

Supplementary Information

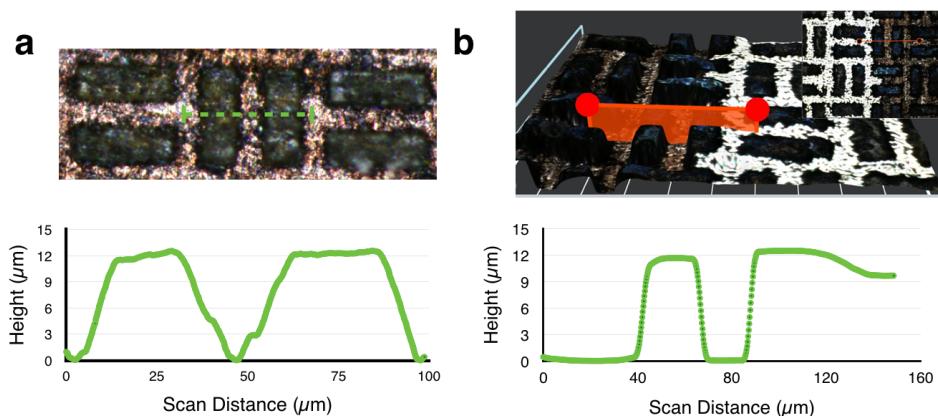


Figure S1. Characterization of polyimide pillars on the master and during electroformation. **a.** Profilometer measurement along two rectangle pillars in the master shows the RIE process etched 12 μm deep. The profilometer tip was not able to fit in between the gaps of the two pillars so we used the Zeiss Smartzoom5 2D/3D Optical Microscope to verify the pillar profiles. **b.** 3D optical profile of the pillars shows the copper surface at the bottom, and a boundary between where permalloy was plated and peeled. The depth profile is plotted here to show that the permalloy can be plated to the height of the pillars and successfully peeled at a thickness of 10 μm .

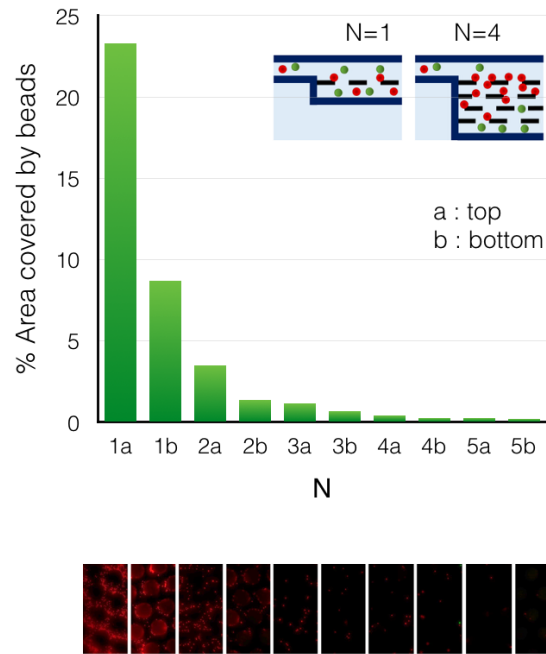


Figure S2. Bead distribution capture rate on the top and bottom surface of each filter in stacked devices. Since MagNET is formed completely of permalloy, this leads to the formation of two traps at the top and bottom surface of each filter (a = top, b = bottom). To demonstrate that each surface does capture beads, the capture rate of each surface for N=5 filters stacked in series was calculated. The capture rate was defined as the area of the microscope image (shown below for each surface) that was covered with beads since individual $1\mu\text{m}$ beads could not be counted individually. We also demonstrate that by stacking filters in series with two surfaces, we give magnetically labelled particles multiple chances to become trapped on MagNET to exponentially increase capture rate.

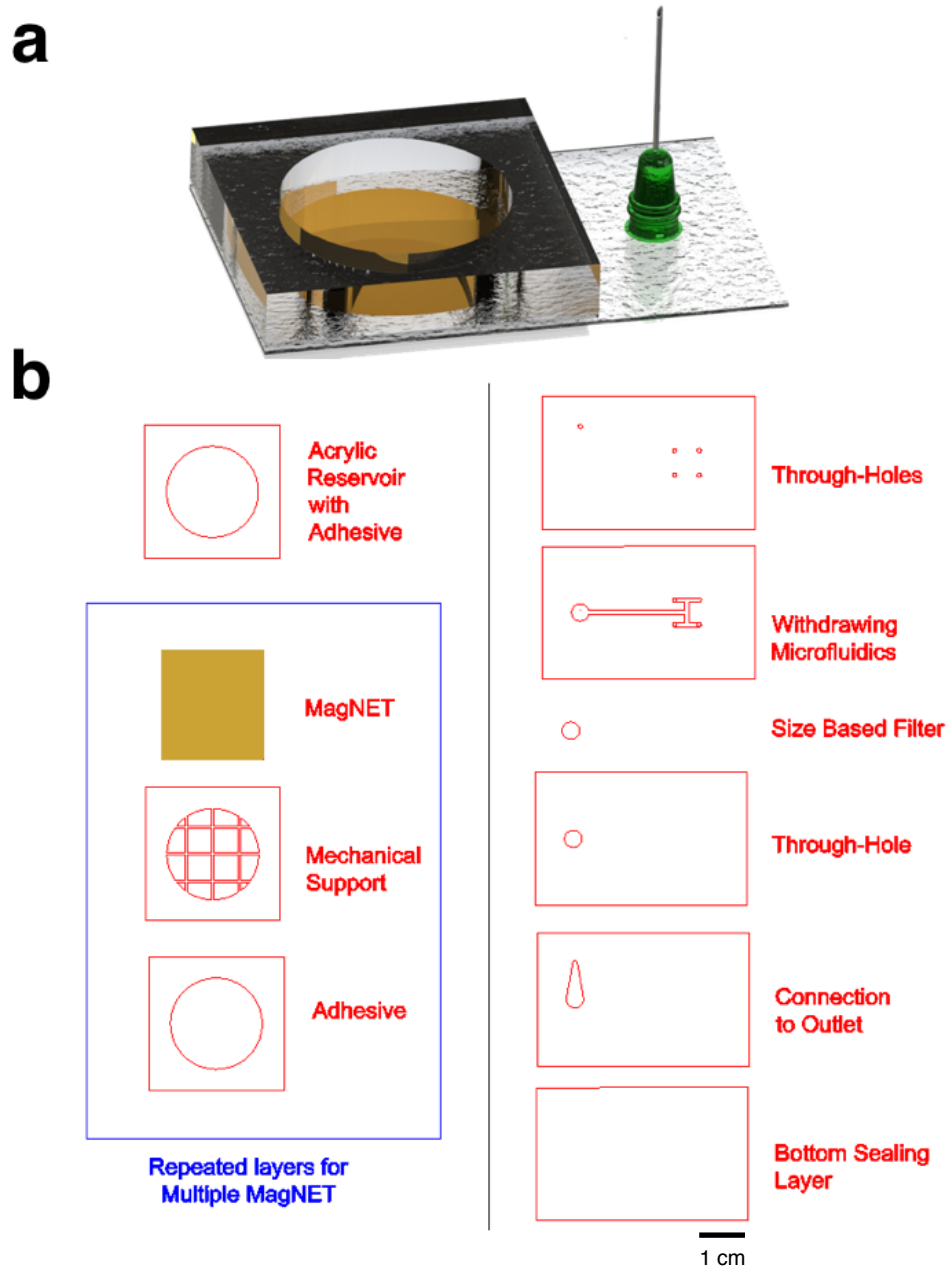


Figure S3. Device Fabrication. **a.** A three dimensional rendering of the device. The sample is loaded into the acrylic reservoir that sits on top of MagNET. A negative pressure is applied at the blunt tip, which draws sample through the MagNET to isolate immunomagnetically labeled cells. **b.** The design of each of the device layers. The boxed in area to the left are the layers associated with each layer of MagNET. The layers shown on the right are the microfluidics that are used to withdraw sample from the reservoir. In this particular device, a size based filter is attached near the output for viewing target cells in a fluorescence microscope after the negative enrichment of the background cells.