

## POST-DOCTORAL RESEARCH ASSOCIATE IN CHARACTERISATION OF POWER PLANT STEELS

Job Ref: REQ200189

**As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.**

A post-doctoral research associate is required to complete research within an industrially led EPSRC / Government funded project into manufacture, performance and microstructural relationships within 9 wt.% steels (specifically MarBN) for power plant applications. The post-holder will work within the industrially-led consortium: "IMPLANT - Advanced Materials and Manufacturing for Improved Power and Process Plant Performance", to characterise materials after different processing approaches or thermal exposures and to provide explanation for their performance in mechanical tests (e.g. creep tests).

Experimental characterisation will be carried out using a mixture of established and novel techniques, using mainly facilities available within the Loughborough Materials Characterisation Centre at Loughborough University. These include optical microscopy, hardness (macro, micro and nano), field emission gun scanning and transmission electron microscopy (FEG SEM/TEM) with energy dispersive X-ray (EDX) analysis and electron backscatter diffraction (EBSD), X-ray diffraction and dual beam focused ion beam / SEM imaging and sample preparation. Different steel samples in various conditions will be examined during this research including cast, extruded, heat-treated, mechanically tested and welded states. A key focus of the microstructural characterisation work will be to examine microstructural change as a function of the state of the material and to examine relationships between the observed and predicted microstructure and possible mechanical properties of the materials and to contribute to discussions around the optimisation of future product.

### Job Description

**Job Grade:** Research Grade 6

#### Job Purpose

To work with the IMPLANT project consortium to experimentally characterise power plant material produced within the project, and to report on findings to the project group and in the wider academic literature.

#### Job Duties

- To make use of a range of experimental techniques to investigate microstructural evolution in as-produced or thermally exposed steels and steel welds, and to determine the consequences of microstructural change for mechanical properties (e.g. creep);
- To utilise existing software modelling packages to make predictions of likely microstructural composition as a function of processing routes and likely service conditions;
- To actively plan, co-ordinate and implement an individual research programme to develop the research objectives for this post and to pursue the research goals and overall aims of the research consortium;
- To liaise with researchers and academics from other consortium members to plan and establish suitable future experimental programmes;

- To identify opportunities for dissemination and to lead in the production of high impact publications and conference contributions;
- To make technical presentations of research findings at conferences, workshops and meetings in the UK and internationally;
- Identify possible direction for future research in related areas and identify future funding opportunities for its pursuit;
- To liaise closely with all project partners to ensure project deadlines, milestones and deliverables are met;
- To co-operate with the protection of any intellectual property which may result from the research in accordance with the project consortium agreement;
- To keep accurate records of research work completed and meetings attended (in written and/or electronic format) and share these with the Loughborough University supervisory team;
- To maintain an up-to-date awareness of current and emerging research relevant to the project;
- To participate in and develop external networks to identify sources of future funding and to build relationships for future activities;
- To maintain confidentiality of results and other confidential project information;
- To comply with University Health and Safety Policy, and all University rules and regulations, including the University IT Acceptable Use Policy;
- To assist with the development of regular and final reports to the funding body or project consortium;
- To undertake such other duties and responsibilities in connection with the research and its outcomes as may be commensurate with the grade and nature 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.

### **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 the Principle Investigator of the project at Loughborough University, Dr Mark A. E. Jepson (Senior Lecturer in Metallurgy and Microscopy)

## Person Specification

Your application will be reviewed with respect to meeting the essential and desirable criteria listed below. Your application will be reviewed against 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. Stages of assessment are as follows:

- 1 – Application
- 2 – Presentation
- 3 – Interview

### Essential Criteria

Area	Criteria	Stage
<b>Experience</b>	Recent research experience in an Academic or Industrial environment in the field of power plant steels or related area	1,2,3
	Background in experimental characterisation of metallic materials	1,2,3
	A strong technical knowledge of power plant materials	1,2,3
	A good understanding of the microstructural effect of creep and the factors which may influence it within 9 wt.% steels	1,2,3
<b>Skills and abilities</b>	Skilled in metallographic preparation and microstructural analysis	1,3
	Good project management skills and the ability to meet deadlines	1,3
	Skilled in the use of Scanning and Transmission Electron Microscopy	1,2,3
	Good verbal and written communication skills	1,2,3
	Ability to be active in the publication of high-quality research papers	1,3
<b>Training</b>	Demonstrate evidence of having undertaken further training	1,3
<b>Qualifications</b>	Good honours degree and a PhD or equivalent in Materials Science, Physics, or another relevant discipline	1
<b>Other</b>	Evidence a good working knowledge of equal opportunities and understanding of diversity in the workplace	1,3
	Willing and able to travel in order to participate in conferences (within the UK or internationally) or project meetings where required	1,3

### Desirable Criteria

Area	Criteria	Stage
<b>Experience</b>	Experience of studying microstructural evolution in power plant steels (such as MarBN) during thermal exposure	1,2,3
	Experience of working within industrially led research projects	1,3
	Some experience of supervising project students or assisting PhD students with their work	1,3
<b>Skills and abilities</b>	An understanding of microstructural evolution of steels	1,2,3
	Familiar with advanced characterisation tools such as EDS, EBSD, and focused ion beam analysis of materials	1,2,3

## Conditions of Service

The position is full time and fixed term for 24 months or until the project end date of 31<sup>st</sup> December 2022, whichever is the soonest. Salary will be on Research Grade 6, £30,942 per annum.

The appointment will be subject to the University's normal Terms and Conditions of Employment for Academic and Related 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/>

## Applications

The closing date for receipt of applications is **22<sup>nd</sup> March 2020**. Interviews will be held on **31<sup>st</sup> March 2020**.