Job description and selection criteria

Job title	**Postdoctoral Research Assistant in Oceanography and Palaeoclimatology**
Division	**MPLS**
Department	**Earth Sciences**
Location	**South Parks Road, Oxford**
Grade and salary	**Grade 7: £40,514 - £47,779**
Hours	**Full time**
Contract type	**Fixed-term until 31 March 2027 in the first instance, with the possibility of an extension**
Reporting to	**Professors Helen Johnson and Stuart Robinson**
Vacancy reference	**185499**
Additional information	**The PDRA will work on two NERC-funded projects:** **MEZCAL (Methods for Extending the horiZontal Coverage of the Amoc Latitudinally and retrospectively) and** **PalaeoGradPhan (Paleoclimate meridional and zonal Gradients in the Phanerozoic)**

Research topic	**Ocean circulation variability in present day and past climates.**
Principal Investigator / supervisor	Professors Helen Johnson and Stuart Robinson
Project team	University of Oxford: Professors Helen Johnson and Stuart Robinson University of Bristol: Professors Dan Lunt and Paul Valdes National Oceanography Centre: Ale Sanchez-Franks National Center for Atmospheric Research (US): Dan Amrhein and Rita Markina
Project web site	
Funding partner	The funds supporting this research project are provided by NERC Grants NE/X000222/1 and NE/Y004272/1.

Recent publications	Relevant publications: Valdes, P. J., Scotese, C. R., and Lunt, D. J.: Deep ocean temperatures through time, Clim. Past, 17, 14831506, https://doi.org/10.5194/cp-17-1483-2021, 2021. Farnsworth, A., Lunt, D. J., O'Brien, C. L., Foster, G. L., Inglis, G. N., Markwick, P., Pancost, R.D., & Robinson, S.A. (2019a). Climate sensitivity on geological timescales controlled by nonlinear feedbacks and ocean circulation. *Geophysical Research Letters*, 46, 9880–9889. Lunt, D.J., Farnsworth, A., Loptson, C., Foster, G.L., Markwick, P., O'Brien, C.L., Pancost, R.D., Robinson, S.A., Wrobel, N. (2016) Palaeogeographic controls on climate and proxy interpretation, *Climates of the Past,* 12, 1181-1198 Frajka-Williams E., Foukal N. and Danabasoglu G. (2023) Should AMOC observations continue: how and why? *Philosophical Transactions of the Royal Society A*. 381: 20220195, http://doi.org/10.1098/rsta.2022.0195 Sanchez-Franks, A., Frajka-Williams, E., Moat, B.I. and Smeed, D.A. (2021) A dynamically based method for estimating the Atlantic meridional overturning circulation at 26◦ N from satellite altimetry, *Ocean Science*, 17, 1321–1340. https://doi.org/10.5194/os-17-1321-2021 Kostov, Y., H. L. Johnson et. al. (2021) Distinct sources of interannual subtropical and subpolar Atlantic overturning variability. *Nature Geoscience*, 14, 491-495. https://doi.org/10.1038/s41561-021-00759-4

Job description

Overview of the role

The post holder will join the Physical Oceanography and Palaeoclimate groups in the Department of Earth Sciences and perform numerical model data analysis relevant to two projects: MEZCAL and PalaeoGradPhan. These two projects have natural synergies; both are focused on the relationship between ocean circulation and surface ocean properties, and use numerical models to understand what we can and cannot infer from imperfect observational data. The PDRA will explore the relationship between ocean circulation, sea surface temperature (SST) and atmospheric forcing in ocean state estimates such as ECCOv5 and GLORYS12 as well as in numerical simulations of current and past climate.

The MEZCAL project, which involves scientists at the National Oceanography Centre in Southampton, as well as at Woods Hole Oceanographic Institution and the National Center for Atmospheric Research in the US, aims to develop and test a framework for monitoring the Atlantic meridional overturning circulation (AMOC) at all latitudes using indirect observations, e.g., of sea surface height, SST and air-sea fluxes of buoyancy and momentum. The Oxford PDRA will test some of these modern-day proxies for the AMOC. For example, they will combine adjoint-derived information about the sensitivity of the AMOC to surface fluxes (as a

function of space and lead time) with surface fluxes from a range of ocean state estimates and coupled climate models to reconstruct AMOC variability; the degree to which the reconstruction agrees with the simulated AMOC is a measure of the usefulness of the proxy. The PDRA may also explore how well AMOC proxies based on sea surface height work in the subpolar gyre, and consider what additional information is required to adequately capture fluxes of heat and freshwater.

The PalaeoGradPhan project, which involves scientists at the University of Bristol, is focused on understanding how and why equator-to-pole temperature gradients have changed over the Phanerozoic (last 500 Million years). The PDRA will explore the role of ocean circulation (including the overturning circulation) in setting and responding to those gradients, using a series of 109 climate model simulations, 5 million years apart over the entire Phanerozoic, carried out by our collaborators in Bristol. They may also investigate the proxy evidence for changes in ocean circulation, and the role of ocean circulation variations in global biogeochemical and carbon cycling.

Although the AMOC as we know it has only existed during the Holocene, the changing relationship between meridional overturning more generally, SST and other climate features under changing gateways and continental configurations provides wider context for the MEZCAL goals, while the understanding of AMOC dynamics developed during MEZCAL will facilitate interpretation of the palaeoclimate simulations.

The postholder will lead on the numerical model analysis in both cases, and will collaborate with modern-day observational oceanographers, palaeoceanographers and palaeoclimate modellers. They will be based in the Department of Earth Sciences at the University of Oxford within the Oceanography, Climate and Palaeoenvironment Research Theme and will report to Professors Helen Johnson and Stuart Robinson. The post holder may be required to provide guidance to junior members of the research groups and project teams, including research assistants, PhD students, and/or project volunteers.

The post is available to start as soon as possible.

Responsibilities/duties

- Analyse numerical model data from ocean state estimates and coupled climate models to explore the relationship between ocean circulation and surface properties.
- Apply a range of statistical tools and calculate relevant ocean and climate diagnostic metrics.
- Develop, test, review and refine hypotheses as appropriate while analysing scientific data from a variety of sources.
- Collaborate in the preparation of research publications.
- Manage own academic research and administrative activities. This involves small scale project management, to co-ordinate multiple aspects of work to meet deadlines.
- Carry out collaborative projects with MEZCAL, PalaeoGradPhan and other colleagues in partner institutions in the US and UK.
- Adapt and improve research methodology and experiment design where necessary.
- Present papers at national and international conferences and meetings.

- Act as a source of information and advice to other members of the group, for example DPhil and Masters research students working on related questions.

- Contribute ideas for new research projects.

- Represent the research group and MEZCAL/PalaeoGradPhan projects at external meetings/seminars.

The successful applicant may have an opportunity to engage in teaching. This may include lectures and small-group teaching of undergraduates and graduate students. There is also scope for the PDRA to supervise Masters projects.

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

Selection criteria

Essential

- Hold or be close to completion of a PhD/DPhil in ocean or atmosphere dynamics (thesis must be submitted before an offer is made)

- Relevant experience in analysing numerical ocean or climate model data.

- An interest in the ocean circulation and climate of the past.

- Sufficient knowledge of ocean and climate dynamics to work within established research programmes.

- Demonstrated ability to design and conduct numerical analysis of large data sets to test hypotheses.

- Ability to lead and report an original research programme, as shown by a documented research track record, including publications and presentations at international conferences.

- Demonstrated ability to contribute ideas for new research projects.

- Excellent communication skills, including the ability to write for publication, present research proposals and results, and represent the research group at meetings.

- Demonstrated willingness and ability to collaborate with other researchers in a multi-disciplinary international environment.

Desirable

- Deep understanding of Atlantic Ocean dynamics.
- Willingness to develop an understanding of relevant palaeoceanographic and palaeoenvironmental proxies.
- Experience of independently managing a discrete area of a research project
- Experience of working with adjoint sensitivity data.

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.

Department of Earth Sciences

The Department of Earth Science conducts research across a broad range of disciplines. This work can loosely divided into the following themes:

- Geophysics and geodynamics
- Planetary evolution and materials
- Oceanography, climate and palaeoenvironment
- Palaeobiology and evolution
- Geodesy, tectonics, volcanology and related hazards
- Earth resources

The department has a national and international reputation for research excellence. It ranked highly in the UK for Earth and Environmental Sciences during the 2021 REF exercise (based both on overall grade, or on the fraction of research judged to be 4*).

The department presently consists of 28 academics (i.e. Associate Professors and Professors) 47 research staff, and 32 support staff.

Thirty-five undergraduate students are admitted each year to read for a BA (3 years) or M. Earth Sci. (4 years) in Earth Sciences. The course provides a broad overview of the earth sciences and requires A levels (or equivalent) in maths and either physics or chemistry to enter. It attracts students of a very high calibre with A level grades of AAA* or higher. The final year of the M. Earth Sci. course includes a substantial research project during which students are embedded in department research groups.

Between 15 and 20 graduate students join the department every year to study for a D. Phil. They can be admitted directly to the department, or through the cross-University NERC Doctoral Training Programme in Environmental Research (http://www.environmental-research.ox.ac.uk/).

The department is housed in a specialist new Earth Sciences building completed in late 2010. The building features a wing with 4 floors of dedicated services laboratories. These contain a wide range of analytical equipment enabling cutting-edge research in a broad range of earth science disciplines. Of these laboratories, 6 are designated as Small Research Facilities (SRFs):

- Cleansuite SRF
- Electron Microanalysis SRF
- Geofacilities SRF
- Stable Isotope SRF
- Trace Metal Analysis SRF
- Workshop SRF

Each of these SRFs are run by at least one full time permanent member of staff

For more information about the department please visit: www.earth.ox.ac.uk

The Department of Earth Sciences holds a Bronze Athena Swan award to recognise advancement of gender equality: representation, progression and success for all.

For further information about working at Oxford, please see:
www.ox.ac.uk/about_the_university/jobs/research/

http://www.careers.ox.ac.uk

Mathematical, Physical & Life Sciences Division

The Mathematical, Physical and Life Sciences (MPLS) Division is one of the four academic divisions of the University of Oxford.
The MPLS Division's 10 departments and 3 interdisciplinary units span the full spectrum of the mathematical, computational, physical, engineering and life sciences, and undertake both fundamental research and cutting-edge applied work. Our research addresses major societal and technological challenges and is increasingly focused on key interdisciplinary issues. We collaborate closely with colleagues in Oxford across the medical sciences, social sciences and humanities, and with other universities, research organisations and industrial partners across the globe in pursuit of innovative research geared to address critical and fundamental scientific questions.

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

Athena Swan Charter

The Department of Earth Sciences holds a Bronze Athena Swan award to recognise 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 internal candidates

If you currently work at the University please note that:

- as part of the referencing process, we will require a reference from your current department to confirm basic employment details including reason for leaving and information about your performance.
- 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@physics.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

The University of Oxford is committed to equal opportunity, and to being an inclusive institution 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.

Recruitment, progression within employment and retention will be determined according to personal merit and the duties and requirements of the post. In all cases, the primary consideration will be the ability to perform the job.

Our commitment to equality and diversity goes hand in hand with our commitment to academic freedom and freedom of speech, as stated in the University's Equality Policy and Equality, Diversity and Inclusion Strategic Plan.

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://hr.admin.ox.ac.uk/staff-benefits. Staff can access a huge range of personal and professional development opportunities. See https://hr.admin.ox.ac.uk/staff-benefits

Employee Assistance Programme

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

University Club and sports facilities

Membership of the University Club is free for University staff. It offers social, sporting, and hospitality facilities. Staff can also use the University Sports Centre on Iffley Road at discounted rates, including a fitness centre, powerlifting room, and swimming pool. See www.club.ox.ac.uk and https://www.sport.ox.ac.uk/.

Information for staff new to Oxford

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 Life in Oxford | Oxford University Jobs
There is also a visa loan scheme to cover the costs of UK visa applications for staff and their dependants. See https://staffimmigration.admin.ox.ac.uk/visa-loan-scheme

Family-friendly benefits

We are a family-friendly employer with one of the most generous family leave schemes in the Higher Education sector (see https://hr.web.ox.ac.uk/family-leave). Our Childcare Services

team provides guidance and support on childcare provision, and offers a range of high-quality childcare options at affordable prices for staff. In addition to 5 University nurseries, we partner with a number of local providers to offer in excess of 450 full time nursery places to our staff. Eligible parents are able to pay for childcare through salary sacrifice, further reducing costs. See https://childcare.admin.ox.ac.uk/.

Supporting disability and health-related issues (inc menopause)

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

Staff networks

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

The University of Oxford Newcomers' Club

The University of Oxford Newcomers' Club is run by volunteers that aims to assist the partners of new staff settle into Oxford, and provides them with an opportunity to meet people and make connections in the local area. See www.newcomers.ox.ac.uk.

Research staff

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

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