JOB DESCRIPTION

Job Title: Lecturer / Senior Lecturer in Materials Science and Engineering

Grade: AC2/3

Department: M^{3}4Impact

Responsible to: Materials Science and Engineering (MSE) Lead

Responsible for: N/A

Key Contacts:

- Computing and Mathematical Sciences (CMS) Head of School
- Faculty of Engineering and Science (FES) PVC
- Colleagues in M34Impact, CMS and FES
- Colleagues in Greenwich Research and Innovation
- Funding agencies
- Research Partners

Standard Occupational Classification (SoC code):

Non-Contractual Nature of Role Profile: This role profile is non-contractual and provided for guidance. It will be updated and amended from time to time in accordance with the changing needs of the University and the requirements of the job.

PURPOSE OF ROLE

Our vision is to expand our world-leading Multi-Disciplinary and Multi-Scale Modelling expertise in both reach and ability, to tackle major societal challenges affecting the environment, quality of life, safety, security, and the economy. This will be achieved through the amalgamation and expansion of two existing award-winning teams: the Centre for Safety, Resilience and Protective Security (CSRPS) and the Computational Science and Engineering Group (CSEG), creating the Multi-scale, Multi-disciplinary Modelling for Impact (M^{3}4Impact) expansion.

Both teams excel at developing and applying mathematical models, computational simulations, and bespoke software to create digital worlds that predict physically accurate outcomes addressing a wide range of societal challenges. M^{3}4Impact links three cross-cutting research and enterprise themes: **Safety and Security (S&S)**, covering disaster resilience, fire and evacuation dynamic coupling, urban-scale and building scale evacuation modelling, and protective security incorporating real-time interactivity through Virtual/Mixed Reality, from

CSRPS; **Materials Science and Engineering (MSE)** focuses on the design and manufacture of sustainable, lighter, stronger materials with broad applications, in the transport, aerospace, energy and biomedical sectors. This encompasses materials and process modelling targeting recyclability, low waste and energy efficiency; and **Digital Cities (DC)**, where interdisciplinary research will develop the evidence-base to protect UK cities/populations from pollution, pathogen dispersal, natural/anthropogenic disasters and to support policy decisions, jointly from CSRPS and CSEG.

This role lies within the remit of MSE's involvement within M^{3}4Impact. It is intended to strengthen and expand the scope of MSE's capacity to conduct high-quality research. The MSE theme covers Materials (with a focus on metals) Advanced Manufacturing, Energy storage, Sustainability, and Space research. This includes the development of novel multi-disciplinary methods such as the use of external fields or control of fluid flow during solidification to improve materials processing and related applications. Underpinning these novel techniques will be numerical simulations utilising High Performance Computing.

In its nature the role involves a highly collegiate approach and close collaboration with the other M^{3}4Impact themes (**S&S** and **DC**). The candidate will take a lead in promoting and supporting the further development and enhancement of our multi-scale multi-physics suite of software, and their deployment on the university HPC & GPU based system. Research topics are broad and could include:

- **Advanced Manufacturing** - Additive Manufacturing (3D Printing), Casting (e.g. Single Crystal for aerospace), Metal-matrix Micro and Nano composites, Melt Processing, Atomisation
- **Energy and Energy Storage** - Battery technology, lifing through phase transformations, Liquid metal batteries, Thermoelectrics
- **Sustainable Materials and Manufacturing** - Recycling (e.g. purifying aluminium alloys), Optimisation of energy usage and materials usage
- **Space Research** - Materials behaviour in microgravity, Manufacturing in microgravity, Fundamentals of solidification

In conjunction with **DC**:

- Building fabric assessment for thermal efficiency
- Environmental acoustics and noise mitigation
- The effect of urban incinerators and other industrial pollution sources on the urban environment.

In conjunction with **S&S**:

- Material behaviour e.g. elasticity and plasticity of metal structures in fires
- Large-scale, real-time fluid dynamic simulation framework applied to both metal processing and combustion dynamics.
- Material response to explosions

Underpinning these applications are a wide range of technologies:

- **High Performance Computing** - Multi-scale, large-scale, real-time modelling, Artificial Intelligence and Physics Informed Machine Learning
- **Multi-Physics Modelling** - Computational Fluid Dynamics / Magnetohydrodynamics – e.g. Finite Volume and Lattice Boltzmann methods, Structural Mechanics – e.g. Finite Element methods, Solidification – e.g. Phase Field Methods, Electromagnetism, Acoustics

The role critically involves the acquisition of external funds from local authorities, national agencies (e.g. EPSRC), the EU and international funding bodies to advance the MSE research portfolio, enterprise and knowledge exchange activities. The candidate is expected to lead (where appropriate) and contribute substantially to the preparation of proposals in the topics outlined above and enter discussions with potential collaborators in academia and elsewhere to promote this activity.

The ideal candidate will have a PhD in a related field and have experience in conducting research in a relevant subject plus a demonstrable track of contributing to grant submission / acquisition. A strong track record of publication in peer reviewed, international journals at the level of Lecturer / Senior Lecturer will be expected.

The focus of this position is on research and enterprise, but there would be a contribution to teaching and student supervision of up to 20%.

The post holder is expected to generate and maintain strong stakeholder relationships at regional, national and international levels, across their research disciplines.

KEY ACCOUNTABILITIES

Team Specific:

- Lead / contribute to subject or professional research resulting in the publication and/or dissemination of original work of international excellence quality.
- Contribute to and win significant research/enterprise bids for funding in support of the five-year strategy for M^{3}4Impact.
- Seek funding opportunities proactively to generate new research/enterprise and knowledge exchange income for MSE and M^{3}4Impact.
- Engage in interdisciplinary research collaboration and team building, within MSE, M^{3}4Impact, the Faculty and beyond.
- Engage in research or innovation consortia with external partners including non-academic stakeholders.
- Raising the MSE/M^{3}4Impact profile and establishing strong relationships with targeted clients and partners resulting in increased business.

- Protect and enhance M³4Impact reputation, promoting its software tools, skills, and expertise to position it as partner of choice.
- Lead / contribute to the supervision of research students at doctoral level.
- Make significant contributions to the development of novel MSc programmes and CPD courses, integrating research, enterprise, and innovation, in support of teaching and knowledge exchange programmes developed as part of M³4Impact.

Generic:

As post holder you will:

- Assist in achieving the KPIs of the M³4Impact expansion
- Contribute to peer review and departmentally-based teaching development activities
- Promote your work and represent your discipline and the work of the University internally and externally, and take a proactive approach to ethical, good practice
- Maintain high professional standing in their discipline and develop their own scholarly profile, including a program of high-quality scholarship, disseminated primarily in professional refereed journals.
- Implement approved policies, guidelines, and standard operating procedures efficiently in relation to their own academic duties.
- Maintain an overview of the welfare, progression, examination, and assessment of allocated students.
- Participate in outreach activities (e.g. visit to schools, local community groups, public engagements and related activity)

Managing Self:

- Keep abreast of developments within your field and seek continuous improvement of own professional practice.
- Actively participate in established professional development framework activities.
- Behave in a manner that reflects the University values and creates a positive environment for work and study.

Core Requirements:

- Adhere to and promote the University's policies on Equality, Diversity and Inclusion and Information Security.
- Ensure compliance with Health & Safety and Data Protection Legislation.
- Support and promote the university's Sustainability policies, including the Carbon Management Plan, and carry out duties in a resource efficient way, recognising the shared responsibility of minimising the university's negative environmental impacts wherever possible.

- Adhere to current legal requirements and best practice relating to digital content and accessibility, including Web Content Accessibility Guidelines when creating digital content.

Additional Requirements:

Undertake any other duties as requested by the line manager or appropriate senior manager, commensurate with the grade.

This is a professional, demanding role as part of a project, M^{3}4Impact, that has a specific and ambitious strategic plan and agenda.

KEY PERFORMANCE INDICATORS:

Performance Indicators will be established in consultation with the Materials Science and Engineering (MSE) lead, the line manager and the other M^{3}4Impact leads, as part of the post holder's annual Appraisal and Professional Development Review and with due regard to the University's KPIs.

KEY RELATIONSHIPS (Internal & External):

- Faculty Management Team
- M^{3}4Impact Management Team
- M^{3}4Impact Staff
- GRI
- External funders and External Partners.

PERSON SPECIFICATION

EXPERIENCE:

Essential Criteria

- Leading and contributing to recognition and expertise in the field of Materials Science and Engineering with a substantial overlap in the research topics listed in the post role specification.
- Individual and /or collaborative income generation (Lecturer – desirable)
- Application for research funding and other bids (Lecturer – desirable)
- Proven track record of sustained academic publications with international impact. (greater number expected at Senior Lecturer)
- Experience of using and/or developing scientific software.
- Contribute to research and/or enterprise projects with a range of stakeholders, including commercial, government and public sector.
- Contribute to delivering impacts or outcomes with demonstrable benefits to businesses, the public sector, or society in general.
- Track record of supervision of research activities of students at various levels, including PhD. (Lecturer – desirable)

Desirable Criteria

- Experience in the use of HPC and parallel computing techniques for large multi-scale simulations.
- Experience of teaching in HE, at a range of levels including, undergraduate, masters and summer schools.
- Experience of computer programming in a structured language such as Fortran, C, or C++.
- Well-developed project management skills.
- Experience of managing, defining and specifying appropriate ethics standards associated with human factors research.
- Understanding of HE in the UK and in a business enterprise role.
- Working knowledge of academic standards.
- Working knowledge of quality assurance and academic standards.

SKILLS:

Essential Criteria

- Knowledge of the mechanisms of applying for research funds including the preparation of grant proposals. (Lecturer – desirable)
- Excellent organisational and management skills.
- Outstanding interpersonal skills and ability to motivate others.
- Excellent written and oral communication skills.
- Commitment to the promotion of high standards and excellence.
- Ability to think strategically and conceptually.
- Capacity to listen and consult, good negotiation skills.
- Capacity to make informed decisions.

- Ability to work effectively and deliver under pressure.
- Able to use IT effectively.

Desirable Criteria

- N/A

QUALIFICATIONS:

Essential Criteria

- PhD degree in related field.

Desirable Criteria

- Postgraduate teaching qualification
- Charted status with an appropriate body
- Membership of appropriate professional bodies

PERSONAL ATTRIBUTES:

Essential Criteria

- We are looking for people who can help us deliver the values of the University of Greenwich: Inclusive, Collaborative and Impactful.

Desirable Criteria

- N/A