

Department of Mathematics and Statistics Colloquium

Fluid Mechanics at the Microscale

Amy Buchmann

University of San Diego

Abstract: I will present mathematical and computational methods used to model interactions between a viscous fluid and elastic structures in biological processes. For example, microfluidic devices carry very small volumes of liquid through channels and may be used to gain insight into many biological applications including drug delivery and development, but mixing and pumping at this scale is difficult. Experimental work suggests that the flagella of bacteria may be used as motors in microfluidic devices, and mathematical modeling can be used to further investigate this idea. Cilia self-organize forming a metachronal wave that propels the surrounding fluid. How this organization occurs is not well understood. Mathematical models can be used to study the role of hydrodynamic interactions in self-organization.

Monday, January 14 at 3:50 in Roop 103

Refreshments at 3:30