Department of Physics
Clarendon Laboratory
Parks Road, Oxford OX1 3PU

UNIVERSITY OF OXFORD

# Job description and selection criteria

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| **Job title** | Postdoctoral Research Assistant in Weather and Climate Modelling (2 posts) |
| **Division** | Mathematical, Physical & Life Sciences Division |
| **Department** | Department of Physics |
| **Location** | Parks Road, Oxford, OX1 3PU |
| **Grade and salary** | Grade 7: £31,076 - £38,183 p.a. |
| **Hours** | Full time |
| **Contract type** | Fixed-term until 30th September 2021 |
| **Reporting to** | Professor Tim Palmer |
| **Vacancy reference** | 128546 |
| **Additional information** | Closing date – midday (UK time) on Friday 2nd June 2017 |

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| **Research topic** | Weather and Climate Modelling |
| **Principal Investigator / supervisor** | Professor Tim Palmer |
| **Project team** | Predictability of Weather and Climate Group |
| **Project web site** | http://www2.physics.ox.ac.uk/research/predictability-of-weather-and-climate |
| **Funding partner** | European Research Council (Advanced Investigator Award) |
| **Recent publications** | |

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## The role

We are looking for up to 2 full-time Postdoctoral Research Assistants in the Predictability of Weather and Climate group within the sub-Department of Atmospheric, Oceanic and Planetary Physics (AOPP). These posts will be available from October 1st 2017 until the end of September 2021.

These positions are funded by the European Research Council (ERC), through an Advanced Investigator award, to Professor Tim Palmer for the project ITHACA: “An Information Theoretic Approach to Improving the Reliability of Weather and Climate Simulations”. The aim of this project is to develop a new synergy between climate and computer science to increase the accuracy and hence reliability of comprehensive weather and climate models. The scientific basis for this project lies in the development of stochastic sub-grid parametrisations for weather and climate models. These parametrisations provide estimates of irreducible uncertainty in weather and climate models, and will be used to determine where numerical precision for model variables can be reduced without degradation. By identifying those bits that carry negligible information- typically in high-wavenumber components of the dynamical core and within parametrisation and Earth-System modules – computational resources can be reinvested into areas (such as resolution) where they are sorely needed. The project will contribute significantly to the development of next-generation weather and climate models and is timed for the advent of exascale computing where energy efficiency is paramount. The ideas will be tested on emerging hardware capable of exploiting the benefits of mixed-precision arithmetic. It is expected that the successful applicant will work closely with scientists from ECMWF, and will make use of the supercomputing facilities there.

Applications are sought from researchers with experience in a variety of sub-fields within the weather and climate-modelling community:

- Dynamical cores
- Parametrisation of sub-grid processes
- Earth-System modules
- Data Assimilation

In addition, applications are welcome from computer scientists including those with experience with GPUs, FPGAs or more unconventional forms of computation.

The successful applicant is expected to work closely with Professor Palmer to develop research strategies, and will take responsibility for the relevant model developments. The results will be presented at national and international meetings as well as published in peer reviewed publications, and may lead to implementations in operational weather and climate models.

## Responsibilities

- The development of original research and analysis strategies
- Responsibility for the relevant model development
- Setting up integrations on local computing and remote supercomputing facilities
- The presentation of the results at national and international meetings and their publication in high-impact peer-reviewed journals
- Liaising with scientists in operational centres, for possible implementation of code in operational weather and climate models.

- Contribution to the intellectual life of the research group, including meetings and collaborations, as required

## Selection criteria

Applicants should possess a doctorate (or be close to obtaining) in weather/climate science, nonlinear dynamics, computer science, Physics or a related field and ideally have a strong numerical modelling background.

The candidates we are seeking should have a sound knowledge of either comprehensive weather or climate models, or some experience with multi-scale nonlinear dynamical systems and/or information theory stochastic modelling from other areas of physics. The candidates should have the drive to perform novel research of international standing in a dynamic working environment and should be willing to work with scientists in operational weather and climate prediction centres.

**Essential**

- Good first degree in physics or mathematics or computing sciences
- Doctorate (or be close to obtaining) in weather/climate science, nonlinear dynamics, computer science, Physics or a related field
- Background in numerical modelling of nonlinear systems
- Excellent computing skills, including the knowledge of UNIX/Linux, FORTRAN and other high-level languages on different computing architectures
- Demonstrated drive and ability to perform novel research of international standing
- The curiosity and ability to analyse complex phenomena and to summarise the findings in peer-reviewed publications
- An ability to work in a team environment

**Desirable**

- Good understanding of atmospheric physics and the Climate System
- Experience in running and/or weather and developing climate models
- Good communication skills

## 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, and in providing all of our staff with a welcoming and inclusive workplace that supports everyone to develop and do their best work. Recognising that diversity is a great strength, and 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. Income from external research contracts in 2014/15 exceeded £522.9m and ranked first in the UK for university spin-

outs, with more than 130 spin-off companies created to date. 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 Physics

Oxford Physics is one of the largest and most eminent departments in Europe – pursuing forefront research alongside training the next generation of leaders in Physics.

With an academic staff of almost one hundred our activities range from fundamental particles to the furthest reaches of the universe to manipulating matter on an atomic scale. Oxford physicists are probing new ways to harness solar energy, modelling the Earth's atmosphere to predict the future climate, exploring computation on the quantum scale and executing calculations that reveal the fundamental structure of space and time.

For more information please visit: http://www2.physics.ox.ac.uk/

## Atmospheric, Oceanic & Planetary Physics (AOPP) Sub-department

The post-holder will be based in the AOPP sub-department, which is one of the six sub-departments that together make up the Department of Physics; these are Astrophysics, Atomic and Laser Physics, Atmospheric, Oceanic and Planetary Physics, Condensed Matter Physics, Particle Physics and Theoretical Physics, with a seventh function (Central Physics) providing administrative and technical support to these sub-departments. Members of all sub-departments take part in research, teaching and matters such as examinations, discussion of syllabi, lectures and liaison with undergraduates and postgraduate students.

## Athena Swan Charter

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

## 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/

## How to apply

If you would like to apply, click on the **Apply Now** button on the 'Job Details' page and follow the on-screen instructions to register as a new user or log-in if you have applied previously.

Please provide details of two referees and indicate whether we can contact them now. You will be asked to upload a CV and statement of research interests. The statement should explain how you meet the selection criteria for the post using examples of your skills and experience. This may include experience gained in employment, education, or during career breaks (such as time out to care for dependants).

Your application will be judged solely on the basis of how you demonstrate that you meet the selection criteria stated in the job description.

Please upload all documents **as PDF files** with your name and the document type in the filename. All applications must be received by **midday** 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 departments.*

*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)*

Should you experience any difficulties using the online application system, please email recruitment.support@admin.ox.ac.uk. Further help and support is available from www.ox.ac.uk/about_the_university/jobs/support/. To return to the online application at any stage, please go to: www.recruit.ox.ac.uk.

Please note that you will be notified of the progress of your application by automatic emails from our e-recruitment system. **Please check your spam/junk mail** regularly to ensure that you receive all emails.

## Important information for candidates

### Pre-employment screening

Please note that the appointment of the successful candidate will be subject to standard pre-employment screening, as applicable to the post. This will include right-to-work, proof of identity and references. We advise all applicants to read the candidate notes on the University's pre-employment screening procedures, found at:

www.ox.ac.uk/about/jobs/preemploymentscreening/.

## The University's policy on retirement

The University operates an employer justified retirement age for all academic and academic-related posts (grade 6 and above), for which the retirement date is the 30 September immediately preceding the 68th birthday. The justification for this is explained at: www.admin.ox.ac.uk/personnel/end/retirement/revisedejra/revaim/.

For **existing** employees any employment beyond the retirement age is subject to approval through the procedures: www.admin.ox.ac.uk/personnel/end/retirement/revisedejra/revproc/

There is no normal or fixed age at which **support staff** in posts at **grades 1–5** have to retire. Support staff may retire once they reach the minimum pension age stipulated in the Rules of the pension scheme to which they belong.

## 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

### Training and Development

A range of training and development opportunities are available at the University. Further details can be found at www.ox.ac.uk/staff/working_at_oxford/training_development/index.html.

### *For research staff only:* Support for Research Staff

There is a particularly wide range of support for career development for research staff. Please visit: www.ox.ac.uk/research/support-researchers to find out more.

### Pensions

The University offers generous occupational pension schemes for eligible staff members. Further details can be found at www.admin.ox.ac.uk/finance/epp/pensions/pensionspolicy/.

### Information for international staff *(or those relocating from another part of the UK)*

A wealth of information is available on the University's International Staff website for staff who are relocating to Oxford from abroad, at www.admin.ox.ac.uk/personnel/staffinfo/international/.

### The University of Oxford Newcomers' Club

The Newcomers' Club is aimed at helping partners of newly-arrived visiting scholars, graduate students and academic members of the University to settle in and to meet people in Oxford.

### Transport schemes

The University offers a range of travel schemes and public transport travel discounts to staff. Full details are available at www.admin.ox.ac.uk/estates/ourservices/travel/.

### University Club and University Sports Facilities

The University Club provides social, sporting and hospitality facilities. It incorporates a Club bar, a cafe and sporting facilities, including a gym. See www.club.ox.ac.uk for all further details.

University staff can use the University Sports Centre at discounted rates, and have the chance to join sports clubs. Please visit www.sport.ox.ac.uk/oxford-university-sports-facilities.

### Childcare and Childcare Vouchers

The University offers quality childcare provision services at affordable prices to its employees. For full details about the services offered, please visit www.admin.ox.ac.uk/childcare/. **NB: Due to the high demand for the University's nursery places there is a long waiting list.**

The University also offers nursery fee payment schemes to eligible staff as an opportunity to save tax and national insurance on childcare costs. Please visit www.admin.ox.ac.uk/childcare.

### Disabled staff

The University is committed to supporting members of staff with a disability or long-term health condition and has a dedicated Staff Disability Advisor. Please visit www.admin.ox.ac.uk/eop/disab/staff for further details.

### BUPA - Eduhealth

Bupa Eduhealth Essentials private medical insurance offers special rates for University of Oxford staff and their families www.eduhealth.co.uk/mini-site/.

### All other benefits

For other benefits, such as free entry to colleges, the Botanic Gardens and staff discounts offered by third party companies, please see www.admin.ox.ac.uk/personnel/staffinfo/benefits/.