Aston University
BIRMINGHAM UK

Postdoctoral Research Fellow in Thermal Energy Systems and Modelling

Reference: 1071-25

Grade: Grade 08

Salary: £ 42,254, per annum, depending on experience

Contract Type: Fixed Term (24 Months)

Basis: Full Time

Job description

Job Purpose

The Postdoctoral Research Associate (PDRA) will play a central role in delivering the technical research objectives of the project, which aims to design, model, and demonstrate an advanced adiabatic compressed-air energy storage (A-CAES) system integrating multi-stage phase-change material (PCM) thermal storage with a high-efficiency rotary-piston expander to provide resilient, low-carbon power for communities in Ukraine.

The postholder will be responsible for conducting high-quality research across thermal-energy storage, heat transfer, and control systems, combining CFD/FEA simulation, laboratory experimentation, and model-predictive control (MPC) development. Working closely with academic and industrial partners in the UK and Ukraine, the PDRA will support prototype development, data analysis, and performance validation, contributing directly to the project's technical milestones and scientific outputs. The role will also involve drafting technical reports, journal publications, and conference papers, supporting knowledge exchange and contributing to the wider exploitation and impact of the AeroVault technology. The PDRA will be an integral member of EBRI's research team, ensuring that Aston's technical work packages are delivered to schedule and that findings feed into both academic dissemination and technology commercialisation pathways.

Main Duties/Responsibilities

- Conduct high-quality research on adiabatic compressed-air energy storage (A-CAES), focusing on the integration of multi-stage phase-change material (PCM) thermal storage and rotary-piston expansion systems.
- Develop and apply CFD/FEA models to optimise PCM module design, thermal-fluid behaviour, and heat-exchanger geometries for enhanced energy density and cycle life.
- Design and implement laboratory experiments for PCM characterisation, heat transfer measurement, and system performance validation under controlled operating conditions.
- Develop and test model-predictive control (MPC) algorithms to regulate pressure, temperature, and load response during charge–discharge cycles.
- Collaborate with industrial and academic partners in the UK and Ukraine to support prototype fabrication, instrumentation, and commissioning activities.
- Analyse experimental and simulated data to evaluate system performance, identify optimisation opportunities, and verify compliance with project KPIs.
- Prepare and maintain detailed technical documentation, including reports, design specifications, and risk assessments, ensuring compliance with Innovate UK and University standards.
- Contribute to the preparation of scientific publications, conference presentations, and funding deliverables, disseminating outcomes to both academic and industrial audiences.
- Engage actively with Aston's Energy and Bioproducts Research Institute (EBRI) team to ensure effective coordination across all work packages and timely milestone delivery.
- Support broader project objectives, including knowledge exchange, technology exploitation, and contributions to future funding proposals and collaborative initiatives.

Additional responsibilities

- Engage in continuous personal and professional development in line with the demands of the role, including undertaking relevant training, research seminars, and development activities.
- Ensure and promote the personal health, safety, and wellbeing of staff, students, and project collaborators in accordance with University and funder policies.
- Carry out all duties in a manner that upholds the highest standards of professionalism, integrity, and fairness, fostering a culture of mutual respect and trust.
- Promote equality of opportunity, diversity, and inclusion in all aspects of research and team collaboration.
- Contribute to Aston University's commitment to environmental sustainability and responsible research and innovation practices.
- Support wider academic citizenship through participation in institute meetings, workshops, and outreach activities that enhance the visibility and impact of the AeroVault Project.

Person specification

	Essential	Method of assessment
Education and qualifications	• A PhD (or equivalent doctoral qualification) in Mechanical Engineering, Energy Systems, Thermal Sciences, or a closely related discipline.	Application form and interview
Experience	• Proven research experience in thermal-energy storage, heat transfer, or energy systems engineering. • Demonstrated capability in numerical modelling and simulation using tools such as ANSYS, COMSOL, or OpenFOAM (CFD/FEA). • Experience in experimental design, instrumentation, and data acquisition for thermal or fluid systems. • Evidence of producing high-quality research outputs, including journal publications and conference presentations. • Experience of working collaboratively in multidisciplinary or multi-institutional research environments.	Application form and interview
Aptitude and skills	• Strong analytical and problem-solving ability with attention to accuracy, reproducibility, and scientific integrity. • Ability to plan, prioritise, and deliver research tasks to tight deadlines with minimal supervision. • Excellent written and verbal communication skills, including the ability to write technical reports/academic papers. • Effective interpersonal skills, with the ability to work constructively within a diverse, international team of researchers and industry partners. • Competence in data processing and visualisation using MATLAB, Python, or equivalent programming tools.	Application form and interview

	Desirable	Method of assessment
Education and qualifications	• Chartered Engineer (CEng) status or eligibility for professional registration (IMechE, IET, or equivalent). • Formal training or certification in advanced numerical modelling, process control, or energy-systems optimisation.	Application form
Experience	• Research experience in phase-change materials (PCM), thermal storage, or compressed-air energy systems (CAES). • Demonstrated experience with model-predictive control (MPC) or related control algorithm development. • Experience in contributing to Innovate UK, UKRI, or European-funded collaborative projects, particularly with industry partners. • Practical experience in prototype design, system integration, or pilot-scale testing of energy or heat-transfer systems. • Familiarity with intellectual property (IP) processes, technology transfer, and research commercialisation.	Application form and interview
Aptitude and Skills	• Ability to link academic research with industrial applications and commercialisation pathways. • Strong organisational and coordination skills, with the ability to manage project documentation, datasets, and milestones effectively. • Awareness of international development, sustainability, or Official Development Assistance (ODA) research principles.	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 23.59 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 Muhammad Imran
Job Title: Reader in Energy Systems
Email: m.imran12@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: You should ensure that you meet the eligibility requirements, including meeting the English language standards. If you do not meet the eligibility criteria, any application for a work visa would be unsuccessful. Please see UKVI guidance for further information on eligibility, knowledge of English requirements and approved test centres https://www.gov.uk/tier-2-general

With the end of free movement for EU/EEA/Swiss nationals from 1 January 2021, the UK's new immigration system applies to all non-UK/Irish nationals who require a visa.

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**.

You can find further information about each of these visa routes on our candidate immigration 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 below for further details.

Academic Technology Approval Scheme (ATAS):
If you will conduct research in your role and you apply for a Skilled Worker or Temporary Worker GAE visa, you may need to apply for and obtain ATAS clearance before Aston can issue a Certificate of Sponsorship for your visa application.

This process can take at least 6 weeks to process, and Aston will consider this when confirming your expected start date. Processing times will increase between April and September and can longer to complete.

There is no fast-track option available. ATAS certificates will be processed in order of receipt.

You can find more information about ATAS on our candidate immigration page.

Before you start and Right to Work

90-day entry vignette
If you have applied for your visa outside of the UK, you will receive a vignette in your passport which is usually valid for 90 days. Please make sure to travel to the UK within the 'valid from' and 'valid to' dates on this visa. If you entered the UK before or after these dates, you would not 'activate' the visa and you would need to leave and re-enter the country.

You will also receive a decision letter confirming details about your immigration permission and where to collect your Biometric Residence Permit.

Cost of Living - Estate and Letting Agents
There are numerous Estate and Letting Agents in and around Birmingham that can help you find suitable accommodation. The Midland Landlord Accreditation Scheme provides a list of professional agencies and landlords who have applied with them for accreditation. Whilst accreditation is not a guarantee of quality, it provides some reassurance about the standard of the service they provide.

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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