

Post doctoral position in programming of multiphase interacting free-surface flows in GPU architecture HPC systems and scientific visualization

Candidates are sought to the interactive coastal laboratory at INRS, Quebec (Canada), in which field, laboratory and numerical investigations work concurrently to predict and prepare for extreme events in a climate changing world. The research work has a focus on fundamental and applied research in the area of ocean and coastal sciences.

One common goal is to improve the understanding of the underlying physics of wind driven waves and the interaction with seabed and marine structures. For this purpose, we are in the process of developing a suite of numerical free-surface solvers. Here we are seeking to further develop our prediction tools, including Lattice Boltzmann algorithms, for parallel CPU and GPU computing. The numerical model developments are complemented by large scale experiments.

Responsibilities, but not limited to, are:

- High performance computing (HPC);
- Operation and maintenance tasks of the HPC facility;
- Advanced programming and optimization;
- GPU architecture HPC systems and programming and optimization;
- Unix/Linux including shell script programming;
- Cluster configurations/operation;
- Network communication;
- Hardware maintenance;
- Scientific visualization (e.g., cave environment).

Examples of research themes of applications in the coastal physics laboratory:

- Numerical methods in fluids, free-surface flows and sediment transport;
- Multiphase flow predictions;
- Fully coupled algorithms between fluid flow physics and interaction with objects.

Other general scope of work of the coastal laboratory:

- Data acquisition system: new user defined functions tailored to specific experiments;
- Programming (CPU/GPU) and signal processing;
- IT of the laboratory;
- Research, client and student projects;
- Input to reports for clients;
- Peer-reviewed journals;
- Proposal input and assistance in various research projects;
- Program and project management;
- Laboratory promotion;
- Student interaction and co-supervision.

The research work will be carried out at the Technology Park facility of the Institute National de la Recherche Scientifique (INRS), Quebec City, Canada (<http://lhc.ete.inrs.ca>).

Candidates are expected to have a Ph.D. in computer sciences, mathematics, physics or engineering and have research experience in the majority of the above areas especially GPU architecture HPC systems and advanced programming. You will join and interact with a team of students, laboratory staff and researchers. The initial period of employment is one year (renewable). Applicants should submit, in English, their CV, transcripts, key written works and one page summary of research conducted including contact details of three referees to recrutement@ete.inrs.ca. An initial review of applications will start on 1 June 2014 but will be continued until the position is filled. Informal inquiries about the research work of the coastal laboratory can be made to Professor Frandsen via email jannette.frandsen@inrs.ca