Wolfson School of Mechanical, Electrical and Manufacturing Engineering

Loughborough University

Research Associate in Acoustic Processing of Materials – Experimental

REQ251077

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.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

We are looking for an enthusiastic post-doctoral Scientist or an Electrical/Electronic or Mechanical Engineer with experience in acoustic signal processing and instrumentation, piezoelectric transducers and experimental rigs. The project involves the design and creation of bespoke experimental rigs for the processing of materials with ultrasound energy and potentially other energy vectors (heat, EM fields etc.).

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.

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.

Key Requirements:

- Designing and building experimental rigs with appropriate piezoelectric transducers, signal processing and instrumentation;
- Extensive experience using oscilloscopes, amplifiers, impedance analysers, function and signal generators, micro/hydrophones, speakers, etc
- Experience of deriving experimental designs and protocols in a laboratory environment
- A strong skillset of data manipulation and graphical representation (e.g. in MATLAB or similar) is a key requirement: gathering experimental results and presenting data as part of regular reviews.
- 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 experimental research in the area of coupled energy vectors applied to materials processing, in particular acoustics/ultrasound and potentially others such as thermal and electromagnetic fields, for the purpose of understanding and developing new materials processing routes. The experimental results shall inform design decisions for new manufacturing processes and processing conditions for novel materials. Practical application of experience in assembling instrumentation, transducers and signal processing to create experimental rigs that can be monitored, actuated and analysed will be required to derive and understand these new materials processing technologies.

Job Duties

- To build experimental rigs to actuate and control process physics and sense key parameters for understanding and control.
- To work with piezoelectric transducers in the kHz range; to extract data from hydrophones and analyse them using oscilloscopes, etc. To modify transducers and characterise them, so they can be deployed in the rigs.
- To develop experimental protocols (i.e., 'Design of Experiments') and implement those to obtain meaningful results
- 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 team that addresses different aspects of the design, build and testing of experimental materials processing rigs.
- 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, 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 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 that are commensurate with the nature and grade of the post.

The purpose of this job description is to indicate the general level of duties and responsibility of the post. The detailed duties may vary without changing the general character or level of responsibility. Training will be provided as necessary and in support of professional development, and an attitude for learning will be an essential criterion.

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 Equity & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equity & Diversity legislation and University policies/procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Belonging and Inclusion, 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 **S**ituation was, which **T**ask you had to do or were allocated, what **A**ction you took, what you did and a justification, and what was the **R**esult. 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 the use of transducers, instrumentation, DAQ hardware and signal processing software in the kHz range.	1, 3
	Experience designing and building experimental rigs with appropriate piezoelectric transducers, signal processing and instrumentation;	1, 2, 3
	Extensive experience using oscilloscopes, impedance analysers, function and signal generators, micro/hydrophones, speakers, etc	1, 2, 3
	Experience creating DoEs (design of experiments) developed from the understanding of the physics behind the phenomena	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
	A strong skillset of data manipulation and graphical representation (e.g. in MATLAB or similar)	1, 2, 3
	Excellent written and oral communication skills in English	1, 2, 3
	Excellent interpersonal and organisational skills	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	Dealing with problems which may affect the achievement of research objectives and deadlines	3

	Experience working with materials such as polymers, metals or ceramics;	1, 3
	Experience working with sound and ultrasound related engineering research	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, FIXED TERM for 12 months with a possibility for an extension to 24 months on the basis of a mid-term and end-of-term reviews. Salary will be on Specialist and Supporting Academic Grade 6 (£35,608 to £41,064 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 equity 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/