**JOB DESCRIPTION**

**Ref:**

**Job Title: Atmospheric chemistry model development postdoc**

**About BSC:**

BSC-CNS (Barcelona Supercomputing Center – Centro Nacional de Supercomputación) is the National Supercomputing Facility in Spain and was officially constituted in April 2005. BSC-CNS manages MareNostrum, one of the most powerful supercomputers in Europe, located at the Torre Girona chapel. The mission of BSC-CNS is to investigate, develop and manage information technology 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 400 staff from 41 countries. To get an idea of what its like to work at the BSC take a look at this video: <https://www.youtube.com/watch?v=VRkEii7OzRE>

**Context and Mission:**

Within the Earth Sciences Department of Barcelona Supercomputing Center, the Atmospheric Composition (AC) group, led by Carlos Pérez García-Pando and Oriol Jorba, aims at better understanding and predicting the spatiotemporal variations of atmospheric pollutants along with their effects upon air quality, weather and climate.

The AC group develops the Multiscale Online Non-hydrostatic AtmospheRe CHemistry model (MONARCH). MONARCH contains advanced chemistry and aerosol packages, and is coupled online with the Non-hydrostatic Multiscale Model (NMMB), which allows for running either global or high-resolution (convection-allowing) regional simulations, and is coupled with an aerosol data assimilation system based on the Local Ensemble Transform Kalman Filter. The group contributes to a variety of forecasting activities. The dust component of MONARCH runs operationally at the first WMO Regional Specialized Meteorological Center for Atmospheric Sand and Dust Forecast (i.e., the Barcelona Dust Forecast Center, [BDFC](https://dust.aemet.es)), and contributes to multi-model ensemble forecasts both at the WMO Sand and Dust Storm Warning Advisory and Assessment System Regional Center (WMO [SDS-WAS](https://sds-was.aemet.es/forecast-products/dust-forecasts) RC) for Northern Africa, the Middle East and Europe, and the International Cooperative for Aerosol Prediction ([ICAP](https://www.nrlmry.navy.mil/aerosol/icap_date.9999.php?date=2017020600&field=aod&spec=dust&regc=global&icap=0&modir=icap_01&quad=0)). Both WMO Regional Centers are co-hosted by BSC and the Spanish Meteorological Agency (AEMET). The group also develops and maintains the [CALIOPE](http://www.bsc.es/caliope/en?language=en) air quality system (“CALIdad del aire Operacional Para España”), which provides high-resolution air quality forecasts over Europe and Spain using the in-house emission model HERMES. The models and forecasts are enhanced by an intensive use of up-to-date observations, both for model evaluation and to feed the aerosol ensemble-based data assimilation system.

Since October 2016, the group hosts an AXA Chair on Sand and Dust Storms. This 15-year research programme is not only intended to support the two WMO SDS Regional Centers based at BSC, but also to widen the scope and relevance of the mineral dust research at BSC-ES. In October 2018, the AC group will start developing an ERC Consolidator Grant that focuses on dust mineralogy and its effects upon climate.

**Key Duties**

**In this context, the applicant will work closely with atmospheric composition researchers and engineers in the development of the new Multiscale Online Nonhydrostatic AtmospheRe CHemistry model (NMMB-MONARCH). The candidate will bring scientific expertise in atmospheric chemistry processes (gas-phase and aerosol) at global and/or regional scales, experience in analyzing model results, and in refining, developing and/or tuning model schemes. Finally, the applicant will provide the support necessary to solve the problems encountered by other researchers and engineers and will run the necessary experiments to validate and verify all the features of each model component. Experience in meteorological/climate model development will be highly appreciated.**

**Other duties include designing research strategies; developing analysis tools; collecting and analyzing data; presenting research findings; writing manuscripts in peer review publications; assisting for grant applications; and other duties as assigned.**

**Requirements**

* **Education**
  + **Having a PhD in Atmospheric Chemistry, Meteorology, Physics or related discipline.**
* **Knowledge**
  + Excellent computing skills in high-level computer languages (especially FORTRAN and C/C++) and experience with UNIX/LINUX environments and scripting languages (bash, Python …).
  + Excellent programming skills to manage big and collaborative projects and experience with git and SVN.
  + Programming skills in parallel programming models (MPI, OpenMP, OmpSs…).
  + **Knowledge of climate data formats (GRIB, NetCDF).**
* **Professional Experience**
  + Previous experience in atmospheric modelling developments in dynamics, physics, chemistry or numerical schemes used in meteorological and air quality models
  + Previous experience in HPC architecture and parallel programming (multi-threaded applications)
  + Previous experience in scientific software and tools (R, CDO, NCO, Python Numpy and Scipy, …) will be valued.
  + **Computer programming experience related to solving scientific computing problems involving the handling of very large projects.**
* **Competences**
  + Capacity to interact and build strong relations with both climate and computer scientists
  + Fluency in English
  + Excellent written and verbal communication skills
  + Ability to take initiative, prioritize and work under set deadlines and pressure
  + **Ability to work both independently and within a team**

**Conditions**

The position will be located at BSC within the Earth Sciences department in collaboration with the specific program coordinator. The contract will be for **two** years.

**Applications Procedure**

All applications must be applied in LINK including:

1. A motivation letter
2. A full CV including contact details
3. Two reference LETTERS or CONTACTS

**Diversity and Equal Opportunity Employment**

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.

***OTHER DETAILS INTERNAL USE:***

***Duration of the contract: 2 years***

***Funding Project:***

***Salary Range: (30 - 35k€) R2***