School of AACME

Senior Research Associate in Vehicle Emission modelling Project Title: Air Quality Analysis and Prediction Tool for Road Vehicles

Job Ref: REQ250149

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

School of Aeronautical Automotive Chemical and Material Engineering

Project Description

Air quality is a growing global concern, driving legislative efforts such as the Green Deal. The European Union is leading the push for zero air pollution by 2050 through the Ambient Air Quality Directive. Among the major contributors to urban air pollution, road transport emissions stand out as a key challenge. This research aims to advance our understanding of the environmental impact of diverse road transport technologies, including various powertrain systems. Adopting a systems engineering approach, it will harness the power of advanced data analytics and predictive modelling, integrating digital twins and artificial intelligence to develop an innovative air quality modelling tool. This tool will enable direct comparative analysis of different transport technologies, providing a data-driven foundation for strategic decision-making. This holistic approach, incorporating life cycle analysis and considerations of societal and economic factors, will help identify the most effective pathways for passenger transportation fleets to comply with WHO Air Quality Standards, both locally and globally, while advancing toward a future of zero pollution.

The successful applicant will be based in the Department of Aeronautical and Automotive Engineering, joining an active research community conducting impactful research, with a focus on addressing global challenges, with key areas including sustainable aviation, net-zero transportation, autonomous and intelligent systems, systems reliability and health management, mechanics and dynamics, and mathematical modelling and simulation.

Job Description

Job Grade: Specialist and Supporting Academic Grade 7

A Senior Research Associate is required to provide management, leadership, technical expertise, and delivery for research activities relating to the development of an air quality analysis and prediction tool. Emphasis will be placed on the understanding and enhancement of air quality analysis modelling for vehicles using advanced data analytic and optimisation methods. The post holder will be expected to co-ordinate the delivery of high-quality project and research outputs. They will provide supervisory support to a team of researchers as well as relationship management of the industrial partner to ensure milestones are met and research activities align with project objectives.

Job Purpose

- To lead and coordinate the technical aspects of research aimed at delivering the air quality measurement tool with particular emphasis on defining consistent data structures and managing data integrity, definition of model requirements using a systems engineering approach, and development of the model using innovative digital twin and AI approaches.
- To take the lead role in organising meetings and liaising with the industrial partner, steering committee and external collaborators.
- To lead the presentation and preparation of progress reports to the industrial partner, ensuring all deliverables and milestones are completed in a timely manner.
- To lead and supervise the PDRA involved in the research, and to support related research activities of Doctoral Researchers working on air quality measurement.
- To be responsible for the day-to-day management and delivery or specific work packages
- To be responsible for undertaking background literature reviews on vehicle emissions, data collection on published research and the acquisition of available data on air quality measurements.
- To develop ideas and research directions to facilitate the development and validation of the air quality modelling tool
- To publish the outcomes of the research in outlets of international standing.
- To attend and contribute to major international conferences.
- To create social, cultural, and economic impacts from the research activity.
- To collaborate in research initiatives with university colleagues, other HEIs, industry and other relevant bodies as appropriate.

Other Related Activities

- To work effectively with relevant administrative, technical, and academic staff within the department of Aeronautical and Automotive Engineering, the AACME School and across the University.
- To engage in training programmes in the University (e.g., through Organisational Development) and elsewhere as required.
- To undertake such 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 the Principal Investigator, Prof Lisa Jackson, Aeronautical and Automotive Engineering Department.

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	Significant research (academic or industrial) experience in vehicle emissions system development with specialised knowledge of automotive power train applications or equivalent	1, 2, 3
	Experience in / of: • Development of vehicle emissions models for components and systems • Application and development of advanced control of emissions systems (e.g. G/DPF, TWC, LNT, SCR) and systems integration with interfacing modules (airpath, fuelling, thermal management) • Systems Engineering processes including Use Case definition, requirements capture and analysis, test development and execution • Demonstratable knowledge of air quality calculation, modelling, monitoring and impact for both vehicle and fleet • Application of data analytic methods and associated validation methodologies to optimise tail pipe emissions • Understanding and experience of vehicle legislation and homologation regulations • Calibration processes and testing experience on dynamometers (engine) and chassis rolls (vehicle)	1, 2, 3
	Significant experience of working in industry and/or collaboration with industry on research projects	1,3
	Significant experience of authoring original work in refereed academic journals, conference papers and/or technical reports.	1, 3
	Project planning and management experience	1, 2, 3
Skills and abilities	Proven technical leadership in writing software and system specifications for real-time emissions systems	1, 2, 3
	Leadership and research management skills with evidence of outcomes	1, 2, 3
	Proven record of managing research teams	1, 2, 3
	Excellent written and oral communication skills	1, 2, 3
	Ability to work independently on own initiative and as part of a team	1, 2, 3
	Excellent interpersonal and organisational skills	1, 3
	Ability to manage research projects to deadlines and within budgets	1, 2, 3
Training	Willingness to undertake appropriate further training and to adopt new procedures as and when required	1
Qualifications	PhD in a relevant area of activity	1

Other	Commitment to observing the University's Equal Opportunities policy at all times.	1

Desirable Criteria

Area	Criteria	Stage
Experience	Experience of air quality measurement	1, 3
	Experience of digital twins	1, 3
	Research experience in an internationally recognised research environment	1, 3
	Experience of developing proposals for funding from external agencies	1, 3
	Experience of teaching and / or supervision of students in relevant areas	1, 3
Skills and abilities	Authoring original work, in the highest quality refereed academic journals	1, 3
	Ability to supervise research students in areas related to the project	1, 3
	A strong publication track record	1, 3
	Ability to develop a programme of original research, with a trajectory to secure funding from external sources	1, 3
Qualifications	PhD in engineering or science	1

Conditions of Service

The position is FIXED TERM, ending 31st December 2027. Salary will be on Specialist and Supporting Academic, £46,735 - £55,755 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 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/