SCHOOL OF NATURAL SCIENCES
APPLIED MATHEMATICS SEMINAR 291

Fluid-Structure Interactions

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Location: **COB 110**

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ABSTRACT

To understand the fluid dynamics of marine phenomena fluid-structure interaction problems must be solved. Challenges exist in developing analytical and numerical techniques to solve these complex flow problems with boundary conditions at fluid-structure interfaces. I will present details of two different problems where these challenges are handled: (1) modeling of pulsating soft corals and (2) accurate evaluation of layer potentials near boundaries and interfaces. The first problem of pulsating soft corals will be motivated by field and experimental work in the marine sciences. I will discuss these related data and provide comparisons with the modeling. For the second problem of accurate evaluation of layer potentials, I will show how classical numerical methods are problematic for evaluations close to boundaries and how newly developed asymptotic methods can be used to remove the error. To demonstrate this method, I will consider the interior and exterior Laplace problems.

BIO:

Shilpa received her Ph.D. in 2009 from the Courant Institute of Mathematical Sciences (NYU). After a postdoctoral position in the Department of Mathematics at the University of North Carolina at Chapel Hill, she joined the faculty in Applied Math at UC Merced in 2014. The focus of her research is fluid dynamics arising in the context of marine phenomena, such as the transport of nutrients,organisms, and pollutants in the ocean. She designs numerical methods for mathematical models that she develops and analyzes while comparing with experimental data - specifically for fluid-structure interactions and multiphase flows.