

Research Associate in Post-processing of Additive Manufactured Titanium Lattices (Part or Full time)

REQ231125

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.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 project will involve the post-processing of lattices and porous structures manufactured using 3D printing and Additive Manufacturing techniques in metal materials such as Titanium and its alloys. Metal lattices manufactured using powder-based laser processes (e.g., SLM) arise with flaws and therefore surface roughness that is undesirable. The removal of secondary roughness and/or satellite particles is the focus of this project. Techniques such as acid treatment, electropolishing or sand-blasting (shot-peening), or hybrid approaches, and their effectiveness will be studied and quantified.

The experimental work will include rig design and construction with Health & Safety measures in place, design of experiments for the sample process, characterisation and analysis (including 3D scanning, image processing, permeability tests, etc). Visualisation of the results and report writing will be an important aspect of this project.

This will be based within the Multifunctional Materials Manufacturing Laboratory at Wolfson School.

Key Requirements:

- Experience of preparing chemical formulations, mixing and disposing chemical waste safely.
- Experience of performing Risks Assessments and COSHHs for experiments.
- Experience of deriving experimental designs and protocols in a lab environment
- Experience of working with electrochemistry rigs
- Experience working with power supplies and high voltage
- Experience with techniques for the characterisation of physical properties such as porosity, roughness, pore size, etc
- Experience handling 3D volumetric reconstructions and software for analysis of those
- Demonstrate excellent communication and interpersonal skills
- Demonstrate excellent self-management and organisational skills, given the nature of the experiments, as well a committed approach to work

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose

To conduct research in the areas of post-processing of metal lattices and porous structures manufactured using powder-based laser techniques. To develop new scientific understanding of post-processing and their effect. To create '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 work as part of a multi-disciplinary, multi-location team that addresses different aspects of the post-processing of the lattices and porous structures.
- For the physical characterisation, to perform, as appropriate to the application, physical, chemical, microstructural characterisation and analysis of the products and processes (e.g., SEM, XPS, micro-CT, mechanical testing, XRD, permeability tests, etc)
- For the digital validation, to create CAD models, manipulate them in a cyber space and analyse them using specialist software.
- 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.

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	Experience within a high-quality research or development environment	1, 3
	Authoring original work for academic journal papers, conference papers or technical reports	1
	Experience of working in a laboratory environment, using hand tools and benchtop rigs connected to compressed air, etc	1, 3
	Experience of chemicals handling	1, 3
	Experience of use of electrochemical rigs	1, 3
	Experience creating DoEs (design of experiments)	1, 3
	Experience of characterisation techniques to quantify physical characteristics such as porosity, roughness (e.g., micro-CT, SEM)	1, 3
	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, etc)	1, 2, 3
	Experience of deriving experimental designs and protocols in a lab environment	1, 3
	Demonstrated excellent communication and interpersonal skills	1, 3
	Demonstrated excellent self-management and organisational skills, given the nature of the experiments, as well a committed approach to work	1, 3
Skills and abilities	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 to meet deadlines	2, 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
	Knowledge of relevant Health & Safety issues and able to prepare Risk Assessments and COSHHs forms	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 degree in a related subjects (Science, Engineering, Technology) 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	Involvement in or having worked across different projects, demonstrating an ability to manage own time and competing priorities	1, 3
	Dealing with problems which may affect the achievement of research objectives and deadlines	3
	Experience working with Titanium and its alloys demonstrated by the knowledge of use of analysis techniques such as XRD, XPS, etc	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
Qualifications	A PhD in a related subject (or near completion)	1
Other	Able to travel to academic and industrial collaborators' sites	1, 3

Conditions of Service

The position available can be FULL or PART-TIME and FIXED TERM for 6 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/>