Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Dynamics of micro-swimmers inside a peristaltic pump ADAM STINCHCOMBE, University of Michigan, CHARLES PESKIN, New York University, ENKELEIDA LUSHI, Brown University — Peristaltic pumping is a form of fluid transport along the length of a tube containing liquid when the tube undergoes a contraction wave. While much is known about the peristalsis of Newtonian liquids, complex ones have received limited attention. There are many examples in nature where motile micro-particles or micro-swimmers (such as bacteria or spermatozoa) are suspended in the fluid inside a peristaltic micro-pump. We present a simulation method that couples the dynamics of many micro-swimmers to each-other, the pump and the fluid flow. The pump and the fluid flow it pushes can affect the swimmer dynamics in interesting ways. Moreover, the presence of the swimmers and their collective motion can affect the net transport and mixing in the pump. The efficiency of mixing abilities of the suspension for a variety of parameters will be discussed.

Enkeleida Lushi
Brown University

Date submitted: 01 Aug 2014 Electronic form version 1.4