University of Nottingham
UK | CHINA | MALAYSIA

Job title	Research Associate/Fellow in (a) Experimental High Throughput Materials Discovery OR (b) Computational Materials with Machine Learning (Fixed term)	**Job family and level**	Research and Teaching Level 4 (Appointment will be Level 4 Career training grade where an appointment is made before PhD has been completed)
School/ Department	Faculty of Engineering	**Location**	Wolfson, University Park Campus

Purpose of role

The successful candidate will perform research on integrating the high-throughput materials discovery apparatus (Raspberry Pi/ Arduino/ FPGA) with a batch processing high-temperature furnace, associated characterisation technique, and close-loop development of coatings using the plasma spray. AI methods, such as, Active learning, Bayesian optimisation, and graph neural networks are core components of the software driving the MDA, which are at the heart of the project. The split is expected to be between 50-50 AI methods, such as machine learning and automation. The role-holder will undertake supervision of researchers, promote and engage in research and training events, collaborate with industrial and academic partner institutions within the project and deliver reports.

	Main responsibilities (Primary accountabilities and responsibilities expected to fulfil the role)	**% time per year**
1	**Research and Innovation** ▪ Carrying out research which may include planning, preparing, setting up, conducting and recording the outcome of experiments within the framework of an agreed programme, and developing AI tools to guide, optimise and predict the properties for the next generation of ceramics. ▪ The activities within this work will focus on integrating the high-throughput materials discovery apparatus with a batch processing high-temperature furnace, associated characterisation technique, and close-loop development of coatings using a plasma spray. Active learning, Bayesian optimisation, and Graph Neural Networks are core to this exciting project. You will be developing machine learning tools to guide and predict the properties of the next generation of ceramics. ▪ Conducting literature and database searches and carry out analyses and/or tests and/or critical evaluations using specified and agreed techniques, approaches and/or models and document findings.	70%
2	**Academic papers, dissemination and outreach** ▪ Production of journal publications, dissemination of results - presentations and travel to meetings and/or outreach to the industry, the scientific community	20%
3	**Project Management**	5%

	▪ Supporting the project leader and the research team within this collaborative project. Support other research strands within the EPSRC project when required.	
4	Any other duties appropriate to this post as required by their line manager	5%

Person specification

	Essential	Desirable
Skills	- Skills in applying and/or developing AI and machine learning techniques, especially active learning, Bayesian optimisation and graph neural networks - Laboratory skills in soldering, circuit board assembly and cobot programming - Skills in automation and control engineering (Building rigs with stepper motors, Raspberry Pi, Arduino, FPGA) - Excellent communication and presentation skills - Strong organisational skills - Self-motivated, able to work independently and as part of a team	- Skills in equipment design and modification using CAD - Excellence at writing research proposals
Knowledge and experience	- Experience of neural networks, active learning, Bayesian optimisation and graph neural networks - Experience of implementing AI models of practical problems and demonstrating their use and applicability - Experience in Python and Matlab programming - Experience in publication of academic journal papers/ appropriate conference papers - Experience in presenting at international conferences - Demonstrated creativity and leadership in problem solving	- Experience in machine learning techniques for new materials discovery - Experience in materials science, especially ceramics for thermal and environmental barrier coatings - Previous research experience at the postdoctoral level - Experience in research proposal writing - Experience with liaising with external partners - Experience of data modeling and analysis
Qualifications, certification and training (relevant to role)	PhD (or close to completion) or equivalent in a related discipline of Computer Science/Artificial Intelligence or control engineering/ automation or computational materials engineering	

Expectations and behaviours

The University has developed a clear set of core expectations and behaviours that our people should be demonstrating in their work, and as ambassadors of the University's strategy, vision and values. The following are essential to the role:

Valuing people

Is friendly, engaging and receptive, putting others at ease. Actively listens to others and goes out of way to ensure people feel valued, developed and supported.

Taking ownership

Is clear on what needs to be done encouraging others to take ownership. Takes action when required, being mindful of important aspects such as Health & Safety, Equality, Diversity & Inclusion, and other considerations.

Forward thinking

Drives the development, sharing and implementation of new ideas and improvements to support strategic objectives. Engages others in the improvement process.

Professional pride

Is professional in approach and style, setting an example to others; strives to demonstrate excellence through development of self, others and effective working practices.

Always inclusive

Builds effective working relationships, recognising and including the contribution of others; promotes inclusion and inclusive practices within own work area.

Key relationships with others

Line manager

Professor of Coatings and Surface Engineering

Role holder

Research Associate/ Fellow

Key stakeholder relationships

| Computer Science Co-I | Colleagues | Students |