

Postdoc Position In High Performance Computing

Ecole/Institution/Société:

University of Basel, Switzerland / Basel

Discipline:

Computational Engineering, Programming Languages

Type d'emploi::

Full-time

Date de publication:

2021-10-16

Personne à contacter:

If you wish to apply for this position, please specify that you saw it on AKATECH.tech

JOB DESCRIPTION

The High Performance Computing research group (lead by Prof. Florina Ciorba) is seeking to hire a postdoctoral researcher, with computer science training, for the SPH-EXA and Swiss SKA projects, with a solid knowledge of C ++ software development and parallelization skills (MPI, OpenMP, OpenACC, CUDA). The postdoctoral researcher will extend the scaling of the SPH-EXA simulation framework to enable Tier-0 and Exascale simulations.

SPH-EXA stands for Smoothed Particle Hydrodynamics for EXAscale, a Swiss interdisciplinary project (in its second 3-year round) developing a scalable and fault-tolerant SPH code for hydrodynamic simulations. The long-term and ambitious vision of SPH-EXA is to study fluid and solid mechanics in a wide range of research fields, starting with astrophysics and cosmology, in particular related to the SKA employing the latest and most innovative algorithms and parallelization techniques in high performance computing.

The Square Kilometer Array (SKA) is an international effort to build the world's largest radio telescope. The Swiss SKA project represents the Swiss participation in the SKA Observatory. The SPH-EXA framework will be used in Swiss SKA to carry out extremely large cosmological hydrodynamical simulations and to develop state-of-the-art numerical simulations to create mock SKA datasets.

Development of an Exascale-grade simulation framework * for astrophysics, cosmology, and computational fluid dynamics, with specific tasks such as:

- Code development following the C ++ 14 standard Code development and parallelization for shared memory, distributed memory, accelerator offloading, and task-based programming
- Knowledge / use of high-performance parallel I / O libraries and visualization tools
- Knowledge / use of state-of-the-art (hierarchical) dynamic load balancing techniques
- Implementation of fault-tolerance mechanisms
- Execute massively parallel numerical simulations (in astrophysics and cosmology, such as type Ia Supernovae and coevolution of galaxies and black holes)
- Performance testing and tuning of the developed code on shared and distributed memory systems
- Employ modern software development techniques and best practices, using a continuous integration system and containerization solutions
- Conduct research in programming models, performance modeling, optimization, scheduling, fault-tolerance, and reproducibility
- Contribute to the analysis of new state-of-the-art astrophysical and cosmological simulations

- Write research papers, articles, and present results at leading international conferences
- Write code documentation and train users via tools such as Jupyter notebooks
- Interact with national and international teams of computer scientists, astrophysicists, cosmologists, and high-performance computing specialists
- A PhD degree in Computer Science, Computer Engineering, or similar
- Extensive C / C ++ knowledge with focus on performance
- Very strong parallel programming skills (OpenMP, MPI, OpenACC, CUDA)
- Experience in any of the following is advantageous: containerization, CI, HIP, Intel oneAPI, OpenCL, HPX, Kokkos
- Fluent in English (oral and written)
- Team-work mindset
- Experience with research projects and writing reports is a plus
- A flexible person with the ability to work under pressure
- 100% funding for three years (starting immediately)
- Joining two exciting exascale projects with the ambition of impacting a wide range of scientific fields
- A dynamic, supportive, and diverse working environment
- Collaboration with leading computer scientists, cosmologists, astrophysicists, and HPC centers

Application / Contact

If you have the necessary qualifications and are keen to work in an international team, please view the position description and click "apply here" to submit your application in English as a single PDF file including a motivation letter (200 words max), curriculum vitae , links to publications, links to examples of personal contributions to software, and contact info (no direct recommendation letters) for peers that can recommend you.

Applications will be regularly reviewed and potential candidates will be contacted. The vacancy will remain open until a suitable candidate has been hired.

JOB DETAILS

Title Postdoc Position in High Performance Computing

Employer University of Basel

Job location Petersplatz 1, CH-4003 Basel

Job types Postdoc

Fields Algorithms, Programming Languages, Computer Engineering, Computational Sciences

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