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**Continuous Nanoparticle Size Separation Using Microfluidic Technology** BUSHRA TASADDUQ, GONGHAO WANG, WENBIN MAO, WILBUR LAM, ALEXANDER ALEXEEV, TODD SULCHEK, Georgia Institute of Technology — High throughput size based separation of nanoparticles is important to better understand and improve diagnosis of diseases that involve nanoparticles. We propose a novel microfluidic device capable of continuous size-dependent separation of particles. The separation device consists of a microchannel with periodically arranged diagonal ridges. The key to the separation is that these diagonal ridges create helical flow fields. Simultaneously, inertial particle migration alters the particle height in a size-dependent manner, which then exposes the particle to different secondary flows. The height-dependent secondary flows then cause particles with different sizes to migrate transversely with unique trajectories. We have characterized the separation results utilizing forward and side scatter flow cytometric analysis. We are able to separate 4 micrometer particles from 7 micrometer; 0.5 micrometer from 5 micrometer; and platelets from RBCs and WBCs with a substantial enrichments of number densities of 29-fold, 227-fold, and 53-fold respectively .We demonstrate there exists a z-position dependent phenomena which affects particle trajectories and hypothesize that controlling the particle z-position, we can further improve the efficiency of size based sorting.

Bushra Tasadduq
Georgia Institute of Technology

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