90_25_ES_CES_R2

Job Reference

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Position

Climate researcher to support machine-learning developments (R2)

Data de tancament

Dilluns, 24 Març, 2025
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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, was a founding and hosting member of the former European HPC infrastructure PRACE (Partnership for Advanced Computing in Europe), and is now hosting entity for EuroHPC JU, the Joint Undertaking that leads large-scale investments and HPC provision in Europe. 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 1000 staff from 60 countries.

Look at the BSC experience:
BSC-CNS YouTube Channel
Let's stay connected with BSC Folks!

We are particularly interested for this role in the strengths and lived experiences of women and underrepresented groups to help us avoid perpetuating biases and oversights in science and IT research. In instances of equal merit, the incorporation of the under-represented sex will be favoured.

We promote Equity, Diversity and Inclusion, fostering an environment where each and every one of us is appreciated for who we are, regardless of our differences.

If you consider that you do not meet all the requirements, we encourage you to continue applying for the job offer. We value diversity of experiences and skills, and you could bring unique perspectives to our team.

Context And Mission

The Earth Sciences Department of Barcelona Supercomputing Center (BSC-ES), led by Prof Francisco Doblas-Reyes, develops global climate models, among other research tools, to perform climate experiments at frontier (storm and eddy-resolving) spatial resolutions.

The Department is looking for a postdoctoral researcher to assist in the analysis of a machine-learning high-resolution global climate emulator that will be developed by a team of climate and computer scientists. The emulator output will be
compared to simulations performed with the IFS-NEMO global climate model.
The researcher will also collaborate with the team in the validation of a fine-tuned large-language model (LLM) to provide trustworthy climate information for climate
adaptation.

The position is linked to the work performed in the context of the Destination Earth initiative. It involves (1) the contribution to the development and leading the validation of the machine learning-based emulator of a global climate model with the ability to run at eddy-resolving resolutions, (2) comparing the physical performance of the emulator with that of the IFS-NEMO global climate model, and (3) the contribution to the development of the LLM for climate adaptation and leading to its validation.

The candidate will closely collaborate with the teams developing both the emulator and the IFS-NEMO physical model.
No previous knowledge of machine learning techniques is required.

Key Duties

- Lead scientific analyses of the physical performance of the machine-learning emulator, with a special focus on the atmospheric and ocean circulation
- Contribute to performing historical and scenario experiments with the emulator
- Use model evaluation software within the AQUA and/or ESMValTool validation frameworks
- Contribute to the process-based evaluations of the IFS-NEMO climate simulations
- Provide scientific inputs for the development of the eddy-resolving version of the model IFS-NEMO using the evidence from the machine-learning emulator
- Contributing to the fine-tuning of the LLM for climate adaptation and leading its validation
- Preparing and submitting supercomputing access proposals to support the simulations and LLM tuning
- Participate in the BSC contributions to several project deliverables

Requirements

- Education
    - A PhD in atmospheric science, applied mathematics, engineering, fluid dynamics, or a related discipline

- Essential Knowledge and Professional Experience

    - Proven ability to prepare and submit manuscripts to peer-reviewed journals
    - Experience developing experimental setups that address specific climate modelling problems
    - Experience in ocean/atmosphere modelling (or environmental modelling) and in handling climate model output
    - Demonstrated experience in high-resolution climate modelling will be valued
    - Programming skills: scripting (e.g. bash, python), data analysis, and visualisation software (e.g. CDO, NCO, R, Python, NCL) is required
    - Experience in handling large datasets and a minimum knowledge of the NetCDF format is required
    - Experience in HPC and parallel computing (multi-threaded applications) is required

- Additional Knowledge and Professional Experience
    - Interest in participating in the writing and, when possible, leading the preparation of research and computing proposals
    - Knowledge of version control systems (git, svn, cvs…)
    - Interest in tutoring and/or advising master and PhD students

- Competences
    - Fluency in spoken and written English, while fluency in other European languages will be also valued
    - Highly collaborative spirit
    - Ability to work independently but still as part of a highly-coordinated team

Conditions

- The position will be located at BSC within the Earth Sciences Department
- We offer a full-time contract (37.5h/week), a good working environment, a highly stimulating environment with state-of-the-art infrastructure, flexible working hours, extensive training plan, restaurant tickets, private health insurance, support to the relocation procedures
- Duration: Open-ended contract due to technical and scientific activities linked to the project and budget duration
- Holidays: 23 paid vacation days plus 24th and 31st of December per our collective agreement
- 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: March 2025

Applications procedure and process

All applications must be submitted via the BSC website and contain:

- A full CV in English including contact details
- A cover/motivation letter with a statement of interest in English, clearly specifying for which specific area and topics the applicant wishes to be considered. Additionally, two references for further contacts must be included. Applications without this document will not be considered.

Development of the recruitment process

The selection will be carried out through a competitive examination system ("Concurso-Oposición"). The recruitment process consists of two phases:

- **Curriculum Analysis:** Evaluation of previous experience and/or scientific history, degree, training, and other professional information relevant to the position. - ***40 points***
- **Interview phase:** The highest-rated candidates at the curriculum level will be invited to the interview phase, conducted by the corresponding department and Human Resources. In this phase, technical competencies, knowledge, skills, and professional experience related to the position, as well as the required personal competencies, will be evaluated. - ***60 points.*** *A minimum of 30 points out of 60 must be obtained to be eligible for the position.*

The recruitment panel will be composed of at least three people, ensuring at least 25% representation of women.

In accordance with OTM-R principles, a gender-balanced recruitment panel is formed for each vacancy at the beginning of the process. After reviewing the content of the applications, the panel will begin the interviews, with at least one technical and one administrative interview. At a minimum, a personality questionnaire as well as a technical exercise will be conducted during the process.

The panel will make a final decision, and all individuals who participated in the interview phase will receive feedback with details on the acceptance or rejection of their profile.

At BSC, we seek continuous improvement in our recruitment processes. For any suggestions or comments/complaints about our recruitment processes, please contact