Job Reference

404_22_ES_CVC_R2

Position

Postdoctoral position - Machine learning ocean biogeochemistry modeling (R2)

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About BSC

The Barcelona Supercomputing Center - Centro Nacional de Supercomputación (BSC-CNS) is the leading supercomputing center in Spain. It houses MareNostrum, one of the most powerful supercomputers in Europe, and is a hosting member of the PRACE European distributed supercomputing infrastructure. The mission of BSC is to research, develop and manage information technologies in order to facilitate scientific progress. BSC combines HPC service provision and R&D into both computer and computational science (life, earth and engineering sciences) under one roof, and currently has over 770 staff from 55 countries.

Look at the BSC experience:

BSC-CNS YouTube Channel

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Context And Mission

This position is hosted by the Climate Variability and Change (CVC) Group within BSC's Earth Science Department. The CVC Group undertakes fundamental research to (1) understand climate variability and change, including for climate extremes, (2) investigate global biogeochemical dynamics, and the effectiveness and impacts of carbon removal technologies to mitigate climate change, (3) developing new Earth System modeling capabilities, and (4) improving our ability to forecast the climate variations from one month to multiple decades into the future, both at global and regional scales.

The position offered is funded by the European projects EDITO-Model Lab and OptimESM. EDITO-Model Lab will prepare the next generation of ocean models, complementary to Copernicus Marine Service, to be integrated into the EU public infrastructure of the European Digital Twin Ocean. OptimESM will develop a novel generation of Earth system models (ESMs), combining high horizontal resolution with an
unprecedented representation of key physical and biogeochemical processes. These models will be used to deliver cutting-edge and policy-relevant knowledge around the consequences of reaching or exceeding different levels of global warming, including the risk of rapid change in key Earth system phenomena.

The successful applicant will be responsible for developing a new hybrid prognostic/Machine Learning version of the ocean biogeochemical model PISCES that will be coupled to the high-resolution configuration of the EC-Earth ESM version 4 and also integrated into the infrastructure of the European Digital Twin Ocean. The applicant will work closely with scientists within the Climate Variability and Change group and the Computational Earth Science group of the Earth Sciences Department. This position will offer the opportunity to work in a multi-disciplinary environment that will place the successful applicant in the ideal position to deliver cutting-edge science in a rapidly expanding field that explores the application of machine-learning techniques to Earth System Science.

**Key Duties**

- Leading the development of the hybrid PISCES model by reviewing state-of-the-art methodologies and tools, and if possible, put forward new improved algorithmic approaches.
- Validating the results of the new model against the fully prognostic version.
- Quantifying the performance of the new model and the reduction in computing cost with respect to the fully prognostic version.
- Assisting the implementation and coupling of the new model in EC-Earth4 and in the model suite that will form the Virtual Ocean Model Lab developed under EDITO-Model Lab.
- Leading research papers that will document the results obtained.
- Actively participate in relevant model development communities (EC-Earth, NEMO) and contribute to pursue new lines of funding.

**Requirements**

- **Education**
  - PhD in oceanography, atmospheric or climate science, or a related discipline

- **Essential Knowledge and Professional Experience**
  - Experience in ocean biogeochemistry/physics and/or climate modelling
  - Experience with machine learning and with packages such as TensorFlow/Keras, Scikit-learn, Xarray, Numpy, Jupyter from the Python data science ecosystem
  - Proven ability to prepare and submit manuscripts to peer-reviewed scientific journals
  - A demonstrated ability to process and analyse large datasets within the Earth Sciences domain.
  - Programming skills: scripting (e.g. bash, Python), programming (Fortran), data analysis and visualization software (e.g. CDO, NCO, R, Python)

- **Additional Knowledge and Professional Experience**
  - Interest and capacity in participating in the writing and, when possible, leading the preparation of research and computing proposals
  - Knowledge of version control systems (git, svn…)
  - Previous postdoctoral experience will be valued

- **Competences**
  - Fluency in spoken and written English
  - Highly collaborative spirit and ability to work as part of a large, strongly-coordinated team and to continuously share both knowledge and tools
**Conditions**

- The position will be located at BSC within the Earth Sciences Department
- We offer a full-time contract, a good working environment, a highly stimulating environment with state-of-the-art infrastructure, flexible working hours, extensive training plan, tickets restaurant, private health insurance, fully support to the relocation procedures
- Duration: Open-ended contract due to technical and scientific activities linked to the project and budget duration
- Salary: we offer a competitive salary commensurate with the qualifications and experience of the candidate and according to the cost of living in Barcelona
- Starting date: January 2023

**Applications procedure and process**

All applications must be made through BSC website and contain:

- A full CV in English including contact details
- A Cover Letter with a statement of interest in English, including two contacts for further references - Applications without this document will not be considered

In accordance with the OTM-R principles, a gender-balanced recruitment panel is formed for every vacancy at the beginning of the process. After reviewing the content of the applications, the panel will start the interviews, with at least one technical and one administrative interview. A profile questionnaire as well as a technical exercise may be required during the process.

The panel will make a final decision and all candidates who had contacts with them will receive a feedback with details on the acceptance or rejection of their profile.

At BSC we are seeking continuous improvement in our recruitment processes, for any suggestions or feedback/complaints about our Recruitment Processes, please contact recruitment [at] bsc [dot] es.

For more information follow [this link](#)

**Deadline**

The vacancy will remain open until suitable candidate has been hired. Applications will be regularly reviewed and potential candidates will be contacted.

**OTM-R principles for selection processes**

BSC-CNS is committed to the principles of the Code of Conduct for the Recruitment of Researchers of the European Commission and the Open, Transparent and Merit-based Recruitment principles (OTM-R). This is applied for any potential candidate in all our processes, for example by creating gender-balanced recruitment panels and recognizing career breaks etc.

BSC-CNS is an equal opportunity employer committed to diversity and inclusion. We are pleased to consider all qualified applicants for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, disability or any other basis protected by applicable state or local law.

For more information follow [this link](#)