

Abstract Submitted  
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**Learning from the Jersey Turnpike: Cell Lysis, Labeling and Washing with Microfluidic Metamaterials**<sup>1</sup> KEVIN LOUTHERBACK, KEITH MORTON, DAVID INGLIS, Princeton University, OPHELI TSUI, Boston University, JAMES STURM, STEPHEN CHOU, ROBERT AUSTIN, Princeton University — Directing objects across functional streamlines at low Reynolds number is difficult but important since this motion can be used to label, lyse, and analyze complex biological objects on-chip without cross-contamination. Here we use an asymmetric post array to move cells across coflowing reagents and show on-chip, immunofluorescent labeling of platelets with washing and *E. Coli* cell lysis with simultaneous separation of bacterial chromosome from the cell contents. Furthermore, we develop the concept of a microfluidic metamaterial by using the basic asymmetric post array as a building block for complex particle handling modes. These modular array elements could be of great use for developing robust techniques for on-chip, continuous flow manipulation and analysis of cells, large bio-particles, and functional beads.

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