Job offer: R&D research/technical staff in computational biomechanics and optimization of personalized implants

Project context

The Universitat Politècnica de València, through the Institute of Mechanical Engineering and Biomechanics - UPV-I2MB - is seeking to recruit a person to join the research team of the project **BAMPI: Implantes de material bioabsorbible personalizados con requisitos estructurales para cirugía ósea mayor** - *Personalized bioabsorbable material implants with structural requirements for major bone surgery*.

BAMPI is a collaborative R&D project focused on developing a new generation of personalized bone implants manufactured with bioabsorbable materials - BAM. The overall aim of the project is to advance towards solutions capable of replacing certain temporary metallic implants used in major bone surgery, thereby avoiding the future need for a second surgical procedure to remove them.

The project brings together advanced biomaterials, medical imaging, artificial intelligence, numerical simulation, structural optimization, additive manufacturing and experimental validation. Within the consortium, UPV-I2MB leads the tasks related to computational mechanics, structural analysis, simulation of the bone-implant assembly, optimization of personalized implants, and validation of the workflow from CT images to demonstrator manufacturing.

The selected candidate will join a multidisciplinary applied research environment, collaborating with technology companies, biomedical centers and hospitals, and contributing to the development of computational methodologies for personalized medicine and bone surgery.

Job description

We are looking for a person with a background in engineering, computational biomechanics, computational mechanics, biomedical engineering or related fields to participate in the development, implementation and validation of numerical tools for the analysis and optimization of personalized bioabsorbable implants.

The work will mainly focus on:

1. Developing and applying methodologies for structural analysis and optimization of personalized implants.
2. Adapting numerical tools to study the fractured bone-implant assembly during the bone healing process.
3. Generating and evaluating optimized internal structures - infills - that reduce the amount of bioabsorbable material used while maintaining the required structural functionality.
4. Validating a complete workflow starting from segmented CT images, continuing with implant design and optimization, and ending with manufacturing using 3D printing technologies.

The geometric design of the implant's external surface will be developed through specialized subcontracting. The hired person will participate in the technical interaction with this tool and in the subsequent structural evaluation and optimization of the generated designs.

Activities to be carried out

- **Structural analysis of the bone-implant assembly:** Adaptation and application of numerical simulation tools to analyze the mechanical behavior of the fractured bone-implant assembly during healing. The models will integrate information from segmented medical images, implant geometries and characterization of bioabsorbable materials, incorporating the failure criteria and allowable limits defined by the partners responsible for the BAM.
- **Structural optimization and infill generation:** Topology optimization methodologies will be developed and validated to generate internal structures - infills - in personalized implants. To this end, designs that reduce the amount of bioabsorbable material used while maintaining the required stiffness and strength during bone consolidation will be evaluated. These methodologies will also be adapted to implants manufacturable by 3D printing, considering manufacturing constraints, resolution and geometric continuity.
- **Integration with medical imaging and segmentation:** Although automatic bone segmentation from CT images will be developed mainly by Lincbiotech, the hired person must become familiar with its results and data formats. They must also be able to work with segmented geometries, prepare data for simulation and coordinate technically with the partners responsible for this task.
- **Validation of the BAMPI workflow:** The hired person will participate in validating the project's complete workflow, from CT images of fractures to optimized personalized implants. To do this, they will apply the developed tools to demonstrator cases, integrating segmentation, geometric design, numerical simulation, infill optimization and implant manufacturing. They will also collaborate with consortium partners to incorporate biomaterial data, clinical requirements, manufacturing constraints and experimental results. Finally, they will contribute to the preparation of technical reports, documentation, deliverables and scientific and technical dissemination activities.

Candidate profile

The candidate must hold a **university degree** in one of the following areas or related fields:

- Industrial Technologies Engineering.
- Mechanical Engineering.
- Biomedical Engineering.
- Aerospace Engineering.
- Or degrees related to computational mechanics and numerical simulation.

Additional master's or doctoral training in related areas will be considered positively.

Knowledge and experience to be valued

- Experience or knowledge of numerical simulation using the Finite Element Method.
- Knowledge of solid mechanics, structural analysis, biomechanics or computational tissue modeling.
- Experience in scientific programming, preferably in Python, MATLAB, C++ or similar languages.
- Knowledge of structural optimization, topology optimization, generative design or generation of lattice/infill structures.
- Familiarity with 3D geometry processing, meshes, CAD models, STL files, segmentations or medical images.
- Previous experience in R&D projects, applied research, scientific software development or technical/scientific publications.

Personal competencies

- Ability to work autonomously and in an organized manner.
- Interest in applied research in biomechanics, health and computational engineering.
- Ability to integrate into a multidisciplinary team with backgrounds in engineering, medicine, materials science, additive manufacturing and artificial intelligence.
- Technical rigor, initiative and results orientation.
- Good oral and written communication skills.
- A level of English sufficient for reading scientific documentation, technical writing and participating in meetings or dissemination activities will be valued.

Contract conditions

- **Contracting entity:** Universitat Politècnica de València - Institute of Mechanical Engineering and Biomechanics, UPV-I2MB.
- **Project:** BAMPI — Implantes de material bioabsorbible personalizados con requisitos estructurales para cirugía ósea mayor (CPP2024-011589). Financiado por MCIN/AEI /10.13039/501100011033 y por la Unión Europea NextGenerationEU/ PRTR.
- **Duration:** 2 years or until project completion.
- **Salary:** EUR 28,700 gross per year.
- **Workplace:** UPV-I2MB, Universitat Politècnica de València.
- **Expected start date:** October 2026.
- **Working time:** full-time.

Documents to be submitted

- Updated curriculum vitae.
- Brief motivation letter stating interest in the position and fit with the profile.
- Documentation proving the required degree.
- Academic transcript.
- References, publications, code repositories or examples of previous work, if available.

Call for applications

The official call will open in September 2026 for a short period of 10 days in this website, but you may already send the documentation listed above to ennaso@upv.edu.es, expressing your interest.