Senior C++ Developer for Parallelization of Scientific Applications

São Paulo, Brazil Deadline: 30 September 2014. Keywords: C++, software development, parallel programming, HPC, Geant4,

High Energy Physics, UNESP, Fermilab, CERN, Intel, Brazil

The Center for Scientific Computing of the São Paulo State University (Núcleo de Computação Científica da Universidade Estadual Paulista – UNESP) in São Paulo, Brazil is opening **two positions** for outstanding senior C++ developers or research fellows to work in association with the Fermi National Accelerator Laboratory (Fermilab) in USA and CERN in Europe. Grant funds are provided by Intel, through the Intel Parallel Computing Center (IPCC) program.

The fellows will be deeply involved in the R&D efforts to adapt High Energy Physics (HEP) software tools to the modern computing architectures. The work will be mostly concentrated on Geant4, a toolkit for the simulation of particle-matter interactions that has been developed for almost two decades by an international collaboration of physicists and computer scientists.

The successful candidate will participate in R&D studies, development and prototyping of different strategies and algorithms to run HEP simulation applications efficiently with multiple computational threads in new and upcoming Intel hardware. An important aspect of this position is the research, implementation and evaluation of existing and new algorithms required by Geant4 type of applications using many computational threads. The work of the successful candidate is expected to add value in computing design and implementation quality, using physics judgment.

**Responsibilities**

The successful applicant will work on the following activities:

- Port, test and measure performance of HEP applications, such as Geant4, on current and new parallel platforms, including the Intel MIC architecture;

- Develop and support strategies and algorithm for simulation tools for these HEP applications to run efficiently on the Intel MIC architecture;

- Devise and implement improved computational techniques, based on physics analysis and/or modeling technical expertise, to meet the requirements of scientific systems;

- Extend documentation to further facilitate the use of these tools;

- Interface with teams that develop and support detector simulation and physics generator packages;
**Requirements** The applicants must have:

- 5+ years of experience developing C++ applications in high performing environments;

- Advanced development skills in C++, including STL and templates, debugging and memory profiling and performance tuning on Linux systems;

- Strong motivation to participate in challenging projects and work in a targeted, structured, and productive manner in a multi-disciplinary team;

- Excellent communication skills in English. Other key selection criteria include:

- Strong background in design, program and optimize parallel applications;

- Knowledge of massive parallel, heterogeneous or many-core architecture;

- Expertise in using key HEP software packages such as Geant4.  

**Appointment**  
These appointments are initially for one year and could be extended up to **two years**, depending on the results of midterm evaluation carried out by Intel. The position is based in São Paulo but we expect that the candidate travel often to Fermilab and/or to CERN. The candidate should be available to spend three consecutive months in those locations.  

**Payment and Other Advantages**  
The yearly income is about USD 35,000.00 (tax exempt). In addition, the candidate will receive the travel ticket to/from São Paulo and installation aid corresponding to one month of salary.  

UNESP is committed to the principles of equal opportunity and affirmative action. Applications from any sexual orientation and members of minority groups are encouraged.  

**How to apply**  
Please provide an application letter, résumé of work experience, and at least two letters of recommendation to:

Sérgio F. Novaes <Sergio.Novaes@cern.ch>

**Deadline for application**  
The deadline is **30 September 2014**. We reserve the right not to make an immediate appointment and continue searching after the closing date. Only shortlisted candidates will be contacted. Shortlisted candidates must be available for an interview where we expect a short presentation on the previous background and achievements.