

*Figure S1: Trap & Release of cells in device I (A) Device layout (B) Zoomed view of droplet generation junction (C) CFD modeling of shear dependent vortices at the droplet generation junction (D) Trapping of k-562 cells in the vortices (E) 1-1 encapsulation of cells into droplets*

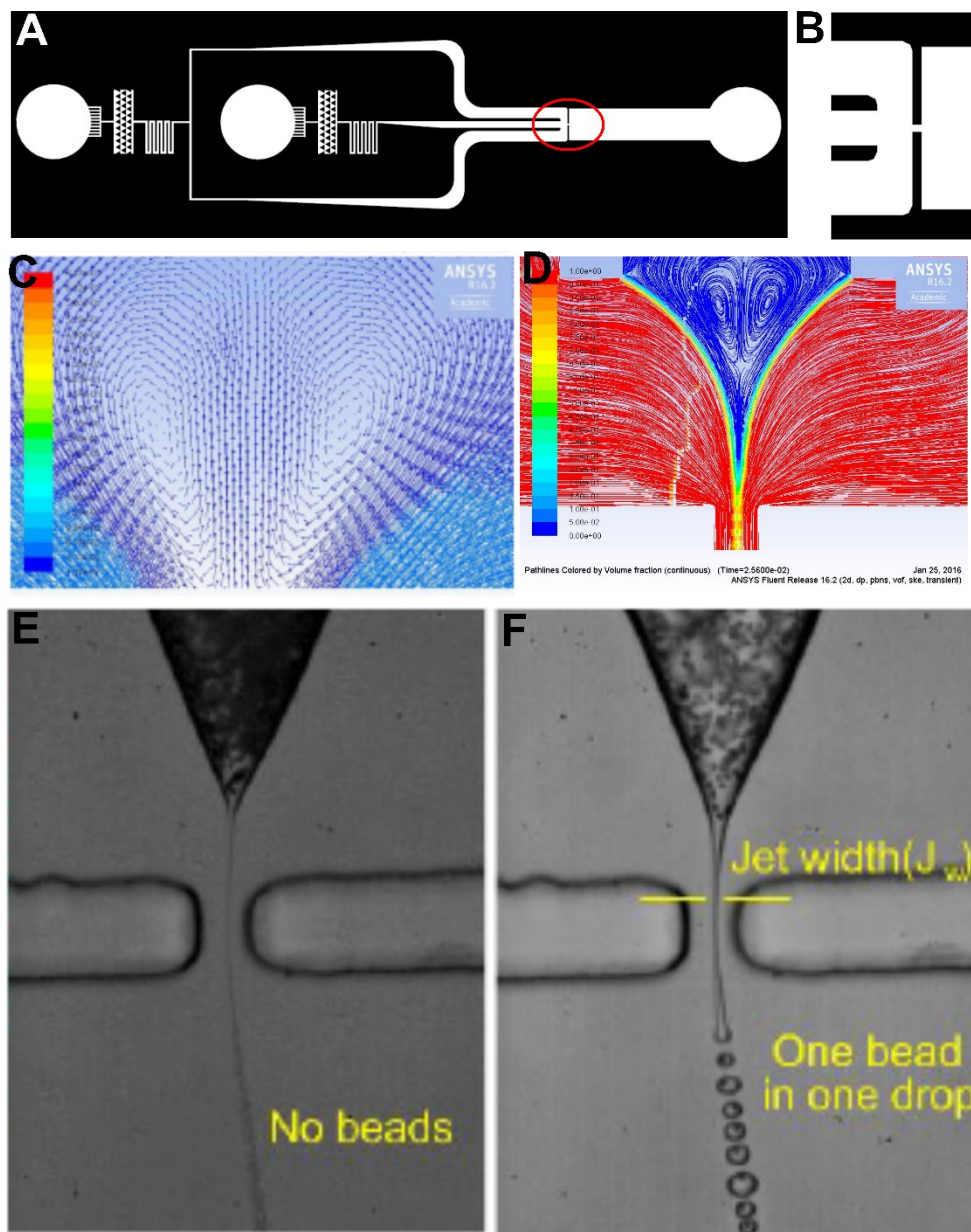


Figure S2: Shear-dependent vortices and bead trapping in device III. (A) Device Layout (B) Zoomed view of droplet generation junction (C&D) CFD model of shear-dependent vortices at the junction (E) Trapping of 2.5  $\mu\text{m}$  beads in the micro-vortices (F) 1-1 release of beads in the jetting regime.

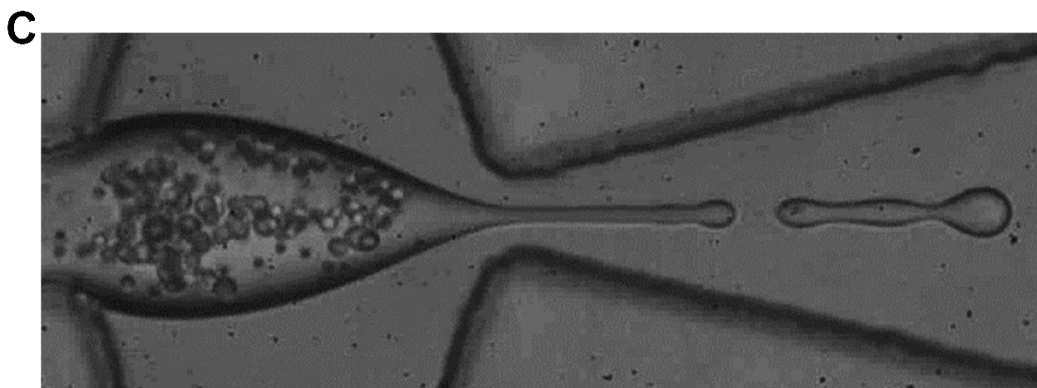
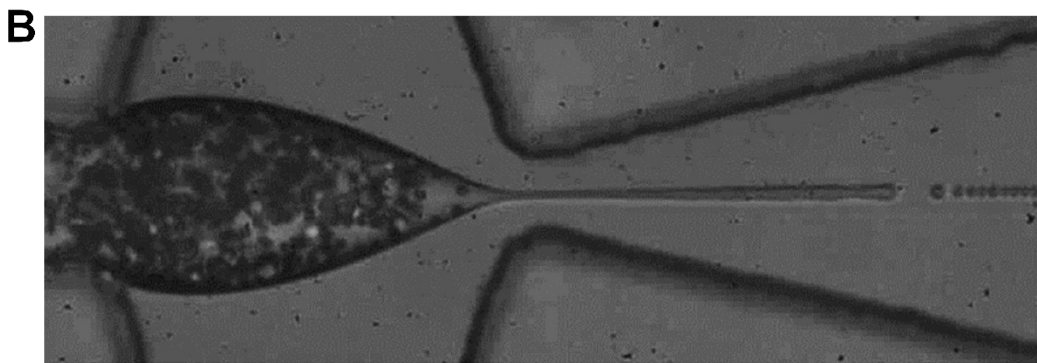
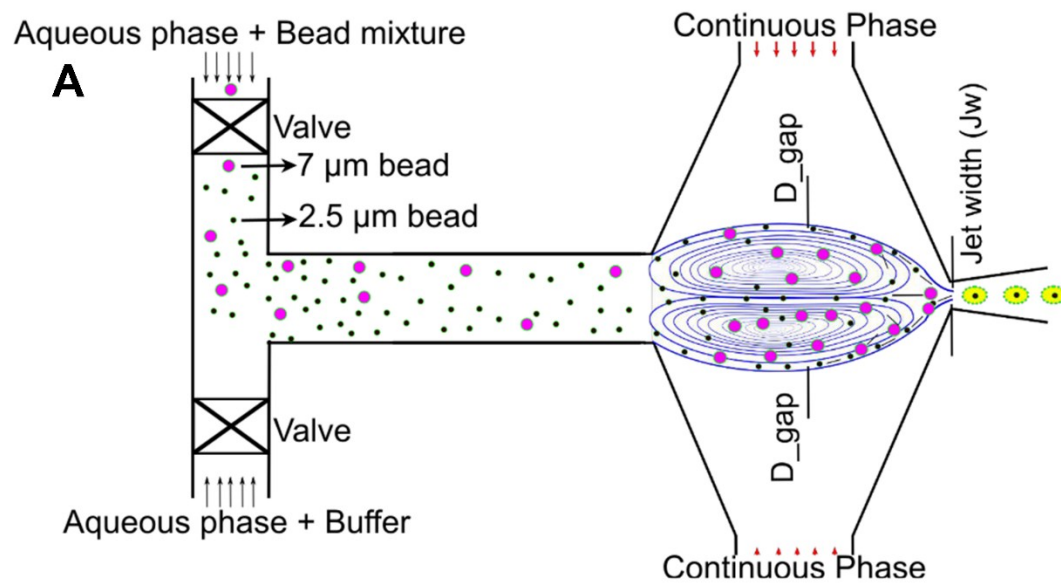


Figure S3: Size-selective capture of beads: (A) Schematic of the device (B) Trapping of 7.32  $\mu\text{m}$  and 2.5  $\mu\text{m}$  beads in the vortices. The  $d_{\text{gap}}$  can be exquisitely controlled by tuning the pressure ratio ( $\Psi$ ) (C) Release of 2.5  $\mu\text{m}$  and while the 7.32  $\mu\text{m}$  beads are trapped.