Center for Fluid Mechanics, Division of Applied Mathematics
Fluids and Thermal Systems, School of Engineering
Joint Seminar Series

TUESDAY – MARCH 12, 2013
3:00pm
Barus & Holley, Room 190

Professor John Bush
Department of Mathematics
Massachusetts Institute of Technology
Cambridge, MA

Hydrodynamic Quantum Analogs: Droplets Walking on the Impossible Pilot Wave

Yves Couder and coworkers have recently discovered that droplets walking on a vibrating fluid bath exhibit several features previously thought to be peculiar to the microscopic, quantum realm. Theoretical developments provide rationale for the complex behavior of the bouncing droplets, and yield a trajectory equation for the walking droplets. Experimental results reveal the emergence of wave-like statistics from pilot-wave dynamics for droplets walking in confined geometries, and for droplets walking on a rotating fluid bath. Theoretical results indicate the manner in which wave-like statistics emerge from pilot-wave dynamics for droplets walking on a rotating bath, or under the influence of a central force. The relation between this fluid system and de Broglie's relativistic pilot-wave theory of quantum dynamics is discussed.

Host: Kenneth Breuer
Kenneth_Breuer@brown.edu