



THE UNIVERSITY OF
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THE COMMITTEE ON
COMPUTATIONAL AND
APPLIED MATHEMATICS

Dissertation Defense:

Peter Nekrasov

Computational and Applied Mathematics
University of Chicago

**“Reflections on ice: flexural wave scattering with applications to
Arctic ice shelves”**

Friday, June 5, 2026, at 1:00 PM
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ABSTRACT

Flexural waves are involved in a number of important phenomena, including the ocean-driven bending and flexing of floating ice sheets. The interaction of these waves with complex features such as rolls and rifts remains poorly understood despite being a potential precursor to ice shelf collapse. In the first part of this talk, we simulate the propagation of Lamb waves in Arctic ice shelves with periodic surface rolls. We find that ice shelves with surface rolls are able to reflect incident wave energy from the ocean, which may help to explain their long-term stability. To study this phenomenon more closely, we turn to a bulk-surface model for flexural-gravity waves and develop numerical tools for ice sheets with variable thickness or openings in the ice cover. We demonstrate how this general class of problems can be reduced to second kind integral equations supported on a compact region of the surface. This approach has a number of analytical and numerical advantages, and the accuracy and scalability of these methods are demonstrated through a variety of examples with extensions to ice floes and ice rumples.