities, and the University's Mathematical, Physical and Life Sciences (MPLS) Division sits at the heart of this reputation. It offers an outstanding environment for research, teaching, and innovation across the mathematical, computational, physical, engineering, and life sciences. As one of the four academic divisions of the University of Oxford, encompassing nine academic departments, a Doctoral Training Centre and Begbroke Science Park, it provides a collaborative, interdisciplinary community with a vibrant network of leading researchers and educators.

The division's research outputs, environment, and impact are consistently recognised at the highest levels, both nationally and internationally. MPLS departments regularly appear at the top of global league tables, including the Times Higher Education and QS World Rankings. Our strong performances in the UK Research Excellence Framework in both 2014 and 2021 also highlight the quality and impact of our work.

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[1] The Mathematical Institute was a founding supporter of the London Mathematical Society's Good Practice Scheme (www.lms.ac.uk/women/good-practice-scheme). We have held an Athena SWAN Silver Award since 2016.

These achievements reflect not only our academic excellence but also the strong networks we foster - with industrial partners, policymakers, and global research institutions.

Our vibrant research environment continues to evolve with major new investments in infrastructure. The Life and Mind Building, the University's largest-ever building project, is now close to completion/opened in 2025. It provides purpose-built facilities for the Departments of Experimental Psychology and Biology in inspiring spaces designed to foster collaboration and brings together researchers working on some of the most pressing questions in life sciences and human behaviour. The striking new Andrew Wiles Building houses our Mathematical Institute next to the Schwarzman Humanities Building, and the Beecroft on the edge of University Parks has provided a transformative home for our physicists. Current plans include significant investment to expand our interdisciplinary research and innovation support facilities at Begbroke Science Park and to transform Osney Mead, to the west of the city centre, into a dynamic innovation district, further strengthening Oxford's position as a world leader in science, technology, and enterprise.

MPLS provides a supportive and inclusive environment for academics at every career stage, from all over the world. The Division has a strong tradition of securing prestigious fellowships and supporting researchers as they progress to leadership roles. We are proud of our diverse community and every department holds an Athena Swan Award.

For educators, Oxford's tutorial system offers an unparalleled opportunity to engage with talented students and contribute to one of the world's most respected teaching systems. The division plays a central role in shaping the future of science through its graduate programmes, with over 3,500 postgraduate students receiving rigorous training and mentorship across MPLS departments.

For more information about the MPLS Division and the dedicated professional support it provides to academics across the sciences, please visit: http://www.mpls.ox.ac.uk

Information for prority 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).

DATA PROTECTION: All data supplied by applicants will be used only for the purposes of determining their suitability for the post, and will be held in accordance with the principles of the Data Protection Act 1998 and the department's data protection policy.
https://www.maths.ox.ac.uk/members/policies/data-protection/statement

Due to the large volume of recruitment that the department administers we are unable to provide feedback to non-shortlisted applicants.

If you need help

Application FAQs, including technical troubleshooting advice is available at: https://www.ox.ac.uk/about/jobs/explore-our-careers/applications-process/support-with-online-applications

Non-technical questions about this job should be addressed to the recruiting department directly at vacancies@maths.ox.ac.uk.

To return to the online application at any stage, please go to: https://www.ox.ac.uk/about/jobs/explore-our-careers/applications-process/how-to-apply

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** of 30 September before the 70th birthday.

For **existing** employees on these grades, any employment beyond the retirement age is subject to approval through the procedures: https://unioxfordnexus.sharepoint.com/sites/OXINTRANET-working-here/SitePages/the-ejra.aspx

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.

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.

Employment with the University and progression within employment will be determined according to personal merit and the application of criteria related to the duties and conditions 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.

Benefits of working at the University

Employee benefits

University employees enjoy 38 days' paid holiday, generous pension schemes, flexible working options, support for sustainable travel and other discounts. Staff can also access a huge range of personal and professional development opportunities. See https://www.ox.ac.uk/about/jobs/working-here .

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://www.ox.ac.uk/about/jobs/life-in-oxford/healthcare-and-wellbeing

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

Please see our Life in Oxford webpage for information on relocating to and settling into the Oxford area. The website offers valuable guidance, including information on where to find more details about housing, transportation, finances, healthcare, and other key aspects of living in Oxford and the surrounding region. See https://www.ox.ac.uk/about/jobs/life-in-oxford

There is also a visa loan scheme to cover the costs of UK visa applications for staff and their dependants. See https://www.ox.ac.uk/about/jobs/explore-our-careers/applications-process/visas-and-immigration

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://www.ox.ac.uk/about/jobs/explore-our-careers/applications-process/terms-and-conditions-of-employment 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://www.ox.ac.uk/about/jobs/life-in-oxford/childcare-and-schooling/childcare

Supporting disability and health-related issues

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/support-for-disabled-staff. The Staff Disability Advisor can be contacted at staffdisability@admin.ox.ac.uk

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/researcher-hub/about