NUFFIELD DEPARTMENT OF
CLINICAL NEUROSCIENCES
West Wing, Level 6, John Radcliffe Hospital, Oxford, OX3 9DU
Web: www.ndcn.ox.ac.uk | **Tel**: +44(0)1865 234702 | **Email**: recruitment@ndcn.ox.ac.uk

UNIVERSITY OF OXFORD

Job title	**Postdoctoral Research Scientist in Pre-clinical MRI Methods**
Division	Medical Sciences Division
Department	Nuffield Department of Clinical Neurosciences (NDCN)
Location	WIN@FMRIB, John Radcliffe Hospital, Oxford, OX3 9DU
Grade and salary	Grade 8: £45,585 - £54,395 per annum A less experienced candidate may be appointed at Grade 7 (£36,024 – £44,263 per annum), with a commensurate adjustment in either the essential criteria, responsibilities or duties.
Hours	Full time
Contract type	Fixed term for 3 years
Reporting to	Prof. Karla Miller
Vacancy reference	170423

Research topic	Quantitative MRI and histology in rodent brain
Principal Investigator / supervisor	Prof. Karla Miller
Project team	WIN Physics Group
Project web site	Lab website (research and members): https://www.win.ox.ac.uk/research/physics-research Lab handbook (ethos and commitment): https://www.win.ox.ac.uk/files/research-groups/physics-group-lab-handbook.pdf
Funding partner	The funds supporting this research project are provided by the Wellcome Trust
Recent publications	**MRI-Histology:** Howard…Jbabdi*, Miller* (2023). The BigMac dataset: An open resource combining multi-contrast MRI an microscopy in the macaque brain. Nature Communications, 14:4320.

Athena Swan Silver Award · Race Equality Charter Bronze Award · Stonewall Silver Employer 2022 · HR · Oxford Living Wage · We are a Living Wage Employer

	Huszar… Miller*, Jenkinson* (2023). Tensor Image Registration Library: Deformable registration of stand-alone histology images to whole-brain post-mortem MRI data. NeuroImage, 265:119792. Smart et al (2023). An optimised tissue processing and para n embedding protocols for mouse brains following ex vivo MR. In press, STAR Protocols. Kor …Miller*, Howard* (2022). An automated pipeline for extracting histological stain area fraction for voxelwise quantitative MRI-histology comparisons. NeuroImage, 264:119726. Tendler…Jbabdi*,Mars*,Miller* (2022). The Digital Brain Bank, an open access platform for post-mortem datasets. eLife, 11:e73153. **UK Biobank:** Griffanti et al (2022). Adapting UK Biobank imaging for use in a routine memory clinic setting: the Oxford Brain Health Clinic. NeuroImage: Clinical, 36:103273. Wang.. Tendler*, Miller* (2022). Phenotypic and genetic associations of quantitative magnetic susceptibility in UK Biobank brain imaging. Nature Neuroscience, 25: 818-831. Mollink…Jbabdi*, Miller* (2019). The spatial correspondence and genetic inuence of inter-hemispheric connectivity with white matter microstructure. Nature Neuroscience, 22: 809-819. Elliott et al (2018). Genome-wide association studies of brain imaging phenotypes in UK Biobank. Nature, 562: 210-216. Miller et al (2016). Multimodal population brain imaging in the UK Biobank prospective epidemiological study. Nature Neuroscience, 19: 1523-1536.

Context

The past decade has seen the emergence of population-level brain imaging. For the first time, imaging can provide a rich, multi-faceted description of how an individual's brain deviates from population norms, potentially informing about early pathology or susceptibility to disease. However, the imaging in these new population-health resources reflects specific imaging protocols that may not match acquisitions in novel settings, such as hospital scanners.

We aim to enable clinical imaging to take advantage of population-level health data resources by addressing the deep challenges of information translation. We will achieve this by linking the relevant biology to the physics of the imaging measurement in order to predict unseen imaging phenotypes. This requires new research across multiple domains, including biophysical modelling, physics-based simulation, quantitative measurement, and detailed validation.

We have recently launched a research programme aiming to translate population imaging studies like the UK Biobank into the broader environment of basic and clinical neuroscience. We are now seeking someone to lead the pre-clincial (rodent) arm of this research programme.

Project and role

The postholder will use rodent models to identify and interpret the cellular features that drive MRI signals. We will perform measurements in mice to identify the biological sources of MR-visible cellular "compartments". For this, we will use sophisticated multi-dimensional quantitative MRI techniques alongside the acquisition of multiple histological immunostains in rodent tissue samples. These experiments, which aim to confer neurobiological meaning to the identified compartments, will be done in a range of mouse models with specific alterations to cellular features of interest (e.g., myelin).

These experiments will align to and be integrated with similar human experiments from our broader research programme. This will enable us: (i) to provide biophysically informed methods for “harmonising” human data in the UK Biobank to new settings, (ii) to precisely prediction how microstructural alterations alter MRI signals, and (iii) to design imaging protocols that are maximally sensitive to specific pathology.

The post holder will be expected to take an independent and proactive role in managing the research process, maintaining and setting up collaborations, and generating new research and grant opportunities. They will be responsible for supervising students and research assistants, both in relation to the postholder’s research project and related projects.

Research group

The postholder will report to Professor Karla Miller and be based in the MRI Physics group at the Wellcome Centre for Integrative Neuroimaging (WIN, formerly FMRIB). Our group develops, validates, and applies novel MRI techniques for neuroscience. We co-lead the brain imaging in UK Biobank. We work at the interface of MRI methods and neuroscience, collaborating closely with the rich and varied expertise of Oxford’s neuroimaging community.

Our lab values diversity and equity. We are committed to creating a working environment where everyone belongs and can thrive. This commitment is threaded into all aspects of our work, and is underpinned by a broad range of projects and initiatives we undertake that aim to promote positive and fair research culture. You can read about our lab ethos, culture, and commitment to each other in our Lab Handbook: https://www.win.ox.ac.uk/files/research-groups/physics-group-lab-handbook.pdf

Responsibilities

- Develop research questions and conduct experiments linking MRI to histological imaging in rodents to understand the neurbiological underpinnings of MRI signals
- Develop new methods for multi-dimensional quantitative MRI in a pre-clinical (rodent) setting, including protocol design, estimation techniques, and analytic pipelines
- Design and oversee experiments for histological interrogation of rodent tissue, including protocol optimisation, semi-quantitative analysis, and co-registration to MRI
- Analyse data linking MRI to histology, interpret the neurobiological significance of findings in causal rodent models, and relate results to population-level human MRI studies
- Disseminate research findings by regularly writing research articles for international peer-reviewed journals and presenting at national and international conferences and seminars
- Agree clear task objectives, organise, and delegate work to other members of the team and coach other members of the group on specialist methodologies or procedures
- Contribute to group research funding applications and manage own area of a larger research budget
- Share responsibility for shaping the research group’s plans in the domain of pre-clinical neuroscience and contribute to the writing of funding applications
- Carry out collaborative projects with colleagues in partner institutions, and research groups
- Undertake other duties in the department from time to time as determined commensurate with the grade and responsibilities of this post, and any other reasonable request

Selection criteria

Essential selection criteria

- Hold a PhD/DPhil in Engineering, Physics, or related subject
- Experience with MRI experimental techniques for studying rodent biology, including protocol development image acquisition, and signal modelling
- Experience with quantitative MRI, including diffusion, quantitative susceptibility mapping, quantitative MRI and structural imaging
- Experience with light microscopy acquisition and analysis, including immunostaining, structure tensor analysis, semi-quantitative analysis
- Experience with programming for data analysis (MATLAB, Python, R, etc)
- Track record in development of MRI analysis pipelines, ideally using FSL
- Publication record and familiarity with the existing literature and research in the field
- Ability to independently plan and manage a research project, including a research budget
- Demonstrated collaborative abilities, inter-personal skills, and desire to work cooperatively in a team environment
- Strong communication skills, including a track record in academic publication

Desirable selection criteria

- Experience of the Bruker MRI scanner platform, particularly in operation for data acquisition
- Experience with designing and conducting experiments using rodent models, including causal genetic manipulations, to relate MRI to histology
- Experience with merging MRI and light microscopy data, including registration, data fusion, and development of analysis pipelines
- Knowledge of neurobiology as it pertains to microstructural effects on MRI signals
- Experience of supervising staff

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. If you have previously worked for the University we will also verify key information such as your dates of employment and reason for leaving your previous role with the department/unit where you worked. 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

Additional security pre-employment checks

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

- University security screening (eg identity checks) for access to certain buildings/facilities

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/organisation.

Medical Sciences Division

The Medical Sciences Division is an internationally recognized centre of excellence for biomedical and clinical research and teaching, and 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 visit: www.medsci.ox.ac.uk

The Nuffield Department of Clinical Neurosciences

The Nuffield Department of Clinical Neurosciences (NDCN), led by Prof Kevin Talbot, has over 400 staff and 150 postgraduate students. NDCN has an established research and teaching portfolio with a national and international reputation for excellence.

NDCN is based in high quality research and clinical facilities in the West Wing of the John Radcliffe Hospital, alongside the Department's world-class Wellcome Centre for Integrative Neuroimaging (WIN) and the Weatherall Institute of Molecular Medicine (which houses 3 of our research groups), and provides the ideal facilities to translate research from bench to bedside. In keeping with the award of NIHR Comprehensive Biomedical Research Centre status, to a partnership between Oxford University and the Oxford Radcliffe Hospitals NHS Trust, we have developed a highly integrated and interdisciplinary environment in which research, teaching, clinical training and clinical care interact. This enables us to establish new approaches to the understanding, diagnosis and treatment of brain diseases. To this end the Department fosters collaborations worldwide and warmly welcomes visiting scientists, clinical fellows and students. The Department comprises six sections:

For more information visit: www.ndcn.ox.ac.uk

Medical Research Council Brain Network Dynamics Unit
The MRC BNDU is directed by Professor Peter Magill and is exceptionally multidisciplinary, integrating research programmes that span clinical, experimental and computational neuroscience. The Unit's collective goal is to understand and exploit the moment-to-moment interactions between nerve cells that are critical for brain functions, with a special focus on the brain circuits underlying movement and memory.

For more information visit: www.mrcbndu.ox.ac.uk

Nuffield Division of Anaesthesia
NDA is led by Associate Professor Andrew Farmery. The NDA is committed to the development and maintenance of internationally competitive research programmes in pain and consciousness; respiration and hypoxia; adult and neuro-intensive care; simulation and human factors training.

For more information visit www.nda.ox.ac.uk

Division of Clinical Neurology
DCN is led by Professor David Bennett. DCN is committed to the development of research programs that improve understanding of the nervous system in health and disease.

For more information visit www.dcn.ox.ac.uk

The Wellcome Centre for Integrative Neuroimaging (WIN)
WIN is a multi-disciplinary neuroimaging research facility led by Heidi Johansen-Berg. WIN aims to bridge the gap between laboratory neuroscience and human health, by performing multi-scale studies spanning from animal models through to human populations. It focuses on the use of Magnetic Resonance Imaging (MRI) for neuroscience research, along with related technologies such as Transcranial Magnetic Stimulation, transcranial Direct Current Stimulation, MEG and EEG. WIN has core locations at the John Radcliffe Hospital (FMRIB), Warneford Hospital (OHBA) and University Science area (BSB).

For more information visit www.win.ox.ac.uk

Nuffield Laboratory of Ophthalmology
NLO is led by Professor Russell Foster, who leads the Sleep & Circadian Neuroscience Institute. NLO pursues scientific and clinical research into a range of areas related to vision, the eye and circadian neuroscience.

For more information visit www.nlo.ox.ac.uk

Centre for the Prevention of Stroke & Dementia
CPSD is led by Professor Peter Rothwell. The centre carries out research that increases understanding of the causes of cerebrovascular disease. Its aims are to improve prevention of stroke and dementia by earlier diagnosis, more reliable prognostication, and more effective use of existing preventive treatments in routine clinical practice.

For more information visit www.cpsd.ox.ac.uk

Working at NDCN

NDCN actively promotes a healthy work life balance amongst employees through a number of family friendly policies. See https://hr.admin.ox.ac.uk/staff-benefits for further information.

The University of Oxford is a member of the Athena SWAN Charter and holds an institutional Bronze Athena SWAN award. The Department of Clinical Neurosciences holds a departmental Silver Athena award in recognition of its efforts to introduce organisational and cultural practices that promote advancement of gender equality: representation, progression and success for all.

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.

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)

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 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@ndcn.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** of 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.

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 https://hr.admin.ox.ac.uk/staff-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 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 website 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

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 the Work+Family Space, 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 https://hr.admin.ox.ac.uk/my-family-care

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 https://childcare.admin.ox.ac.uk/

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 https://edu.admin.ox.ac.uk/disability-support

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 https://edu.admin.ox.ac.uk/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.

Oxford Research Staff Society (OxRSS)

A society run by and for Oxford University research staff. It offers researchers a range of social and professional networking opportunities. Membership is free, and all researchers employed by Oxford University are welcome to join. Subscribe at researchstaff-subscribe@maillist.ox.ac.uk to join the mailing list to find out about upcoming events and other information for researchers, or contact the committee on committee@oxrss.ox.ac.uk. For more information, see www.ox.ac.uk/oxrss, Twitter @ResStaffOxford, and Facebook www.facebook.com/oxrss.