

## ENGINEERING SCIENCE

<b>Job title</b>	Research Associate in Impact Engineering Experimentation for Aerospace Applications
<b>Division</b>	Mathematical, Physical and Life Sciences Division
<b>Department</b>	Engineering Science
<b>Location</b>	Impact Engineering Laboratory, Begbroke Science Park
<b>Grade and salary</b>	Grade 7: £31,604 - £42,418 per annum
<b>Hours</b>	Full time
<b>Contract type</b>	Fixed-term (2 years)
<b>Reporting to</b>	Professor Nik Petrinic
<b>Vacancy reference</b>	132291
<b>Additional information</b>	Two positions available. Reimbursement of relocation costs for postdoctoral positions is only available where allowed on the project.

<b>Research topic</b>	Advanced loading and diagnostics in characterisation of pressure, temperature and rate dependent behaviour of advance materials to provide data for development of related modelling methodologies in Impact Engineering
<b>Principal Investigator / supervisor</b>	Professor Nik Petrinic
<b>Project team</b>	Impact Engineering Laboratory
<b>Project web site</b>	<a href="http://iel.eng.ox.ac.uk/">http://iel.eng.ox.ac.uk/</a>
<b>Funding partner</b>	The funds supporting this research project are provided by Rolls-Royce, Defence Agencies, EPSRC and other industrial partners
<b>Recent publications</b>	

## The role

Oxford is world-leading in the design of bespoke experiments aimed at observation and quantification of pressure, temperature and rate dependent deformation and failure



mechanisms in naturally occurring and man-made materials, as well as developing analytical and numerical methodology (software) to simulate the experimentally observed and quantified behaviour of materials, systems and structures. With the addition of recently newly appointed staff, we operate a comprehensive array of loading platforms, from intermediate- to high-rate to hypervelocity impact systems, which collectively access dynamic conditions extending from a few MPa to 100s GPa. There is a great interest in increasing the overlap between modelling and experiment, through the development of new high-resolution surface and sub-surface structural characterisation across the breadth of loading platforms, in addition to the design of experiments for arbitrary combined thermomechanical loads. These jobs have thus arisen as a result of the desire to exploit the latest advances in dynamic loading and diagnostics to provide new opportunities for materials characterisation aimed at development, calibration and validation of models, and ultimately enhance the understanding of the multi-scale, hierarchical nature of material response under dynamic loading. The appointed candidates would be expected to engage in experimentation and related modelling in order to propose, resource and deliver an internationally-leading programme of research, furthering both PI's and individual interests.

Additionally, there is a strong interest in establishing closer ties between Oxford academics working in high-rate and shock physics, taking advantage of collective expertise to close the loop between theory, modelling and experiment. The successful candidate would be invited to help define the scope and research strategy of a new high-rate/shock-physics consortium operating out of the Impact Engineering Laboratory, and participating in joint Research Council bids, consulting, short courses and training.

Reporting to Professor Nik Petrinic. The post holder will be a member of a research group providing day-to-day supervision for researchers. However, the post holder will also be responsible for their own grant funded research projects within a discrete area of the wider research programme.

## **Responsibilities/duties**

### **Specific Tasks**

- Organise, plan and carry out experimental campaigns aimed at the characterisation of the rate and temperature dependent mechanical behaviour of titanium alloys.
- Improve, enhance and integrate experimental methodologies employed at Oxford across the full range of loading platforms.
- Develop, establish, and pursue appropriate analytical protocols and techniques to support research in the Impact Engineering Laboratory.
- Regularly write research articles at an international level for peer-reviewed journals, book chapters, and reviews.
- Present papers at international conferences, and lead seminars to disseminate research findings
- Contribute to the development of work plans and testing solutions to attract funding and support from potential sponsors.
- Liaise with funding bodies, provide information to project stakeholders and represent the research group at external meetings/seminars, either with other members of the team or alone.

### **Additional Tasks**

- Manage own academic research and administrative activities. This involves small scale project management, to co-ordinate multiple aspects of work to meet deadlines
- Adapt existing and develop new scientific techniques and experimental protocols
- Test hypotheses and analyse scientific data from a variety of sources, reviewing and refining working hypotheses as appropriate
- Contribute ideas for new research projects
- Develop ideas for generating research income, and present detailed research proposals to senior researchers
- Collaborate in the preparation of scientific reports and journal articles and occasionally present papers and posters
- Use specialist scientific equipment in a laboratory environment
- Act as a source of information and advice to other members of the group on scientific protocols and experimental techniques
- Represent the research group at external meetings/seminars, either with other members of the group or alone
- Carry out collaborative projects with colleagues in partner institutions, and research groups
- The researcher may have the opportunity to undertake ad-hoc paid teaching (this includes lecturing, demonstrating, small-group teaching, tutoring of undergraduates and graduate students and supervision of masters projects in collaboration with principal investigators). Permission must be sought in advance for each opportunity and the total must not exceed 4 hours a week.
- Any other duties appropriate with the role.

## **Selection criteria**

### **Essential**

- Hold a Ph.D/D.Phil in a relevant discipline (e.g. Engineering, Materials Science or Physics) with post-qualification research experience
- Experience designing experimental platforms and experimental methodologies for high-rate loading, with a view to acquiring specific material response data of interest
- Strong publication record and familiarity with the existing literature and research in the field.
- Good knowledge of the field of materials in extreme dynamic environment in aerospace and defence sectors
- Experience of presenting research to external audiences at conferences, meetings, and/or workshops.
- Ability to independently plan and manage a research project, including a research budget
- Exceptional interpersonal skills (ability to work in a cross-disciplinary team and build collaborative relationships with external funding bodies)
- Ability to read, interpret and check engineering drawings
- Ability to work under pressure in order to respect tight deadlines

## Desirable

- Experience in experimental assessment of the deformation and failure in materials subjected to dynamic loading by means of Split-Hopkinson-Bar and/or gas gun based techniques.
- Possess demonstrable knowledge and research experience in high-rate optical diagnostic development and experimental characterisation of pressure, temperature and rate dependent behaviour of materials for advanced engineering applications.
- Experience developing and implementing optical (including laser based) diagnostics, and simulating / modelling / interpreting measurement data
- Experience of working as part of a multidisciplinary team Ability to write computer programs using, e.g. MATLAB, C/C++, Python, FORTRAN
- Proficiency with CAD and solid modelling packages (such as SolidWorks, Catia or AutoCAD) Familiarity with numerical modelling software (such as LS-DYNA, Abaqus)
- Knowledge of IP and patent application drafting

## 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, and in providing all of our staff with a welcoming and inclusive workplace that supports everyone to develop and do their best work. Recognising that diversity is a great strength, and 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 2014/15 exceeded £522.9m and ranked first in the UK for university spin-outs, with more than 130 spin-off 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)

## Engineering Science Department

Engineering teaching and research takes place at Oxford in a unified Department of Engineering Science whose academic staff are committed to a common engineering foundation as well as to advanced work in their own specialities, which include most branches of the subject. We have especially strong links with computing, materials science and medicine. The Department employs about 90 academic staff (this number includes 13 statutory Professors appointed in the main branches of the discipline, and 25 other professors in the Department); in addition there are 9

Visiting Professors. There is an experienced team of teaching support staff, clerical staff and technicians. The Department has well-equipped laboratories and workshops, which together with offices, lecture theatres, library and other facilities have a net floor area of about 22,000 square metres. The Department is ranked third in the world in the latest *Times Higher Education World University Rankings*, behind Caltech and Stanford, but ahead of MIT (4<sup>th</sup>), Cambridge (5<sup>th</sup>), Princeton (6<sup>th</sup>) and Imperial (7<sup>th</sup>).

### *Teaching*

We aim to admit 160-170 undergraduates per year, all of whom take a 4-year Engineering Science course leading to the MEng degree. The course is accredited at MEng level by the major engineering institutions. The syllabus has a common core extending through the first two years. Specialist options are introduced in the third year, and the fourth year includes further specialist material and a major project.

### *Research*

The Department was ranked the top engineering department in the UK, as measured by overall GPA, in the Research Excellence Framework 2014 exercise. We have approximately 350 research students and about 130 Research Fellows and Postdoctoral researchers. Direct funding of research grants and contracts, from a variety of sources, amounts to an annual turnover of approximately £19m in addition to general turnover of about £18m. The research activities of the department fall into seven broad headings, though there is much overlapping in practice: Thermofluids; Materials and Mechanics; Civil and Offshore; Information, Control and Vision; Electrical and Optoelectronic; Chemical and Process; Biomedical Engineering.

For more information please visit:

<http://www.eng.ox.ac.uk/>

The Department of Engineering Science holds a bronze Athena Swan award to recognise advancement of gender equality: representation, progression and success for all.

## **The Mathematical, Physical, and Life Sciences Division**

The Mathematical, Physical, and Life Sciences (MPLS) Division is one of the four academic divisions of the University. 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. MPLS is proud to be the home of some of the most creative and innovative scientific thinkers and leaders working in academe. We have a strong tradition of attracting and nurturing the very best early career researchers who regularly secure prestigious fellowships

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 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. 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 must 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.

## References

Please give the details of people who can provide a reference for you. If you have previously been employed, your referees should be people who have managed you, and at least one of them should be your formal line manager in your most recent or current job. Otherwise they may be people who have supervised you in a recent college, school, or voluntary experience. It is helpful if you can tell us briefly how each referee knows you (e.g. 'line manager', 'college tutor'). Your referees should not be related to you.

We will assume that we may approach them at any stage unless you tell us otherwise. If you wish us to ask for your permission before approaching a particular referee, or to contact them only under certain circumstances (for example, if you are called to interview) you must state this explicitly alongside the details of the relevant referee(s).

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/).

### 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/revisedejra/revaim/](http://www.admin.ox.ac.uk/personnel/end/retirement/revisedejra/revaim/).

For **existing** employees, any employment beyond the retirement age is subject to approval through the procedures: [www.admin.ox.ac.uk/personnel/end/retirement/revisedejra/revproc/](http://www.admin.ox.ac.uk/personnel/end/retirement/revisedejra/revproc/)

From 1 October 2017, 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

The University Club provides social, sporting and hospitality facilities. It incorporates a bar, café and sporting facilities, including a gym. 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 (or those relocating from another part of the UK)

If you are relocating to Oxfordshire from overseas, or elsewhere in the UK, the University's International Staff website includes practical information related to moving to and settling in Oxford such as advice on immigration, relocation, accommodation, or registering with a doctor.

See: [www.internationalstaffwelcome.admin.ox.ac.uk/](http://www.internationalstaffwelcome.admin.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

([www.admin.ox.ac.uk/personnel/staffinfo/benefits/family/mfc/](http://www.admin.ox.ac.uk/personnel/staffinfo/benefits/family/mfc/)) and staff are eligible to register for emergency back-up childcare and adultcare services, a 'speak to an expert' phone line and a wide range of guides and webinars through a website called the Work + Family space.

### Disabled staff

We are committed to supporting members of staff with disabilities or long-term health conditions. Please visit [www.admin.ox.ac.uk/eop/disab/staff](http://www.admin.ox.ac.uk/eop/disab/staff) for further details including information about how to make contact, in confidence, with the University's Staff Disability Advisor.

### 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/)

### Other benefits

Staff can enjoy a range of other benefits such as free visitor access to the University's colleges and the Botanic Gardens as well as a range of discounts.

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