## Job description and selection criteria

<table>
<thead>
<tr>
<th>Job title</th>
<th>Research Assistant in Mathematical Modelling of Design Strategies for Membrane Filtration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division</td>
<td>Mathematical, Physical and Life Sciences</td>
</tr>
<tr>
<td>Department</td>
<td>Mathematical Institute</td>
</tr>
<tr>
<td>Location</td>
<td>Andrew Wiles Building, Radcliffe Observatory Quarter, Woodstock Road, Oxford, OX2 6GG</td>
</tr>
<tr>
<td>Grade and salary</td>
<td>Grade 6: salary £27,057 p.a.</td>
</tr>
<tr>
<td>Hours</td>
<td>Full time</td>
</tr>
<tr>
<td>Contract type</td>
<td>Fixed term for 3 years</td>
</tr>
<tr>
<td>Reporting to</td>
<td>Dr Ian Griffiths and Dr Maria Bruna</td>
</tr>
<tr>
<td>Vacancy reference</td>
<td>118942</td>
</tr>
<tr>
<td>Additional information</td>
<td>This position is subject to a 9 month probationary period. The position is funded by EPSRC and can lead to the award of a D.Phil. (Ph.D.). The post is available from 1 October 2015 or as soon as possible thereafter.</td>
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</tbody>
</table>

The University of Oxford is a complex and stimulating organisation, which enjoys an international reputation as a world-class centre of excellence in research and teaching. It employs over 11,000 staff and has a student population of over 22,000.

Our annual income in 2013/14 was £1,174.4m. Oxford is one of Europe’s most innovative and entrepreneurial universities: income from external research contracts exceeds £478.3m p.a., and more than 80 spin-off companies have been created.

Oxford is a collegiate university, consisting of the central University and colleges. The central University is composed of academic departments and research centres, administrative departments, libraries and museums. There is a highly devolved operational structure, which is split across four academic divisions, Academic Services and University Collections and University Administrative Services. For further information, please see: [www.ox.ac.uk/staff/about_the_university/new_to_the_university/structure_of_university](http://www.ox.ac.uk/staff/about_the_university/new_to_the_university/structure_of_university).

For more information please visit [http://www.ox.ac.uk/about](http://www.ox.ac.uk/about)

The University of Oxford is a member of the [Athena SWAN Charter](http://www.ox.ac.uk/about) and holds an institutional Bronze Athena SWAN award.
MPLS Division

The MPLS Division’s departments span the full spectrum of the mathematical, computational, physical, engineering and life sciences. Between them they undertake fundamental research and cutting-edge applied research. Focused on solving major societal and technological challenges, research is increasingly focused on interdisciplinary areas.

MPLS collaborate closely with colleagues in other Divisions at Oxford, with other universities, research organisations and industrial partners across the globe. MPLS senior researchers have been awarded some of the most significant scientific honours (including Nobel prizes and prestigious titles such as FRS and FR.Eng) and have a strong tradition of attracting and nurturing the very best early career researchers who regularly secure prestigious fellowships.

The Division is also the proud holder of six Athena Swan Awards (four silver and two bronze) illustrating their commitment to encouraging women in science research and careers.

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

The Mathematical Institute

The Mathematical Institute, as Oxford’s Department of Mathematics is known, is one of the leading mathematics departments in the world, with a significant research profile in central areas of contemporary mathematical research. Mathematical Science was ranked first in the UK in the 2014 Research Excellence Framework exercise, a government review of research in all UK universities. The department is the main focus of research in Oxford for both pure and applied mathematics. The inclusive nature and overall size of the department are key factors in the provision of an outstanding research environment for its members. The large number of faculty, postdocs and students in the department, all supported by excellent facilities, allows us to maintain a critical mass in research groups encompassing a wide spectrum of mathematics, while the integrated nature of the department fosters collaboration between fields.

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 (http://www.maths.ox.ac.uk/research). The range of our research interests is also reflected to a large extent by the current holders of our statutory chairs (the most senior academic posts at Oxford), as listed at 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 http://www.maths.ox.ac.uk/news/awards-and-prizes.

The Institute acts as the focus of activity in fundamental and applied mathematics. Its facilities, such as the Whitehead Library and the computer network, are available for all members of the faculty. In a major boost to Oxford Mathematics, the department moved into the splendid, purpose-built Andrew Wiles Building in the University’s Radcliffe Observatory Quarter in September 2013.

With an annual intake of approximately 300 undergraduates on various courses, some offered jointly with other departments, 100 students on taught master’s degree courses and 40 doctoral students, the building is a main focus for teaching, which takes place in spacious, purpose-designed lecture theatres and meeting rooms on the mezzanine floor, which also houses the café. This mezzanine floor is the focus for external conferences and events, primarily held out of term. The large lecture theatre, seating over 300, is one of the largest in
the university and is considered a prime venue. Graduate students are accommodated in the upper floors, with shared study areas or offices. The department also hosts a large number of academic visitors. There is a small laboratory for table-top experiments which is available to all faculty.

The Mathematical Institute was a founding Supporter of the London Mathematical Society's Good Practice Scheme, and is proud to have received an Athena SWAN Bronze Award in 2013. The department actively strives to ensure that all its members (staff and students) are given the opportunity and support to achieve their full potential. These activities are overseen by the Good Practice Steering Group, which contributes to many aspects of the work of the department and is chaired by Professor Frances Kirwan FRS DBE.

The department's web pages (www.maths.ox.ac.uk) provide comprehensive information about all of its activities.

**Job description**

**The Appointment:**

We invite applications for a Research Assistant position, funded by EPSRC to work with Dr Ian Griffiths and Dr Maria Bruna in the Mathematical Institute. This is a 3 year fixed-term position and is available from 1 October 2015 or as soon as possible thereafter.

This position can lead to a D.Phil. (Ph.D.) in Mathematics. Interested candidates should contact Dr Griffiths at ian.griffiths@maths.ox.ac.uk in the first instance for details on how the position could lead to the award of a D.Phil. (Ph.D.) degree.

**The Project Description:**

Although water was once considered an abundant if not unlimited resource, population growth, drought and contamination are straining our finite water supplies, resulting in water quality and quantity concerns being one of the largest environmental issues facing the world today. As a result, the race to find new and effective strategies for the production of clean water is now more important than ever.

This project will develop mathematical models for membrane filtration, in which contaminated water is pushed through a porous medium that rejects the particulates, allowing only clean water to pass through. Recent experimental observations indicate that the pressures across a membrane as the fluid is pushed through cause deformations that lead to expansion of the pores. This allows particles that would usually be rejected at the surface to be transmitted deep into the membrane structure or even pass through the entire membrane entirely, both of which are undesirable. This project will combine mathematical models for fluid flows and elasticity that will provide a description of the microstructural behaviour during filtration, and connect this to the macroscopic observables. The model will enable us to answer such questions as how fast we can process contaminated water without compromising the structural integrity of the membrane. The results will also allow us to predict the best strategy for cleaning the membrane ready for re-use.

The postholder will have the opportunity to teach. This may include lecturing, small-group teaching, and tutoring of undergraduates and graduate students. The postholder will carry out any other duties as are within the scope, spirit and purpose of the job as requested by their line manager or the Principal Investigators.
This project will involve collaboration with key experimentalists in the Laboratory of Fields, Flows, and Interfaces, Ryerson University, Toronto to ensure that the models developed address the pressing issues faced in the filtration industry. The student will spend one month per year visiting this laboratory.

**Main skills and experience required (selection criteria)**

- A four-year undergraduate degree in mathematics or a mathematics-related subject; or a three-year undergraduate degree plus a Masters degree in mathematics or a mathematics-related subject.
- Knowledge of partial differential equations (PDEs) and scientific computing, in particular for the numerical solution of PDEs.
- Dedication to the project research area.
- The ability to work independently and to pursue research as part of an interdisciplinary and international team.
- The ability to demonstrate excellence.
- An interest in pursuing doctoral research (desirable).

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. All applicants must read the candidate notes on the University’s pre-employment screening procedures, found at:

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

**For all academic and related posts:**
All academic and related posts (grades 6 to 10 (inclusive) and all academic grades) at the University are subject to the University’s retirement policy. The University operates an employer justified retirement age, for which the retirement date is the 30 September immediately preceding the 68th birthday. For further details, please see:

www.admin.ox.ac.uk/personnel/end/retirement/acrelretire/ejra/.

**Working at the University of Oxford**
For further information about working at Oxford, please click on the link below:

www.ox.ac.uk/about_the_university/jobs/research/

**How to apply**

If you consider that you meet the selection criteria, click on the **Apply Now** button on the ‘Job Details’ page and follow the on-screen instructions to register as a user. You will then be required to complete a number of screens with your application details, relating to your skills and experience. When prompted, please provide details of two referees. You will also be required to upload a curriculum vitae, a transcript of your undergraduate degree and a supporting statement. The supporting statement should describe how you meet the selection criteria outlined above.

Please save all uploaded documents to show your name and the document type.

**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: Fax: 01865 615323: Email: vacancies@maths.ox.ac.uk
by the closing date (a letter by email is sufficient) quoting the vacancy reference 118942. 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 Wednesday 22nd July 2015

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<thead>
<tr>
<th>Information for priority candidates</th>
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<tr>
<td>A priority candidate is a University employee who is seeking redeployment owing to the fact that he or she has 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.</td>
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<td>If you are a priority candidate, please ensure that you:</td>
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<tr>
<td>- attach your redeployment letter to your application</td>
</tr>
<tr>
<td>- explain in your covering letter how you meet the selection criteria for the post.</td>
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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 http://www.ox.ac.uk/about_the_university/jobs/support/

To return to the online application at any stage, please click on the following link www.recruit.ox.ac.uk

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