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

**TUESDAY – MARCH 5, 2013**
**3:00pm**
**Barus & Holley, Room 190**

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**Department of Chemical & Biological Engineering**
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**Troy, NY**

# Collective Behavior in Suspensions of Swimming Microorganisms

Large collections of swimming microorganisms are able to produce collective motions on a scale much larger than the scale of a single organism. In particular, the collective behavior leads to velocities larger than that of an isolated organism, fluid structures larger than the size of an organism, enhanced transport in the fluid, and enhanced stress fluctuations which produce altered rheological properties. Many models attempt to treat this onset of collective behavior as a "phase transition." However, it is unlike normal phase transitions because the system is far from equilibrium. The active motion of each swimming organism pushes the system away from equilibrium. I will discuss our efforts to understand these systems with both theory and computer simulations. In particular, I will discuss the importance of periodic versus confining geometries, features that are not captured in mean-field theories, and the influence of the suspending fluid.

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