Aston University
BIRMINGHAM UK

Research Associate

Reference: 0773-26

Grade: 08

Salary: £41,064 per annum

Contract Type: Fixed Term (60 months)

Basis: Full Time

Job description

Job Purpose:

We are seeking a highly motivated Postdoctoral Researcher to join the flagship SmartChar programme, a five-year, EPSRC funded research programme focused on developing self-sensing, low-carbon concrete infrastructure through the integration of biochar materials, advanced fibre optic sensing, and digital technologies.

This role focuses on the assessment, optimisation and advanced characterisation of biomass-derived biochar and biochar production technologies for use in low-carbon concrete, as well as wider biochar applications in civil and environmental engineering. The postholder will help establish the material and process foundation for the programme by investigating how feedstock type, pyrolysis technology, reactor configuration, process conditions and resulting biochar properties influence performance in construction-related applications.

The position combines biochar production and process optimisation, pilot-scale pyrolysis trials, reactor system comparison, mass and energy balance assessment, emissions/yield evaluation and advanced material characterisation. This will include working with rotary kiln and auger pyrolysis systems, generating process datasets, and applying characterisation techniques such as TGA/DSC, FTIR, BET and XRD, alongside functional testing such as water holding capacity, hydrophobicity and thermal behaviour.

The successful candidate will work closely with colleagues in Aston's EBRI, AIPT, Department of Civil Engineering and the wider programme team and its industrial partners.

Main Duties and Responsibilities:

Research and Technical Responsibilities:

- Carry out research activities within biochar optimisation and material characterisation, ensuring delivery of key technical milestones, datasets and reports in line with the SmartChar programme objectives.
- Contribute to the assessment and optimisation of biochar production technologies, with particular focus on comparing different pyrolysis systems in terms of process conditions, energy demand, mass yield, emissions, scalability and resulting biochar properties.
- Support the selection and assessment of suitable biomass feedstocks for biochar production, including consideration of UK biomass availability, feedstock variability, cost, sustainability and relevance to civil and environmental engineering applications.
- Plan, coordinate and conduct pilot-scale pyrolysis trials using selected feedstocks and reactor systems, ensuring systematic recording of process parameters, mass balances, energy balances, emissions-related data and biochar yields.
- Develop and apply a standardised biochar characterisation framework using techniques such as BET, XRD, TGA and FTIR, alongside relevant physicochemical and functional tests.
- Characterise biochar in terms of pore structure, surface chemistry, mineral composition, morphology, thermal stability, water holding capacity, hydrophobicity, thermal behaviour and other properties relevant to low-carbon concrete and environmental engineering applications.
- Analyse the relationship between feedstock type, pyrolysis conditions, reactor configuration and biochar properties, with the aim of identifying reproducible and performance-matched biochar for construction-related applications.

- Generate high-quality datasets on biochar process conditions, material properties and functional performance to support downstream activities across the SmartChar programme, including concrete mix development, durability assessment, modelling, lifecycle assessment and standardisation.
- Contribute to the development of a UK Biochar Material Database, building on existing resources such as Charchive, by preparing structured datasets linking feedstock characteristics, pyrolysis parameters, biochar properties and performance-related indicators.
- Work with colleagues across the project to ensure that outputs provide suitable input data for concrete performance testing, predictive modelling, Aspen Plus modelling and techno-economic evaluation.
- Support the development of material guidance for the selection and use of biochar in low-carbon concrete, including recommendations on feedstock-process combinations for durability, water retention, CO_2-curing performance and wider civil and environmental engineering applications.
- Ensure that experimental methods, data collection and reporting procedures are robust, reproducible and aligned with emerging UK, EU and international standards for biochar and construction material.

Collaboration and Project Support

- Work collaboratively with academic staff, researchers and technical specialists across Aston University, the University of Edinburgh and the wider SmartChar programme.
- Liaise with colleagues in bioenergy, biochar science, civil engineering, materials characterisation, sustainability assessment, modelling and data science to ensure effective integration of WP1 outputs across the programme.
- Contribute to regular project and programme-level meetings, providing updates on experimental progress, data generation, risks, technical challenges and milestone delivery.
- Support coordination between project work packages by ensuring timely provision of biochar samples, characterisation data, process datasets and synthesis reports.
- Contribute to the preparation of project deliverables, milestone reports, internal technical notes and progress updates for funders and project partners.
- Support the supervision and training of researchers/project staff where appropriate, particularly in relation to biochar preparation, pyrolysis trials, material characterisation and data interpretation.
- Work with technical teams to ensure appropriate use, maintenance and safe operation of laboratory equipment, pyrolysis systems and characterisation facilities.

Dissemination and Impact

- Prepare and contribute to high-quality peer-reviewed publications based on research outputs, including biochar production technology assessment, material characterisation, process-property relationships and applications in low-carbon construction materials.
- Present research findings at national and international conferences, workshops, project meetings and stakeholder events.
- Contribute to knowledge exchange with industrial partners, particularly in relation to biochar production, process scalability, material quality, construction-sector applications and environmental performance.
- Support the development of standardised terminology, characterisation protocols and material classification approaches relevant to biochar use in concrete and related civil engineering applications.
- Contribute technical content, case studies and training material to support programme-level dissemination, stakeholder engagement and curriculum development activities.

- Identify opportunities for applied impact, commercialisation and wider adoption of biochar-based materials in sustainable construction and environmental engineering.

As a part of the 5-years SmartChar programme, the postholder will primarily contribute to their assigned Work Packages, and will support cross-cutting activities such as standardisation, policy, engagement and training, as appropriate.

Additional responsibilities

- Engage in continuous personal and professional development in line with the demands of the role, including undertaking relevant training and development activities to develop themselves and support the development of others.
- Ensure and promote the personal health, safety and wellbeing of staff and students.
- Carry out duties in a way which promotes fairness in all matters and which engenders trust.
- Promote equality of opportunity and support diversity and inclusion as well as working to support the University's environmental sustainability agenda and practices.

Person specification

	Essential	Method of assessment
Education and qualifications	A Master's degree, MEng, MSc or equivalent qualification in Chemical Engineering, Environmental Engineering, Materials Science, Mechanical Engineering or a closely related discipline.	Application form
Experience	Understanding of biochar production technologies, including the influence of feedstock type, reactor configuration and pyrolysis conditions on biochar properties. Experience in biochar, biomass-derived materials, carbon materials, thermochemical conversion, pyrolysis, cementitious materials, or related sustainable materials research. Experience in materials characterisation, for example using techniques such as TGA/DSC, elemntal analysis, FTIR and other biochar/material characterisation methods. Experience in experimental design, laboratory-based research, data collection and interpretation of material/process-property relationships. Ability to analyse and report data relating to mass balance, energy balance, material yield,	Application form and interview

	Essential	Method of assessment
	emissions-related parameters and physicochemical properties. Ability to contribute to academic publications, technical reports and research dissemination	
Aptitude and skills	Strong analytical and problem-solving skills. Ability to work independently and as part of a multidisciplinary team. Good communication and organisational skills.	Application form and interview

	Desirable	Method of assessment
Experience	Strong analytical and problem-solving skills, with the ability to interpret complex experimental and characterisation datasets. Good organisational skills, including the ability to plan experiments, manage samples, record data accurately and meet project deadlines. Ability to work independently and as part of a multidisciplinary team involving bioenergy, materials science, civil engineering, sustainability assessment and industrial partners. Good written and verbal communication skills, including the ability to explain technical findings to both specialist and non-specialist audiences. Commitment to safe, responsible and sustainable laboratory practice.	Application form and interview

University values

All staff are expected to demonstrate/promote the University's values and expectations, which are an integral part of our strategy and underpin the culture of the University. In addition, our leaders are expected to be accountable, help to execute strategic visions of the University and share and set clear expectations that inspire those around them.

How to apply

You can apply for this role online via our website https://www2.aston.ac.uk/staff-public/hr/jobs.

Applications should be submitted by 23.59pm on the advertised closing date.
All applicants must complete an application form, along with your CV.

Any CV sent direct to the Recruitment Team and Recruiting Manager will not be accepted.

If you require a manual application form, then please contact the Recruitment Team via recruitment@aston.ac.uk.

Contact information

Enquiries about the vacancy:

Name: Dr Daniel Nowakowski
Job Title: Lecturer In Chemical Engineering
Email: d.j.nowakowski@aston.ac.uk

Name: Dr Abed Alaswad
SmartChar PI & Director
Email: a.alaswad@aston.ac.uk

Enquiries about the application process, shortlisting or interviews:
Recruitment Team via recruitment@aston.ac.uk or 0121 204 4500.

Additional information

Visit our website https://www2.aston.ac.uk/staff-public/hr for full details of our salary scales and benefits Aston University staff enjoy.

Salary scales: https://www2.aston.ac.uk/staff-public/hr/payroll-and-pensions/salary-scales/index

Benefits: Benefits and Rewards | Aston University

Working in Birmingham: https://www2.aston.ac.uk/birmingham

Employment of Ex-Offenders: Under the Rehabilitation of Offenders Act 1974, a person with a criminal record is not required to disclose any spent convictions unless the positions they applying for is listed an exception under the act.

Eligibility to work in the UK: Where an individual is subject to UK immigration control, they will require a visa to work in the UK.

The following individuals do not need a visa for the UK, but do still have to prove their right to work before employment can commence:

- **British Citizens or Irish Nationals**
- **EU/EEA/Swiss nationals with Settled or Pre-settled status under the EU Settlement Scheme**
- **Non-EEA nationals with Indefinite Leave to Remain/Settlement in the UK**

The main routes available for those who need a visa to work in the UK are **Skilled Worker**, **Global Talent** and the **Graduate Route**.

Please see UKVI guidance for further information on eligibility, knowledge of English requirements and approved test centres https://www.gov.uk/skilled-worker-visa You can also find further information on our candidate immigration web page.

If you will conduct research in your role, you may need to apply for and obtain ATAS clearance before Aston can issue a Certificate of Sponsorship for your visa application. Please see our candidate immigration web page for further details.

Before you start and Right to Work

Right to Work Check
All employees must complete a Right to Work check before they commence work at Aston. HR will contact you during the onboarding process to arrange your check.

Cost of Living - Estate and Letting Agents
There are numerous Estate and Letting Agents that can help you find suitable accommodation. Useful websites for support and guidance https://www.gov.uk/government/publications/how-to-rent/how-to-rent-the-checklist-for-renting-in-england and https://www.citizensadvice.org.uk/housing/
You can also use property search websites such as Rightmove or Zoopla.

Equal Opportunities
Aston University promotes equality and diversity in all aspects of its work. We aim to ensure, through our admissions policies for students, and our staff recruitment and selection processes that we encourage applications from all groups represented in the wider community at a local, national and international level.

The University will endeavour not to discriminate unfairly or illegally, directly or indirectly, against student or potential students, staff or potential staff. This commitment applies to all functions of the University and to any stage of an individual's career.

An Equal Opportunities Monitoring Form is included within the application form. Data you provide on the Equal Opportunities Monitoring Form will be included in a general database, for statistical monitoring purposes, enabling the University to monitor the effectiveness of its Policy, Codes of Practice and Guidelines on Equal Opportunities in Employment. Individuals will not be identified by name.

Data Protection
Your personal data will be processed in compliance with the Data Protection Act 2018 and the General Data Protection Regulation ((EU) 2016/679) ("GDPR"). The University's Data Protection Policy and Privacy Notices, including the Job Applicant Privacy Notice can be found at https://www2.aston.ac.uk/data-protection. Your application will only be used to inform the selection process, unless you are successful, in which case it will form the basis of your personal record with the University which will be stored in manual and/or electronic files. Information in statistical form on present and former employees is given to appropriate outside bodies.
Full details of our terms and conditions of service and associated policies and procedures are available online at https://www2.aston.ac.uk/staff-public/hr/policies

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