

ANNOUNCEMENT FOR PROVISION OF THE WORKPLACE

VAC-2023-59 – Grant for the hiring of predoctoral research personnel (FPI) in the framework of the BLAS_IT project - New numerical methodology for fracture simulation due to pressure pulses. Gas-structure interaction

Number of positions to be filled: 1

Professional category: PhD Student

Workplace: Barcelona, Campus Nord UPC

Salary (gross): 17.651,68€¹

Weekly working hours: 40h/week

Contract type: PhD

Duration: 4 years

Expected start date: January 1st 2024 as maximum

Functions to be developed:

Carrying out a doctoral thesis in the framework of a research project titled BLAS_IT - New numerical methodology for fracture simulation due to pressure pulses. Gas-structure interaction, Ref. PID2022-139903OA-I00, whose principal investigator is Prof. Lucía Gratiela Barbu, co-leading the Computational Design & Analysis of Engineering Metamaterials group.

The objective of the BLAS_IT project, within which this position is situated, is the development of an innovative numerical method capable of simulating a wide range of engineering problems involving the interaction of shockwaves from explosions and structures in the nonlinear range. The new numerical methodology will be validated and tested based on experimental data obtained during the project. All these

¹ The salary will be adapted in accordance with the stipulated in Real Decreto 103/2019 (current salary revised annually: 17.651,68€ for the 1st and 2nd year, 18.912,52€ for the 3rd year and 23.640,65€ for the 4th year) and next actualizations.

Additional grant of 6.860€ to cover the expenses derived from stays in R&D centers.

features will be implemented in an open-source software called Kratos-Multiphysics, which is accessible, modular, scalable, and expandable.

The work aims to achieve technology validation in an industrially relevant environment, leading to a Technology Readiness Level (TRL) of 5.

Expected Results:

- Study and development of equations of state (pressure evolution over time) for explosions.
- Use of a finite element program to simulate compressible flow.
- Utilization of a methodology for fracture mechanics combining the finite element method and discrete element method (FEM-DEM).
- Development of a coupled tool between compressible flow and fracture solutions: Fluid-structure interaction.
- Validation of the developed tools through experimental data.

Additional information about the Project is available at: [CIMNE RTD Project: BLAST IT](#)

The candidate will join the research group of Computational Design & Analysis of Engineering Metamaterials: [Computational Design & Analysis of Engineering Metamaterials](#)

This contract is financed by the announcement of Proyectos de Generación de Conocimiento 2022 del Ministerio de Ciencia e Innovación: [Proyectos de Generación de Conocimiento 2022 | Agencia Estatal de Investigación \(aei.gob.es\)](#)

Required skills:

- The candidate must have a Master's degree (or equivalent) in Civil Engineering, Mechanical Engineering, Industrial Engineering, Computational Mechanics, or related fields; and to be in disposition to be enrolled in a PhD programme in the moment of the contract's formalitacion.
- Excellent written and oral communication skills in English demonstrable with an academic certificate.
- Strong background and knowledge of the Finite Element Method or other relevant numerical methodologies.

Other valued skills (not mandatory):

- Authorship or co-authorship of publications in journals and/or contributions to international conferences.
- Education from recognized universities and research institutions, as well as participation in research projects, will be viewed favorably. International experience will be an additional advantage.
- Knowledge of programming languages such as Python and/or C++.
- Proficiency in nonlinear constitutive modeling of solids (damage, plasticity, etc.).
- Proficiency in modeling compressible fluids and pressure waves.
- Experience in using GitHub and/or GitLab environments.
- Previous involvement in competitive scientific projects will be an additional advantage.

Qualification system:

The requirements and merits will be valued with a maximum grade of 100 points. This maximum score will be obtained by adding the following points:

1. Academic and/or scientific/technical career (up to 50 points).
 - Scientific/technical contributions (up to 45 points). The academic record and other curricular merits will be valued, as well as the level of suitability that these will have with respect to the tasks to be managed, based on previous academic and professional experience.
 - Mobility and internationalization (up to 5 points). The relevance and impact of their research path and/or in the industry will be valued, considering the prestige of the entity and the activities that are developed in it.
2. Candidate's willingness to develop the research activities of the job offer (up to 50 points). The suitability of the candidate to the program, project or research activities to be developed will be a plus in terms of his/her previous academic and professional experience. Therefore, the extra value that the realization of the project will represent in his/her professional career, and the extra value that it will be for the center and the team, will be considered as a plus.

Candidates must complete the "Application Form" on our website, indicating the reference of the vacancy and attaching the required documents.

The deadline for applying for the vacancy is November 2nd, 2023 at 12 noon.

The pre-selected candidates may be asked to send the documentation required in the "Requirements" and "Merits" sections, duly scanned, and may be called to go through selection tests (which may be of an eliminatory nature) and / or personal interviews. At the time of formalization of the contract, the candidate must be admitted in a PhD Program.

***It is mandatory to provide the CV in the official form of the Spanish Ministry, which can be downloaded from the following link: <https://www.cimne.com/cvdata/cntr2/spc2/dtos/mdia/People/CV-abreujat.pdf>**

This contract is funded by Grant PID2022-140249OB-I00 financed by MCIN/AEI /10.13039/501100011033/ FEDER, UE.



A CONSORTIUM OF

IN COOPERATION WITH