

Open position

GATE-Lab: developing GATE for Radiation Therapy simulations in hybrid computing environment

Context

The [CREATIS](#) laboratory of the [University of Lyon](#) (France) opens a post-doctoral fellow position for 24 months to conduct studies in the area of Monte-Carlo simulations for radiation therapy and high-performance computing. Application of non-PhD will also be considered if the background is sufficiently strong. This position is funded by the French Research National Agency (ANR), under grant [hGate](#). See: <http://www.creatis.insa-lyon.fr/site/fr/node/39351>

Detailed description of the research topics

The work program mainly consists of the following two tasks:

- In collaboration with computer scientists specialized in high-performance computing technologies, the first task consists in the **design**, the **testing** and the **diffusion** of the GATE-Lab software. GATE-Lab is a "virtual laboratory for Monte-Carlo simulations", aiming at facilitating access to [GATE](#) running on several computing platforms. Generally, researchers have to use various computing facilities such as clusters of workstations or even grids. However, they are generally not specialized in computer science and efficiently using these technologies is difficult, largely impacting the overall research process. The main goal is to provide access to hybrid sources of computing power, including: a local machine, clusters (of GPUs or CPUs) and world-wide aggregation of clusters (e.g. [EGEE](#) infrastructure). Specific strategies optimizing the execution of GATE in distributed and heterogeneous environment will be developed and integrated in the GATE-Lab.
- Evaluation of the new GATE version on CPU/GPU for radiation therapy applications. In particular, the hired person will have to **propose**, **perform** and **analyze** benchmarks and realistic simulation examples for conventional radiotherapy (photon beam), but also for hadrontherapy (proton and carbon ion beams). Results obtained from realistic GATE simulations will be compared to measured data (when available) and/or dose distribution predicted by a commercial Treatment Planning System (XIO CMS).

These two tasks will be performed in parallel.

Skills: Monte-Carlo simulations - Computer Science - Particle Physics. We seek either a particle physicist specialized in Monte-Carlo simulation with strong skills in computer science and informatics, or a computer scientist with a good knowledge of particle physicist simulations. *Required:* good C++ (for GATE/Geant4) and Java (for Gate-Lab) programming skills, experience with Linux. *Appreciated:* experience with Geant4, Monte-Carlo simulation in radiation therapy, distributed systems, in particular clusters and/or grids

Location: Lyon, France

Salary (gross): about 2500€/month for post-doc or 2000-2300€/month for Master/Engineer

Duration: 24 months, start in September 2010 (earlier) to December 2010 (later).

Language: French and/or English

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