Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

The Hawaiian bobtail squid as a model system for selective particle capture in microfluidic systems. JANNA NAWROTH, Caltech, MARGARET MCFALL-NGAI, University of Wisconsin at Madison, JOHN DABIRI, Caltech — Juvenile Hawaiian bobtail squids reliably capture and isolate a single species of bacteria, Vibrio fischeri, from inhaled coastal water containing a huge background of living and non-living particles of comparable size. Biochemical mechanisms orchestrate a chain of specific interactions as soon as V.fischeri attach to the squid's internal light organ. It remains unclear, however, how the bacteria carried by the squid's ventilation currents are initially attracted to the light organ's surface. Here we present preliminary experimental data showing how arrangement and coordination of the cilia covering the light organ create a 3D flow field that facilitates advection, sieving and selective retention of flow-borne particles. These studies may inspire novel microfluidic tools for detection and capture of specific cells and particles.

Janna Nawroth
Caltech

Date submitted: 25 Jul 2013 Electronic form version 1.4