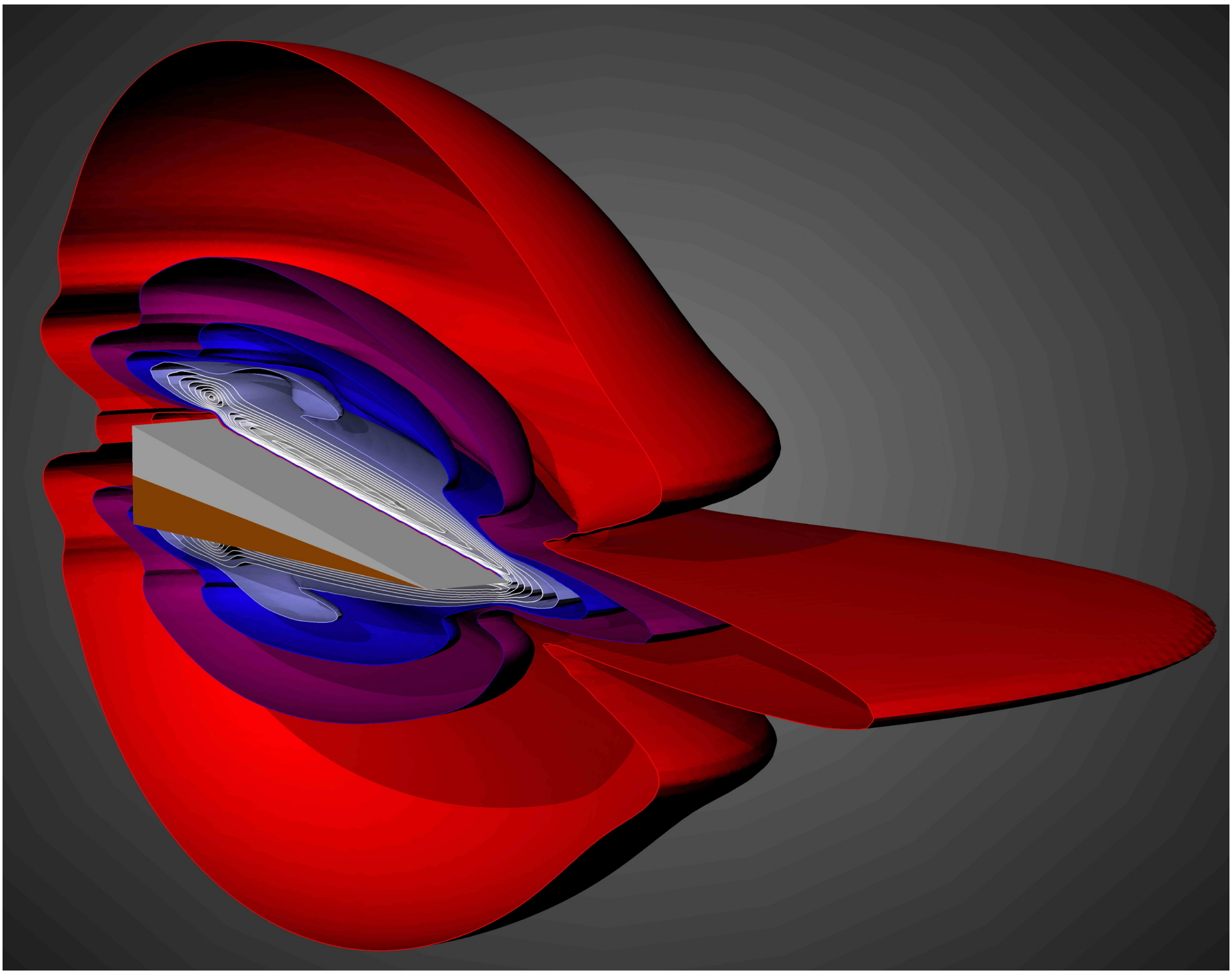
Boston University Physics Colloquium



Sailing on Diffusion

Buoyancy-driven flow, which is flow driven by spatial variations in fluid density, lies at the heart of a variety of physical processes, including mineral transport in rocks, the melting of icebergs and the migration of tectonic plates. Here, we report on a new discovery that buoyancy-driven flows can also generate propulsion. Specifically, we find that when an asymmetric object floats in a density-stratified fluid, the diffusion-driven flow at its sloping boundaries draws energy and momentum from microscale molecular diffusion to produce a macroscopic sideways thrust. This remarkable and fundamental discovery has implications for transport processes in regions of varying fluid density, such as the ocean pycnocline, and wherever there is a temperature difference between immersed objects and the surrounding fluid.

Tom Peacock

MIT

March 8, 2011 (Tuesday) at 3:30pm (Refreshments at 3:15pm)

SCI 107, Metcalf Science Center, Boston University

Call: Winna Somers (wsomers@bu.edu) (617) 353-9320

Host: David Campbell