807_24_CS_PPC_R3

Job Reference

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Position

Advanced Predictable Systems (R3)

Fecha de cierre

Martes, 11 Marzo, 2025
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Job title: Advanced Predictable Systems (R3)

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

Software systems used in domains such as automotive, space, large scientific infrastructures or smart cities, have seen their complexity drastically increased in the last years due to the need of implementing advanced functionalities applied to cutting edge research areas like autonomous driving, traffic management, etc. The performance requirements of these new functionalities urge the use of parallel and heterogeneous architectures capable of delivering the expected throughput while still considering other non-functional aspects of the system like real-time requirements, fault-tolerance, and energy budgets, among others.

The research activities will be focused on one or several of the following topics, among others:
1. In close collaboration with leading automotive, space and avionic companies, development of software system prototypes to address the requirements of cutting-edge functionalities.
2. Optimization of advanced software functionalities targeting parallel computing architectures, including multi-core systems, GPUs and/or FPGAs.
3. Programming models: use, implementation and extension of programming models with parallel capabilities, like OpenMP and CUDA, to target complex software systems, and concurrent languages like RUST and Ada.
4. Code transformation and optimization: high-level synthesis and compilation techniques to boost performance, predictability and correctness, mostly based on LLVM and MLIR.
5. Runtime systems: run-time techniques to boost performance, heterogeneity (targeting GPUs and FPGAs) and fault-tolerance.

Key Duties

- Research on parallel programming models towards productivity and other non-functional requirements
- Development of compiler and run-time techniques to support extensions for performance and other non-functional requirements.
- Development of advanced application prototypes for the automotive, space and avionics domains to evaluate the proposed techniques
- Write technical reports and papers
- Attend technical meetings

Requirements

- Education
  - PhD on parallel programming models and compiler optimization techniques

- Essential Knowledge and Professional Experience
  - Linux
  - Programming fluently in C/C++, OpenMP, CUDA

- Additional Knowledge and Professional Experience
  - Experience on HPC and/or embedded systems

- Competences
  - Candidates shall be proactive and self-motivated, with positive work attitude
  - Fluent English both written and spoken
  - Ability to take initiatives, prioritize tasks and work under set deadlines
  - Ability to work both independently and within a team
  - Analytical thinking, problem-solving and result-oriented attitude

Conditions

- The position will be located at BSC within the Computer 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: 01/03/2025

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