

Abstract Submitted  
for the DFD14 Meeting of  
The American Physical Society

**Salmonella capture using orbiting magnetic microbeads<sup>1</sup>** DREW OWEN, MATTHEW BALLARD, ZACHARY MILLS, SRINIVAS HANASOGE, PETER HESKETH, ALEXANDER ALEXEEV, Georgia Institute of Technology — Using three-dimensional simulations and experiments, we examine capture of salmonella from a complex fluid sample flowing through a microfluidic channel. Capture is performed using orbiting magnetic microbeads, which can easily be extracted from the system for analysis after salmonella capture. Numerical simulations are used to model the dynamics of the system, which consists of a microchannel filled with a viscous fluid, model salmonella, magnetic microbeads and a series of angled parallel ridges lining the top of the microchannel. Simulations provide a statistical measure of the ability of the system to capture target salmonella. Our modeling findings guide the design of a lab-on-a-chip experimental device to be used for the detection of salmonella from complex food samples, allowing for the detection of the bacteria at the food source and preventing the consumption of contaminated food. Such a device can be used as a generic platform for the detection of a variety of biomaterials from complex fluids.

<sup>1</sup>This work is supported by a grant from the United States Department of Agriculture.

Matthew Ballard  
Georgia Institute of Technology

Date submitted: 30 Jul 2014

Electronic form version 1.4