Offer #2024-08024

Post-Doctoral Research Visit F/M Intraneode and Internode scalability of the Composyx linear algebra package

Contract type: Fixed-term contract
Renewable contract: Yes
Level of qualifications required: PhD or equivalent
Function: Post-Doctoral Research Visit
Level of experience: From 3 to 5 years

About the research centre or Inria department

The Inria center at the University of Bordeaux is one of the nine Inria centers in France and has about twenty research teams. The Inria centre is a major and recognized player in the field of digital sciences. It is at the heart of a rich R&D and innovation ecosystem: highly innovative SMEs, large industrial groups, competitiveness clusters, research and higher education players, laboratories of excellence, technological research institute...

Context

We are offering an exciting post-doctoral position within the framework of the European project EOCOE-III: https://eurohpc-ju.europa.eu/research-innovation/our-projects/eocoe-iii en.

About EOCOE-III: EOCOE III (Energy Oriented Centre of Excellence) is a project deeply rooted in both the high-performance computing (HPC) community and the energy sector. This project aims to demonstrate the advantages of HPC in facilitating the energy transition towards carbon neutrality, benefiting research institutions as well as key industries in the energy sector. Building on the successes of the previous projects EOCOE-1 and EOCOE-II, EOCOE-III will leverage multidisciplinary expertise in applied mathematics and supercomputing to deliver significant efficiency gains across a diverse set of computational applications from four energy domains.

In this third phase, EOCOE-III will focus on five flagship exascale applications covering key areas such as energy materials, water, wind, and fusion. The multidisciplinary efforts of the consortium partners will harness innovations in computer science and mathematical algorithms through a tightly integrated co-design approach. This will overcome performance bottlenecks, deploy the flagship applications on future European exascale infrastructure, and anticipate future HPC hardware developments.

New modeling capabilities will be developed on an unprecedented scale, showcasing potential benefits for the energy industry. These include accelerated design of photovoltaic devices, high-resolution modeling of wind farms in complex terrains, and quantitative understanding of plasma-core interactions in ITER-sized tokamaks. These flagship applications will provide a high-visibility platform for high-performance computational energy science, enriched by close working connections with the ERAI consortium.

Assignment

The post-doctoral researcher will focus on improving the intra-node and inter-node scalability of the open-source code Composyx: https://gitlab.inria.fr/composyx/composyx.

Main activities

Task-Based Programming: Central to this role, task-based programming will be employed to leverage node heterogeneity for intra-node scalability and to transparently manage communications for inter-node scalability.

Code Integration and Evaluation: The resulting code improvements will be integrated into the EOCOE-III project applications and evaluated on the European HPC machines provided by the project.

Skills

Technical skills and level required: 5 years or more of higher education or equivalent, master or engineering degree or PhD in applied mathematics or computer science with a scientific computing component.

Languages: the working language will be mainly French, but English will be used in exchanges with non-French speaking team members or collaborators.

Interpersonal skills: enjoy working and interacting in a collaborative research environment, curiosity and creativity.

Additional skills: writing scientific papers and public presentations of results.

Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking and flexible organization of working hours
- Professional equipment available (videocollaboration, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Remuneration

The gross monthly salary will be 2788€ (before social security contributions and monthly withholding tax).

General Information

- Theme/Domain: Distributed and High Performance Computing
- Institution: CNRS - Talence
- Inria Center: Centre Inria de l'université de Bordeaux
- Starting date: 2023-10-01
- Duration of contract: 12 months
- Deadline to apply: 2024-07-26

Contacts

- Inria Team: CONCACE
- Recruiter: Giraud Luc / Luc.Giraud@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

The keys to success

The candidate should be interested in programming in general (C, C++, fortran, compilation, scripting, python), and digital sciences and high performance computing in particular. Teamwork, both locally and remotely, will be part of the daily routine of this job.
Instruction to apply

If you are interested by this job, please could you apply on website jobs.inria with the following documents:

- cv
- cover letter

Defence Security:

This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

Recruitment Policy:

As part of its diversity policy, all Inria positions are accessible to people with disabilities.