Job description and selection criteria

Job title	Postdoctoral Research Assistant in Robust Financial Mathematics
Division	Mathematical, Physical and Life Sciences
Department	Mathematical Institute
Location	Andrew Wiles Building, Radcliffe Observatory Quarter, Woodstock Road, Oxford, OX2 6GG
Grade and salary	Grade 7: £29,541-£36,298 per annum
Hours	Full time
Contract type	3 years Fixed-term
Reporting to	Dr Jan Obloj
Vacancy reference	110905
Additional information	This position is funded with European Research Council (ERC) Starting Grant 335421 and is available from 01 September 2014 (or as soon as possible thereafter). It comes with equipment and research related travel as specified below.
	The successful applicant will automatically become an Associate Member of the Oxford-Man Institute of Quantitative Finance entitled to use its usual provisions including dinning rights.
	This position is subject to a 9 months probationary period.
	(PLEASE NOTE: Applicants are responsible for contacting their referees and making sure that their letters are received by the closing date)

Introduction

The University

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 10,000 staff and has a student population of over 22,000.
Most staff are directly appointed and managed by one of the University's 130 departments or other units within a highly devolved operational structure - this includes over 6,500 'academic-related' staff (postgraduate research, computing, senior library, and administrative staff) and over 2,700 'support' staff (including clerical, library, technical, and manual staff). There are also over 1,600 academic staff (professors, readers, lecturers), whose

appointments are in the main overseen by a combination of broader divisional and local faculty board/departmental structures. Academics are generally all also employed by one of the 38 constituent colleges of the University as well as by the central University itself.

Our annual income in 2011/12 was £1,016.1m. Oxford is one of Europe's most innovative and entrepreneurial universities: income from external research contracts exceeds £409m p.a., and more than 80 spin-off companies have been created.

For more information please visit www.ox.ac.uk/staff/about_the_university.html

The University of Oxford is a member of the Athena SWAN Charter and holds an institutional Bronze Athena SWAN award.

MPLS Division

Oxford is widely recognised as one of the world's leading science universities. The disciplines within the MPLS Division regularly appear at the highest levels in world rankings and have been evaluated as conducting world-leading and internationally excellent research in UK research assessments.

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.

MPLS is proud to be the home of some of the most creative and innovative scientific thinkers and leaders working in academe. Our 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 we 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 (4 Silver and 2 Bronze) illustrating our commitment to ensure good practice and to encourage women in science at all levels in the 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. It is the main focus of mathematics research in Oxford for both pure and applied. 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, post docs 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 are organised within a framework of interlinked and overlapping research groups and centres. The fact that these research groups have indistinct boundaries and nontrivial intersections reflects a widespread recognition within the department of the unity of mathematics and the importance of cross-fertilisation between

fields. Further information about these research groups can be found at http://www.maths.ox.ac.uk/research.

The spread of research interests is also reflected to a large extent by the current holders of our statutory chairs; these are listed at http://www.maths.ox.ac.uk/about/statutory-professors. 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-prizes.

The Institute acts as the focus of activity in pure and applied mathematics. Its facilities, such as the Whitehead Library (for research in mathematics) and the computer network, are available for all members of the faculty. The department has recently moved into a brand new, purpose designed, building offering fantastic facilities and environment.

With an annual intake of approximately 300 undergraduates on various courses, some offered jointly with other departments, 100 students on taught masters degree courses and 40 doctoral students, the building will be a main focus for teaching, which will take place in spacious, purpose-designed lecture theatres and meeting rooms on the mezzanine floor, which also houses the café. This mezzanine floor will also be 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 visitors, both short-term and long-term, who are attached to different research groups.

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

Quantitative Finance in Oxford

The Mathematical and Computational Finance Group at the Mathematical Institute is one of the longest-established, largest and leading groups in the field worldwide. Headed by Professor Xunyu Zhou as the Nomura Chair, it has currently 13 faculty member, 1 Research Fellow and nearly 25 DPhil students. It runs active seminars and visitors programmes and hosts the Nomura Centre for Mathematical Finance. If offers a stimulating and diverse environment with expertise in core mathematical fields relevant to finance (such as probability theory and stochastic analysis, stochastic control, numerical methods, partial differential equations, mathematical modelling, operations research). The group also runs two MSc programs. Please visit www.maths.ox.ac.uk/mcfg for further details.

Oxford is a thriving centre for interdisciplinary research in quantitative finance facilitated by, and focused through, the Oxford-Man Institute of Quantitative Finance. Headed by Professor Terry Lyons, the Oxford-Man Institute draws together researchers and students from many departments in the University, as well as academic institutions across the globe. It has particular strengths in computational finance, financial econometrics and hedge fund research. OMI is funded by Man Group plc which has co-located the Man Research Laboratory within the Institute, providing a unique opportunity for academics and commercial researchers to work alongside each other on a daily basis in a vibrant and purpose designed environment. Please visit www.oxford-man.ox.ac.uk for further details.

Overview of the role

The successful applicant will join the MCFG group at the Mathematical Institute and engage in research under the guidance of Dr Jan Obloj on the ERC funded project "Robust Financial Mathematics: model-ambiguous framework for valuation and risk management". He or she will be part of a team with two DPhil (Ph.D.) students and, in future, another post-doc and

DPhil student focusing on cutting-edge research developing new robust framework in financial mathematics. The team is at the forefront of the research in the field and maintains close ties with leading researchers interested in the robust approach to quantitative finance. Dr Obloj's ERC grant offers further support for organising seminars, conferences and inviting visitors.

The appointment

We invite applications for a Postdoctoral Research Assistant, funded within European Research Council Starting Grant 335421 to work with Dr Jan Obloj at the Mathematical Institute, University of Oxford. This is a 3 year fixed term position and is available from 01 September 2014 (or as soon as possible thereafter).

The successful applicant will benefit from the usual arrangements at the Mathematical Institute. He or she will be provided with office space and a desktop computer, and further a personal laptop computer as well as access to generous funds covering research related travel.

The successful applicant will become an Associate Member of the Oxford-Man Institute of Quantitative Finance and will be able to take part in all of the Institute's activities, use its facilities and data provisions, and will be entitled to daily lunch and other catering arrangements available at the Institute.

The Project

Dr Obloj's ERC funded project strives to create a coherent mathematical framework for valuation, hedging and risk management, which starts with the market information and not an a priori probabilistic setup. Motivated by recent contributions, it consistently combines model ambiguity with a comprehensive use of market information and has a built-in flexibility to interpolate between the model-specific and model-independent settings.

Its main objectives are: (i) to incorporate both historical data and current option prices as inputs of the proposed robust framework, (ii) to establish pricing-hedging duality, define the concept of no-arbitrage and prove a Fundamental Theorem of Asset Pricing, all in a constrained setting where the market information, and not a probability space, is fixed from the outset, (iii) to develop numerical algorithms, implement and test the performance of robust valuation and hedging methods in practice.

The project proposes a genuine change of paradigm. It requires building novel mathematical tools combining pathwise/quasi-sure stochastic calculus, embedding problems, martingale optimal transport, variation inequalities as well as numerical methods and functional analysis. Candidates with experience in probability theory and some of the above mentioned fields are particularly encouraged to apply. Candidates should also be enthusiastic about learning new methods, and applying their existing knowledge in innovative ways.

Responsibilities/duties

The successful candidate will perform mathematical research on parts of the above project as well as newly arising research directions. They will write this up for publication in scientific journals and will fully participate in the activities of the research group. They may also be required to do a limited amount of teaching of undergraduate or graduate classes each year.

Selection criteria

Essential

The successful applicant will be expected to have:

- A PhD or equivalent awarded, or a Master's degree and PhD submitted (at the time of taking up the position) in mathematics or a related discipline;
- To be able to demonstrate an excellent potential for research in mathematical or computational finance;
- To have a publication record in refereed journals commensurate with their career to date;
- To have experience in aspects of probability theory and stochastic analysis and have research interests compatible with the project;
- To be enthusiastic about learning new methods, and applying her/his existing knowledge in innovative ways.

Desirable

- Experience in research topics particularly relevant to the project would be advantageous, these include (but are not limited to): Skorokhod embedding problems, time-change techniques, optimal transport, quasi-sure stochastic calculus and G-expectation.

Candidates should explain in their covering letter how they satisfy these criteria.

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 full list of publications, a statement of research interests 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, Woodstock Road, Oxford OX2 6GG
Fax: 01865 273583
Email: vacancies@maths.ox.ac.uk

by the closing date (a letter by email is sufficient) **quoting the vacancy reference 110905.** 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 by the closing date for your application to be complete.**

Only applications received before **12:00 noon UK time on Monday 6th January 2014** can be considered.

Interviews are expected to take place on 23rd or 24th January 2014 or in the following week.

Information for Priority Candidates

*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 and this letter **<u>must</u>** be attached to any application they submit.*

The priority application date for this post is 12 noon UK time on Monday 23rd December 2013.

Full details of the priority application process are available at:
www.admin.ox.ac.uk/personnel/end/red/redproc/prioritycandidate

Should you experience any difficulties using the online application system, please email recruitment.support@admin.ox.ac.uk

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.