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**Inertial Particle Migration in the Presence of a Permeate Flow** MIKE GARCIA, AMANDA SINGELTON , SUMITA PENNATHUR, University of California Santa Barbara — Tangential Flow Filtration (TFF) is a rapid and efficient method for the filtration and separation of suspensions of particles such as viruses, bacteria or cellular material. Enhancing the efficacy of TFF not only requires a detailed understanding of particle transport mechanisms, but also the interactions between these mechanisms and a porous wall. In this work, we numerically and experimentally explore the mechanisms of inertial particle migration in the presence of a permeate flow through the porous walls of a microchannel. Numerically, we develop a force balance model to understand the competition between permeate and inertial forces and the resultant consequences on the particle equilibrium location. Experimentally, we fabricated MEMS TFF devices to study the migration of 5, 10 and 15 m fluorescent polystyrene beads in straight channels with perpendicular permeate flow rates up to 90% of the inlet flow rate. We find that the permeate flow directly influences the inertial focusing position of the particles, both as a function of downstream channel position and ratio of inlet to outlet flow rate. Comparing experiments to our model, we can identify inertial, viscous and a co-dominant regimes.

Mike Garcia
University of California Santa Barbara

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