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| Job title | Research Associate in Impact Engineering Experimentation for Aerospace Applications |
| Division | Mathematical, Physical and Life Sciences Division  |
| Department  | Engineering Science  |
| Location | Impact Engineering Laboratory, Begbroke Science Park |
| Grade and salary | Grade 7: £32,236- £39,609 per annum |
| Hours | Full time  |
| Contract type | Fixed-term (2 years) |
| Reporting to | Dr Antonio Pellegrino, Prof. Nik Petrinic |
| Vacancy reference | 142443 |
| Additional information |  |

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| Research topic | Characterisation of pressure and strain rate dependence of lightweight aerospace alloys. Experiments analysis and modelling of pressure, temperature and rate dependent behaviour of titanium and other advanced metallic aerospace materials |
| Principal Investigator / supervisor  | Professor Nik Petrinic/Dr Antonio Pellegrino  |
| Project team  | Impact Engineering Laboratory |
| Project web site  | http://iel.eng.ox.ac.uk/ |
| Funding partner  | The funds supporting this research project are provided by Rolls Royce plc |
| Recent publications  |  |

### 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. We are seeking a highly talented and motivated researcher to contribute to the experimental characterization and analysis of the behaviour of lightweight aerospace alloys when subjected to impact loading, cyclic loading and high temperatures.

The desired candidate would have significant experience with experimental techniques for the characterization of the behaviour of materials at high strain rate.

The successful candidate will be tasked with conducting, analysing and interpreting high strain rate and gas gun experiments, as well as with communicating the results to industrial and academic partners. The ideal candidate would also have knowledge in material modelling, data acquisition systems, development of novel diagnostics and apparatuses in experimental mechanics, temperature and environmental conditioning of materials.

Reporting to Professor Nik Petrinic and Dr Antonio Pellegrino, 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

**Specific Tasks**

* Organise, plan and carry out experimental campaigns. Manage own academic research and administrative activities. This involves small scale project management, to co-ordinate multiple aspects of work to meet deadlines.
* Propose and implement Improve, enhance and integrate adopted methodologies across the range of loading platforms throughout the Impact Engineering Laboratory and associated laboratories within Oxford as required.
* Develop, establish, and pursue appropriate analytical protocols and techniques to support research in the Impact Engineering Laboratory Adapt existing and develop new scientific techniques and experimental protocols
* Agree clear task objectives, organise, and delegate work to other members of the team and coach other members of the group on specialist methodologies or procedures
* Develop research proposals and conduct individual research, in particular designing and performing original experiments and analysis to produce and interpret detailed, and often complex, data form a variety of sources
* Develop research questions within a specific context, conduct individual research, analysing detailed and complex qualitative and/or quantitative data from a variety of sources, and generate original ideas by building on existing concepts
* Translate experimental data into constitutive models and numerical models
* 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. Represent the research group at external meetings/seminars, either with other members of the group or alone.
* 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
* Carry out collaborative projects with colleagues in partner institutions, and research groups

**Additional Tasks**

* Test hypotheses and analyse scientific data from a variety of sources, reviewing and refining working hypotheses as appropriate
* Contribute ideas for new research projects
* Act as a source of information and advice to other members of the group on scientific protocols and experimental techniques
* 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.

## *This job description should be viewed as a guide to the role and is not intended as a definitive list of duties. It may be reviewed in light of changing circumstances with consultation with the post holder.*

## Selection criteria

### Essential

* Hold a Ph.D/D.Phil in a relevant discipline (or be close to completion) (e.g. Engineering, Materials Science or Physics) with post-qualification research experience.
* 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.
* 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.
* Good knowledge of the mechanical behaviour of ductile and brittle materials subjected to rapidly applied loading.
* 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 and to work under pressure in order to respect tight deadlines.

* Exceptional interpersonal skills (ability to work in a cross-disciplinary team and build collaborative relationships with external funding bodies).
* Proficiency with CAD and solid modelling packages (such as SolidWorks, Catia, Creo etc.). Ability to read, interpret and check engineering drawings.

**Desirable**

* Knowledge of temperature and environmental conditioning systems for experimental mechanics, cryogenic and vacuum equipment.
* Experience in the use of high speed photography equipment and in the use of Digital Image correlation techniques.
* Experience designing experimental platforms and experimental methodologies for high-rate loading, with a view to acquiring specific material response data of interest.
* Possess demonstrable knowledge and research experience in high-rate optical diagnostic development.
* Experience in developing LABVIEW or Simulink DAQ programs for the control of experimental instrumentation and apparatuses.
* Experience in Developing MATLAB/Python programs for the analysis and interpretation of experimental data.
* Familiarity with numerical modelling software (such as LS-DYNA, Abaqus).
* Experience in writing FORTRAN user subroutines in LS-DYNA or Abaqus CAE environments.
* 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 (4th), Cambridge (5th), Princeton (6th) and Imperial (7th).

*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 University of Oxford is a member of the [Athena SWAN Charter](http://www.athenaswan.org.uk/) and holds an institutional Bronze Athena SWAN award. The Department of Engineering Science holds a Departmental Bronze Athena award in recognition of its efforts to introduce organisational and cultural practices that promote gender equality in SET and create a better working environment for both men and women.

**The Impact Engineering Laboratory**

The Impact Engineering Laboratory (IEL) represents a significant activity within the Solid Mechanics and Materials Engineering Group, and is a leading academic research facility dedicated to the study of rate-dependent behaviour in naturally occurring and man-made materials. Based at the University of Oxford Begbroke Science Park, the IEL comprises over 900m2 of shared laboratory space, playing host to a comprehensive suite of loading and diagnostic equipment, high-performance computing and materials characterisation tools. This unique combination of resources supports the activities of numerous postdoctoral researchers and postgraduate students, who collectively address the constitutive and failure behaviour of a wide range of materials and systems through the fusion of precision experiments and multi-scale predictive modelling. Research at the IEL is coordinated by its board of PIs, led by Professor Nik Petrinic, Dr Antonio Pellegrino, Professor Clive Siviour and Professor Dan Eakins, who as well as pursuing their individual activities, oversee the sharing of equipment, knowledge and resources, and management of joint projects. Further facilities for high strain rate materials characterisation are found in the Department’s site in Central Oxford, where they sit alongside a state of the art thermomechanical testing suite, and electron microscopes with a unique range of in-situ loading stages. These facilities allow an integrated approach to characterising and understanding the underlying physics of rate dependence in materials.

Further details of the IEL’s research activities may be found on the Laboratory website (<http://iel.eng.ox.ac.uk/>)

**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 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. 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 for all academic and academic-related posts (grade 6 and above), for which the retirement date is the 30 September immediately preceding the 68th birthday. 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/)

There is no normal or fixed age at which **support staff** in posts at **grades 1–5** have to retire. Support staff may retire once they reach the minimum pension age stipulated in the Rules of the pension scheme to which they belong.

**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**

## Training and Development

A range of training and development opportunities are available at the University. Further details can be found at [www.ox.ac.uk/staff/working\_at\_oxford/training\_development/index.html](http://www.ox.ac.uk/staff/working_at_oxford/training_development/index.html).

## *For research staff only:* Support for Research Staff

There is a particularly wide range of support for career development for research staff. Please visit: [www.ox.ac.uk/research/support-researchers](https://www.ox.ac.uk/research/support-researchers?wssl=1) to find out more.

### Pensions

The University offers generous occupational pension schemes for eligible staff members. Further details can be found at [www.admin.ox.ac.uk/finance/epp/pensions/pensionspolicy/](http://www.admin.ox.ac.uk/finance/epp/pensions/pensionspolicy/).

**Information for international staff** *(or those relocating from another part of the UK)*

A wealth of information is available on the University's International Staff website for staff who are relocating to Oxford from abroad, at [www.admin.ox.ac.uk/personnel/staffinfo/international/](http://www.admin.ox.ac.uk/personnel/staffinfo/international/).

**The University of Oxford Newcomers' Club**

The Newcomers' Club is aimed at helping partners of newly-arrived visiting scholars, graduate students and academic members of the University to settle in and to meet people in Oxford.

**Transport schemes**

The University offers a range of travel schemes and public transport travel discounts to staff. Full details are available at [www.admin.ox.ac.uk/estates/ourservices/travel/](http://www.admin.ox.ac.uk/estates/ourservices/travel/).

## University Club and University Sports Facilities

The University Club provides social, sporting and hospitality facilities. It incorporates a Club bar, a cafe and sporting facilities, including a gym. See [www.club.ox.ac.uk](http://www.club.ox.ac.uk) for all further details.

University staff can use the University Sports Centre at discounted rates, and have the chance to join sports clubs. Please visit [www.sport.ox.ac.uk/oxford-university-sports-facilities](http://www.sport.ox.ac.uk/oxford-university-sports-facilities).

**Childcare and Childcare Vouchers**

The University offers quality childcare provision services at affordable prices to its employees. For full details about the services offered, please visit [www.admin.ox.ac.uk/childcare/](http://www.admin.ox.ac.uk/childcare/). **NB: Due to the high demand for the University’s nursery places there is a long waiting list.**

The University also offers nursery fee payment schemes to eligible staff as an opportunity to save tax and national insurance on childcare costs. Please visit [www.admin.ox.ac.uk/childcare](http://www.admin.ox.ac.uk/childcare).

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## Disabled staff

The University is committed to supporting members of staff with a disability or long-term health condition and has a dedicated Staff Disability Advisor. Please visit [www.admin.ox.ac.uk/eop/disab/staff](http://www.admin.ox.ac.uk/eop/disab/staff) for further details.

## BUPA - Eduhealth

Bupa Eduhealth Essentials private medical insurance offers special rates for University of Oxford staff and their families [www.eduhealth.co.uk/mini-site/](http://www.eduhealth.co.uk/mini-site/).

## All other benefits

For other benefits, such as free entry to colleges, the Botanic Gardens and staff discounts offered by third party companies, please see [www.admin.ox.ac.uk/personnel/staffinfo/benefits/](http://www.admin.ox.ac.uk/personnel/staffinfo/benefits/).