

2021-04309 - Handling HPC challenges for SKA

Type de contrat : CDD
Niveau de diplôme exigé : Bac + 5 ou équivalent
Autre diplôme apprécié : A PhD will be very welcome.
Fonction : Ingénieur scientifique contractuel
Niveau d'expérience souhaité : De 3 à 5 ans

A propos du centre ou de la direction fonctionnelle

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.

Contexte et atouts du poste

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.

Mission confiée

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.

Principales activités

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.

Compétences

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.

Informations générales

- **Thème/Domaine** : Calcul distribué et à haute performance
Calcul Scientifique (BAP E)
- **Ville** : Lyon
- **Centre Inria** : [Centre Inria de Lyon](#)
- **Date de prise de fonction souhaitée** : 2022-11-01
- **Durée de contrat** : 2 ans
- **Date limite pour postuler** : 2022-09-30

Contacts

- **Equipe Inria** : [AVALON](#)
- **Recruteur** :
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A propos d'Inria

Inria est l'institut national de recherche dédié aux sciences et technologies du numérique. Il emploie 2600 personnes. Ses 200 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3500 scientifiques pour relever les défis du numérique, souvent à l'interface d'autres disciplines. L'institut fait appel à de nombreux talents dans plus d'une quarantaine de métiers différents. 900 personnels d'appui à la recherche et à l'innovation contribuent à faire émerger et grandir des projets scientifiques ou entrepreneuriaux qui impactent le monde. Inria travaille avec de nombreuses entreprises et a accompagné la création de plus de 180 start-up. L'institut s'efforce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

L'essentiel pour réussir

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).

Consignes pour postuler

Sécurité défense :

Ce poste est susceptible d'être affecté dans une zone à régime restrictif (ZRR), telle que définie dans le décret n°2011-1425 relatif à la protection du potentiel scientifique et technique de la nation (PPST). L'autorisation d'accès à une zone est délivrée par le chef d'établissement, après avis ministériel favorable, tel que défini dans l'arrêté du 03 juillet 2012, relatif à la PPST. Un avis ministériel défavorable pour un poste affecté dans une ZRR aurait pour conséquence l'annulation du recrutement.

Politique de recrutement :

Dans le cadre de sa politique diversité, tous les postes Inria sont accessibles aux personnes en situation de handicap.

Attention: Les candidatures doivent être déposées en ligne sur le site Inria. Le traitement des candidatures adressées par d'autres canaux n'est pas garanti.

Avantages

- 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