OLLSCOIL NA GAILLIMHE
UNIVERSITY OF GALWAY

HR EXCELLENCE IN RESEARCH

Research Associate/Postdoctoral Researcher – Computational Modeling and Scientific Computing of an Integrated Optimisation Platform for Lattice-based, Additive Manufacturing

Biomechanics Research Centre (BioMec), Institute for Health Discovery and Innovation and School of Engineering, College of Science & Engineering

Ref. No. 011766

JOB ADVERTISEMENT

Applications are invited from suitably qualified candidates for a full-time, fixed term position as a Research Associate/Postdoctoral Researcher with Biomechanics Research Centre (BioMec), Institute for Health Discovery and Innovation and School of Engineering at the University of Galway, Ireland.

This position is funded by the European Research Council (ERC) and is available from 1st July 2026 to contract end date of 30th December 2027.

Concept-AM is a European Research Council Proof-of-Concept project at the University of Galway that will develop a new paradigm in Design Optimisation for Additive Manufacturing (DOfAM). The project builds on the original LatticeWorks toolbox to create a high-performance, scalable software platform capable of producing lightweight, high-strength, and sustainable components tailored to the unique capabilities of additive manufacturing. By generating complex, functionally graded, and biomimetic lattice structures inspired by nature, Concept-AM will enable significant reductions in material use, weight, and energy consumption while improving structural performance and durability. The key technical pillars include advanced optimization algorithms that automate material distribution for optimised performance, integrated simulation coupling lattice generation with open-source solvers that allow for structural validation, and design-to-manufacture for incorporating AM constraints. Concept-AM project follows a commercialization strategy landscape and aims to integrate the easy-to-use technology with the industrial applications and licensing the core technology.

This position will be responsible for integrating the numerical optimisation into additive manufacturing, through an easy-to-use platform. The candidate will be at the forefront of developing bio-inspired topology optimization algorithms and integrating them with open-source Finite Element Analysis (FEA) solvers to create a tool that is accessible to both academic researchers and industrial partners. This research will be conducted using the equipment, technical expertise, office and research space within the Biomechanics Research Centre (BioMec), Institute for Health, Discovery and Innovation (IHDI) and School of Engineering at the University of Galway. The Alice Perry Engineering building houses state-of-the-art Biomedical Engineering facilities including additive manufacturing laboratories, micro-CT scanning, microscopy, research space and state-of-the-art computer software.

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Salary: Research Assistant / Postdoctoral Researcher salary scale €46,805 - €59,654 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 27th May 2026. It will not be possible to consider applications received after the closing date.

Interviews are planned to be held on 12th June 2026

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

JOB DESCRIPTION

Job Description:
The successful candidate joins the Concept-AM project, aimed at developing a fully integrated software environment capable of guiding a design from initial concept through to AM-ready output. The candidate will be responsible for developing an environment that embed structural efficiency, functional grading, and manufacturability constraints directly into the design process, ensuring porous AM components are optimised for both performance and production. Expertise in coding and optimization strategies will be essential for developing the software, and additive manufacturing experience is desirable, ensuring that the technology can be expanded and delivered to the end-users. The candidate will work closely with the project PI and the research team, within the Concept-AM project.

Duties:

- Develop an end-to-end Design Optimisation for Additive Manufacturing (DOfAM) workflow. Will spearhead the creation of an integrated platform that transitions seamlessly from initial concept to high-performance, optimized geometries. This involves expanding the lattice generation library, in-situ topology optimization algorithms coupled with open-source Finite Element Analysis (FEA) solvers (e.g., FEBio) to ensure material efficiency and mechanical integrity.
- Design for industrial feasibility by incorporating AM-specific manufacturing constraints (e.g. build orientation, wall thickness, and support structure requirements) to ensure generated design is ready for prototyping.
- Develop a suite of application-specific demonstration modules to validate the platform's optimization and manufacturing capabilities. This involves creating industry-relevant case studies by designing modular demos that showcase the platform's utility in key sectors, such as generating biomedical implants or lightweighting aerospace components through topology optimization.

- Hand on experiments for prototyping designs and validation of the design-ready constraints, by testing manufacturability for a specified AM technique (e.g. SLA), as proofing for the concept-AM idea.
- Enhance the accessibility and usability of Concept-AM through the design of an intuitive Graphical User Interface (GUI) that enables non-expert engineers to interact with complex lattice design workflows, modular software architecture, robust documentation frameworks, and repository management.
- Assist in IP protection activities and contribute technical insights toward a business plan for potential spin-out opportunities.
- Be responsible for preparation of project reports on project deliverables.
- Actively participate in national/international conferences and meetings.
- Publish data in high impact factor journals and/or protect new intellectual property.
- Be responsible for project-related management and preparation of project reports.
- Actively participate in national/international conferences and meetings.
- Any other duties assigned commensurate to this level of post

ELIGIBILITY REQUIREMENTS

Essential Requirements:

- Applicants must have a PhD in mechanical engineering, biomedical engineering, computer science, computational engineering, additive manufacturing, applied mathematics, OR have a primary degree (level 8) in one of the above areas with four years full-time relevant research experience post primary degree.
- Applicants must have advanced programming skills in one or more relevant languages such as Python, C++, Julia, MATLAB, or similar.
- Applicants must have experience in numerical methods and computational design for engineering applications, such as finite element or finite volume methods, and preferably structural simulation of complex structures and/or metamaterials.
- Applicants must have evidence of peer-reviewed publications in numerical methods, computational mechanics, design optimisation, computational design, or a related area.
- Applicants must demonstrate excellent communication, organisational, and project management skills, and the ability to work effectively within an interdisciplinary research team.
- Applicants should be highly motivated and passionate about developing next-generation computational tools for sustainable additive manufacturing.

Desirable Requirements:

- A strong track record in scientific software development and coding, evidenced through publications, software tools, GitHub repositories, or equivalent outputs.
- Experience with commercial or open-source software environments relevant to the project, such as Abaqus, ANSYS, COMSOL, Rhino/Grasshopper, nTopology, Blender, OpenSCAD, FreeCAD, CGAL, VTK, or similar.

- Evidence or experience in translational research into innovations, such as licensable IPs, or being familiar with commercialisation pathway.
- Experience in developing graphical user interfaces, plugins, or standalone software packages for engineering applications.
- Experience with 3D printing and practical additive manufacturing processes (e.g. metal AM, polymer AM, laser powder bed fusion, extrusion-based printing).
- Experience of working with industrial collaborators or on industry-focused projects.

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 Professor Ted Vaughan, Professor of Biomedical Engineering and Director of the Institute for Health Discovery and Innovation at ted.vaughan@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.

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