

Andrew Wiles Building, Radcliffe Observatory Quarter, Woodstock Road, Oxford, OX2 6GG

## Job Description and Selection Criteria

<b>Job title</b>	Two Postdoctoral Research Assistants in Complex Systems and Data Modelling for Urban Development
<b>Division</b>	Mathematical, Physical and Life Sciences
<b>Department</b>	Mathematical Institute
<b>Location</b>	Andrew Wiles Building, Radcliffe Observatory Quarter, Woodstock Road, Oxford, OX2 6GG.
<b>Grade and salary</b>	Grade 7: salary £31,604 - £38,833 p.a.
<b>Hours</b>	Full time
<b>Contract type</b>	3 years fixed-term
<b>Reporting to</b>	Dr Neave O’Clery
<b>Vacancy reference</b>	131688
<b>Additional information</b>	<p>These are full-time positions that cannot be held concurrently with any other substantive post without the explicit permission of the Head of Department.</p> <p>These positions are subject to a 9 month probationary period.</p> <p>These positions are funded by RCUK grant ‘PEAK’, and are available from April 1<sup>st</sup> 2018 (or as soon as possible thereafter, see below for details)</p> <p><b>(PLEASE NOTE: Applicants are responsible for contacting their referees and making sure that their letters are received by the closing date)</b></p>

### The Appointment

We invite applications for 2 Postdoctoral Research Assistant positions, funded by RCUK GCRF ‘PEAK Urban’ grant to work with Dr Neave O’Clery at the Mathematical Institute, University of Oxford. These are 3 year fixed term positions and are available from April 1<sup>st</sup> 2018 (there may be some flexibility in the start date for one of the positions, but no later than June 1<sup>st</sup> 2018).

The post-holder will join an international cohort of postdoctoral scholars within the PEAK Urban project, a 4-year, international, multidisciplinary GCRF programme involving Oxford researchers at Anthropology (COMPAS), the Mathematical Institute, Geography (Transport Studies Unit) and Medicine (George Institute), along with universities in China (Peking University), South



Africa (University of Cape Town), India (Indian Institute for Human Settlements) and Colombia (EAFIT University). See [www.peak-urban.org](http://www.peak-urban.org) for more details.

Working across borders and disciplines, this is a unique opportunity to develop and apply tools and techniques from mathematics and data science to better understand urban systems within a development context. The research project focuses on *network and data modelling of the dynamics behind the economic prosperity of cities*. Industries and firms are thought to locate together in cities to take advantage of shared labour, knowledge and customers/suppliers (the so-called Marshallian channels), while also benefiting from the diversity of skills which are critical to the emergence of sophisticated economic activities. What role does the physical form and built environment of the city have in constraining (or strengthening) these processes of sharing and matching? Using a range of techniques in mathematical and data modelling, as well as interfacing with a variety of analysis tools from geography and spatial economics, we will study the dynamics of urban economies, and their relation to space and density, on multiple scales. We will take advantage of a range of data sources, from administrative micro data on employees, to telecoms, commuting and satellite data.

The researcher will collaborate directly with academics and policy-makers in Oxford, Colombia, and possibly South Africa, India and/or China, to maximise relevance and impact. The post-holder will also attend an annual summer school with other postdoctoral researchers from around the world, and will have an opportunity to spend time within a partner research institution (Medellin, Cape Town, Bangalore or Beijing) as appropriate to their research project.

## **Responsibilities/duties**

The successful candidate will perform mathematical/data science research on the project. They will provide an average of 3 hours per week of teaching for 24 weeks of the year, for which additional remuneration will be paid. This teaching, which will be undertaken under the direction of the Mathematical Institute, will normally be delivered as classes, but it might also involve giving lectures or college tutorials.

The successful candidate will be expected to:

- To develop new research methodologies, reviewing and refining theories as appropriate, at the interface between mathematics, data science, economics, geography and urban policy;
- Develop ideas for new research projects alongside Dr O'Clery and other participants in the PEAK Urban project, and for generating research income;
- Manage own academic research and administrative activities. This involves small scale project management, to co-ordinate multiple aspects of work to meet deadlines;
- Fully participate in the activities of Dr O'Clery's research group, including mentoring of students and project supervision where appropriate;
- Collaborate with a network of international academics, and link with policy-makers based in both governmental and non-governmental organisations;
- Collaborate in the preparation of research publications, book chapters, and policy reports;
- Present papers at conferences or public meetings;
- Travel periodically to work alongside international colleagues as appropriate, attend conferences, and participate in annual global project meetings ('summer schools').

## **Selection criteria**

- A PhD awarded, or a Master's degree and PhD submitted (at the time of taking up the position) in mathematics or a related discipline. A candidate with a PhD in economics or

another social science with a significant data-science component, or postdoctoral experience in this field, may also be considered;

- A research background in networks or complex systems or data modelling (including machine learning) or social data science;
- A good research and publication record, judged by the candidate's career stage;
- Excellent computational skills (e.g., highly proficient at coding in chosen language(s), and handling large datasets);
- Excellent communication, inter-personal and writing skills;
- The ability to work independently, including decision-making, problem-solving, planning and organising;
- Enthusiasm and willingness to work with international collaborators, and travel regularly.

### **Desirable selection criteria**

- A proven ability to communicate research with policy makers and with non-mathematical (other sciences and social sciences) and non-academic audiences;
- Experience in international and/or cross-disciplinary academic collaboration;
- Experience of working with economic data;
- Knowledge of topics and theories in urban and international development, economic complexity or evolutionary economic geography;
- Experience of working on mathematical/data modelling of urban flows (transport/people), knowledge diffusion, economic complexity, industrial diversification, or urban agglomeration.

### **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. Income from external research contracts in 2014/15 exceeded £522.9m and we rank first in the UK for university spin-outs, with more than 130 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](http://www.ox.ac.uk/about/organisation)

## The Mathematical Institute

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

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

The Mathematical Institute moved into the purpose-built Andrew Wiles Building in the University's Radcliffe Observatory Quarter in September 2013. As well as providing offices for all staff and graduate students, it houses a range of other facilities available to members of the department, including the Whitehead Library, a large range of meeting rooms, teaching spaces, lecture rooms, and social spaces, and a small facility for carrying out table-top experiments. For more information, see [www.maths.ox.ac.uk/about-us](http://www.maths.ox.ac.uk/about-us).

Teaching is central to the life of the Mathematical Institute and we have an annual intake of approximately 300 undergraduates, some on courses jointly with other departments. We admit 100 students each year across five taught master's degree courses and have over 230 doctoral students in residence at any one time. Our doctoral programme always attracts the best research students from across the world, and we have a broad mentoring and training programme. Our provision expanded in 2014 following the award of two EPSRC-funded Centres for Doctoral Training.

The Mathematical Institute strives to ensure that all staff and students are given the opportunities and support they need to achieve their potential. We are committed to equality of opportunities and to advancing women's careers. We support staff returning from long-term absence and provide flexible arrangements for staff with parental responsibilities. Further information about family support can be found in the Standard Terms and Conditions. Our Good Practice Committee<sup>1</sup> contributes to many aspects of our work, see [www.maths.ox.ac.uk/members/good-practice](http://www.maths.ox.ac.uk/members/good-practice).

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

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<sup>1</sup> The Mathematical Institute was a founding supporter of the London Mathematical Society's Good Practice Scheme ([www.lms.ac.uk/women/good-practice-scheme](http://www.lms.ac.uk/women/good-practice-scheme)) and have recently been awarded an Athena SWAN silver award.

## MPLS Division

The university's Division of Mathematical Physical and Life sciences contains departments that span the full spectrum of the mathematical, computational, physical, engineering and life sciences. Between them, they undertake a huge range of fundamental research and develop application that respond to the great societal and technological challenges of our time. Research across the Division is increasingly interdisciplinary in nature.

MPLS's scientists collaborate closely with colleagues in other Divisions across Oxford, with other universities, research organisations and industrial partners across the globe.

Our senior researchers have been awarded some of the most significant scientific honours (including Nobel prizes and prestigious titles such as FRS and FEng). The Division is equally proud of its tradition of attracting and nurturing the very best early career researchers, many of whom regularly secure prestigious fellowships.

The Division holds six Athena Swan Awards (four silver and two bronze) illustrating its commitment to encouraging women in science research and careers.

For more information visit <http://www.mpls.ox.ac.uk/about/about-mpls-division>

## How to Apply

Before submitting an application, you may find it helpful to read the 'Tips on applying for a job at the University of Oxford' document, at [www.ox.ac.uk/about/jobs/supportandtechnical/](http://www.ox.ac.uk/about/jobs/supportandtechnical/).

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. You will also be required to upload a curriculum vitae, list of publications, a statement of research interests and supporting statement. The supporting statement should describe how you meet the selection criteria outlined in the job description.

Please also provide details of two referees, one should include the applicant's current or most recent employer, whenever possible and indicate whether we can contact them now.

Please upload all documents **as PDF files** with your name and the document type in the filename.

### **Applicants should ask their referees to send their letters of reference DIRECTLY to**

The Administrative Assistant (Vacancies)

The Mathematical Institute, Andrew Wiles Building, Radcliffe Observatory Quarter, Woodstock Road, Oxford, OX2 6GG.

Tel: 01865 273525: Email: [vacancies@maths.ox.ac.uk](mailto:vacancies@maths.ox.ac.uk)

**by the closing date** (a letter by email is sufficient) **quoting the vacancy reference 131688.**

Referees should preferably not be from the same institution and whenever possible one should be the applicant's current, or most recent, supervisor. **NOTE: referees letters must be received from your referees by the closing date for your application to be complete.**

All applications must be received by **12:00 noon UK time on Thursday 11<sup>th</sup> January 2018**

### 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](mailto:recruitment.support@admin.ox.ac.uk). Further help and support is available from [www.ox.ac.uk/about the university/jobs/support/](http://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](http://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/](http://www.ox.ac.uk/about/jobs/preemploymentscreening/).

### The University's policy on retirement

The University operates an Employer Justified Retirement Age (EJRA) for all academic posts and some academic-related posts. From 1 October 2017, the University has adopted an EJRA of 30 September before the 69<sup>th</sup> birthday for all academic and academic-related staff in posts at grade 8 and above. The justification for this is explained at:

[www.admin.ox.ac.uk/personnel/end/retirement/revisedejra/revaim/](http://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/](http://www.admin.ox.ac.uk/personnel/end/retirement/revisedejra/revproc/)

From 1 October 2017, there is no normal or fixed age at which staff in posts at **grades 1–7** 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

### University Club and sports facilities

The University Club provides social, sporting and hospitality facilities. It incorporates a bar, café and sporting facilities, including a gym. 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](http://www.club.ox.ac.uk) and [www.sport.ox.ac.uk/oxford-university-sports-facilities](http://www.sport.ox.ac.uk/oxford-university-sports-facilities).

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

If you are relocating to Oxfordshire from overseas, or elsewhere in the UK, the University's International Staff website includes practical information related to moving to and settling in Oxford such as advice on immigration, relocation, accommodation, or registering with a doctor. See: [www.internationalstaffwelcome.admin.ox.ac.uk/](http://www.internationalstaffwelcome.admin.ox.ac.uk/)

### 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 to settle into Oxford and to provide them with an opportunity to meet people in the area. See [www.newcomers.ox.ac.uk/](http://www.newcomers.ox.ac.uk/)

### Childcare

The University has excellent childcare services with 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 [www.admin.ox.ac.uk/childcare](http://www.admin.ox.ac.uk/childcare).

### Family-friendly benefits

The University subscribes to My Family Care ([www.admin.ox.ac.uk/personnel/staffinfo/benefits/family/mfc/](http://www.admin.ox.ac.uk/personnel/staffinfo/benefits/family/mfc/)) and staff are eligible to register for emergency back-up childcare and adultcare services, a 'speak to an expert' phone line and a wide range of guides and webinars through a website called the Work + Family space.

### Disabled staff

We are committed to supporting members of staff with disabilities or long-term health conditions. Please visit [www.admin.ox.ac.uk/eop/disab/staff](http://www.admin.ox.ac.uk/eop/disab/staff) for further details including information about how to make contact, in confidence, with the University's Staff Disability Advisor.

### 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 [www.admin.ox.ac.uk/eop/inpractice/networks/](http://www.admin.ox.ac.uk/eop/inpractice/networks/)

### Other benefits

Staff can enjoy a range of other benefits such as free visitor access to the University's colleges and the Botanic Gardens as well as a range of discounts. See [www.admin.ox.ac.uk/personnel/staffinfo/benefits](http://www.admin.ox.ac.uk/personnel/staffinfo/benefits)