

Research Associate in (Bio)Chemical Engineering

Algae-based carbon capture and utilisation for UK cluster decarbonisation

Job Ref: REQ221718

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

Project Description

This 12-month position is part of a multi-disciplinary and multi-institutional (Loughborough University, University of Manchester, Heriot-Watt University) project funded through IDRIC (the Industrial Decarbonisation Research and Innovation Centre), which will develop flexible carbon capture and utilisation (CCU) technology for converting CO₂ from industrial waste gases or mixed process gases (e.g., biogas, syngas) into algae biomass which can be sold directly or processed into new valuable speciality products.

The project will be based in the Departments of Chemical Engineering (School of Aeronautical, Automotive, Chemical and Materials Engineering) and Water Engineering (Architecture, Building and Civil Engineering), which have recently undergone extensive £25 million refurbishment to house a range of state-of-the-art laboratory facilities and modern office environment.

We are committed to achieving equality for all those who learn and work here and providing a diverse and inclusive working environment. We will consider reasonable adjustments commensurate with the project requirements.

Full project details

Building on our earlier proof-of-concept studies of selectively removing and converting CO₂ from biogas into net-negative algae biomass via the reversible absorption of CO₂ into carbonate solutions, the project will establish continuous system operation to evaluate key performance parameters for algae-culture scale-up, including long-term carbonate cyclability, output gas quality, nutrient requirements, impact of changing environmental conditions and algae composition. The project will play a key role in informing the design, scale-up and roll-out of new algae-based carbon utilisation opportunities within the UK's industrial clusters and requires close cooperation with the other two PDRAs working on whole system modelling and stakeholder engagement.

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose

To be responsible for the development of a continuous algae-based carbon capture system, including the design and selection of a suitable gas-liquid contactor, integration with existing programmable photobioreactor using suitable tubing and transfer pumps, and system commissioning and operation. To undertake primary data collection, including screening and optimisation of halophilic microalgae and cyanobacteria strains, implementation of industrially relevant environmental and operating conditions, analysis of liquid, gas and algae compositions and concentrations over time.

Job Duties

- To select and cultivate suitable halophilic microalgae and cyanobacteria strains under batch (e.g. shake flasks) and continuous conditions and investigate the effect of environmental conditions on algae growth, bicarbonate conversion and biomass composition.
- To develop, assemble and commission a continuous integrated carbon capture and algae cultivation system, through design/specification of individual system components
- To collaborate with our academic and industrial project partners, including short and medium-term visits, and coordinate activities across the consortium.
- To perform risk assessments, develop method statements and implement safety procedures.
- To organize and coordinate the lab, manage technical equipment and provide training to other users as required.
- To formulate detailed plans for the project based on broad guidance from the project team.
- To feed back to the project team on progress, to make recommendations for next steps.
- Travel to attend meetings and make presentations both within the project partners working group and to external stakeholders.
- To support the project team by enhancing relationships with existing collaborators and by assisting the establishment of relationships with new collaborators.
- To write research papers suitable for publication in high quality academic journals.
- To attend and contribute to conferences.
- To contribute to project promotion and public engagement events.
- Contribute ideas for new research and enterprise directions.
- Maintain confidentiality at all times and ensure that intellectual property (IPR) agreements are not violated.
- To assist the academic staff in the project team with the supervision of undergraduate MSc and PhD project work and day today supervision and support of other researchers.
- Engage in training programmes in the University (or elsewhere) that are consistent with the needs and aspirations of the project and those of the Department.
- Undertake other duties as may be reasonably requested 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 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 Dr Jonathan Wagner, Senior Lecturer in Chemical Engineering.

Person Specification

Your application will be reviewed with respect to meeting the essential and desirable criteria listed below. 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	Background in Chemical Engineering, Chemistry, Biochemistry, (Micro)biology or other relevant technical discipline]	1,3
	Experience in experimental design, equipment development, continuous operation	1,3
	Experience in algae cultivation, including aseptic techniques	1,3
	Authoring original work for academic journal papers, conference papers or technical reports	1,3
	Experience of project planning and management	1,3
Skills and abilities	Ability to work across multiple fields and readily understand new and challenging concepts	1,3
	Ability to complete basic chemical engineering calculations including mass and energy balances, equipment sizing and separation processes	1,3
	Ability to manage laboratory equipment, including the organisation of equipment training sessions, preparation of Standard Operating Procedures (SOP) documents, management of equipment booking calendars and equipment troubleshooting.	1,3
	Excellent written and oral communication skills	1,3
	Self-motivated with ability to meet deadlines	1,3
	Excellent interpersonal, and organisational skills	1,3
	Working knowledge of software packages [Excel, Word, PowerPoint]	1,3
	Working knowledge of specific analytical methods, including GC, HPLC, TOC/TON, biochemical analysis, UV-Vis, elemental analysis, FTIR	1,3
	Ability to write project reports and make technical presentations to industrial and academic research groups	1,3
	Knowledge of relevant Health & Safety issues	1,3
Training	A willingness to undertake further training as appropriate and to adopt new procedures as and when required	1,3
Qualifications	PhD (or near completion) in Chemical Engineering, Chemistry, Biochemistry or other relevant subject	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	1
	Willingness to travel and do medium-term visits to project partners	1,3

Desirable Criteria

Area	Criteria	Stage
Experience	Developing proposals for funding from external agencies	
	Working in a high quality academic research environment	
	Experience of teaching and / or supervision of students in relevant areas	
	Experience of working in industry or collaborating with industrial partners	
Skills and abilities	Authoring original work, in the highest quality refereed academic journals	
	A strong publication track record	
	<i>Experience of process simulation software, e.g. Aspen Hysys</i>	
	Experience of public speaking at conferences and project meetings	
Qualifications		
Other		

Conditions of Service

The position is FULL TIME and FIXED TERM. Salary will be on Specialist and Supporting Academic Research, Grade 6, Salary Band £30,942 - £35,845 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 for STAFF GRADES 1-5/STAFF GRADES 6 AND ABOVE, 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 can be found [here](#).

The University offers a wide range of employee benefits which can be found [here](#).

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/>