



# McGill Computational Science and Engineering Seminar



**Friday, November 12, 2004 at 10:45 a.m.  
McConnell Engineering Bldg. Room 603**

## **The Flow and Solidification of a Thin Water Layer on a Cold Surface**

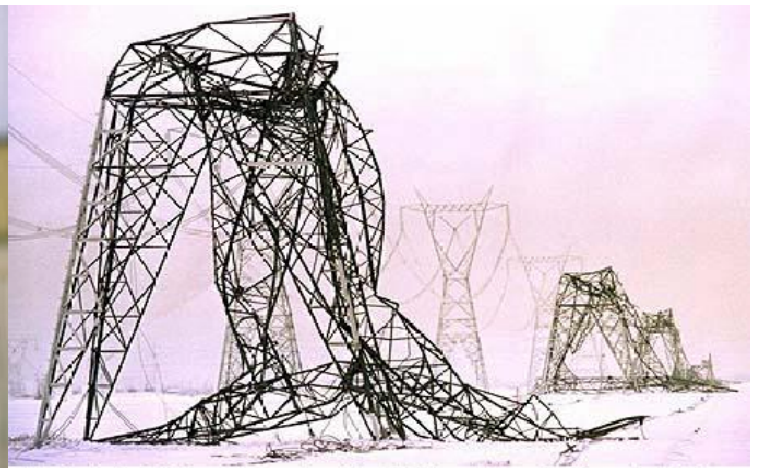
**Tim Myers**

**Visiting Professor, Institute of Applied Mathematics, University of British Columbia**

The flow and solidification of a thin liquid film has applications in many natural and industrial processes. Examples include ice accretion from a thin water layer, spray forming and numerous coating processes. In this talk a model will be developed for fluid flow and solidification on an arbitrary three-dimensional surface, where the surface is maintained below the solidification temperature.

The talk will be focused on the application of thin film solidification to ice accretion. It will be shown how a mathematical model can be used to describe the process. In the limit where no ice grows standard models for thin film flow are retrieved. These are typically applied in coating processes and will be briefly discussed. The results of the full icing problem will then be considered.

Numerical and analytical results will be presented for practical examples, such as: 1) water flow on an initially dry surface, due to a localized incoming fluid source (rain) and driven by gravity and air shear; 2) ice accretion on power lines and in-flight aircraft. The results will also be compared with experimental work from a commercial aircraft icing project.



**Coffee and snacks will be served at 10:30 a.m. in Room 603 before the seminar.**