Wolfson School of Mechanical, Electrical and Manufacturing Engineering

Loughborough University

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

Job Ref: REQ250996

School/Department summary:

The Wolfson School of Mechanical, Electrical and Manufacturing Engineering is one of the largest engineering schools in the UK. Our vision is to provide world-leading engineering solutions to today's global challenges. This position will be within the newly formed Hydrogen Fuels and Energy Engineering Group that aims to develop scalable and efficient processes for sustainable energy-fuel conversions. The holder of the position will work with the Group's state of the art facilities including a dedicated bench top flow reactor fitted with in situ catalyst- and online gas product- analysis capability. The research will involve close collaboration with the department of Chemistry, and collaboration with other groups in the university is foreseen and will be strongly encouraged.

Job Description

Job Family and Grade: Specialist and Supporting Academic Research Grade 6

Job Purpose

The successful candidate will develop thermochemical processes and 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 research will target high utilisation of green hydrogen, heat management and efficient process integration.

Job Duties

Research

- To conduct experimental research aimed at intensifying and optimising scalable high-performance thermochemical reactors for the production and use of hydrogen and its derivatives.
- To design and build thermochemical reactor prototypes and test stations for comprehensive analysis of reaction kinetics and process dynamics
- 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 and disseminate findings in peer reviewed journals and at conferences.
- To collaborate with colleagues and collaborating partners from academia and industry.

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 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 outlined in the document.

Organisational Responsibility

Reports to: Professor Sonya Calnan, Professor of Energy Engineering.

Person Specification

Your application will be assessed based on the essential and desirable criteria listed below.

Applicants are strongly encouraged to explicitly demonstrate how they meet each essential (and desirable) criteria at the application stage. The criteria that you need to demonstrate in your application will be listed as Stage 1 in the table below.

Stages of assessment are as follows:

1 – Criteria measured within the Application
2 – Criteria measured at Test/Assessment Centre/Presentation
3 - Criteria measured at 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
	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
	Strong knowledge of thermochemical and kinetics analytical techniques as well as process performance and stability evaluation.	1,2,3
	Hands on experience in **at least three** 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) product analysis using gas chromatography, mass spectrometry and/or infra-red spectroscopy, (iv)automation of data acquisition and process control using LabVIEW, PLC or equivalent and (v) construction and operating chemical reaction test benches.	1,2,3
Skills and abilities	Ability to use initiative to learn and apply new techniques or methods	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

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 comply with Health and Safety regulations	3
	Commitment to maintain confidentiality, where relevant, always	3

Desirable Criteria: These are skills, experience and competencies that are additional extras that may be used to narrow the pool down if we receive a high volume of applications that meet the essential 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
	Experience in process modelling and optimisation using Aspen or equivalent	1, 2, 3
Skills and abilities	Willingness to travel	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, £35,608 to £46,049 per annum, at a starting salary to be confirmed on offer of appointment.

The appointment will be subject to the University's Terms and Conditions of Employment relevant to the job grade.

Shared University Responsibilities

As a member of the Loughborough community, you are expected to:

- Take reasonable care of yourself, others and the environment, and to prevent harm by your acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Sustainability Policies & Procedures.

- Uphold and actively contribute to the University's commitment to Equity, Diversity, and Inclusion, ensuring that all duties are carried out in alignment with this.

Our Purpose, Vision, and Values

Our purpose, Vision and Values underpin all that we do and shape how we work together at Loughborough.

We're proud to promote our values: **Adventurous**, **Collaborative**, **Creative**, **Authentic** and **Responsible**. Our people bring these values to life every day, and they are central to the positive and supportive culture that makes Loughborough unique.

If you join us, you'll be encouraged to bring these values to life in your own work and contribute to the positive, supportive culture that makes Loughborough unique.

Read more about our **vision and values**.

Our Accreditations

We 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 career.

We are proud to be a Race Equality Charter Member. The Charter aims to improve the representation, progression and success of all minority ethnic staff and students within higher education and address issues of racism within higher education institutions (HEIs).

We are proud to be a Disability Confident Employer and have adopted a proactive approach to employing disabled people and to creating a more diverse workforce. We ensure that our recruitment processes are inclusive and accessible. We guarantee to offer an interview to all applicants who have declared a disability, provided that the essential criteria for the role are met. We proactively anticipate and provide reasonable adjustments and support existing employees who acquire a disability or long-term condition to thrive in the workplace.

We are a real living wage employer, and our Living Wage Employer Mark shows our commitment to paying our staff according to the cost of living.

We are proud supporters of the City of Sanctuary movement and delighted to be recognised as a University of Sanctuary. This national network brings together, university staff, lecturers, academics, and students, who together work to make Higher Education institutions places of safety, solidarity and empowerment for people seeking sanctuary.

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.