



International Conference on Micro Nano Fluidics (ICOM 2025)



October 31 – November 2, 2025, IIT Guwahati

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Tentative topic of the invited talk

Microfluidic Devices for Particle Separation: from Platelets to Extracellular Vesicles

Abstract of the invited talk

In this talk I will describe passive microfluidic devices for separation of particles, ranging from blood cells to extracellular vesicles. In the first part of my talk, I will describe continuous isolation of platelets from whole blood. Isolation of platelets from whole blood is challenging as red blood cells (RBCs) generally outnumber the platelets. Moreover, RBCs are highly deformable and can pass through constrictions that are much smaller than their size. We developed RAPID, a passive microfluidic device, that could operate continuously up to six hours without clogging to isolate platelets from whole blood. In the second part of my talk, I will describe inertial microfluidic devices for one-step label-free continuous isolation of extracellular vesicles (EV), which are nanoscale membrane-bound objects released by cells. The size range of the particles isolated from dilute cell suspensions and blood plasma by our microfluidic platform compares well with standard EV isolation methods, such as ultracentrifugation, size-exclusion chromatography, and precipitation.

References

Mehendale, N., Sharma, O., D'Costa, C., and Paul, D., A Radial Pillar Device (RAPID) for continuous and high-throughput separation of multi-sized particles, Biomed. Microdev. 20, 6 (2018).

Mehendale, N., Sharma, O., Pandey, S. and Paul, D., Clogging-free continuous operation with whole blood in a radial pillar device (RAPID), Biomed. Microdev. 20, 75 (2018).