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Separating Particles Using Tangential Flow Filtration and Inertial Microfluidics AMANDA SINGLETON, MIKE GARCIA, SUMITA PENNATHUR, Univ of California - Santa Barbara — The separation of micron-sized particles is a crucial component in a myriad of applications. Recently researchers have attempted to use inertial microfluidics to separate particles because the technique requires smaller sample volume, has a high throughput, and is inherently robust. Unfortunately, inertial microfluidics lacks versatility: geometric considerations limit variation of particle size. To overcome this limitation, we experimentally investigate the effect of adding permeate flow to refocus particles into tunable equilibrium locations. Specifically, we experimentally investigate the effect of permeate flow on the equilibrium location of 5, 10, and 15-micron polystyrene particles in a MEMS fabricated tangential flow filtration device. We see that contrary to inertial focusing in straight microfluidic channels, smaller particles focus closer to the center than larger particles. Furthermore, the particle equilibrium location is a function of streamwise distance, and equilibrium location at the exit is a function of the ratio of outlet to inlet flow. Taking advantage of this data, we aim to create in-situ control of particle equilibrium locations resulting in real time separations of particles of unknown size distribution. This method can be combined with on-chip devices for diagnostic applications, benefitting the fluids and separations community

Amanda Singleton
Univ of California - Santa Barbara

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