University of Oxford Department of Computer Science

Job description and selection criteria

Job title	Research Assistant (2 posts)
Division	MPLS
Department	Computer Science
Location	Wolfson Building, Parks Road, Oxford.
Grade and salary	Grade 7: Salary £29,541 – £36,298 p.a.
Hours	Full Time
Contract type	Fixed term for up to 2 years
Vacancy reference	109517

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

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	Automated verification and synthesis
Principal Investigator / supervisor	Professor Marta Kwiatkowska
Project team	VERIWARE project, Automated Verification theme
Funding partner	ERC

Overview of the role

Two Grade 7 postdoctoral research assistant posts are available to work on automated verification and synthesis under the direction of Professor Marta Kwiatkowska in the Department of Computer Science, University of Oxford. The posts are in association with the ERC Advanced Investigator Grant "VERIWARE: From software verification to everyware verification". The VERIWARE project is concerned with sensor-enabled, software-controlled, autonomous devices (so called for 'everyware'), and its overall aim is to develop the foundations, techniques and software tools for quantitative verification and synthesis of their embedded software. A broad range of topics is covered, including the following: quantitative verification and synthesis for stochastic games, with application to distributed energy management and user-centric networks; quantitative verification for stochastic hybrid systems, with application to verification of cardiac pacemaker software; quantitative verification for DNA computing devices; runtime verification for probabilistic systems, with application to mobile phones; as well as quantitative abstraction-refinement, and controller/strategy synthesis techniques.

The VERIWARE team is led by Professor Kwiatkowska and includes five postdoctoral researchers, two doctoral students and four associate members, in addition to the postdoctoral researchers advertised here.

Applicants must have (or shortly be expecting to obtain) a PhD in Computer Science or a closely related field. Candidates who can demonstrate strong background in relevant aspects of automated verification and/or synthesis are encouraged to apply. The application should include a supporting statement which summarises how they would contribute to the project. Priority will be given to candidates who can strengthen and/or broaden existing activities of VERIWARE. Interviews will take place on 24th or 25th October 2013.

The successful candidates will be expected to work with Professor Marta Kwiatkowska and the VERIWARE team to contribute to achieving the goals of the project and will be members of the Automated Verification theme. More information about the project and the Verification theme can be found at:

http://www.cs.ox.ac.uk/projects/VERIWARE/index.html

http://www.cs.ox.ac.uk/research/verification/

The main duties are described below. The exact scope of the research will depend on the skills of the candidate appointed who will be expected to fulfil the selection criteria defined below.

Responsibilities/duties

The roles will require the postholder to undertake innovative research as defined by the project proposal and to work with colleagues to progress the objectives of the project as part of VERIWARE project team.

The duties and responsibilities are as follows:

- To provide leadership in the relevant research aspects of the project, developing research questions, generating original ideas and conducting individual research.
- To collaborate with members of the VERIWARE team and support the research of junior researchers by providing technical assistance and advice on methodology, as required.
- To initiate publication of research results in top ranking journals and present research results at leading conferences.
- To contribute to software development, including tool releases, case studies and benchmarks, as required.
- To assist with managing the project and group's websites, including publication, case studies, tutorial, and other material, as required.
- To assist with project reports and contribute to new research funding applications, as necessary.
- To contribute to lecturing, software demos, and other activities described in the project proposal.
- The researcher 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.

Selection Criteria

Essential:

Applicants should have

- a doctoral degree in computer science, mathematics, or related discipline;
- excellent knowledge of theoretical computer science, automated verification and/or synthesis;
- strong track record of relevant publications;

- excellent scientific writing ability;
- excellent communication skills in English;
- ability and willingness to participate in the development of experimental software;
- ability and willingness to mentor or supervise doctoral students;

Desirable

- familiarity with probabilistic and or real-time modelling and verification;
- experience of software tool development.

Candidates with prior experience in probabilistic model checking applied to biological systems are especially encouraged to apply.

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 ERC and is available for up to 2 years, has a salary on the University grade 07S scale (currently £29,541 - £36,298 p.a.). 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 **job14@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. You will also be asked to provide reference details as part of the online application process and will be asked

to indicate whether you are happy for us to contact your referees directly should they not provide a reference by the stated 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.