Arts et Métiers
Sciences et Technologies

Localisation :
Talence (Bordeaux)

Additional Information :
Position available from :
1st March 2025

Unit of assignment : **I2M**

Financement : Région NA / ANR
Co-tutelle éventuelle : OUI

Type of contract : PostDoc (CDD)

Topic :
Analysis and modelling of variable stiffness composites produced by additive manufacturing: analysis and integration of process specificities

Duration of the contract : 24 months

Work shift : Full time

Attachment to post-type : PostDoc

Required documents :
CV, Motivation Letter, PhD Defense Report, PhD Reviewers Reports

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Reference Place of public employment :

PostDoc Position at I2M Laboratory of Bordeaux

Topic : Analysis and modelling of variable stiffness composites produced by additive manufacturing: analysis and integration of process specificities

Context
The National School of Arts et Métiers is a scientific, cultural and professional public institution (EPSCP) under the sole supervision of the Ministry of Higher Education and Research. It is composed of eight campuses and three institutes spread throughout the country.
Its missions are those of a public institution of higher education: initial and continuing education, research and development.

Missions / profile
The proposed PostDoc is part of the SMARTCOMPOSITE2 and GLAMOUR-VSC projects, which aim at creating a digital and experimental R&D platform for composites obtained by additive manufacturing (AM). The PostDoc's work will focus on:

1) Studying the effects of the complexity of the morphology of composites and the specific features of the AM process on the mechanical response of the material and the structure (on any relevant scale);
2) To develop the composite AM process towards the manufacture of structural components through the use of high modulus and/or high toughness resins;
3) 3) Design non-standard tests to characterise damage kinetics specific to this class of composites.

To this end, the SMARTCOMPOSITE polymer and filled polymer AM platform at I2M/ENSAM will be used. This platform is equipped with an AM process for composites produced using a robotic arm whose reinforcement can be deposited along curvilinear trajectories inside complex topologies. The main limitations of the process as well as the imperfections and damage mechanisms of the composite will be analysed and integrated into the modelling techniques already used in the I2M laboratory. More specifically, the tasks planned for this topic are:

T1. Identification of process parameters that influence the generation of imperfections and correlation with design variables. Manufacture and testing of representative samples.

T2 Carrying out manufacturing tests on high-modulus thermoplastic resin composites compatible with the AM robot. Adaptation of process parameters to high-modulus resins and manufacturing tests.

T3 Development of high-fidelity numerical models at any characteristic scale, i.e. from the scale of constituent phases to the macroscopic scale.

T4 Development of experimental protocols to characterise the mechanical behaviour in correlation with the local micro and mesostructure of the composite.

Required profile :

PhD in Engineering Mechanics of Composite Materials (Bac+8)

Composite Materials and Structures

Additive Manufacturing

Experimental testing

FE modelling (Ansys, Abaqus)