

SENIOR LECTURER IN Gas Turbine Aero-thermal Technology

Job Ref: REQ17668

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

Department of Aeronautical and Automotive Engineering

Overview of the Department

The Department of Aeronautical and Automotive Engineering (AAE) is one of three departments making up the School of Aeronautical, Automotive Chemical and Materials Engineering. The Department has a well-established reputation for its research and degree programmes. Undergraduate courses in Automobile and Aeronautical Engineering began in 1919 and 1935 respectively; today the Department enjoys a high status in the UK academic community with 33 full-time academic staff members. The Automotive Engineering programme remains specialist in nature and stands out in the UK academic community. Aeronautical Engineering is one of few in the UK and ranks highly amongst peers, and both Aeronautical and Automotive Engineering appear in the top 10 of undergraduate league tables. The University's performance in REF positions Loughborough as a leading research University, with the Times Higher ranking Loughborough 14th in the UK and 9th in England for research intensity. The department's annual research grants and contracts income is currently around £5 million per annum. This supports a research community of about forty post-doctoral research associates, seventy-five research students and a number of technical and administrative staff. In both research and teaching, the Department enjoys strong industrial links that support research sponsorship and collaboration, student placement and graduate employment. The department hosts the Rolls Royce University Technology Centre in Combustion System Aero Thermal Processes and the new £10 million National centre of excellence in gas turbine combustion systems and the Caterpillar Innovation and Research Centre.

Loughborough University Achievements. <http://www.lboro.ac.uk/about/achievements/>

Loughborough University Research. <http://www.lboro.ac.uk/research/#>

Aeronautical and Automotive Engineering. <http://www.lboro.ac.uk/departments/aae/>

Aeronautical and Automotive Engineering Research. <http://www.lboro.ac.uk/departments/aae/research/>

Aeronautical and Automotive Research facilities.
<http://www.lboro.ac.uk/departments/aae/research/majorlaboratoryfacilities/>

Note: The Department web pages are currently undergoing a major overhaul to update and reflect significant recent growth.

Research Activity in Applied Aerodynamics:

This group is focussed on the use of experimental and numerical aerodynamic techniques to understand and exploit fluid mechanics in real aerospace and automotive applications. Broadly, there are three main areas of activity; Experimental Aerodynamics, Computational Fluid Dynamics (CFD) and an application focussed team forming the Rolls-Royce University Technology Centre (UTC) in Combustion system aero-thermal processes.

Experimental and computational Aerodynamics:

This activity consists of both Aeronautical and Automotive research activities. The experimental work is focused largely on low speed wind tunnel activities employing a wide range of experimental techniques including forces and moments via high accuracy balances, hot-wire anemometry, pressure scanners and planar, stereo and tomographic PIV. The CFD activity is focussed on the development and application of Large Eddy Simulation to gas turbine combustion and propulsion installation aerodynamics and as well as developing in-house research CFD codes, development work is also undertaken on the Rolls-Royce Hydra and Precise-UNS CFD codes. In addition, licenses are available for ANSYS Fluent, CD-Adapco STAR-CCM+, Centaur, Fieldview and Tecplot.

The activity includes a vehicle aerodynamics research group of 2 post docs and 8 PhD students working on projects co-funded with Jaguar Land Rover focused in Vehicle Drag Reduction, fundamental studies of Base pressure and wake dynamics, Experimental and computational studies of surface contamination and water management and real world aerodynamics, including the coupling of unsteady CFD and handling models.

Aerospace research examples include, experimental studies of battle damage, LES of a realistic gas turbine compressors, prediction of gas turbine handling bleed valves and LES of subsonic free jets to provide two-point space time correlations for jet noise modelling.

Rolls-Royce UTC in Combustion System Aero-thermal Processes:

The UTC is a strategic partnership with Rolls Royce for advanced technology and associated research in combustion aerodynamics. As well as direct funding from Rolls- Royce, projects involve many other partners including EPSRC and DTI, as well as international partners such as EU framework 7 programmes. Currently there are about 40 ongoing projects led by 6 academic staff and supported by a team of around 30 researchers, 5 technical staff and three administrative staff. Annual turnover of the UTC has averaged £1.6M pa over last 6 years. This represents a significant growth from its opening in 1991 and is a consequence of a UTC strategy of expanding into new research areas such as 2-phase flow, heat transfer, and aeroacoustics. The income is expected to grow significantly with the opening of the new National centre.

Recent achievements of the UTC include:

- Provision of advanced combustor diffuser designs including those now used in the Trent engine series, with the resulting improved aerodynamic performance leading to a significant reduction in engine specific fuel consumption.
- The aerodynamic design, development and evaluation of future low emission combustor technology and the importance of aerodynamic interactions such as, for example, compressor inlet conditions and strut wakes on the downstream combustor flow field and the unsteady aerodynamics of lean burn fuel injectors.
- Improved understanding of flows within Annular S-shaped ducts that connect the compressor spools within gas turbine engines, so leading to the design of more highly loaded aerodynamic ducts.
- Development of numerical methods within RANS and LES codes delivered to Rolls- Royce to support not only aerodynamics but also conjugate heat transfer, two- phase flows and aero-acoustic predictions.

National Centre of Excellence in Gas Turbine Combustion System Aerodynamics

The National Centre of Excellence in Gas Turbine Combustion System Aerodynamics due to open in Spring 2018 will focus on the development of future low emission aerospace combustion systems that will reduce the environmental impact of aircraft. Rolls-Royce will be a lead partner in the project, building on the existing relationship between Loughborough University and Rolls-Royce.

The Centre will allow industrial problem-owners to visit and work closely with academic researchers to ensure that new technologies are translated from theory to practice as quickly and as efficiently as possible.

It will also become a training ground for current and future aerospace engineers in a critical skill area for the UK

This post

The creation of this post is a part of Loughborough Universities' commitment to the success of the National Centre of Excellence in Gas Turbine Combustion System Aero-thermal technology. The successful candidate will demonstrate research alignment with the Centre's focus on the development of future low emission aerospace combustion systems while also strengthening and broadening the research activity of the Rolls Royce UTC and the wider applied aerodynamics research activity in the department.

In addition the candidates must demonstrate significant experimental experience and expertise in one or more relevant fundamental disciplines that complement and add to our existing research capabilities.

Job Description

Please note that this is a generic job description for the position of Senior Lecturer.

Job Grade

Research, Teaching and Enterprise Grade 8

Job Purpose

To take a leading role in developing and enhancing the research, teaching and enterprise activities of the Aeronautical and Automotive Engineering Department in the area of Gas Turbine Combustion System Aero-thermal Engineering in support of the University's Strategy, Building Excellence.

Job Duties

Research

- To pursue a personal research programme consistent with the research priorities of the Department of Aeronautical and Automotive Engineering that increases the global visibility and reputation of the University.
- To secure external research funding.
- To supervise and manage research projects.
- To publish the outcomes of research in outlets of international standing.
- To attend and contribute to the organisation of major international conferences.
- To supervise postgraduate students at Masters and Doctoral levels.
- To lead and collaborate in research initiatives with colleagues both within the University and externally.

Teaching

- To work with colleagues in the School to deliver an exceptional learning environment for students.
- To teach and inspire undergraduate and postgraduate students, and to conduct associated assessments.
- To provide academic and pastoral support to undergraduate and postgraduate students.
- To promote the use of a range of methods and techniques in teaching, learning and assessment.
- To engage in the evaluation and development of modules for which you have responsibility, in terms of content, delivery and assessment.
- To be responsible for the design and content of specific areas of teaching and learning within the School's undergraduate and postgraduate programmes.
- To lead colleagues in the continuous review and development of the School's taught programmes and the curriculum.

Enterprise

- To lead engagement with business, public and voluntary organisations through knowledge exchange activities such as student projects and placements, research collaboration, consultancy and specialist training.
- To create social, cultural and economic impacts from academic, especially research, activity.
- To secure external funding in support of these activities.
- To seek opportunities for the commercialisation of research and the formation of social enterprises.

Related Activities and Functions

- To work effectively with relevant administrative, technical and academic staff in the School and across the University.
- To carry out specific administrative roles and functions as may be reasonably required.
- To take part in and, on occasion, act as chair of one or more of the School's committees.

- To engage in training programmes in the University (e.g. through Staff Development) which are consistent with your needs and aspirations and those of the School.
- To undertake such other duties as may be reasonably requested and that are commensurate with the nature and grade of the post.
- To engage fully with the annual Performance and Development Review (PDR) process.

Points To Note

The purpose of this job description is to indicate the general level of duties and responsibility of the post. The detailed duties may vary from time to time without changing the general character or level of responsibility entailed

Special Conditions

All staff have a statutory responsibility to take reasonable care of themselves, others and the environment and to prevent harm by their acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Policy & Procedures.

All staff should hold a duty and commitment to observing the University's Equality & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equality & Diversity legislation and University policies/procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Respecting Diversity and, where appropriate, Recruitment and Selection.

Organisational Responsibility

Reports to the Head of Department, Aeronautical and Automotive Engineering.

Person Specification

Your application will be reviewed against the essential and desirable criteria listed below. Applicants are strongly advised to explicitly state and evidence how they meet each of the essential (and desirable) criteria in their application. Stages of assessment are as follows:

- 1 – Application
- 2 – Test/Assessment Centre/Presentation
- 3 – Interview

Essential Criteria

Area	Criteria	Stage
Experience	Evidence of research and/or academic activity in gas turbine aero-thermal engineering including significant experimentally based experience	1
	A record of excellence that is contributing to the furtherance of knowledge in gas turbine aero-thermal engineering, and that is recognized at least nationally in that area.	1,2,3
	Experience of working in an internationally recognised academic research environment, including significant experience at post-doctoral level.	1
	Evidence of authoring a substantial body of original work, in the highest quality refereed academic journals.	1
	Significant experience of successfully supervising the projects of taught and research students or company staff at equivalent levels.	1,3
	Candidates from outside of academia must be able to demonstrate the ability to make the transition to becoming a top academic	1,2,3
Skills and abilities	Experience of presenting research work at conferences.	1
	Experience of teaching and assessment.	1,3
	Demonstrated ability to develop an original research programme on your own initiative and to persuade others of its importance orally and on paper.	2,3
	Demonstrated ability to secure research and/or enterprise funds from external / company sources.	1,3
	Demonstrated ability to create social / cultural / economic impacts from professional activity.	2,3
	A clear trajectory towards achievements at a higher academic level.	1,2,3
	Excellent communication and interpersonal skills which give you the ability to engage with students, colleagues, business and other agencies on a wide variety of matters.	1,2,3
	Ability to work as part of and to lead a team.	2,3
	Excellent IT skills.	1
Training	Commitment to and evidence of continuing professional development.	1,3
Qualifications	Relevant PhD or equivalent experience.	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	1,3
	Formal recognition of professional standing in teaching (e.g. Fellow of the HEA) or commitment to obtaining this within reasonable timeframe.	1

Desirable Criteria

Area	Criteria	Stage
Experience	Experience of work in or in collaboration with aerospace industry.	1
	Experience of presenting research work at international conferences.	1
	Experience in commercial exploitation of products / services.	1.3
Skills and abilities	A sound understanding of the structure of universities and issues facing the UK higher education sector, for example: <ul style="list-style-type: none">• Research funding opportunities in UK HE.• The challenges faced in recruiting students to UK HE• Achieved or progressing towards appropriate professional status.	2,3 1 1

Conditions of Service

The position is Full Time and Open-Ended. Salary will be on Research, Teaching and Enterprise, Grade 8 £49,772 - £55,998 per annum, at a starting salary to be confirmed on offer of appointment. Subject to annual pay award.

The appointment will be subject to the University's normal Terms and Conditions of Employment for Academic and Related staff, details of which can be found [here](#).

The University is committed to enabling staff to maintain a healthy work-home balance and has a number of family-friendly policies which are available at <http://www.lboro.ac.uk/services/hr/a-z/family-leave-policy-and-procedure---page.html>.

We also offer an on-campus nursery with subsidised places, subsidised places at local holiday clubs and a childcare voucher scheme (further details are available at: <http://www.lboro.ac.uk/services/hr/a-z/childcare-information---page.html>)

In addition, the University is supportive, wherever possible, of flexible working arrangements. We also strive to create a culture that supports equality and celebrates diversity throughout the campus. The University holds a Bronze Athena SWAN award which recognises the importance of support for women at all stages of their academic career. For further information on Athena SWAN see <http://www.lboro.ac.uk/services/hr/athena-swan/>

Informal Enquiries

- Prof Jon Carotte, Director of Rolls-Royce University Technology Centre in Combustion System Aero-thermal Processes, by phone on +44 (0)1509 227 251 or by email at: j.f.carrotte@lboro.ac.uk
- Prof Martin Passmore, Head Of Department, by phone on +44 (0) 1509 227 250 or by email at: M.A.Passmore@lboro.ac.uk

Applications

The closing date for receipt of applications is **31 August 2017**