

Research Associate in Modelling of Flow through Porous Structures (remote or on-site) (1FTE or lower)

REQ240037

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.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

The post can be held remotely, on-campus or hybrid.

We offer a range of adjustments to enable colleagues with additional commitments, requirements and needs to take up the role – this includes, for example, those in the writing up stage of PhD or those with caring responsibilities. 1FTE (full time) or lower FTE (e.g. part time) are possible.

The project will involve the modelling of flow through porous structures and lattices manufactured using Additive Manufacturing techniques. The data will inform design decisions for the structure, so only the promising structures are manufactured, saving raw material, effort and time. In particular, flow velocity, pressure drop, tortuosity and permeability are the main features to measure in silico. We are looking for an engineer or scientist who has experience in the use of Multiphysics simulators such as COMSOL or other CFD softwares, and CAD packages to manipulate 3D and STL reconstructions.

The work will include requirements capture, design of experiments, simulation, data harvesting, analysis and visualisation, and interpretation to derive insight and guide engineering design; communicating research results and outputs to a scientific audience as well as the general public.

Key Requirements:

- Experience of deriving experimental designs and protocols in a simulation environment
- Experience of performing fluid dynamics simulation through porous structures
- Experience with COMSOL Multiphysics (or a similar simulator/software)
- Experience handling 3D volumetric reconstructions and software for analysis of those
- Demonstrate excellent communication and interpersonal skills
- Demonstrate excellent self-management and organisational skills as well a committed approach to work
- Demonstrated ability to write scientific reports, manuscripts and deliver presentations to a wide range of audiences.

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose

To conduct research in the area of fluid dynamics modelling of porous structures to be manufactured using Additive Manufacturing techniques to inform design decisions before the design is realised. In silico testing for the assessment of permeability parameters of a porous structure subjected to flow through for the purpose of feeding

back to the design stage. Use Multiphysics simulators such as COMSOL or other CFD softwares and CAD packages to carry out these studies.

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 work as part of a multi-disciplinary, multi-location team that addresses different aspects of the design, manufacture and testing of the porous structures.
- To develop experimental protocols (i.e., 'Design of Experiments') for a simulation and implement those to obtain meaningful results
- To create CAD models, manipulate them in a cyber space and analyse them using specialist software.
- To create simulations in a Multiphysics environment using COMSOL or similar software.
- To lead in the data gathering and analysis thereof using tools such as Excel, MatLab, Origin, etc
- To synthesise and interpret data, to present results and conclusions in a rigorous but succinct manner
- To assist the academic staff in the project team with the day-to-day supervision and support of other researchers and students.
- 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 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 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, Health & Safety, etc.

Organisational Responsibility

Reports to Prof Paul P. Conway and Prof Carmen Torres-Sanchez, 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 **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 – Presentation at interview
- 3 – Interview

Essential Criteria

	Criteria	Stage
Experience	Experience within a high-quality research or development environment	1, 3
	Authoring original work for academic journal papers, conference papers or technical reports	1
	Competence in Multiphysics or other Computer Fluid Dynamics (CFD) software to model flow, esp. COMSOL.	1, 3
	Competence in software that can handle STL files and volumetric representations (e.g., Magics, Simpleware, Blender, MeshLab, etc)	1, 3
	Experience creating DoEs (design of experiments) developed from the understanding of the physics behind the phenomena	1, 3
	Demonstrated excellent communication and interpersonal skills	1, 3
	Demonstrated excellent self-management skills to perform under remote or minimal supervision, as well as a committed approach to the work and respect of deadlines	1, 3
Skills and abilities	Ability to organise resources to support and further own research activities within the scope of their work	1, 3
	Excellent written and oral communication skills in English	1, 2, 3
	Excellent interpersonal and organisational skills	1, 3
	Working knowledge of data analysis software packages (e.g., MatLab, Origin, Excel, Tableau, etc)	1, 3
	Ability to write project reports and make technical presentations to industrial and academic research groups	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	A PhD degree (or near completion) in a related subjects (Science, Engineering) or equivalent industrial experience	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	3

Desirable Criteria

Area	Criteria	Stage
Experience	Experience in the use of software to visualise and characterise/quantify 3D volumetric models (i.e. CAD packages and Analysis software eg Avizo, VG Studio, Dragonfly, Simpleware, etc)	1, 2, 3

	Dealing with problems which may affect the achievement of research objectives and deadlines	3
	Experience working with metallic porous metals and their in silico testing	1, 3
Skills and abilities	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
	Using own initiative to identify areas for research, developing new simulation approaches based on the underpinning physics	1, 3
Other	Able to travel to academic and industrial collaborators' sites	1, 3

Conditions of Service

The position available can be FULL or PART-TIME, held REMOTELY or ON-CAMPUS and FIXED TERM for 12 months with a possibility for an extension on the basis of a mid-term and end-of-project reviews. Salary will be on Specialist and Supporting Academic Grade 6 (£33,966 to £42,978 per annum) at a starting salary to be confirmed on offer of appointment.

Job Share and lower FTE would be actively considered. The University recognises the value of a fulfilling and balanced work and personal life which promotes wellbeing. We seek to support colleagues in achieving this balance and have family-friendly policies, flexible working arrangements and many roles can be suitable for dynamic working arrangement. This includes considering applications to work on a part-time, flexible and job share basis wherever possible.

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/>