Position Offered: PREDOCTORAL RESEARCHER

Project: Machine Learning and Digital Twins in Earth Sciences (GEODA)

Technological and scientific fields: Advanced Earth Observation Techniques; Data Integration; Artificial Intelligence; High-Performance Computing; Digital Twins

Location: Madrid, Instituto de Geociencias (IGEO, CSIC-UCM), https://igeo.ucm-csic.es/

Research Group/PI: Dynamics and Structure of the Earth, María Charco/Javier Fullea

PROJECT SUMMARY

This project focuses on the development and use of Machine Learning techniques for the study of earth dynamics. Physically Informed Neural Networks are a viable alternative for the resolution of inverse problems in geophysics and geodesy such as the characterization of volcanic deformation sources and the estimation of surface heat flow in areas without direct measurements based on other complementary geophysical observations. Thus, the project has as fundamental two objectives: (1) Increasing the credibility levels of eruption forecasting by building a digital twin of volcanic unrest combining real-time data and realistic interpretation models; (2) Predicting surface heat flow and optimizing geophysical-petrological inversions to characterize the temperature and lithology of the upper crust and sediments in Iberia.

PROFESSIONAL PROFILE

Minimum requirements:

Degree in Physics, Mathematics, Mathematics and Data Science, Mathematical Engineering, Computer Engineering, Data Engineering and Artificial Intelligence, Data Systems and Engineering, Industrial Engineering, Mechanical Engineering, Mining Engineering;

English proficiency: B2 level minimum.

Merits to be considered:

Master's degree in Earth science/data science and related fields; Background in Earth science: Geophysics, Geodesy, Geology; Computer skills in Python, Matlab/Octave, C, Fortran, R, Java...; Linux; GIS; Latex.

WHAT IS OFFERED

Training plan in Machine Learning techniques, Advanced Earth Observation Techniques and Data Integration, simulation and modeling using High Performance Computing. Integration in a collaborative and interdisciplinary research group (CSIC-UCM), with extensive experience in consulting for Spanish national volcano monitoring authorities (e.g., IGN) and public/private entities related to geothermal energy exploitation (e.g., IGME-CSIC; REPSOL). Visiting leading international research institutions in the field.

Contract conditions:

Predoctoral Researcher contract of 4 years' duration. Gross annual salary of 23,871.33 €.

Start of contract: before 31 December 2024

PRINCIPAL INVESTIGATOR CONTACT

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