Wolfson School of Mechanical, Electrical and Manufacturing Engineering

Research Associate in Manufacturing Process Simulation and Validation to Support Next Generation Engineering Design

REQ210534

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.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

Re-Imagining Engineering Design (RIED) is a multi-institutional Programme Grant, co-funded by the EPSRC and a consortium of Industrial Collaborators. This presents an opportunity for high calibre research associates to join our team as we develop new approaches to integrating design, manufacturing and physical verification of processes, products, services and supply chains.

We are seeking to appoint two researchers to contribute to the workpackages that comprise process parameterisation, simulation, as well as the challenges of verification/validation to a standard that can inform (and be informed by) new Design Methodologies, considering the various stakeholders along a supply chain.

Expertise and background experience is sought in one or more of the areas listed below for each post:

- Complex process, Multi-physics simulation, formal requirements capture architectures.
- Validation and verification of products and processes, exploring the concepts of 'Smart testing' via in-silico or ex-silico/real life approaches.
- Design of experiments, data harvesting, collation, analysis and interpretation to derive insight and guide engineering design.
- Development of novel processing manufacturing techniques that allow the realisation of new design solutions
- Materials processing techniques, materials characterisation (e.g., mechanical, physico-chemical, optical, electro-magnetic, etc) and the use of advanced processing equipment

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose

To conduct research in the area of Physical and/or In-silico Characterisation, Simulation and Validation of Multifunctional Materials, Structures and Manufacturing Processes within the framework of a Design Methodology(-ies). To develop new scientific understanding of materials processing, manufacturing techniques, simulation and 'smart testing' protocols. To generate high quality scientific reports and papers suitable for publication in International Journals.

Job Duties

- To undertake research into requirements capture for specification of manufacturing processes (incl. new approaches) and their validation

- To conduct research of academic rigour and scientific standard, carry out authoritative literature reviews, and publish in top quality journals, consistent with the quality and ambition of the School.
- To apply experience in data gathering and analysis using tools such as MatLab, Origin, GraphPad, SPSS
- To develop and implement Design of Experiments techniques and protocols prior to manufacturing, materials characterisation, process simulation and validation.
- For the physical characterisation: To perform, as appropriate to the application, physical, chemical, microstructural, thermomechanical, electrical, and electromagnetic characterisation and analysis of the products and processes, incl. materials under study (e.g., SEM, TEM, DMA, DSC, XPS, micro-CT, mechanical testing, AFM, XRD, etc)
- For the in-silico validation: multi-physics modelling (e.g., COMSOL, ABAQUS), thermo-dynamics (e.g., ThermoCalc/Calphad, MTDATA), Phase-field approaches, etc
- To work as part of a multi-disciplinary, multi-location team that addresses different aspects of the design, manufacturing, validation cycle.
- 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 in order to ensure a safe environment in the labs
- 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 up 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 undertake experimental trials, attend meetings and make presentations, when required.
- To attend and contribute to conferences.
- To contribute to project promotion and public engagement events.
- Contribute ideas for new research and enterprise directions.
- Maintain confidentiality at all times and ensure that intellectual property (IPR) agreements are not violated.
- Where appropriate, to deliver teaching, tutorial and laboratory sessions to students.
- Engage in training programmes in the University (or elsewhere) that are consistent with the needs and aspirations of the project and those of the Department.
- 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 Paul P. Conway and Dr Carmen Torres-Sanchez, Principal Investigators on the Programme Grant.

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. It is highly recommended that the candidates express in their Cover Letter how they fit to the Job Purpose and Job Duties described above, in particular in reference to the physical vs modelling experience. 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 for academic journal papers, conference papers or technical reports	1
	Using creativity to analyse and interpret research data and draw conclusions on the outcomes	2, 3
	Using initiative to identify areas for research, developing new research methods and extending the research portfolio	1, 3
Skills and abilities	At least one of these: - Multiphysics Process Modelling/Simulation - Novel manufacturing processes, e.g., hybrid or repurposed manufacturing - Physico-chemical, mechanical characterisation techniques	1, 2, 3
	Ability to organise resources to support and further their research activities within the scope of their work	1, 3
	Ability to plan own workload in accordance with the overall project objectives and work independently to meet deadlines	3
	A good understanding of the basics of materials processing techniques and manufacturing	1, 3
	Excellent written and oral communication skills	1, 2, 3
	Self-motivated with an ability to work independently and in teams in order to meet the project(s) deadlines	1, 3
	Excellent interpersonal, and organisational skills	1, 3
	Working knowledge of data analysis software packages (e.g., MatLab, Origin, Excel, SPSS, etc)	1
	Ability to write project reports and make technical presentations to industrial and academic research groups	1, 3
	Knowledge of relevant Health & Safety issues	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, Materials Science, Physical Sciences, Computer Science, Maths or related discipline and at least a 2:1 Bachelors or Masters level Degree	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	3

Desirable Criteria

Area	Criteria	Stage
Experience	Involvement in or having worked across different projects, demonstrating an ability to manage own time and competing priorities	1, 3
	Complex multi-physics modelling for the in-silico validation and verification	1, 3
	Techniques for the experimental validation of products and processes	1, 3
	Experience in the use of typical materials characterisation equipment (for example SEM, XRD, DSC, XPS, nanoindentation, etc)	1, 2, 3
	Experience of teaching and / or supervision of students in relevant areas	1, 3
	Dealing with problems which may affect the achievement of research objectives and deadlines	3
	Depth of understanding of the Science underpinning the Research	1, 2, 3
	A strong publication track record	1
Skills and abilities	Understanding of Design Methodologies as a framework to inform product and system development	1, 3
	A self-starter who can operate effectively with minimal supervision	3
Other	Able to travel to industrial collaborators' sites	3

Conditions of Service

There are two positions available that are FULL TIME and FIXED TERM for 24 months with a possibility for an extension on the basis of good performance and mid-term review of the Programme Grant that will inform future research directions. 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.

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.

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/

Applications

The closing date for receipt of applications is **29 July 2021.** Interviews are likely to be held w/c 9 / 16 August 2021. The applicants are recommended to attach their best journal publication to their application. Please submit all your documents as a single file.