

## Job Description: Associate Professor (Research and Education)

Post title and post number	<b>Associate Professor in Mechanical Engineering</b>
Grade	9
<b>Background</b>	
<p>This is an exciting time to be an academic in engineering at the University of Birmingham. Following the creation of the School of Engineering in 2016, which brought together the disciplines of Civil Engineering, Mechanical Engineering, and Electronic, Electrical and Systems Engineering, we are now entering the next phase of our development. We are investing significantly in both people and infrastructure: our new £65m landmark building and our £28m UK Rail Research and Innovation Network (UKRRIN) Centre of Excellence for Digital Systems have recently opened, while our world-leading £26m National Buried Infrastructure Facility opened in 2020.</p> <p>The School of Engineering has a long-standing tradition of world-class research and strong industrial partnerships, ensuring that our innovations deliver rapid real-world impact. We are now seeking a highly motivated, research-active academic to join the Department of Mechanical Engineering.</p> <p>This post is open to candidates with expertise in advanced propulsion and vehicle systems, particularly in areas with strong potential for research funding, including:</p> <ol style="list-style-type: none"><li>1. Sustainable and low-carbon fuels, such as hydrogen carrier fuels (hydrogen, ammonia and etc), and fuel-flexible systems (spray, combustion, emissions, and efficiency)</li><li>2. Integrated electrified and hybrid powertrains, including system design, intelligent control, energy management, and thermal (HVAC) systems, with consideration of efficiency, degradation, and lifecycle performance</li><li>3. Powertrain decarbonisation strategies, involving electrification, hydrogen integration, net-zero vehicle systems, and intelligent, connected and automated vehicle systems empowered by AI technologies</li><li>4. Integrated mobility systems, including smart fleet management, vehicle–infrastructure interaction, and whole-system efficiency optimisation</li></ol> <p>This role offers a unique opportunity to contribute to the UK’s net-zero transport ambitions, supported by leading industry collaborations and strong funding opportunities.</p> <p>The successful candidate will have a PhD, or equivalent qualification, in one of the areas above. They will be expected to secure support from government, industry, and international organisations to conduct high-quality research, generate high-quality publications in internationally recognised journals, and contribute to the development and delivery of undergraduate, postgraduate, and CPD programmes as appropriate to the disciplinary area. Industrial experience, whether through direct employment or through collaboration, is highly desirable, as is the ability to engage effectively with academic, government, and industrial partners in the UK and internationally.</p> <p>For informal enquiries, please contact Dr Carl Anthony, Head of the Department of Mechanical Engineering, at <a href="mailto:c.j.anthony@bham.ac.uk">c.j.anthony@bham.ac.uk</a>.</p>	

## **Summary of Role**

You will contribute at a senior level to teaching, research, and administration. In addition you will be expected to contribute to academic citizenship, likely to be demonstrated through generous, mutually respectful and supportive working relationships with all staff and students.

Teaching is likely to include: (a) development and leadership of major teaching programmes or equivalent; and (b) enhancement of the student experience or employability.

Research is likely to involve an established national and international reputation through significant original research work and a clear record of impact.

Management and administration is likely to include Departmental/School leadership and management activity with University wide involvement – for example through sustained high value research, knowledge transfer, enterprise, business engagement, and public engagement or similar activities.

## **Main Duties / Responsibilities**

### **Education**

You will contribute across the range of teaching and learning activities:

- making a significant contribution to the pedagogical knowledge base of the subject that advances teaching through the enhancement of practice, the development of teaching resources and/or through practice-based research;
- leading on the management and the development of approaches to teaching and learning, including designing innovative approaches to digital resources/environments and supporting colleagues to use them that are innovative to the subject area or institution;
- leading on curriculum design at module and programme level to ensure it is contemporary, inclusive, engaging and academically challenging;
- actively engaging students in curriculum design and sharing evidence of “what works”;
- making an impactful, high quality contribution to debates about education policy, methods and practices through internal and external publications, subject societies and conference activity;
- developing an external profile evidenced through engaging in external quality assurance activities related to teaching, eg. external examining and engaging with/supporting education in other institutions;
- playing an important and sustained role in the recruitment and admission of students;
- co-supervising doctoral students to completion;
- leading the development of teaching, learning and assessment policies and strategies;
- acting as an education mentor to colleagues in the School/Department/College or more widely;
- leading the development of new and appropriate approaches to learning and teaching. This may be underpinned by research and evaluation of teaching methods and systems
- leading sustained high value impact in knowledge transfer and enterprise (including business engagement, public engagement) that enhances the student experience and/or or employability, and is of manifest benefit to learning and teaching in the College and the University
- undertaking own teaching, which will include teaching and examining courses at a range of levels, planning and reviewing own teaching approaches, developing programme proposals, supervision, marking and examining. You will ensure that your teaching practice is informed by discipline based research, through participating in the research culture of the School.

### **Research**

To pursue sustained research activity through original research and scholarship, including other research-related contributions through conference papers and presentations and/or consultancy projects and advice, including (as appropriate):

- contributing to the management of research activities and/or supervising other research staff;
- leading successful funding bids;
- consistently publishing internationally excellent research, with some research regarded as world leading, that results in a sustained, highly respected reputation of international quality;
- supervising and examining PhD students, both within the institution and externally;
- providing expert advice internally and externally;
- peer reviewing articles for peer reviewed academic journals and grant applications by research councils and/or other major funding bodies;
- leading sustained impact activity including public engagement and makes a significant contribution to policy development at a national and international level;
- supervising and examine PhD students, both within the institution and externally;
- as appropriate, managing research activities and/or supervising other research staff;
- developing novel methodologies and techniques appropriate to the type of research being pursued.

### **Management/administration**

Lead activities in the Department/ School and represent the School on College/ University committees or working groups. Where appropriate to the discipline, this is likely to include some but not all of the responsibilities listed below:

- making an important contribution to the development and running of the Department or School, for example, leading activity on research and/or teaching assessment
- leading a successful international engagement at School or College level;
- developing and managing staff and resources in support of major research and/or teaching activities
- making important contributions to the development of the Department's research and/or learning and teaching strategy
- contributing significantly to the development and delivery of knowledge transfer, enterprise, business engagement and public engagement activities with sustained high value impact of manifest benefit to the College and the University;
- promoting a culture (including policies and procedures) that embeds equality and values diversity and inclusion
- leading, serving on and assisting the work of committees and task and finish groups beyond School/ Research Institute, e.g., Senate, Council, University Education or Research Committee etc.;
- leading external committees, e.g., those associated with public/professional bodies or delivery of activities for an external body at an appropriate level, e.g., chairing sub committees associated with large elements of work;
- leading/project managing a team to devise and implement a new and/or revised process (e.g. a new research initiative, or a recruitment drive);
- making a sustained contribution to widening participation, schools outreach and/or public understanding of the discipline;
- contributing to administrative activities within the University (e.g. appeals panels, working groups).

### **Citizenship**

- identifying wellbeing issues within the School/College/University and developing appropriate solutions to address these;
- taking collective ownership of challenges faced by the School or College and working with colleagues to develop solutions;
- mentoring and coaching of colleagues, particularly those in the early stages of their career.

### **Person Specification**

- A first degree in engineering, physics or a subject allied to the field of advanced propulsion and vehicle systems
- A doctoral qualification with direct relevance to advanced propulsion and vehicle systems
- Industrial experience, either through working in or with industry would be desirable
- Demonstrated excellence in at least Research, with competence in Learning and Teaching and Management and Administration.

### **Learning and teaching requirements**

An excellent teaching profile and performance in terms of both impact and quality. The teaching quality demonstrated to be informed by an appropriate level of scholarship. Evidence of success under the following headings:

- High national reputation for the development of teaching and learning excellence within the discipline with an emphasis on powertrain and vehicle technologies, including their context in terms of sustainability and net-zero
- Successful and sustained use of a range of appropriate teaching methods, and assessment strategies that promote high quality learning, including learning that is flexible, distinctive, and current and stimulates learners' natural curiosity
- Significant and sustained contribution to one or more of the following: strategic development of new programmes; approaches to learning; the development of learning resources
- High quality and sustained contributions to fostering excellence in teaching activities more widely, i.e., in the Department/School or College and/or externally
- Track record of substantial and sustained high value impact on the enhancement of the student experience, and/or employability
- Mentoring and expert advice which develops the skills of colleagues in teaching and in fostering learning

### **Research requirements**

An excellent national reputation and a developing international profile through significant original research work and a clear record of impact in the field of advanced propulsion and vehicle systems. Evidence of success under the following headings, as appropriate to the discipline:

- High level peer esteem as evidenced by
  - Excellent reputation in the UK and often internationally, reflected in sustained high-quality output, level of innovation, impact on subject and recognition
  - An excellent and sustained record of peer reviewed research publications in one or more of the following: Sustainable and low-carbon fuels; Integrated electrified and hybrid powertrains; Powertrain decarbonisation strategies; or Integrated mobility systems.
- Significant prior research experience in one or more of the following: Sustainable and low-carbon fuels; Integrated electrified and hybrid powertrains; Powertrain decarbonisation strategies; or Integrated mobility systems.
- Substantial and sustained research income generation in the relevant areas, e.g., through research grants, contracts, research consultancy or other external funding,
- Successful and sustained supervision of doctoral students to completion
- Sustained high value impact knowledge transfer and enterprise that is of manifest benefit to the College and University
- Experience of the development and application of AI to your research would be desirable

### **Management and administration-related requirements**

Demonstrated significant achievement in management and administration-related activities, which may include leadership of activities/initiatives. Evidence of success under the following headings

- Successful and sustained performance in significant administrative/managerial role (s) (e.g. exams officer)
- Significant and sustained high quality innovative contributions to the management/administration of the Department/School/College or University
- Successful and sustained contribution to the corporate life of the School/College/University, displaying willingness to contribute actively to committees, collaborative teaching and administrative tasks
- Actively promotes equality and diversity to internal and external stakeholders
- Able to use data to identify equality and diversity issues
- Experience of developing interventions to address equality and diversity issues