

Senior Research Associate in Multi-physics Digital Validation

Job Ref: REQ230287

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.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 7

Job Purpose

The Senior Research Associate will be responsible for developing, managing and conducting research in the area of 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. To work as part of a multidisciplinary team across several institutions and companies.

Job Duties

Research

- To provide leadership to research projects, including day-to-day management and coordination of the research activities.
- To help investigate, formulate and develop new lines of research and support new research grant applications.
- To research into requirements capture for specification of manufacturing processes (incl. new approaches) and their digital validation by means of (multi-)physics simulation approaches
- 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 the representation and parameterisation of physical processes and phenomena and create interrogable and interactive models and simulations, e.g., digital twins
- To develop and implement Design of Experiments techniques for the interrogation of these models
- To lead in the data analysis thereof using tools such as MatLab, Origin, GraphPad, SPSS
- To synthesise and interpret data, to present results and conclusions in a rigorous but succinct manner

- To perform multi-physics modelling (e.g., COMSOL, ANSYS, etc), FEA analysis (e.g., ABAQUS, etc), thermo-dynamics (e.g., ThermoCalc/Calphad, MTDATA).
- To lead the identification of future work and generation of new funding proposals to support continuation of research and implementation of research results and findings.
- To liaise with academic and industrial project partners and manage and plan activities across the programme team.

General, technical

- To supervise undergraduate, MSc and PhD students 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.
- To be responsible for the day-to-day running and maintenance of the specific resources required in this role.

General, administrative

- Maintain confidentiality at all times and ensure that intellectual property (IPR) agreements are not violated.
- To work as part of a multi-disciplinary, multi-location team that addresses different aspects of the design, manufacturing, validation cycle.
- To work effectively with relevant administrative, technical and academic staff in the School and across the University.
- To engage in training programmes in the University (e.g. through Staff Development) which are consistent with the RA's ongoing professional development, and the needs and aspirations of the project team and those of the School.
- 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 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

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 relevant 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 own initiative to identify areas for research, developing new research methods and extending the research portfolio	1, 3
	Competence in Multiphysics or other Digital representations of physical phenomena (e.g., COMSOL, ANSYS, etc)	1, 3
	Experience of using CAD, CAE and other engineering modelling and analysis software and tools	1,3
	Track record of publishing research papers for publication in peer-reviewed journals	1
Skills and abilities	Ability to work independently and also as part of a team	1,3
	Ability to organise resources to support and further own and the team's research activities within the scope of their work	1, 3
	Ability to plan own workload and the work of others in the team in accordance with the overall project objectives and work, both independently and managing a team, to meet deadlines	3
	Ability to write project reports and make technical presentations to industrial and academic research groups	1, 3
	Excellent written and oral communication skills in English	1, 2, 3
	Self-motivated, attention to detail and a flair for meeting the project(s) objectives and deadlines	1, 3
	Excellent interpersonal and organisational skills	1, 3
	Ability to mentor and supervise others	1, 3
	Working knowledge of data analysis software packages (e.g., MatLab, Origin, Excel, SPSS, etc)	1
	Skills in finding information in the scientific literature and proposing original ideas	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 Mathematics, Physics, Engineering, Materials Science, Physical Sciences, Computer Science or related discipline and at least a 2:1 Bachelors or Master's level Degree	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	3
	Commitment to maintain confidentiality, where relevant, at all times	1,3

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
	Competence with Complex Multi-Physics Modelling for the in-silico Validation and Verification	1, 3
	Experience of using formal requirements capture architectures.	1, 3
	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.	1, 3
	Development of digital representations of novel manufacturing techniques that allow the realisation of new design solutions.	1, 3
	Experience of modelling techniques at the macro scale, that could inform the direction of experimental activity (e.g. finite element simulations and numerical computations). Demonstrate excellent communication and interpersonal skills	1, 3
	Writing research proposals for funding (of any kind, e.g., travel grants, access to research facilities, etc) from internal/external sources.	1, 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
	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 is a position that 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. The role is also suitable to REMOTE-WORKING patterns by prior agreement. Salary will be on Specialist and Supporting Academic Grade 7 £44,414 to £52,841 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/>