

Helen Barton Lecture Series in Computational Mathematics



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Friday, March 24, 2017

Refreshments: 3:30 pm in Petty 116

Talk: 4:00 p.m. in Petty 150

Title: Using Computational Fluid Dynamics to Understand Organism Form, Function, and Behavior

Abstract: The natural world is replete with countless interesting examples of different types of fluid-structure interactions such as pumping of blood by the heart; swimming in fluid from the scale of bacteria to whales; flying on scales from tiny parasitoid insects to the California condor; filtering by bristled appendages and mucus nets; or drag reduction through reconfiguration. In this presentation, I will provide an overview of some of these problems with a focus on the use of computational fluid dynamics (CFD) as a tool for understanding biological form and function. For example, I will discuss how CFD has been used to reveal the aerodynamics of tiny insects and to explain why they may fly with bristled wings. I will also present results on how the placement of muscles in the jellyfish bell can generate asymmetric contractions necessary for turning. Other examples will be taken from collective pulsing of soft corals, crab sniffing, and ballooning in spiders.

