

Sediment-laden ice blocks, which form on the intertidal flats of the Bay of Fundy and have been observed in Minas Passage where tidal in-stream power generation infrastructure is currently being tested, can pose a risk to the turbines. The sediment makes the ice heavier than the sea water, meaning that these blocks, which can be several metres high and more than 10 metres long, are carried along by the currents at depths where they can crash into the turbines. Although large, they are hard to detect because they are submerged and the water is murky and turbulent. Sonar is likely the only means of detecting incoming ice blocks at a long enough range to attempt any mitigation.



We are looking for a graduate student to assess the acoustic properties of these ice blocks. The challenge is that there is little theory or observation of sound scattering from ice that contains sediment. The project will involve making field and laboratory observations, with both broadband and multi-beam echosounders, of ice blocks, both fabricated and collected/observed in situ. Based on these data the student will develop a theoretical framework for sound scattering from sediment-laden ice. The hope is that this will allow the acoustic remote sensing of not only the presence of ice blocks, but also some of the relevant properties of the blocks, such as their size and strength. This would allow remote assessment of their imminent risk to the turbines.

The project is based in the Department of Oceanography (<http://oceanography.dal.ca/>) at Dalhousie University in Halifax, Nova Scotia, Canada. In 2007, Dalhousie was voted the #1 Best Place to Work In Academia (International Academic Institutions) in *The Scientist*. The funding for the graduate studentship (either MSc or PhD) is part of a larger project looking at the potential risk of sediment laden ice blocks on tidal in-stream power generation devices. Potential students are encouraged to contact Dr. Tetjana Ross (tetjana@dal.ca; <http://www.phys.ocean.dal.ca/~tetjana/>).