ORNL Publications

External Publication

Job Posting Title

Postdoctoral Research Associate – High Energy Particle Transport Computational Physicist / NB50688130

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Purpose

The High Performance Computing (HPC) Methods and Applications Team in the Radiation Transport Group within the Oak Ridge National Laboratory (ORNL) Reactor and Nuclear Systems Division (RNSD) seeks applications to fill a postdoctoral research associate position focused on the development and optimization of Monte Carlo particle transport algorithms for high energy hadrons on current and future HPC architectures.

The HPC Methods and Applications Team conducts leading-edge research and development on computational radiation transport methods and applications targeting current and next-generation HPC systems and architectures. The team implements these methods in software applications to solve complex problems in nuclear science and engineering using leadership class computing at ORNL, Argonne National Laboratory (ANL), and other facilities around the world.

Major Duties/Responsibilities

The successful candidate will work with experienced staff in the HPC Methods and Applications Team and collaborators at Fermilab, Lawrence Berkeley National Laboratory (LBNL), and CERN to optimize the hadron particle physics transport algorithms in the GEANT4 code for use on HPC systems to model high-energy physics (HEP) experiments. The specific objectives in this project are:

- Formal documentation of the current state-of-the-art GEANT4 hadron physics modules in use for HEP experimental modeling
- Development of a proxy application to investigate Monte Carlo hadron transport algorithms on current and next-generation HPC hardware including node-based accelerators such as graphics processing units (GPUs)

The successful candidate will work in a multi-institutional team environment. The position will provide the candidate with the opportunity to work within the US Department of Energy (DOE) Exascale Computing Project (ECP) that spans multiple national laboratories. Within ECP, the candidate will collaborate with world-recognized leaders in computational physics and computer science and will have access to the cutting-edge leadership computing facilities, software, and hardware. The candidate will be expected to satisfy ECP project-defined milestones and publish findings in peer-reviewed journals and conferences.

Qualifications Required

Candidates must have a PhD in physics, nuclear engineering, computer science, or an equivalent area encompassing

applied science and mathematics. Excellent communication skills, including verbal, presentation, and writing skills, are required to enable effective interaction with technical peers and program managers.

Qualifications Desired:

The ideal candidate will have a background in computational particle transport methods and/or physics, particularly Monte Carlo–based methods. Familiarity with hadron and charged particle physics, particularly as they apply to transport mechanics, is strongly recommended. Experience using GEANT for development or applications is desirable.

The ideal candidate will possess substantive experience in modern C++ and/or parallel programming models and methods. Experience using Message Passing Interface (MPI), CUDA, OpenMP/OpenACC or other advanced parallel programming models is a plus. The candidate should be familiar with software tools expected to be heavily used in this position, which include Python, Git, parallel Linux/POSIX computing platforms, parallel job queuing systems, and parallel visualization software.

An applicant cannot have received the most recent degree more than five years prior to the date of application and must complete all degree requirements before starting the appointment.

Appointments will initially be for 24 months, with a possibility of an extension of up to 12 months. Initial appointments and extensions are subject to performance and availability of funding.

This position will remain open for a minimum of 5 days after which it will close when a qualified candidate is identified and/or hired.

We accept Word(.doc, .docx), Excel(.xls, .xlsx), PowerPoint(.ppt, .pptx), Adobe(.pdf), Rich Text Format(.rtf), HTML(.htm, .hmtl) and text files(.txt) up to 2MB in size. Resumes from third party vendors will not be accepted; these resumes will be deleted and the candidates submitted will not be considered for employment.

If you have trouble applying for a position, please email ORNLRecruiting@ornl.gov.

Notice: If the position requires a Security Clearance, reviews and tests for the absence of any illegal drug as defined in 10 CFR 707.4 will be conducted by the employer and a background investigation by the Federal government may be required to obtain an access authorization prior to employment and subsequent reinvestigations may be required.

If the position is covered by the Counterintelligence Evaluation Program regulations at 10 CFR 709, a counterintelligence evaluation may include a counterintelligence-scope polygraph examination.

ORNL is an equal opportunity employer. All qualified applicants, including individuals with disabilities and protected veterans, are encouraged to apply. UT-Battelle is an E-Verify Employer.