



Offer #2021-04309

Handling HPC challenges for SKA

Contract type : Fixed-term contract

Level of qualifications required : Graduate degree or equivalent

Other valued qualifications : A PhD will be very welcome.

Fonction : Temporary scientific engineer

Level of experience : From 3 to 5 years

About the research centre or Inria department

The Inria research centre in Lyon (previously the Lyon branch of the Inria centre in Grenoble) is the 9th Inria research centre, formally created in December 2021. It brings together approximately 270 people (including 110 Inria employees) in 15 research teams and research support services.

Its staff are distributed at this stage on 2 campuses: in Villeurbanne La Doua (Centre / INSA Lyon / UCBL) on the one hand, and Lyon Gerland (ENS de Lyon) on the other. A third site should be opened in the course of 2022. The teams are mainly hosted with our partners. The centre's teams work closely with research and higher education institutions (ENS de Lyon, UCBL, INSA Lyon, etc.), their laboratories, and other research organisations in Lyon (CNRS, INRAE, competitiveness clusters, etc.), but also with Lyon and regional economic players. Many international collaborations are also underway.

The Lyon centre is active in the fields of software, distributed and high-performance computing, embedded systems, quantum computing and privacy in the digital world, but also in digital health and computational biology.

Context

The SKA project is an international effort to build and operate the world's largest radiotelescopes covering all together the wide frequency range between 50 MHz and 15.4 GHz. The scale of the SKA project represents a huge leap forward in both engineering and research & development towards building and delivering a unique Observatory, whose construction has officially started on July 2021. The SKA Observatory is the second intergovernmental organisation for ground-based astronomy in the world, after the European Southern Observatory. It brings together a wealth of the world's finest scientists, engineers and policy makers to bring the project to fruition.

SKA-France is a national coordination of the industrial, technical and scientific participation to the SKA project in France. Inria as a member of SKA-France brings its expertise in some challenging aspects of the project such as in high performance computing, big data, resource management, I/O, and IA. The proposed job is an opportunity to work with many different people from around the world: physicists, computer scientists, engineers from academia and from the industry. It is also a rare opportunity to participate directly to a very ambitious international scientific project and see how it is operated.

Assignment

The finalization of the design of some of the software components generate an intense software engineering activity. Development work is organized in small software teams distributed across the globe who coordinate through quarterly week-long planning events following an agile methodology.

The recruited person will be part of PlaNet team that is dedicated to platforms (benchmarking, co-design, profiling, etc) and network issues. This participation involves direct engineering work, regular intra/inter team meetings, closely follow the development of SKA software, define and test benchmarks on different hardware, etc. Raised questions related to various High Performance Computing (HPC) topics such as programming models, I/O, application performances, resource management, or energy efficiency.

Main activities

The main activities can be split into four types:

- The recruited person will closely follow the evolution of softwares that are being developed within SKA by working with developers of Data Processing (DP) teams.
- The recruited person will identify representative code bases and define the benchmarks for different softwares.

- The recruited person will develop the infrastructure that orchestrates the running of benchmarks and collection of various performance metrics on different platforms
- The recruited person will contribute to identify issues which require specific expertise, identify Inria teams with relevant solutions, and work with them to transfer solutions to the SKA project.

Skills

Technical skills and level required:

- A good understanding of high-performance computing (programming models like MPI, benchmarking/profiling, optimization, parallelization, I/O) is desired.
- Experience with HPC environment like batch schedulers (SLURM, PBS), parallel file systems (LUSTRE, IBM Spectrum Scale) is desired. Experience in package managers like Spack would be a plus.
- Experience with Python is desired. Other languages like C/C++, CUDA would be a plus.
- Experience with version control tools like git is desired. Experience with GitLab Continuous Integration (CI) would be a plus.
- Knowledge of containerization technologies like Docker, Singularity, Sarus would be appreciated. Knowledge of orchestration tools like Kubernetes would be a plus.
- Basic Linux admin skills would be appreciated.
- Knowledge of DevOps, agile project management techniques (Kanban, Jira, SAFe) will be valuable to interact with SKA development teams.

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 (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

General Information

- **Theme/Domain** : Distributed and High Performance Computing Scientific computing (BAP E)
- **Town/city** : Lyon
- **Inria Center** : [Centre Inria de Lyon](#)
- **Starting date** : 2023-03-01
- **Duration of contract** : 2 years
- **Deadline to apply** : 2023-02-28

Contacts

- **Inria Team** : [AVALON](#)
- **Recruiter** :
Perez Christian / christian.perez@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

This position requires to have a taste for collaborative work as it involves interacting with people in various organizations (French and international academics, and industrials).

Warning : you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

Instruction to apply

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.