



Chemical & Physical Sciences  
UNIVERSITY OF TORONTO  
MISSISSAUGA

## COLLOQUIUM

TUESDAY, FEBRUARY 26<sup>TH</sup>, 2013  
12:00 P.M. (**SHARP**) – 1:00 P.M.  
**IB270**

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# Stephen W. Morris

*University of Toronto*

## “Consider the Icicle”

Icicles are harmless and picturesque winter phenomena. The shape of an icicle emerges from a subtle feedback between ice formation, which is controlled by the release of latent heat, and the flow of water over the evolving shape. The water flow, in turn, determines how the heat flows. The air around the icicle is also flowing, and all forms of heat transfer are active in the air. Ideal icicles are predicted to have a universal "platonic" shape, independent of growing conditions. In addition, many natural icicles exhibit a ripply shape, which is the result of a morphological instability. The wavelength of the ripples is also remarkably independent of the growing conditions. Similar shape and ripple phenomena are also observed on stalactites, although certain details of their formation differ. We built a laboratory icicle growing machine to explore icicle physics. We learned what it takes to make a platonic icicle and the surprising origin of the ripples.