

# The Subtle Physics of Icicles

**Dr. Stephen Morris**  
**University of Toronto**

## Abstract:

Icicles are harmless and picturesque winter phenomena, familiar to every Canadian. 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. Ideal icicles are predicted to have a universal "platonic" shape, independent of growing conditions. In addition, many natural icicles exhibit a ripply texture, which is the result of a mysterious morphological instability. The wavelength of the ripples is 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. Work done with Antony Szu-Han Chen and John Ladan.

See The Icicle Atlas for pictures, movies  
[https://www.physics.utoronto.ca/Icicle\\_Atlas/](https://www.physics.utoronto.ca/Icicle_Atlas/)

### + Date

Monday  
February 26, 2018

### + Time

2:30 – 4:00 P.M.

### + Location

7-152 Lecture Theatre  
Agora

### + Contact

Name: Dr. Ian Hartley  
Phone: 250-960-6054  
Email: [ian.hartley@unbc.ca](mailto:ian.hartley@unbc.ca)

**Everyone welcome**  
**Light refreshments served**