Wolfson School of Mechanical, Electrical and Manufacturing Engineering

Loughborough University

Post Doctoral Research Associate: Intensification of Scalable Thermochemical reactors and processes for Energy and Fuel Conversion

REQ250286

Job Description

Job Grade: Post Doctoral Research Associate (Grade 6)

Job Purpose: Reporting to the Hydrogen Fuels and Energy Engineering Group Leader, the successful candidate will develop thermochemical reactors suitable for integration with intermittent renewable energy sources. The scope will predominantly cover de(hydrogenation) reactions, using abundant molecules like water, nitrogen and carbon dioxide, as raw materials for fuels derived from green hydrogen. The role will thus focus on advancing and intensifying scalable thermochemical reactor prototypes to fulfil the technical, economic and environmental demands of a successful net zero energy transition. The related activities will include conceptualising, implementing and characterising effects of novel reactor architectures and process innovations targeting integration for energy to fuel conversions and vice versa.

Job Duties:

Research

- To conduct experimental research aimed at intensifying and optimising of scalable high-performance thermochemical reactors for production and use of hydrogen and its derivatives.
- To design and build thermochemical reactor prototypes targeting high utilisation of green hydrogen, heat management and efficient process integration.
- To design and build test stations for comprehensive analysis of process dynamics and reaction kinetics of thermochemical reactors.
- To develop and implement experimental protocols for testing and analysing the performance (selectivity, yield, conversion, catalyst lifetime and durability) of thermochemical reactors and processes.
- To analyse and interpret data generated from experiments.
- To collaborate with colleagues and collaborating partners from academia and industry and contribute to high quality research on scalable thermochemical technologies.
- To present experimental progress and publish findings in peer reviewed journals and at conferences.

General, technical

- To perform risk assessments, develop, review and update standard operating procedures and implement safe working practices.
- To manage technical equipment and provide training to other users as required.
- To contribute to the development of research proposals and grant applications for project funding.
- To ensure that a safe working environment is always maintained through compliance with Health and Safety at Work Regulation and the University's Operational Procedures.
- To provide knowledge transfer to students, other staff members and/or industrial partners.

General and administrative

- To engage in continuous professional development and participate in training as required.
- To assist the academic staff in the School with the supervision of undergraduate MSc and PhD project work and day-to-day supervision and support of other researchers.
- To participate in outreach projects relating to the group's activities.
- To carry out specific duties as may be reasonably requested by the group leader and that are commensurate with the nature and grade of the post.

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 always observing the University's Equity & Diversity policy and procedures. Duties must be carried out in accordance with relevant Equity & Diversity legislation and University policies/procedures.

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

Organisational Responsibility

Reports to Professor Sonya Calnan, Wolfson School of Mechanical, Electrical and Manufacturing 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	Extensive research or professional experience in development and innovation of thermochemical reaction processes and continuous flow reactors.	1, 2, 3
	Relevant experience in an academic and/or industrial environment e.g. via (post)doctoral research, or previous employment.	1, 3
	Strong knowledge of thermochemical and kinetics analytical techniques as well as process performance and stability evaluation.	1, 2, 3
	Hands on experience of product analysis using gas chromatography, mass spectrometry and/or infra-red spectroscopy.	
	Proven track record of rigorous research including scientific publications in peer reviewed journal papers and conference presentations or at least one patent filed on thermochemical reactors and/or processes.	1, 2, 3
	Hands on experience in at least two of the following (i) design, construction and optimisation of high temperature/pressure chemical reactors, (ii) real time online control and monitoring of dynamic reactions, (iii) automation of data acquisition and process control using LabVIEW or equivalent and (iv) construction and operating chemical reaction test benches.	1, 2, 3
Skills and abilities	Proven ability to plan and execute experiments	1, 3
	Ability to produce written research reports	1, 3
	Demonstrable ability to work with efficiency and accuracy to deadlines	3
	Professional manner with excellent interpersonal and communication skills	2,3
	Ability to show initiative and work independently but also make a full contribution as a team player	3
	Ability to use initiative to learn and apply new techniques or methods	3
Training	Willingness to undertake further training as appropriate, both internally and externally	1, 3
Qualifications	PhD in Chemical/Process/Mechanical Engineering, Chemistry, or other relevant area	1
Other	To always observe the University's Equal Opportunities policy	3
	To comply with Health and Safety regulations	3
	Commitment to maintain confidentiality, where relevant, always	3

Desirable Criteria

Area	Criteria	Stage
Experience	Experience in working with high pressure systems	1, 2, 3
	Experience with multiphysics multiscale modelling using COMSOL or equivalent,	1, 2, 3

Area	Criteria	Stage
	Experience in process modelling and optimisation using Aspen or equivalent	1, 2, 3
Skills and abilities	Understanding of current Health and Safety legislation, risk management and COSHH regulations	1, 3
	Willingness to travel	3
	Ability to work in a team and strong interpersonal skills	3
	Ability to organise time, plan and work independently	3

Conditions of Service

This is a FULL-TIME position for 37 hrs per week and FIXED TERM for 24 months. Salary will be on Research Grade 6, £35,116 to £45,413 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 Technical staff, details of which can be found at http://www.lboro.ac.uk/services/hr/a-z/conditions-of-service.html.

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 Equity 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 http://www.lboro.ac.uk/services/hr/athena-swan/.

Applications

The closing date for receipt of applications is **28 April 2025. Please accompany your application with ONE DOCUMENT which includes:**

- a cover letter briefly describing your qualifications and motivation for this position.
- a curriculum vitae.
- a list of your publications highlighting your self-selected top 2 and/or relevant achievements e.g. patent, or contributions to collaborative projects.