Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Particle Dynamics in Tangential Flow Filtration MIKE GARCIA, SUMITA PENNATHUR, UCSB — Tangential Flow Filtration (TFF) is a rapid and efficient method for filtration and separation of solutions containing particles such as viruses, bacteria or cellular material. Enhancing the efficiency of TFF not only requires a detailed understanding of the individual mechanisms behind particle transport, but the interaction between these transport mechanisms and a porous wall. In this work, we numerically and experimentally explore how inertial migration is affected by the presence of a permeate flow through the porous walls of a microchannel in order to develop a platform for further studies of particle transport in a TFF device. Numerically, we use COMSOL multiphysics to model the large parameter space of permeate versus inertial forces. Experimentally, we develop a MEMS fabricated TFF device to confirm the results of the numerical model, where the permeate flow is controlled using multiple pumps and pressure transducers regulated by a feedback loop. Experimental and numerical results reveal interesting dynamics, including the competition between permeate and inertial forces and the consequences of this competition on particle trajectories and equilibrium location.

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Date submitted: 30 Jul 2015 Electronic form version 1.4