

## **Ph.D. Studentships in simulation of extreme ocean events and coastal processes**

Ph.D. students are sought to our interactive laboratory 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 coastal sciences and engineering.

One common goal is to improve the understanding of the underlying physics of wind driven waves and the interaction with seabed and structures. The proposed research is focused on the development of mathematical and numerical models to study the physics of complex fluid mixing and structural response as coupled interactions. Developing these models require a detailed understanding of the primary processes of the fluid dynamics especially when the free-surface break-up generating overturning waves with entrained air, bubbles and sprays. The underlying mechanism is driven by wind and thus the air-sea interactions are important to understand. High Reynolds number flows on its own merits also present a challenging problem. In shallow depth, the wave processes are influenced by currents and sediments, and therefore can be important to analyze and predict as coupled interactions. 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. This project is complemented by small and large scale experiments. Candidates with interest in model scale testing and/or field surveys only are also welcomed to apply. The lab. is also well equipped with tools/techniques including particle image velocimetry, lidar, multi sonar beam, data/image analysis, etc.

The research work will be carried out at the Technology Park facility of the National Institute of Scientific Research, Quebec City, Canada ([lhe.ete.inrs.ca](http://lhe.ete.inrs.ca)).

The successful candidates are expected to have a first class degree and have (or expected to obtain by start date) earned a M.Sc. in science or engineering and have a relevant background in some of the above areas of physics, mathematics, computer science and/or ocean/coastal engineering. You will join a team of students, laboratory staff and researchers. The graduate projects will be carried out in English.

Prospective candidates are invited to submit their CV, B.Sc./M.Sc. transcripts, and a one page summary explaining their interests in the project supported by a description of their knowledge of computational/experimental methods and/or coastal/ocean engineering or other relevant areas. The application should include contact details of three referees. Application via email is acceptable and should be forwarded to [recrutement@ete.inrs.ca](mailto:recrutement@ete.inrs.ca). An initial review of applications will start in June 2014 but will be continued until the position is filled. Informal inquiries about the position can be made to Professor Frandsen via email [jannette.frandsen@ete.inrs.ca](mailto:jannette.frandsen@ete.inrs.ca)