



THE UNIVERSITY OF
CHICAGO

THE COMMITTEE ON
COMPUTATIONAL AND
APPLIED MATHEMATICS

Computational and Applied Mathematics Colloquium

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The University of Chicago

Title to be announced

THURSDAY, September 28, 2023, at 4:00PM

Jones 303, 5747 S. Ellis Ave. Chicago, IL 60637

ABSTRACT

In this talk we will discuss computational methods for forward and inverse problems involving interfaces and nonlocal operators. Such problems arise naturally in a number of contexts including, inter alia, quantum optics, topological insulators, acoustics, and optics. In particular, in the first part of the talk we will focus on the problem of singular waveguides separating insulating phases in two-space dimensions. The insulating domains are modeled by a massive Schrödinger equation and the singular waveguide by appropriate jump conditions along the one-dimensional interface separating the insulators. We will discuss two integral equation based methods for solving this problem, discuss guarantees on solvability, and fast, efficient algorithms for approximating the solution. In the second part of the talk, we will turn to discussing an inverse scattering problem related to models of photon propagation in quantum optics.

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