

## **Research Associate in Hydride- Based Technologies (fixed term until to 31 March 2018 at the latest)**

**Job Ref: REQ170993**

**As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.**

### **School/Department summary**

The research group consists of researchers involved in computational fluid dynamics and combustion modelling. The Wolfson School of Mechanical, Manufacturing and Electrical Engineering at Loughborough University has outstanding research facilities for thermo-fluids, IC engines, computational fluid dynamics (CFD) and combustion modelling. The group is engaged in numerous CFD activities and widely known for their contributions in numerical and modelling research applied to IC engines, combustion, explosions, radiation and LES applications.

The Research Associate will join an established group investigating hydrogen safety. In this work safety of hydrogen in connection with a novel metal hydride based energy store is being investigated using computational fluid dynamics based fire and flame propagation modelling. This post is funded by the EPSRC SUPERGEN programme and two other universities are involved in the project as project partners. The first part of this project has been mainly on fire modelling and that work has been completed. The remaining work involves the investigation of flame propagation in premixed hydrogen mixtures and the development of modelling techniques for metal hydride dust explosions. Some development work for the modelling of gas explosions and powder dust explosions has been completed. Experimental data is available for the validation work. The safety assessment of metal hydride in powder form and simulation of possible fire and explosion hazards is to be conducted by developing correlations based computer models for dust explosions. Some experiments have been planned to obtain data, these experiments are carried out by a testing organisation and it is expected that some data will be available for model development. The RA who will join is expected to get familiarise with the work done so far and complete remaining tasks including publications. With the support of the supervisors the RA is expected to engage in developing new lines of research and writing of research proposals for further work. Excellent technical writing ability and communications skills are essential form the RA.

### **Job Description**

**Job Grade:** Research Grade 6

### **Job Purpose**

The Research Associate will be responsible for continuing research and development of modelling techniques into hydrogen fire and explosion assessment through simulations using computational fluid dynamics techniques. The RA is expected to engage in completing publications arising from the work conducted so far and assist in formulating research proposals for further work.

### **Job Duties**

- To become familiar with existing research and literature relating to hydrogen safety and simulation techniques.
- To become familiar with CFD, turbulence, LES and combustion models for fire and explosion simulations work done so far and follow up research work.
- To engage in completing publications from current research and assist and engage in writing up research proposals for further work

- To make contributions to research involving the development of modelling techniques to be used in the simulation of hydrogen fires, jet flames, propagating flames in hydrogen mixtures and powder dust explosions
- To provide guidance and support on relevant work to other Universities involved in collaborative research.
- To collaborate and work with other researchers within the programme when necessary to meet research project objectives.
- To assist in other related engineering research projects as required.
- To carry out literature reviews, write up technical reports and technical papers for publication of the results obtained and the generation of research posters and other publicity media.
- To plan, manage and conduct the work to agreed dead-lines.
- To set and monitor budgets with respect to expenditure on equipment, consumables and travel.
- To assist in guiding and training postgraduate research students.
- To assist in managing research projects.
- To keep close contact with research sponsors, collaborating partners and make technical presentations.
- To maintain confidentiality where appropriate and to ensure that intellectual property (IP) agreements are met.
- Where necessary, to spend short periods of time travelling in the UK and overseas.
- Travel to other organisations and project partners on an ad-hoc basis.

## **Points To Note**

### ***Teaching***

Teaching is not the primary purpose of this post and teaching load will be small relative to the typical load of a member of academic staff in the School, but the Research Associates will be expected to contribute to taught programmes and student projects, at any level, if appropriate and if requested to do so.

### ***Other Related Activities and Functions***

- To engage in training programmes in the University (e.g. through Professional Development) and elsewhere as required.
- To undertake such other duties as may be reasonably requested and that are commensurate with the nature and grade of the post.

## **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 Supervisors responsible for managing the research project.

## 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	Experience in the use of Computational fluid dynamics (CFD) techniques for simulations	(1,3)
	Experience and knowledge of various turbulence and combustion models as applied to combustion simulations	(1,2,3)
	Experience in the development of modelling techniques	(1,3)
	Experience of working in an academic or industrial research environment	(1)
	Competent IT/ Internet use	(1,3)
	Ability to compile reports and publication material	(1,3)
	Ability to write research proposals for new lines of research	(1,3)
	Demonstration of excellent technical ability	(1,2,3)
	Good mathematical background to understand theoretical and conceptual subject matter related to turbulent combustion and dust explosions modelling	(1,3)
Skills and abilities	Excellent research paper and report writing skills	(1,3)
	Highly-motivated with the ability to set and meet deadlines appropriate to the progress of the project	(1,3)
	Excellent inter-personal and communication skills - both written and oral	(1,2,3)
	Ability to programme in FORTRAN and run large scales codes	(3)
	Excellent team-working skills	(3)
Training	A willingness to undertake further training as appropriate and to adopt new procedures as and when required	(3)
Qualifications	A minimum 2:1 class first degree in a relevant engineering discipline	(1)
	PhD in Mechanical Engineering, Physics or similar discipline or equivalent experience	(1)

## Desirable Criteria

Area	Criteria	Stage
Experience	Combustion modelling research and experience	(1,2, 3)
	Experience with Fortran programing and use of CFD codes written in Fortran	(1,3)
	Experience with Linux and CAD software	(1,3)
	Hydrogen safety experience	(1,3)
Skills and abilities	Familiarity with large scale computing	(1,2,3)
	Ability to programme and run large scales codes	(1,3)
	Familiarity with commercial software packages most relevant is STAR CCM+	(1,3)
Qualifications	A PhD with relevant computational fluid dynamics (CFD) and combustion simulation experience or equivalent	(1)

## Conditions of Service

The position is full time and fixed term until 31 March 2018 at the latest. Salary will be on Research Grade 6, (£29,799 - £38,833 per annum) at a starting salary to be confirmed on offer of appointment.

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

Informal enquiries should be made to Professor W. Malalasekera by email at [W.Malalasekera@lboro.ac.uk](mailto:W.Malalasekera@lboro.ac.uk) or by telephone on 01509 227556

## Applications

The closing date for receipt of applications is **23 October 2017**.

Interviews will be held on 1 November 2017