Big Data Institute

<table>
<thead>
<tr>
<th>Job title</th>
<th>Postdoctoral Researcher in Statistical Genetics and Pathogen Dynamics</th>
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<tbody>
<tr>
<td>Division</td>
<td>Medical Sciences</td>
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<tr>
<td>Department</td>
<td>Nuffield Department of Medicine</td>
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<tr>
<td>Location</td>
<td>Big Data Institute, Li Ka Shing Centre for Health Information and Discovery, Old Road Campus, Headington, Oxford, OX3 7LF</td>
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<tr>
<td>Grade and salary</td>
<td>Grade 7: £31,604 - £38,833 p.a (with a discretionary range to £42,418 p.a)</td>
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<tr>
<td>Hours</td>
<td>Full time</td>
</tr>
<tr>
<td>Contract type</td>
<td>Fixed term for 5 years</td>
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<tr>
<td>Reporting to</td>
<td>Group Leader</td>
</tr>
<tr>
<td>Vacancy reference</td>
<td>134388</td>
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<tr>
<td>Additional information</td>
<td>Funded by a Wellcome Trust Collaborators Award ‘Artic network’.</td>
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<tr>
<th>Research topic</th>
<th>Developing a response system for real-time analysis of viral outbreaks</th>
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<tbody>
<tr>
<td>Principal Investigator / supervisor</td>
<td>Professor Christophe Fraser</td>
</tr>
<tr>
<td>Project team</td>
<td>Artic network</td>
</tr>
<tr>
<td>Project web site</td>
<td><a href="http://artic.network">http://artic.network</a></td>
</tr>
<tr>
<td>Funding partner</td>
<td>The funds supporting this research project are provided by Wellcome Trust through a collaborative award</td>
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</table>

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 2015/16 exceeded £537.4m and we rank first in the UK for university spinouts, 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)

**Medical Sciences**

The Medical Sciences Division is an internationally recognized 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](http://www.medsci.ox.ac.uk)

**Nuffield Department of Clinical Medicine (NDM) …fostering your career in science**

The Nuffield Department of Clinical Medicine (NDM) is one of the largest departments of the University of Oxford and is part of the Medical Sciences Division, with responsibility for a significant part of the teaching of clinical students within the Medical School.

NDM has significant financial turnover and complexity, resulting from its diverse research portfolio, its geographical spread and its close links with NHS funding and strategic teams involved in the development and delivery of increasingly integrated clinical research platforms. For more information please visit: [http://www.ndm.ox.ac.uk/home](http://www.ndm.ox.ac.uk/home)

The Nuffield Department of Clinical Medicine has been presented with a Departmental Athena SWAN Silver award in recognition of the commitment made to promote gender equality through our organisational and cultural practices and our efforts to improve the working environment for both men and women. For more information please see our Departmental Athena SWAN pages: [https://www.ndm.ox.ac.uk/working-for-ndm/aboutndmatheneswan/](https://www.ndm.ox.ac.uk/working-for-ndm/aboutndmatheneswan/)

**Oxford Big Data Institute**

The Big Data Institute (BDI) is a state-of-the-art building at Oxford University's Old Road Campus. When it opens in early 2017, this interdisciplinary research centre will focus on the analysis of
large, complex, heterogeneous data sets for research into the causes and consequences, prevention and treatment of disease. To this end, BDI researchers will develop, evaluate and deploy efficient methods for acquiring and analysing information for large clinical research studies. These approaches will be invaluable in identifying the associations between lifestyle exposures, genetic variants, infections and health outcomes around the globe.

Research will be conducted in 4 general themes: genomics, population health, infectious disease surveillance, and methodology (including informatics, statistics, and engineering). Big Data methods could transform the scale (breadth, depth and duration) and efficiency (data accumulation, storage, processing and dissemination) of large-scale clinical research. The work of the BDI requires people and projects that span traditional departmental boundaries and scientific disciplines, supported by technical resources to handle the vast quantities of data they generate.

Under the leadership of Professor Gil McVean (Director) and Professor Martin Landray (Deputy Director), the BDI will comprise around 350 researchers (approx. 30 research groups) drawn from a wide range of departments and will form an analytical hub, deeply connected to the wider experimental and clinical community in Oxford and beyond.

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

Overview of the role

This is an exciting opportunity to join a team dedicated to developing a system for processing samples from viral outbreaks all the way from taking samples to real time epidemiological analysis that can be used for decision making by public health bodies. The post holder will report to Professor Christophe Fraser, and be based in the Pathogen Dynamics group at the new Oxford Big Data Institute.

The post-holder will join a team working on the Artic project (http://artic.network).

Since the 2009 ‘swine-flu’ epidemic, pathogen genetics has become an important tool in responding to public health emergencies. The 2014 Ebola epidemic in West Africa was the first epidemic in which information from pathogen sequence data became available fast enough to model the whole epidemic in real time. This effort was repeated in the 2016 Zika virus outbreak in Brazil. This project builds on the experience from these outbreaks and aims to build a response system that spans all the way from acquiring samples in the outbreak area to generating real-time epidemiological information that can be used for decision making by public health bodies.

The project has five components: (1) Developing a lab in a suitcase for efficient use in the field, (2) Improving PCR methods to identify the virus causing the epidemic and adopting Oxford Nanopore sequencing technology (“sequencing in a USB stick”) to high-throughput work, (3) Developing an off-line bioinformatics package that can be used by non-expert users without the need of a high-speed internet connection to transfer large sequence data files, (4) Development of a real-time phylodynamics analysis that can incorporate new data as more sequences become available during the epidemic, and (5) Visualisation of the results to make them interpretable for users at public health bodies.

The approach being used is multidisciplinary, combining viral genomics, bioinformatics, statistics, modelling, phylodynamics, and statistical genetics. The post holder will join a multidisciplinary team addressing the different aims of this study. The post holder will work primarily on the phylodynamics component (component 4) and will be member of a multi-site team, using the approaches implemented at www.nextstrain.org, extending the BEAST framework (http://beast.community), extending phylogeographic models to reconstruct graphical
dissemination of viruses using population structure models and testing epidemiological linkage between cases.

This work involves developing new algorithms for phylodynamic analysis, analysis of complex data, and communication with a wide variety of stakeholders involved in the project.

The researcher will be an integral member of the Pathogen Dynamics group based at Oxford, led by Christophe Fraser. Members of the group study the dynamics of several human infectious diseases using both modelling and pathogen genetics, and the post offers substantial opportunities for career development.

The post holder will provide guidance to less experienced members of the research group, including postdocs, research assistants, and PhD and project students.

**Responsibilities/duties**

- Develop new and adapt existing analysis methods, simulation methods and computer code for phylodynamic analysis.
- Perform analyses, including active management of programs on high performance cluster.
- Test hypotheses and analyse data from a variety of sources, reviewing and refining working hypotheses.
- Contribute to bioinformatics pipelines, and occasionally provide support to other members of the group.
- Actively manage collaboration with colleagues working on the project, both within the Pathogen Dynamics group at Oxford and more broadly.
- Collaborate in the preparation of scientific reports and journal articles, and present papers and posters at project workshops and international conferences.
- Manage own academic research and administrative activities. This involves small scale project management, to co-ordinate multiple aspects of work to meet deadlines.
- Contribute ideas for new projects related to viral genetics or epidemiology, and develop ideas for generating research income.
- Act as a source of information and advice to other members of the group.
- Represent the research group at external meetings/seminars, either with other members of the group or alone.
- Participate in and support the public engagement and widening access activities of the Department and the University. This is anticipated to be not more than 2 days per year.

**Hazard-specific / Safety-critical duties:**

This job includes the following hazards or safety-critical activities which will require successful pre-employment health screening through our Occupational Health Service before the successful candidate will be allowed to start work:

- Lone Working
- Travel outside of Europe or North America on University Business

**Selection criteria**

**Essential**

- PhD in quantitative biology, applied mathematics, statistical genetics, theoretical physics, or another relevant and related subject
• Ability to manage own academic research and associated activities, and to work to deadlines
• Ability to work in a collaborative project with multiple investigators and overlapping research strands
• Previous experience of contributing to scientific publications or presentations
• Excellent communication skills, including the ability to write for publication, present research proposals and results, and represent the research group at meetings
• Experience of coding, including scientific algorithm development

Desirable

• Sufficient specialist knowledge in genetics or pathogen dynamics, epidemiology or simulation science to work within established research programmes
• Experience of coding in python and R
• Proven interest in virology and/or epidemiology, or other infectious diseases
• Willingness to travel to stakeholder meetings and conferences
• Experience of working in a multidisciplinary team
• Excellent publication record

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_the_university/jobs/research/

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 also be asked to upload a CV and a supporting statement. The supporting 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.

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 (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 69th 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/acrelretire8+/.

For **existing** employees, any employment beyond the retirement age is subject to approval through the procedures: www.admin.ox.ac.uk/personnel/end/retirement/acrelretire8+/

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 and 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/

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/

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.

Family-friendly benefits

The University subscribes to My Family Care (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 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/

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