

JOB DESCRIPTION

Research Assistant in Quantitative Fluorescence Microscopy and Protein - Membrane Interactions

NDORMS, Medical Science Division

Summary

Job title	Research Assistant in Quantitative Fluorescence Microscopy and Protein - Membrane Interactions
Division	Medical Sciences Division
Department	Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences
Location	Kennedy Institute of Rheumatology, Roosevelt Drive, Headington, Oxford OX3 7FY
Grade and salary	Grade 6: £36,360 per annum
Hours	Full-time
Contract type	Fixed-term (1 year)
Reporting to	Dr Narain Karedla
Vacancy reference	189906
Funding Information	Funding provided by European Commission

Research project details	**Research topic**	Quantifying protein - membrane interactions using fluorescence microscopy methods
	Principal Investigator / supervisor	Dr. Narain Karedla and Prof. Marco Fritzsche
	Project website	https://www.ndorms.ox.ac.uk/research/research-groups/karedla-group-quantitative-immunodynamics-laboratory
	Recent publications	Gallea *et al*. Science Advances, 12 (2026) Chen *et al.* Communications Biology, 7 (2024) Scheider *et al.* Nature Communications, 15 (2024)

The role

The Quantitative Immunodynamics group, led by Dr Narain Karedla at the Botnar Institute of Musculoskeletal Sciences (NDORMS), is looking for a motivated Research Assistant to study how membrane composition and charge control molecular binding, retention and mobility at immune cell membranes. Using quantitative fluorescence methods, the project will link binding kinetics, molecular mobility and membrane organisation.

The project has two phases. First, the postholder will help establish Selective Plane Illumination Lattice Light-Sheet Microscopy (SPI-LLSM) to measure how fluorescently labelled molecules bind to and diffuse in Giant Unilamellar Vesicles (GUVs) of different lipid compositions and then extend these measurements to live immune cells. Second, they will combine Metal-Induced Energy Transfer (MIET) with Fluorescence Lifetime Correlation Spectroscopy (FLCS) to study proteins and small molecules trafficking at membranes. By changing membrane composition and charge in a controlled way, this phase will develop MIET-based electrometry and nanometry (MIETEN) to show how protein–membrane electrostatics govern molecular recruitment, retention and mobility. These processes are central to membrane trafficking and sensing.

The postholder will prepare and characterise model membranes, label molecules, optimise experiments, carry out fluorescence measurements and analyse the data quantitatively. Working closely with the group and its collaborators, they will help build reproducible experimental workflows. They will also present findings in reports and talks and contribute to publications. The work will take place at the Kennedy Institute of Rheumatology (KIR), the Oxford-ZEISS Centre of Excellence (O-ZCoE) and the Rosalind Franklin Institute (Harwell Campus). The RA will be co-supervised by Prof. Marco Fritzsche, who leads the Biophysical Immunology Lab at KIR and serves as the Scientific Director of the O-ZCoE.

We are looking for someone with a Bachelor's Degree (or Master's) in physical chemistry, chemical biology, pharmacology, biophysics or a related discipline, and experience in bioconjugation chemistry and quantitative fluorescence microscopy. This should include hands-on experience of fluorescence correlation spectroscopy (FCS), fluorescence lifetime imaging microscopy (FLIM) and high-resolution imaging such as image scanning microscopy (ISM), together with strong analytical skills, including the use of MATLAB or Python to analyse fluorescence and imaging data. Experience in protein modification and labelling, model membrane preparations, cell-based experiments or molecular spectroscopy would be an advantage. An interest in developing advanced microscopy approaches to study protein–membrane interactions and reaction–diffusion processes, and in pursuing a DPhil/PhD in biophysics, would also be welcome.

Responsibilities

- Manage own research and administrative activities, within guidelines provided by senior colleagues
- Establish and optimise SPI-LLSM experiments to investigate molecular binding and diffusion in model membranes that mimic immune cell membranes, and subsequently extend these measurements to live immune cells.
- Use and maintain the ZEISS LLS7 lattice light-sheet microscope at the Oxford ZEISS Centre of Excellence and the PicoQuant Luminosa microscope at the Rosalind Franklin Institute.
- Select, implement and adapt experimental protocols for preparing model membranes, performing reaction–diffusion assays and bioconjugation reactions, and conducting SPI-LLSM measurements. Design experiments to benchmark and validate the technology.
- Subsequently develop and apply MIET-FLCS measurements to investigate protein–membrane binding kinetics and molecular mobility, contributing to the wider MIETEN programme.
- Determine appropriate methodologies to test hypotheses and identify suitable alternatives when technical problems arise.

- Gather, analyse and present scientific data, developing analysis pipelines and validating them against Monte Carlo simulations.
- Contribute to wider MIETEN project planning, including ideas for new research projects investigating the role of electrostatic interactions in protein–membrane binding and diffusion.
- Contribute to scientific reports, journal articles and conference presentations.
- Contribute to discussions and share research findings with colleagues across partner institutions and research groups.
- Represent the research group at external meetings and seminars, independently or alongside colleagues.
- Undertake general laboratory management and administration, including stock control of laboratory consumables.

Selection criteria

Essential selection criteria

- Hold a Bachelor's Degree (or Master's) in physical chemistry, pharmacology, biophsyics, chemical biology, or a related discipline.
- Have practical experience in quantitative fluorescence spectroscopy and microscopy, including fluorescence correlation spectroscopy (FCS), relevant to establishing SPI-LLSM measurements in model membranes and live cells.
- Possess sufficient specialist knowledge of molecular spectroscopy, fluorescence photophysics, fluorescence lifetime imaging microscopy (FLIM), Fluorescence Lifetime Correlation Spectroscopy (FLCS) and molecular diffusion to contribute to established research programmes investigating protein–membrane interactions and reaction–diffusion processes.
- Have experience of quantitative live cell imaging with Image Scanning microscopy or lightsheet microscopy.
- Have experience of quantitative analysis of fluorescence or imaging data using custom written MATLAB, Python routines.
- Ability to manage own research and administrative activities
- Excellent communication skills, including the ability to write text that can be published, present data at conferences, and represent the research group at meetings
- Experience of following and adapting protocols and selecting appropriate experimental methodologies Demonstrate an ability to follow departmental guidance in handling sensitive and personal information, including complying with current data protection legislation.

Desirable selection criteria

- Experience in glycochemistry or site-specific installation of post-translational modifications on proteins.
- Experience of contributing to scientific reports, publications or conference presentations.
- An interest in pursuing a DPhil/PhD in biophysics or a related discipline. .

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

Hazard-specific/safety-critical duties health questionnaire

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 to a successful outcome of this assessment.

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

- Lone working
- Working with category 3b or 4 lasers (laser safety class)
- Work with any substance which has one or more of the following pictograms on its Safety Data Sheet (SDS):



Additional security pre-employment checks

This job includes duties that will require additional security pre-employment checks:

- A satisfactory basic Disclosure and Barring Service check due to the nature of the work at the Kennedy Institute.

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.

Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences

The Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (NDORMS) is part of the Medical Sciences Division and is the largest European academic department in its field, running a globally competitive programme of research and teaching.

Our mission is to discover the causes of musculoskeletal and inflammatory conditions to deliver excellent and innovative care that improves people's quality of life. Our highly skilled teams have expertise in a broad range of areas, including orthopaedic surgery, inflammation, immunology, rheumatology, medical statistics, epidemiology, and clinical trials.

We currently have 480 staff, approximately 120 post-graduate students and have a grant portfolio worth over £180 million.



The Kennedy Institute is a biomedical research centre uniquely bringing together discovery science and early-stage clinical research, to develop transformative new therapies for chronic inflammatory and musculoskeletal conditions.

Broadly focused on the thematic areas of immunity and microbiome, inflammation biology and tissue remodelling and repair, the Institute's research is relevant for a range of common diseases such as arthritis, inflammatory bowel disease, fibrosis and cancer.

The Institute has capacity for up to 260 staff and students who work collaboratively across 25 research groups. This enables a multidisciplinary approach of molecular and cellular biology, combined with analysis of disease models, patient tissue samples and longitudinal clinical data. Collectively, these studies seek to uncover the biological processes that maintain tissue health and how these pathways break down in disease.

Research at the Institute is supported by a suite of core technology platforms, as well as through strategic partnerships with other basic and clinical research centres in Oxford, across the UK and internationally. These state-of-the-art technologies include the Oxford-Zeiss Centre for Excellence and other advanced microscopy and imaging facilities, mass and flow cytometry, as well as capabilities for microbial genomics and functional microbiome studies made available through the Oxford Centre for Microbiome Studies.

Complementing a strong programme of lab-based research, the Institute has established a core of expertise and technologies in data science including single cell genomics, statistical genetics, computational biology, and research informatics. A recent extension to the Institute building with a new third floor creates additional space purposely designed for computationally intensive research.

A true trendsetter in innovative and transformational research, the Kennedy also boasts a relaxed and friendly atmosphere, revolving around its bright and airy atrium that provides a space for colleagues to meet over coffee and tea to talk about their research and beyond throughout the day.

For more information please visit: http://www.kennedy.ox.ac.uk

The Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (NDORMS) holds a silver Athena Swan award to recognise advancement of gender equality: representation, progression and success for all.



The **Botnar Institute for Musculoskeletal Sciences** enables and encourages research and education into the causes of musculoskeletal disease and their treatment.

The Centre provides world-class facilities for scientists in the field of musculoskeletal research. It takes a multidisciplinary approach, encompassing orthopaedic, rehabilitation and rheumatology clinical scientists, bone oncologists, laboratory scientists, epidemiologists, engineers and statisticians. The Botnar also hosts the Oxford Clinical Trials Research Unit (OCTRU) and the Centre of Statistics in Medicine (CSM), providing excellent statistical support to all aspects of clinical research.

The Botnar opened in 2002, with a large annex completed in 2013. The Botnar is now home to around 300 staff and postgraduate students enjoying the international and friendly atmosphere of this workplace and benefits from the vast knowledge of leading experts in the field of musculoskeletal research.

To accommodate its rapid growth, the Centre has opened another wing in early 2022. The new space provides additional 1000m2 of office and 1000m2 of laboratory space. The laboratory space includes a GMP clean room facility suitable for the manufacturing of biomaterials for human implantation.

Sharing the site of the Nuffield Orthopaedic Centre, the largest specialist academic musculoskeletal hospital in the UK, puts the Botnar in a unique position to foster the collaboration between basic scientists and clinicians, which is essential to success in medical research.

The Kadoorie Institute of Trauma, Emergency and Critical Care brings together interdisciplinary research across trauma and rehabilitation, emergency care and critical care, with a focus on improving outcomes for patients with life-threatening illness and injury.







The Institute integrates expertise across these closely connected specialties within a single research environment. What unites them is the need for speed: developing and evaluating urgent interventions that can save lives, improve recovery and support more effective and sustainable healthcare.

Based at the John Radcliffe Hospital, the centre of urgent and emergency care in Oxford, the Institute supports more than 100 multidisciplinary researchers working across the breadth of trauma, emergency and critical care research. Its research spans the use of routinely collected healthcare data and early- and late-phase clinical trials, enabling discoveries to be translated into improvements in clinical practice and patient care.

The Institute benefits from close collaboration between the University of Oxford and Oxford University Hospitals NHS Foundation Trust. It sits jointly within the Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (NDORMS) and the Nuffield Department of Clinical Neurosciences (NDCN), creating a strong platform for translational research that directly informs clinical practice.

Building on internationally recognised research programmes, the Institute works with national and global partners to strengthen the evidence underpinning clinical practice, guidelines and health policy, including through organisations such as the National Institute for Health and Care Excellence (NICE).

Alongside its research, the Institute plays an important role in education and training, supporting research students and providing education for clinicians and researchers from Oxford, across the UK and increasingly around the world. Across its work, it is committed to collaboration, rigorous evidence and the rapid translation of research into practice, delivering meaningful improvements for patients and healthcare systems worldwide.

www.ndorms.ox.ac.uk/about/kadoorie-institute

Equality, Diversity and Inclusion (EDI) and Athena Swan

NDORMS is committed to promoting a diverse and inclusive community and we have an active Equality, Diversity, and Inclusion (EDI) committee. We hold an Athena SWAN silver award in recognition of our efforts to introduce organisational and cultural practices, which promote gender equality and create a better working environment for all. NDORMS has been awarded the Athena Swan Silver award for the third consecutive time, in March 2024, recognising the department's commitment to gender equality. Every Athena SWAN application includes a thorough action plan, and ours is no different in this respect. We have developed a comprehensive plan to fully support our positive work and ambitions for gender equality in NDORMS. See more information here.

The Department promotes family-friendly policies and supports flexible working arrangements where possible. The University offers 450 nursery places for staff and students at five dedicated University nurseries and a network of local community nurseries. We will be happy to provide you with information about nurseries and schools in Oxford upon request.

We encourage applications from suitably qualified, experienced, and eligible candidates regardless of sex, race, disability, age, sexual orientation, gender reassignment, marriage or civil partnership, religion or belief, or pregnancy and maternity. We embrace our differences, and you are very welcome at NDORMS, without the need to hide any part of who you are.

To learn more about EDI in NDORMS, visit our website.

In line with University policy, we expect all members of the NDORMS community to treat each other with respect, courtesy and consideration and do not tolerate any form of unlawful discrimination, bullying, harassment or victimisation.

Medical Sciences Division

The Medical Sciences Division is an internationally recognised centre of excellence for biomedical and clinical research and teaching. We are the largest academic division in the University of Oxford.

World-leading programmes, housed in state-of-the-art facilities, cover the full range of scientific endeavour from the molecule to the population. With our NHS partners we also foster the highest possible standards in patient care.

For more information please visit: www.medsci.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@ndorms.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