

Position Offered: POSTDOCTORAL RESEARCHER

Project: *Generative Design and Topological Optimization in Additive Manufacturing of Soft Materials: From Material to Application*

Technological and scientific fields: AI, Robotics, Virtual Reality, Additive Manufacturing

Location: Madrid, Comunidad de Madrid, ICTP-CSIC, C/Juan de la Cierva, 3

Research Group/PI: Macromolecular Engineering/Alexandra Muñoz Bonilla

PROJECT SUMMARY

This project aims to implement generative design and topological optimization in additive manufacturing (AM), adapting models to soft materials in three application areas: soft robotics, aerospace seals, and medical orthotics. To achieve this, soft polymeric materials will be developed, and scanning techniques will be employed to verify the printed parts and provide feedback to the design and manufacturing process. The tasks include identifying and developing materials, implementing AI-assisted generative design (GD) techniques, obtaining parts with elastic properties through AM techniques, and scanning prototypes to validate models in real environments. To successfully carry out this project, the ICTP has extensive experience in the development and characterization of photopolymerizable resins and thermoplastic elastomers and offers an AM unit with various advanced manufacturing equipment. Additionally, there are current collaborations of interest for the selected applications.

PROFESSIONAL PROFILE

Minimum requirements:

- PhD in Science and Technology related to additive manufacturing.
- Proven proficiency in aerospace mechanical design software.
- Proven proficiency in additive manufacturing technologies for elastic/soft polymers.
- Proven research experience in FDM, SLA, SLS and 3D scanning.
- Proven proficiency in English.

Merits to be considered:

- Proven knowledge in finite element analysis using COMSOL.
- Proven knowledge in data analysis and programming.
- Proven knowledge in techniques for characterizing polymeric materials.
- Experience in the aerospace sector and hospital 3D printing.

WHAT IS OFFERED

Training in AI-assisted generative design for the manufacturing of elastic parts using advanced AM technologies, collaborating with CSIC research teams and industry companies. Extensive training in AI and data analysis for the implementation of generative design, training in generative design and topological optimization, and training in robotics and the healthcare sector. Short stays will be conducted at research centers such as CAR-CSIC, hospitals such as the Toledo Paraplegics Hospital, and companies in the aerospace sector such as Airbus. The mentorship of undergraduate, master's, and PhD students collaborating on the project will be promoted.

Contract conditions:

Indefinite contract for a Postdoctoral Researcher associated to the Momentum Project of 4 years' duration according to Spanish science law. Gross annual salary (41.000 € - 52.000 €).

Start of contract: before 31 December 2024

PRINCIPAL INVESTIGATOR CONTACT

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