



College of Engineering
Department of
Mechanical & Industrial Engineering

The Robert W. Courter Seminar Series



3:00-4:00pm, Friday, February 28th, 2020

1263 Patrick F Taylor Hall

Thermodynamics of Fluid Interfaces

by **Janet Elliott***

University of Alberta

If a system of interest involves micro- or nano-scale phenomena, finely divided phases (drops, bubbles, emulsions, foams, or capillary menisci), aggregation phenomena, surface adsorption or surface reactions, then surface and interfacial thermodynamics is important. Many evolving technologies involve single- or multi-component liquids with curved interfaces, either surrounded by another fluid phase or in contact with a smooth, rough, or porous solid. Gibbsian thermodynamics has been used to understand fluid interface behaviour for more than 130 years. However, the treatments are often applied to the least complicated of systems (such as single-component systems or ideal geometries). My research group has worked on applying Gibbsian thermodynamics to systems with multiple phases, multiple components, or sophisticated geometries in order to provide theoretical descriptions of important natural and engineering phenomena including wetting of rough surfaces and multicomponent fluid phase equilibrium in systems with nanoscale interfacial curvature.

* Janet A. W. Elliott is a University of Alberta Distinguished Professor and Canada Research Chair in Thermodynamics in the Department of Chemical and Materials Engineering. Dr. Elliott obtained her BSc in the Engineering Physics Option of Engineering Science, and her MSc and PhD in Mechanical Engineering at the University of Toronto. Dr. Elliott's research interests include thermodynamics, transport, surfaces, colloids, cryobiology, and cryopreservation. Dr. Elliott currently serves as Associate Editor of the journal *Cryobiology*, on the Editorial Advisory Boards of *The Journal of Physical Chemistry* and *Langmuir*, and on the Editorial Board of *Advances in Colloid and Interface Science*. She has previously served on the Physical Sciences Advisory Committee of the Canadian Space Agency, the Board of Directors of the Canadian Society for Chemical Engineering, and the Executive Committee of the American Chemical Society Division of Colloid and Surface Chemistry. Dr. Elliott's research has been recognized nationally and internationally in science and engineering by Fellowship in the American Institute for Medical and Biological Engineering (2019), Fellowship in the Society for Cryobiology (2018), Fellowship in the Chemical Institute of Canada (2015), the Canadian Society for Chemical Engineering Syncrude Canada Innovation Award (2008), the Natural Sciences and Engineering Research Council of Canada Doctoral Prize (1998), the Canadian Council of Professional Engineers Young Engineer Achievement Award (2001), the Canadian Institute for Advanced Research Young Explorer's Prize (2002), and *Time Magazine's* Canadians Who Define the New Frontiers of Science (2002). Dr. Elliott has also received many provincial and University awards including the Association of Professional Engineers and Geoscientists of Alberta Summit Excellence in Education Award (2017). As one student put it, "She could convince rocks to study thermodynamics."