Job description and selection criteria

Job title	Research Assistant
Division	MPLS
Department	Computer Science
Location	Wolfson Building, Parks Road, Oxford.
Grade and salary	Grade 7: Salary £29,541- £36,298 p.a.
Contract type	Fixed term contract for up to 3 years
Reporting to	Professor Jeremy Gibbons

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 21,000.

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 5,900 'academic-related' staff (postgraduate research, computing, senior library, and administrative staff) and 2,820 '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 2010/11 was £919.6m. Oxford is one of Europe's most innovative and entrepreneurial universities: income from external research contracts exceeds £376m p.a., and more than 70 spin-off companies have been created.

For more information please visit www.ox.ac.uk

MPLS Division

The Mathematical, Physical, and Life Sciences Division (MPLS) is one of the four academic divisions of the University.

Oxford is widely recognised as one of the world's leading science universities. In the 2008 UK Research Assessment Exercise over 70% of research activity in MPLS was judged to be world-leading (4*) or internationally excellent (3*), and Oxford was ranked first in the UK across the mathematical sciences as a whole.

The MPLS division's ten departments and three 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. We have over 6,000 students and research staff, and generate over half of our funding from external research grants. Our research addresses major societal and technological challenges and is increasingly interdisciplinary in nature. We collaborate closely with colleagues in Oxford across the medical sciences, social sciences and humanities, as well as with researchers from around the world.

For more information, please visit:

http://www.mpls.ox.ac.uk/

Department of Computer Science

The Department of Computer Science (DoCS) was established in 1957. It is one of the UK's leading Computer Science Departments (ranked first in a number of newspaper rankings, and third in terms of research power). In the RAE in 2008, 80% of the submitted research was found to be in the top two tiers, either 4* (world-leading) or 3* (internationally excellent). Many members of the Department are active in externally sponsored research, with both government and industrial funding. At present there are 52 members of academic staff and over 80 research staff.

DoCS has close links with government, industry, and other departments within the University. Among the latter are Mathematics, Engineering, Physics, Statistics and a number of life sciences departments. It has a major role in the rapidly-developing field of e-Science alongside the Oxford e-Research Centre, an independent unit with which we share a building. This is an essentially inter-disciplinary activity which is at present attracting major funding from a number of sources. At present DoCS holds £37m in external research contracts.

Research in DoCS is currently managed in seven themes. *Software Engineering* (led by Professor Jim Davies), works on a wide variety of areas including e-Science and model-driven development; *Programming Languages* (led by Professor Jeremy Gibbons and including Dr Ralf Hinze and Professor Oege de Moor); Security (leader Professor Bill Roscoe, with Professor Sadie Creese leading a new Cyber Security Centre, and Professor Gavin Lowe); *Verification* (leader Professor Marta Kwiatkowska) covering probabilistic and software model checking (Professor Daniel Kroening) with time and concurrency (Professor Joel Ouaknine, Professor James Worrell, and Professors Roscoe and Lowe), and automated verification of hardware (Professor Tom Melham); *Computational Biology* (led by Professor David Gavaghan and including Professors Kevin Burrage and Helen Byrne) is one of the world's leading groups building computational models of biological systems and is particularly well known for its work on the heart; and *Foundations, Logic and Structures*, (leader, Professor Samson Abramsky) which includes groups working on quantum information and computation (Abramsky and Professor Bob Coecke), game semantics and verification (Professor Luke Ong) and constraints (Professor Peter Jeavons); *Information*

Systems (jointly led by Professors Georg Gottlob and Ian Horrocks and including Professor Stephen Pulman, who works on Computational Linguistics, and Professor Michael Benedikt). In addition the department has recently recruited Professors Mike Wooldridge (Agent Based Systems) and Elias Koutsoupias (Algorithms). A realignment of the themes is expected shortly.

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

Job description

Research topic	A Theory of Least-Change for Bi-directional Transformations
Principal Investigator / supervisor	Professor Jeremy Gibbons
Funding partner	EPSRC

Overview of the role

Applications for invited for a Research Assistant on an EPSRC-funded project "A Theory of Least-Change for Bidirectional Transformations".

The project is a collaboration between Professor Jeremy Gibbons in the Department of Computer Science, University of Oxford, and Dr Perdita Stevens and Dr James Cheney in the School of Informatics, University of Edinburgh. The Research Assistant will be under the supervision of Professor Jeremy Gibbons at Oxford, and is available for three years from 31st August 2013.

The project concerns bidirectional transformations, which are a means of maintaining consistency between multiple information sources: when one source is edited, the others may need updating to restore consistency. There are applications in model-driven engineering, database design, and program development, among others. A bidirectional transformation can be implemented in terms of several unidirectional restoring functions, one per source; but this duplicates information, wasting effort and risking inconsistencies. Bidirectional transformation languages allow one to describe the consistency relationship and the restoring functions with a single declarative specification.

Our aim in this project is to study the principle of least change: that a bidirectional transformation should not make unnecessary or unnecessarily large changes when it re-establishes consistency. The primary focus of the Oxford contribution is the development of a theory of alignment for bidirectional transformations on structured data, especially in the case of non-free datatypes such as associative lists and graphs. We conjecture that the mathematics of container datatypes and combinatorial species will be particularly relevant.

Responsibilities/duties

The main duties of the successful candidate will include:

- Participation in regular meetings with colleagues at the Universities of Oxford and Edinburgh.
- Preparation of research papers for publication in the scientific literature.
- Representing the research at workshops and conferences.
- Willingness to travel to meetings.

- 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 the Principal Investigators

Essential
- A doctoral degree (or close to finishing one) in computer science, mathematics, or a closely related discipline;
- Good verbal and written communication skills in English;
- A proven background in one of: principles of programming languages, model-driven development, database theory;
- Publications in leading journals and/or conferences.

Desirable:
- A track record of performing autonomous research;
- Knowledge of algebraic and categorical methods, and their application to computation;
- Experience in designing languages and developing software tools.

Working at the University of Oxford

For further information about working at Oxford, please see:

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

Salary and Benefits

The post, which is a full-time appointment, is funded by EPSRC for a fixed term of up to 3 years. The post has a salary on the University grade 07S scale (currently £29,541 to £36,298). This includes membership of the University Superannuation Scheme (USS) and has an annual leave entitlement of 38 days per year (inclusive of all public holidays and university closed periods).

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 and indicate whether we can contact them at this stage. You will also be required to upload a CV and supporting statement. The supporting statement should describe what you have been doing over at least the last 10 years. This may have been employment, education, or you may have taken time away from these activities in order to raise a family, care for a dependant, or travel for example. Your application will be judged solely on the basis of how you demonstrate that that you meet the selection criteria outlined above and we are happy to consider evidence of transferable skills or experience which you may have gained outside the context of paid employment or education.

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

All applications must be received by **midday** on the closing date stated in the online advertisement.

Candidates must also ask their referees to consider this job description and email their reference directly to **job11@cs.ox.ac.uk** or, alternatively, post or fax it to: The Administrator, Department of Computer Science, Wolfson Building, Parks Road, Oxford OX1 3QD, such that the reference arrives by, or shortly after, the advertised closing date.

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.