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

## TUESDAY – September 24, 2013

## 3:00pm

## Barus & Holley, Room 190

**Enkeleida Lushi**
**Brown University**

# The Origin and Nature of Spiral Vortex Ordering in a Bacterial Drop

Hydrodynamics plays an important role in transport, mixing, and many aspects of biophysical systems, yet its importance on self-organizing systems in active matter has not been fully appreciated. We investigate here the influence of the fluid dynamics on the orientational order of a dense bacterial suspension within small flattened droplets. In a recent experiment swimmers were showed to form a steady single-vortex state with a counterrotating cell boundary layer. Using a minimal model and simulation method that captures oriented cell-cell and cell-fluid interactions, we show that hydrodynamics is crucial in reproducing and explaining the phenomenon. We give new insights into the microscopic arrangement of the bacteria, which are confirmed by new experiments.

Collaborators: Hugo Wioland and Raymond Goldstein, DAMTP, University of Cambridge