

## Research Associate in Multi-physics Digital Validation

### Job Ref: REQ230286

*As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.*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-Imaging Engineering Design (RIED) is a multi-institutional Programme Grant, co-funded by the EPSRC and a consortium of Industrial Collaborators. The project will involve development of new approaches to integrating design, manufacturing and physical verification of processes, products, services and supply chains. Contribution to the workpackages that comprise process parameterisation, digital simulation for the purpose of design validation, as well as addressing 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.

### Job Description

**Job Grade:** Specialist and Supporting Academic Grade 6

### Job Purpose

To conduct research in the areas of physical and digital characterisation and validation of multifunctional materials and structures (nominally engineered porous structures and lightweight materials, metals and alloys). To develop new scientific understanding of materials processing and manufacturing techniques by creating 'smart testing' protocols that parameterise the process. 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 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, DSC, XPS, micro-CT, mechanical testing, AFM, XRD, etc)
- To work as part of a multi-disciplinary, multi-location 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 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, 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 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, giving examples of recent experience. You may use the **STAR** approach: explain what the **Situation** was, which **Task** you had to do or were allocated, what **Action** you took, what you did and a justification, and what was the **Result**. 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 for academic journal papers, conference papers or technical reports   | 1       |
|                      | Using initiative to identify or develop new research avenues and extending the research portfolio of the host lab   | 1, 2, 3 |
|                      | Evidenced experience in metal and alloys manufacturing processes; their characterisation and validation   | 1, 2, 3 |
|                      | Knowledge of material properties of metals and alloys   | 1, 2, 3 |
| Skills and abilities | Working knowledge of characterisation tools and techniques such as SEM, TEM, DSC, XPS, micro-CT, mechanical testing, AFM, XRD, etc  | 1, 2, 3 |
|                      | Ability to organise resources to support and further own 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 and self-propelled to meet deadlines  | 2, 3    |
|                      | A good understanding of the basics of materials processing techniques and manufacturing   | 1, 3    |
|                      | Excellent written and oral communication skills in English  | 1, 2, 3 |
|                      | Self-motivated with an ability to work independently and in teams 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, MiniTab, Tableau, etc)   | 1, 3    |
|                      | 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 in Manufacturing Engineering, Mechanical Engineering, Materials Science, Physical Sciences, Computer Science, Maths or related discipline and at least a 2:1 Bachelors or a Master's 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    |
|                      | Experience of macro scale modelling techniques, e.g. COMSOL or similar  | 1, 3    |
|                      | Experience in Image Processing techniques to interrogate volumetric (re-)constructions  | 1, 2, 3 |
|                      | Dealing with problems which may affect the achievement of research objectives and deadlines   | 3       |
|                      | Experience of creating multi-physics simulations, esp. physical, chemical or biological processes and phenomena   |         |
|                      | Validation and verification of products and processes, exploring the concepts of 'Smart testing' via in-silico approaches that could compliment and inform ex-silico approaches.                    |         |
| 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, liaising with members of the team on own initiative  | 3       |
|                      | Presentation skills of technical and non-technical aspects of the project to various audiences (i.e. academic and industrial collaborators, and general public dissemination of results and impact) | 1,3     |
| Other                | Able to travel to academic and industrial collaborators' sites  | 1, 3    |

## Conditions of Service

The position available is FULL TIME and FIXED TERM for 24 months with a possibility for an extension on the basis of a mid-term review of the Programme Grant that will inform future research directions. Salary will be on Specialist and Supporting Academic Grade 6 £33,348 to £43,155 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 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/>