

# Position Offered: POSTDOCTORAL RESEARCHER

## Project: *Integration of Artificial Intelligence in Numerical Models Applied to Geosciences*

**Technological and scientific fields:** High-Performance Computing, Artificial Intelligence, Mass Data and Information Processing Technologies, Data Analysis and Integration, Advanced Techniques in Earth and Ocean Observation, Digital Twins

**Location:** Barcelona, Cataluña, Geociencias Barcelona, <https://www.geo3bcn.csic.es/>

**Research Group/PI:** GEO3BCN, Geodynamics / Ivone Jiménez Munt

### PROJECT SUMMARY

Geosciences are characterized by the use and processing of large amounts of information, both to identify the Earth's internal structure and their processes. The recent rise of artificial intelligence (AI) presents a unique opportunity to be applied in the field of geosciences. The processes that occur inside the Earth involve interactions between different physical phenomena, such as the dynamics of solids and fluids. The coupling between these processes is vital to understanding their global behavior. The different temporal and spatial scales at which these processes occur increase the difficulty of their solution. AI can help us overcome the limitation of large data sets in multiscale modeling, allowing us to create predictive models. This project aims to train an expert in multiphysics and multiscale modeling with AI. This integration requires multidisciplinary collaboration between geoscientists, modelers, and AI experts. The main objective of this project is to attract talent, train it, and open a new line of research in geosciences that combines high-performance numerical modeling with AI. The employed will develop its activity within the Geodynamic Modeling Laboratory of GEO3BCN, co-directed with the Numerical Calculation group of the Universitat Politècnica de Catalunya (UPC).

### PROFESSIONAL PROFILE

#### Minimum requirements:

PhD. High proficiency in English. Knowledge of numerical techniques. Participation in research projects.

#### Merits to be considered:

Experience in numerical modeling, preferably applied in geosciences. Knowledge of fluid mechanics. Experience in HPC and AI techniques. Stays abroad.

### WHAT IS OFFERED

GEO3BCN includes the Laboratory of Geodynamical Modeling with experience on develop and on the numerical modeling techniques. Currently it works through three associated units with universities and research centers, where the postdoc will be able to develop the tasks: 1) With the UPC, it will facilitate the candidate's access to infrastructures and organized activities, participating in courses and stays during the contract. 2) With the BSC (Barcelona Supercomputer Center), they will benefit from access to the MareNostrum 5 supercomputer, as well as technical support. 3) With the Department of Petrology of the University of Barcelona (UB), with the incorporation of data from natural samples. During this contract, several long-term stays are planned: 1) at the UPC, with the co-PI, experts in numerical techniques; 2) at the University of Durham, a leading group in geodynamic modeling; 3) at the BSC, experts in AI techniques. The interaction between the four groups guarantees to the candidate the necessary scientific and technical support to carry out the proposed project.

#### 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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