

Research Associate in Design and Manufacturing with Hybrid Machining

REQ200443

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.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

Applications are invited for a Research Associate position in the Mechanics of Advanced Materials Research Group, Wolfson School of Mechanical, Electrical and Manufacturing Engineering, Loughborough University. The research group (<https://moamrg.co.uk/>) has an outstanding international reputation in performing multi-disciplinary research into the response of advanced engineering materials to various types of external loading and environmental conditions, using a combination of analytical, numerical and experimental techniques. The engineering Schools at Loughborough have outstanding research facilities second to none. The work is funded by the EPSRC via the prestigious Adventurous Manufacturing Research Scheme, with an explicit aim of enabling discoveries that lead to new, disruptive technologies.

The Research Associate will be primarily based in the Wolfson School of Mechanical, Electrical and Manufacturing Engineering, with certain laboratory work conducted elsewhere at the University and beyond.

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose

Manufacturing of high-end parts requires machining of difficult-to-cut materials which is rather challenging. To radically improve this process, we need to explore different non-conventional routes. Here, we explore a hybrid machining process where a high-density electric current is delivered to the metallic workpiece during vibratory machining. This is expected to significantly reduced machining forces, improve part integrity in service and make the overall machining process much cheaper, by eliminating the need for re-work and finishing. Finally, research will be conducted with the aim of developing next-generation inexpensive tools for optimal manufacture. This unique machining prototype will be designed, developed and installed on a CNC machine to test the efficacy of machining relevant materials. Machining studies will be conducted at industrially relevant machining conditions.

Job Duties

Research

- To design, develop and manufacture/assemble a hybrid machining setup with relevant instrumentation for monitoring of performance.
- To contribute to the optimisation of the design of the machine for deployment in an industrial setup.
- To design appropriate tooling for the hybrid machining process.
- To conduct relevant experimental work (materials characterisation and testing) for numerical modelling.
- To assist in other related engineering research projects as required.
- To contribute, attend and present the scientific findings in relevant international conferences.
- To manage the progress of the project for the deliverables required according to the time scale.

- To write and publish high quality and high impact journal papers based on the research outcomes and make presentations on the work to present to academic and related partners.
- To carry out appropriate literature survey on experimental and analytical methods in electric field assisted manufacture of advanced materials.
- To write technical reports and present research findings for publication and other publicity media.
- To contribute and present the results to EPSRC, academic and industrial collaborators.
- To plan, manage and conduct the work according to agreed deadlines.
- To assist in research grant applications where appropriate.

Teaching

- Teaching is not the primary purpose of this post and teaching load will be small relative to the typical load of a member of academic staff in the School, but the Research Associates will be expected to contribute to taught programmes and student projects, at any level, if appropriate and if requested to do so.

Other Related Activities and Functions

- To engage in training programmes in the University (e.g. through Professional 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 project supervisor, Professor Anish Roy.

Person Specification

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	Recent experience in an academic or industrial R&D environment	(1, 3)
	Experiences with engineering design	(1, 3)
	The conducting of original research that can be, or has been, published in high-quality journals	(1, 3)
	Good understanding of instrument design	(1, 3)
	Able to manufacture and assemble components	(1, 3)
	Experiences of materials testing and characterisation	(1, 3)
Skills and abilities	Demonstration of excellent technical ability	(1, 3)
	Ability to work accurately and precisely on specific engineering problems	(1, 3)
	Self-motivated and able to work without close supervision	(1, 3)
	Ability to work to deadlines	(1, 3)
	Good report writing and presentation skills	(1, 3)
	Good journal and conference publication records	(1, 3)
	Ability to maintain confidentiality at all times	(1, 3)
	Ability to work independently and as part of a team	(1, 3)
Training	A willingness to undertake further training as appropriate and to adopt new procedures as and when required	(3)
Qualifications	Hold a PhD degree (or approaching completion of a PhD) in engineering, manufacturing, physics or other relevant subjects.	(1, 3)
Other	Evidence a good working knowledge of equal opportunities and understanding of diversity in the workplace	(3)

Desirable Criteria

Area	Criteria	Stage
Experience	Post-doctoral research in Engineering or equivalent experience	(1, 3)
	Knowledge of pulsed electric instrumentation	(1, 3)
	Knowledge of ultrasonic transducers	(1, 3)
	Knowledge of numerical modelling using finite elements	(1, 3)
Skills and abilities	Knowledge of relevant Health & Safety issues	(1, 3)
	Public engagement	(1, 3)
Qualifications	PhD in Electrical/Mechanical Engineering	(1, 3)

Conditions of Service

The position is **full-time** and **fixed-term** until 30 September 2021. Salary will be on Specialist and Supporting Academic Grade 6 (£30,942-£40,322 per annum), at a starting salary to be confirmed on offer of appointment. It is expected that the position will be extended beyond the end date of the project.

The appointment will be subject to the University's Terms and Conditions of Employment for Grade 6 and above staff, 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 are available at <http://www.lboro.ac.uk/services/hr/a-z/family-leave-policy-and-procedure---page.html>.

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

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/>