



DEPARTMENT OF  
**COMPUTER  
SCIENCE**

University of Oxford Department of Computer Science

## Job description and selection criteria

<b>Job title</b>	Research Associate in Medical Image Segmentation
<b>Division</b>	MPLS
<b>Department</b>	Computer Science
<b>Location</b>	Wolfson Building, Parks Road, Oxford.
<b>Grade and salary</b>	Grade 7: £32,236 - £39,609 p.a.
<b>Hours</b>	Full Time (flexible working options considered)
<b>Contract type</b>	Fixed term for 1 year
<b>Reporting to</b>	Dr Irina Voiculescu
<b>Vacancy Reference</b>	137204



## The role

Hip and knee arthritis affects more than 10 million people in the UK and it causes pain and inflammation as a result of both cartilage damage, and of the eventual bone-on-bone articulation when the cartilage is completely worn away. Imaging techniques to assess the extent of cartilage damage are important to clinicians and researchers to help them plan appropriate treatment for individual patients with arthritis.

Currently at the Nuffield Orthopaedics Centre the shapes of the anatomical structures are found through visual inspection or manual segmentation of CT or MRI scan slices, which is time consuming and subjective.

The Spatial Reasoning Group within the Department of Computer Science has been working on ways to improve this task. A piece of software has been built (for supporting medical decisions), which can automatically segment and analyse medical images. It works on a range of image formats and uses a novel approach to partitioning 3D volumes of voxels into smaller regions and then analysing those to identify relevant features (bones, organs and blood vessels). This method has been thoroughly tested with good results, detailed in a number of publications.

The principal goal of this project is to re-design this software so as to make its interface easy to use in clinic to accurately segment geometry from MRI scans, and to perform more validation and testing necessary to ensure user confidence in the software.

We are looking for an enthusiastic and creative individual to join a team of scientists rebuilding a medical image segmentation system to assist clinicians in their pre-operative decision making. The successful candidate will be seconding in a weekly clinic at the Nuffield Orthopaedic Centre and using that experience in order to transfer the clinical requirements into our software tool, thereby strengthening our connections with our main clinical users and potentially expanding our collaboration to other users. This is a highly interdisciplinary project, which will involve close collaboration with surgeons, radiologists and researchers at the Nuffield Orthopaedic Centre.

<b>Research topic</b>	Segmentation of medical data from MRI scans
<b>Principal Investigator / supervisor</b>	Dr Irina Voiculescu
<b>Funding partner</b>	EPSRC (IAA)

## Responsibilities/duties

- Implement and improve on novel partitioning and segmentation algorithms
- Reorganise the code base in a robust way
- Implement systematic methods for validating the software output
- Contribute documented software to the group library
- Maintain and document the software and data repositories
- Write timely reports on research, and publishing these as papers in leading journals

- Travel to the Nuffield Orthopaedic Centre regularly to shadow clinicians
- Build, install and demonstrate the software tool to users on a variety of platforms
- Perform demonstrations to clinicians and researchers at the NOC
- Collaborate with students conducting related research
- Represent the research group at internal and external meetings and seminars
- Strengthen the impact of the research by developing links with potential partners
- Collaborate in the preparation of research publications, or book chapters
- Help write grant proposals in order to extend the lifetime of this project (and this post)
- Carry out any other duties as are within the scope, spirit and purpose of the job as requested by the investigators
- The post holder may have the opportunity to teach. This may include lecturing, demonstrating, small-group teaching, or supervision of masters projects in collaboration with the investigators.

## **Essential**

- Hold a PhD/DPhil (or close to completion)\* in a relevant numerate discipline
- Strong C++ programming and code documentation skills
- Familiarity with the existing literature and research in image segmentation
- Excellent communication skills
- Ability to write for publication, present research proposals and results, and represent the research group at meetings
- Ability to interact with other scientists and clinicians, putting across technical information to researchers in other fields
- Ability to work in a team
- Ability to manage own academic research and co-ordinate multiple activities to meet deadlines
- Previous experience of contributing to publications/presentations
- Ability to travel between Oxford-based sites
- A genuine interest in the aims of the research programme

## **Desirable**

- Experience of independently managing a discrete area of a research or software project
  - Experience of actively collaborating in the development of research articles for publication
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\*Evidence required:

EITHER a copy of your PhD/ DPhil award certificate;

OR an academic reference confirming the qualification has been awarded;

OR an academic reference confirming that you have submitted your thesis, if you have not yet completed.

## **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 2016/17 exceeded £564m and we rank first in the UK for university spin-outs, 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)

## Department of Computer Science

The Department of Computer Science was established in 1957, making it one of the longest-established Computer Science departments in the country. It is one of the UK's leading Computer Science Departments (ranked first in a number of international rankings). The UK Research Excellence Framework (REF) in December 2014 resulted in 74 members of the Department having 53% of their research activity ranked in the top category of 4\* (world-leading). Overall, we received an average of 3.34 across the Department (3\* being internationally excellent). A significant majority of the Department are active in externally sponsored research, with both government and industrial funding. At present, there are 69 members of academic staff and almost 100 research staff.

The Department 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. The Department is housed across multiple sites within the University's South Parks Road Science Area, facilitating strong collaborative links with research groups and institutes in closely allied areas (including the Oxford Internet Institute and the Oxford e-Research Centre). This is an essentially inter-disciplinary activity which is at present attracting major funding from a number of sources. At present, the Department holds over £50m in external research contracts.

Research in the Department is currently managed in ten themes:

- *Algorithms & Complexity Theory* focusses on determining the inherent difficulty of computational problems, classifying problems according to this inherent difficulty, and designing and analysing algorithms that use computational resources as efficiently as possible;
- *Artificial Intelligence & Machine Learning* focuses on theoretical foundations, multiagent systems, deep learning and computational linguistics;
- *Automated Verification* investigates theory and practice of formal verification and correct-by-construction synthesis for software and hardware systems;
- *Computational Biology & Health Informatics* is concerned with computational approaches for biomedical research and healthcare innovation;
- *Cyber-Physical Systems* is focusing on intelligent and autonomous sensor systems with applications in positioning, healthcare, environmental monitoring and smart cities;
- *Foundations, Structures and Quantum* embraces interdisciplinary research, and has a particular interest in structural foundations of quantum computation;
- *Human-Centred Computing* covers human-computer interaction, social computing and world-wide web;
- *Information Systems* covers databases, knowledge representation and reasoning;
- *Programming Languages* covers functional programming, program analysis, and programming language foundations;
- *Security* specialises in cybersecurity, protocol analysis, systems security, trusted computing, human-centred security, and networking.

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

## **The Mathematical, Physical, and Life Sciences Division (MPLS)**

The Mathematical, Physical, and Life Sciences (MPLS) Division is one of the four academic divisions of the University. 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. In the results of the six-yearly UK-wide assessment of university research, REF2014, the MPLS division received the highest overall grade point average (GPA) and the highest GPA for outputs. We received the highest proportion of 4\* outputs, and the highest proportion of 4\* activity overall. More than 50 per cent of MPLS activity was assessed as world leading.

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 eight Athena Swan Awards (4 Silver and 4 Bronze) illustrating our commitment to ensure good practice and to encourage women in science at all levels in the division.

We have around 6,000 students and play a major role in training the next generation of leading scientists. Oxford's international reputation for excellence in teaching is reflected in its position at the top of the major league tables and subject assessments. MPLS academics educate students of high academic merit and potential from all over the world. Through a mixture of lectures, practical work and the distinctive college tutorial system, students develop their ability to solve major mathematical, scientific and engineering problems.

MPLS is dedicated to bringing the wonder and potential of science to the attention of audiences far beyond the world of academia. We have a strong commitment to supporting public engagement in science through initiatives including the Oxford Sparks portal (<http://www.oxfordsparks.net/>) and a large variety of outreach activities; these are crucial activities given so many societal and technological issues demand an understanding of the science that underpins them. We also endeavour to bring the potential of our scientific efforts forward for practical and beneficial application to the real world and our desire is to link our best scientific minds with industry and public policy makers.

For more information about the MPLS division, please visit: <http://www.mpls.ox.ac.uk/>

## 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/jobs/supportandtechnical/](http://www.ox.ac.uk/about/jobs/supportandtechnical/).

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.

Please upload all documents **as PDF files** with your name and the document type in the filename.

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](mailto:recruitment.support@admin.ox.ac.uk). Further help and support is available from [www.ox.ac.uk/about\\_the\\_university/jobs/support/](http://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](http://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/](http://www.ox.ac.uk/about/jobs/preemploymentscreening/).

### Data Privacy

Please note that any personal data submitted to the University as part of the job application process will be processed in accordance with the GDPR and related UK data protection legislation. For further information, please see the University's Privacy Notice for Job Applicants at: [www.admin.ox.ac.uk/councilsec/compliance/gdpr/privacynotices/job/](http://www.admin.ox.ac.uk/councilsec/compliance/gdpr/privacynotices/job/). The University's Policy on Data Protection is available at:

[www.admin.ox.ac.uk/councilsec/compliance/gdpr/universitypolicyondataprotection/](http://www.admin.ox.ac.uk/councilsec/compliance/gdpr/universitypolicyondataprotection/).

### 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 69<sup>th</sup> 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+/](http://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+/](http://www.admin.ox.ac.uk/personnel/end/retirement/acrelretire8+/).

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

Membership of the University Club is free for all University staff. The University Club provides social, sporting and hospitality facilities. 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](http://www.club.ox.ac.uk) and [www.sport.ox.ac.uk/oxford-university-sports-facilities](http://www.sport.ox.ac.uk/oxford-university-sports-facilities).

## Information for international staff

The University offers support and advice to international staff, including a visa loan scheme to cover the costs of UK visa applications for staff and their dependents.

See [www.admin.ox.ac.uk/personnel/permits/reimburse&loanscheme/](http://www.admin.ox.ac.uk/personnel/permits/reimburse&loanscheme/).

## Information for staff new to Oxford

If you are relocating to Oxfordshire from overseas or elsewhere in the UK, the University's Welcome Service website includes practical information about settling in the area, including advice on relocation, accommodation and local schools. See [www.welcome.ox.ac.uk](http://www.welcome.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](http://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](http://www.admin.ox.ac.uk/childcare).

## Family-friendly benefits

The University subscribes to My Family Care service through which staff are eligible to register for emergency back-up childcare and adultcare services, a 'speak to an expert' advice service and a wide range of guides and webinars through a website called the Work+Family space.

See: [www.admin.ox.ac.uk/personnel/staffinfo/benefits/family/mfc/](http://www.admin.ox.ac.uk/personnel/staffinfo/benefits/family/mfc/).

## Disabled staff

We are committed to supporting members of staff with disabilities or long-term health conditions. For further details, including information about how to make contact, in confidence, with the University's Staff Disability Advisor, see

[www.admin.ox.ac.uk/eop/disab/staff](http://www.admin.ox.ac.uk/eop/disab/staff).

## 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/](http://www.admin.ox.ac.uk/eop/inpractice/networks/).

## Additional benefits

Staff can enjoy a range of other benefits and discounts, including free entry to the Botanic Gardens and University colleges, and discounts at University museums.

See [www.admin.ox.ac.uk/personnel/staffinfo/benefits](http://www.admin.ox.ac.uk/personnel/staffinfo/benefits).