POST-DOCTORAL RESEARCHER/RESEARCH ASSOCIATE IN PHASE FIELD MODELLING OF THERMO-MECHANICAL CONTROLLED PROCESSING AND WELDING FOR IMPROVED FATIGUE STEELS

School of Engineering, College of Science and Engineering
Ref. No. 011326

JOB ADVERTISEMENT

Applications are invited from suitably qualified candidates for a full-time, fixed term position as a post-doctoral researcher or research associate within Mechanical Engineering at the University of Galway, Ireland.

This position is funded by Research Ireland and Sustainable Energy Authority of Ireland and is available from 1st November 2025 to contract end date of 31 July, 2027, with possible extension.

University of Galway
Located in the vibrant cultural city of Galway in the west of Ireland, the University of Galway has a distinguished reputation for teaching and research excellence

For information on moving to Ireland please see www.euraxess.ie

Detailed Project Description.
The TAILORED MANUFACTURING FOR SAFE, SUSTAINABLE OFFSHORE WIND TURBINE SUPPORT STRUCTURE MATERIALS (TRANSFORRM) project, funded by Research Ireland and Sustainable Energy Authority of Ireland (SEAI), aims to develop a multi-scale, process-structure-property-performance (PSPP) framework for manufacturing-informed design of safe, sustainable structures for upscaling of offshore wind turbines (OWTs). TRANSFORRM will develop methods to achieve increased safety, reduced cost and longer life for offshore renewable energy (ORE) structures (e.g. monopiles, jackets) via through-process design and thermo-mechanical controlled processing (TMCP) and welding of state-of-the-art high-strength low-alloy (HSLA) steel. The specific focus will be on increased material strength and increased resistance to fatigue crack initiation (FCI) and growth in welded connections, via control of manufacturing-induced microstructure. In partnership with industrial collaborators, TRANSFORRM will thus provide the key building blocks for a digital twin for OWTs and novel structural design and condition monitoring techniques. TRANSFORRM will involve close collaboration with relevant key national and international academic, research and industry partners. The position may involve international travel for collaboration visits (up to 6 months in duration) and conference attendance. International collaborators include IMDEA Materials Institute (Madrid, PFM and multi-scale modelling), Imperial College London (residual stresses and FCG in welds), Universities of Plymouth (offshore renewables), Nottingham (fixed OWT design, analysis), Strathclyde (floating OWT design, analysis) and DTU Denmark (Design Codes and Standards), as well as Univ of Limerick (EBSD, CPFE).

Salary: Postdoctoral Researcher / Research Associate salary scale €46,305 - €59,063 per annum, (subject to the project's funding limitations), and pro rata for shorter and/or part-time contracts.

The default position for all new public sector appointments is the 1st point of the salary scale. This may be reviewed, and consideration afforded to appointment at a higher point on the payscale (subject to the project's funding limitations), where evidence of prior years' equivalent experience is accepted in determining placement on the scale above point 1, subject to the maximum of the scale. (Research Salary Scales - University of Galway)

Closing date for receipt of applications is 17:00 (Irish Time) on 23rd September, 2025. It will not be possible to consider applications received after the closing date.

Optional: Interviews are planned to be held on 7 October, 2025

***Please review full job description for further details and essential requirement**

JOB DESCRIPTION

Job Description:
This position will focus on multi-scale modelling methods for microstructure evolution, such as phase field modelling, for TMCP and/or welding processes for HSLA steels and micromechanical modelling for assessment of effects of manufacturing processes on mechanical properties, leading to optimization with respect to thickness size effects in TMCP steels. This candidate will contribute to project management of the overall project. This will also include collaboration with and management of PhD projects, particularly on the various tasks required for development of the multi-scale models for TMCP steels for OWT structures, fixed and floating.

The aim of the micro-macro modelling is to establish microstructure-sensitive models to quantify effects of manufacturing-induced texture and heterogeneity on FCI and early growth for welded TMCP steels. The key deliverable will be process-structure-property maps for fatigue of welded TMCP steels to facilitate physically-based design with specific focus on OWT geometry upscaling (e.g. wall thickness effects).

We anticipate recruiting a researcher with excellent project management experience. This person will need extensive experience as a post-doctoral researcher on macro-micro modelling of microstructure evolution using phase field methods, CalPHAD or cellular automata, for example, and/or crystal plasticity methods for micromechanics for plasticity, damage and/or fatigue in order to work effectively with the team of PhD researchers and collaborators to (i) integrate the phase field modelling with crystal plasticity for TMCP and welding-induced material heterogeneities, including damage and user material modelling, (ii) provide support for welding and TMCP simulations for microstructure evolution to (iii) achieve manufacturing-informed design of improved steels and structures for OWTs.

Duties: The main duties are as follows:

- Project management, to work directly with Prof Leen to support coordination and management of meetings, collaborations, reporting, financial management etc.
- Microstructure evolution modelling using phase field methods, CalPHAD or cellular automata
- Micromechanics modelling using crystal plasticity (CPFE, CPFFT), especially for crystallographic texture in TMCP or welded steels
- Write internationally-leading journal articles and present at international conferences

Essential Requirements:

- PhD in mechanical engineering, materials science, mechanics or closely-related area for the proposed research
- Track record of high impact journal publications and international conference presentations
- Experience of advanced non-linear computational mechanics, including development, e.g. phase field modelling, cellular automata, user subroutines for plasticity, fatigue, fracture mechanics etc.
- Experience of coordinating or managing collaborative research projects and excellent inter-personal and written-verbal communications skills

Desirable Requirements: (i.e criteria for shortlisting (minimum of four)

- Post-doctoral research experience or equivalent
- Knowledge and experience of crystallographic texture measurement in metals
- Experience of microstructure and micromechanical modelling of metallographic texture, e.g. PFM, CA, CPFE, or similar
- Micromechanics of welded connections or closely related

ELIGIBILITY REQUIREMENTS

Essential Requirements:

- For post-doctoral role, PhD in mechanical engineering, materials science, mechanics or closely-related area for the proposed research; for Research Associate role, more than 4 years post-graduate experience in mechanical engineering, materials science, mechanics or closely-related area for the proposed research
- Track record of high impact journal publications and international conference presentations
- Experience of advanced non-linear computational mechanics, including development, e.g. phase field modelling, cellular automata, user subroutines for plasticity, fatigue, fracture mechanics etc.
- Experience of coordinating or managing collaborative research projects and excellent inter-personal and written-verbal communications skills

Desirable Requirements:

- Post-doctoral research experience or equivalent
- Knowledge and experience of crystallographic texture measurement in metals
- Experience of microstructure and micromechanical modelling of metallographic texture, e.g. PFM, CA, CPFE, or similar
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CONTINUING PROFESSIONAL DEVELOPMENT

Continuing Professional Development/Training:
Researchers at University of Galway are encouraged to avail of a range of training and development opportunities designed to support their personal career development plans. University of Galway provides continuing professional development supports for all researchers seeking to build their own career pathways either within or beyond academia. Researchers are encouraged to engage with our Researcher Development Centre (RDC) upon commencing employment - see HERE for further information.

FURTHER INFORMATION/LINKS

- **TO APPLY:** Search Current University of Galway vacancies. Applications must be submitted online.
  - How to apply guide

- For informal enquiries, please contact Prof Seán Leen, Mechanical Engineering, School of Engineering, University of Galway, Email: sean.leen@universityofgalway.ie

- University's Strategic Plan

- Working in Research at University of Galway

- Moving to Ireland (Euraxess)

- Applicant Information

- We reserve the right to re-advertise or extend the closing date for this post.

- University of Galway is an equal opportunities employer.

- All positions are recruited in line with Open, Transparent, Merit (OTM) and Competency based recruitment.