Wolfson School of Mechanical, Electrical and Manufacturing Engineering

Loughborough University

Research Associate – Powder Alloying to manufacture Multifunctional Structures

Job Ref: REQ240854

Full or part-time, 6-month fixed term

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

The Wolfson School of Mechanical, Electrical and Manufacturing is one of the leading Engineering Schools in the country. With a strong tradition in Manufacturing and in the discovery and application of Materials for applications in a broad range of industrial sectors (e.g., electronics, bioengineering & healthcare, automotive, food industry, etc), we strive for academic excellence and research at the leading edge.

Project Description

This post can be held part of full time. To be negotiated with the candidates at interview stage.

The project involves the development of new alloys to manufacture structures using Advanced Manufacturing processes (e.g., Additive Manufacturing). This role is suited to an ambitious researcher who has a passion for materials science, manufacturing and engineering. The researcher will work on the entire workflow from powder selection and preparation, alloy manufacturing and its process parameterisation, characterisation of the resulting alloy and structure, and validation as multifunctional structures. Data analytics methods will be applied to accelerate the understanding of materials discovery, processing parameters and system optimisation.

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose

To conduct research in the areas of manufacture, characterisation and validation of multifunctional materials and structures (nominally alloys and engineered porous structures, esp. metals) from engineered powder feeds. To develop new scientific understanding of powder materials processing and manufacturing techniques to create alloys, materials and structures that possess more than one function (e.g. mechanical and thermal, mechanical and bio-instructive, etc). To use analytical tools to parameterise the process and optimise it for time and raw material efficiency. To generate high quality scientific reports and papers suitable for publication in International Journals.

Job Duties

- To conduct research of academic rigour and scientific standard, carry out authoritative literature reviews, and publish in top quality journals, consistent with the School's and Research Lab's quality and ambition.
- To develop and implement Design of Experiments techniques and protocols that support manufacturing, materials characterisation, process simulation and validation.
- For the powder preparation: to characterise powder feeds using techniques such as particle size distribution analysers, to use ball milling with the purpose of adjusting size or pre-alloying.
- To be able to study processing parameters using analytical tools to optimise the manufacturing process.

- For the manufactured alloys, materials and structures: to analyse chemical features using e.g., XRD, SEM, DSC, XPS; to undertake physical and mechanical characterisation using optical microscopy, mechanical testing, corrosion testing, etc.
- To apply experience in data gathering and analysis using tools such as MatLab, Origin, GraphPad, etc
- To work as part of a multi-disciplinary team that addresses different aspects of the design, manufacturing, validation cycle of porous materials and structures.
- To be responsible for the day-to-day running and maintenance of the specific resources required in these roles that are pertinent to the project.
- To carry out Risk Assessments and COSHH inventories to ensure a safe environment in the labs and working place(s) for all the team members involved.
- To assist the academic staff in the project team with the supervision of undergraduate, MSc and PhD project work and day-to-day supervision and support of other researchers.
- Write regular progress reports and present outcomes to all Investigators and Collaborators (incl. those located at other Institutions), making recommendations for next steps.
- To support the project team by enhancing relationships with existing collaborators and by assisting the establishment of relationships with new collaborators.
- Travel to external partners and collaborators to attend meetings and make presentations, when required.
- To attend and contribute to conferences, seminars, webinars and other events of interest to the team.
- To contribute to project promotion and public engagement events.
- To contribute ideas for new research and impact directions.
- To always maintain confidentiality and ensure that intellectual property (IPR) generation is safeguarded, and agreements are not violated.
- When appropriate, to deliver teaching, tutorials and laboratory sessions to students, in support of the Teaching & Learning environment in the School.
- To engage in training programmes in the University (or elsewhere) that are consistent with the needs and aspirations of the project and those of the Lab.
- To undertake 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. Training will be provided as necessary and in support of the Researchers' professional development, and an attitude for learning will be an essential criterion in the selection of a successful candidate.

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 Prof Carmen Torres-Sanchez and Prof Paul P. Conway, Principal Investigators.

Person Specification

Your application will be reviewed with respect to meeting 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, giving examples of recent experience. You may use the **STAR** approach: explain what the **S**ituation was, which **T**ask you had to do or were allocated, what **A**ction you took, what you did and a justification, and what was the **R**esult. It is highly recommended that the candidates express in their Cover Letter how they fit to the Job Purpose and Job Duties described above. Stages of assessment are as follows:

1 – Application

2 – Test/Presentation

3 – Interview

Essential Criteria

	Criteria	**Stage**
Experience	Significant experience within a high-quality research or development environment	1, 3
	Authoring original work with an R&D purpose, e.g. academic journal papers, conference papers or industrial technical reports	1
	Evidenced experience in materials selection and materials properties, esp. metals and alloys	1, 2, 3
	A good understanding of the basics of materials processing techniques, in particular using Additive Manufacturing technology	1, 3
	Evidenced experience in the design of experimental protocols and routines to improve the workflow	1, 2, 3
	Experience giving presentations to a variety of audiences, from peer researchers to more generalists and industrialists	1, 2, 3
Skills and abilities	Has used manufacturing processes for powder preparation, e.g. ball milling, atomisation, etc and the characterisation of powder feeds	1, 3
	Working knowledge of characterisation tools and techniques such as XRD, SEM, DSC, XPS, optical microscopy, mechanical testing, powder measurements, etc and the corresponding sample preparation protocols. A willingness to deepen understanding and use of these techniques	1, 2, 3
	Ability to organise resources to support and further own research activities within the scope of their work	1, 3
	Proven ability to work with others, be cooperative and a good team player	1, 3
	Working knowledge of data analysis software packages (e.g., MatLab, Origin, Excel, etc)	1, 3
	Excellent written and oral communication skills in English	1, 2, 3
	Self-motivated with an ability to initiate work independently and in teams to meet the project(s) deadlines	1, 3
	Excellent interpersonal and organisational skills	1, 3
	Ability to write weekly project reports and make technical presentations to industrial and academic research groups	1, 3
	Knowledge of relevant Health & Safety matters, COSSHs, etc	1, 3
Training	Evidence of having undertaken further training and a willingness to be trained if necessary to fulfil the requirements of the job	1, 3

Qualifications	PhD (or near completion) in Manufacturing Engineering, Mechanical Engineering, Materials Science, Physical Sciences or related discipline. Alternatively, equivalent industrial experience in an R&D environment.	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	1, 3
	Ability to maintain confidentiality at all times	3

Desirable Criteria

Area	Criteria	Stage
Experience	Dealing with problems which may affect the achievement of research objectives and deadlines	3
	Knowledge of basic statistics that are able to correlations, regressions, analysis of variance, etc.	1, 3
Skills and abilities	Understanding of Design Methodologies as a framework to inform product and system development, esp DfAM	1, 3
Other	Able to travel to academic and industrial collaborators' sites	1, 3

Conditions of Service

The position available is FULL OR PART TIME (FTE to be discussed to suit candidate's personal circumstances) and FIXED TERM for 6 MONTHS with a possibility for an extension on the basis of performance and a mid-term review that will inform future research directions.

Salary will be on Specialist and Supporting Academic Grade 6 (£33,966 to £44,263 per annum) at a starting salary to be confirmed on offer of appointment according to the successful candidate's knowledge and experience.

The appointment will be subject to the University's normal Terms and Conditions of Employment for Academic and Related staff/Operational and Administrative 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.

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 and dynamic working when the tasks and assignments of the project can permit it.

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/