Applications are invited from suitably qualified candidates for a full-time Research Associate position on the Computational Biomechanics and Mechanobiology of Biodegradable Implants for Tissue Expansion Applications at the Biomechanics Research Centre (BioMec), College of Engineering and Informatics, University of Galway. This position is funded through a Horizon Europe EIC Pathfinder project, BIOMET4D, whose aim is to develop a new generation of shape-shifting and load-bearing implants for dynamic tissue restoration. The position is available from 1st December 2022 to the 31st May 2024.

Reconstructive surgeries frequently require multiple, often complex, procedures at high social and economic costs. A shape-morphing implant that can be implanted using less invasive procedures and that then undergoes predesigned shape changes, leading to tissue expansion and allowing for complete degradation coupled with tissue regeneration, is a radically new treatment concept. BIOMET4D aims to create a new generation of shape-shifting and load-bearing implants for dynamic tissue restoration for both soft- and hard-tissue applications. This position will develop a multi-physics computational optimization framework that integrates key aspects of spatial and temporal device performance (mechanical, physiochemical, and biological) in the implanted environment and thus provides a basis to systematically improve implant design for these shape-morphing implants.

This research will be conducted using the equipment, technical expertise, office and research space within the Biomechanics Research Centre in the School of Engineering at University of Galway. The Alice Perry Engineering building houses state-of-the-art Biomedical Engineering facilities including cell culture laboratories, biomechanical testing laboratories, micro-CT scanning, microscopy, research space and computer suites.

Job Description:
The successful candidate will be involved in the computational design, development and verification of the implanted devices under development. This role will combine the physicochemical problem of metal degradation with device expansion and couple long-term load-bearing behavior with the mechanobiological problem of implant-tissue interactions to generate proof-of-concept designs. The candidate will work closely with industrial and academic collaborators within the BIOMET4D consortium.

Duties:
The successful candidates will:

- Develop Finite Element Models of metallic shape-shifting scaffolds to understand functional performance.
- Develop Finite Element Models of surface-based corrosion process for metallic scaffolds to predict degradation performance.
- Develop Mechano-regulation models that will consider the cellular processes that drive tissue damage, growth, and regeneration in the implant environment.
- Establish multi-domain coupling of these modelling frameworks (i.e., corrosion, topology optimization, and mechano-regulatory) to facilitate optimization of the load-bearing capacity of the implant based on the constraints of the application.
• 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.

Qualifications/Skills required:

Essential Requirements:
• Primary degree and masters in mechanical or biomedical engineering, or a related discipline.
• 4+ year’s research/industry experience in computational modelling of degradation-based process in metallic medical devices.
• Applications must have a strong background in the Abaqus Finite Element software, or similar and must have experience in engineering programming languages (e.g. Fortran, C, Matlab, Python).
• Applicants must have a strong background in the mechanobiological theory and modelling
• Applicants must have evidence of peer-reviewed journal publications in the area of medical devices.
• Applicants should have excellent communication and organizational skills and should be highly motivated and passionate about development of advanced computational engineering solutions.

Desirable Requirements:
• PhD in engineering.
• Experience in topology optimisation tools used during the design process of medical devices (or similar).
• Experience of working on industry-related projects, or in collaboration with industry.

Salary: €39,522 to €46,907 per annum pro rata for shorter and/or part-time contracts (public sector pay policy rules pertaining to new entrants will apply).

Start date: Position is available from 1st December 2022

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.

Further information on research and working at University of Galway is available on Research at University of Galway

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

Informal enquiries concerning the post may be made to Dr. Ted Vaughan at ted.vaughan@universityofgalway.ie

To Apply:
Applications to include a covering letter, CV, and the contact details of three referees should be sent, via e-mail (PDF attachments only) to Dr. Ted Vaughan at ted.vaughan@universityofgalway.ie

Please put reference number University of Galway 253-22 in subject line of e-mail application.

Closing date for receipt of applications is 5.00 pm, 30th October 2022

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

University of Galway is an equal opportunities employer.