

Supplementary Figures

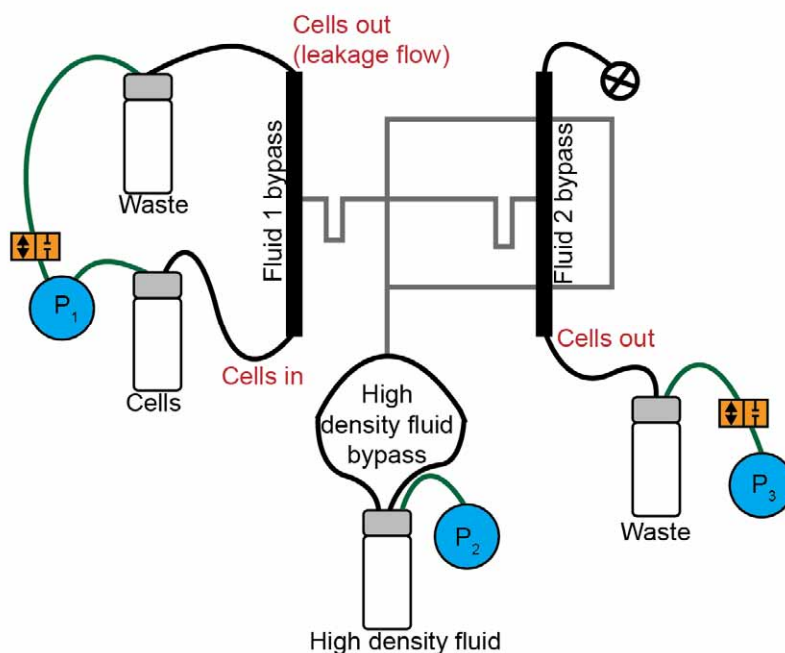


Figure S1 Diagram of fluidic and pressure components in dual SMR. Solenoid valves (orange rectangles) set waste vial pressures to those of the pressure regulators (blue circles) or to atmosphere. A plug (circled black X) forces waste fluid into a single vial. Experimental pressures are typically around 11.8 psi for P_1 and P_2 , and 12 psi for P_3 . The Reynolds number is approximately 0.08, and varies based on the flow rate for a particular experiment.

Supplementary Table 1 Channel geometries for dual SMR designs. The serpentine channel dimensions for the narrow T-junction and cross-junction provide pressure damping advantages over the wide T-junction.

	Bypass Channel	SMR Channel	Serpentine Channel	Serpentine Channel
			Narrow T-junction and Cross-Junction	Wide T-junction
Cross Sectional Area	70 x 70 μm	25 x 25 μm	25x25 μm	50x25 μm

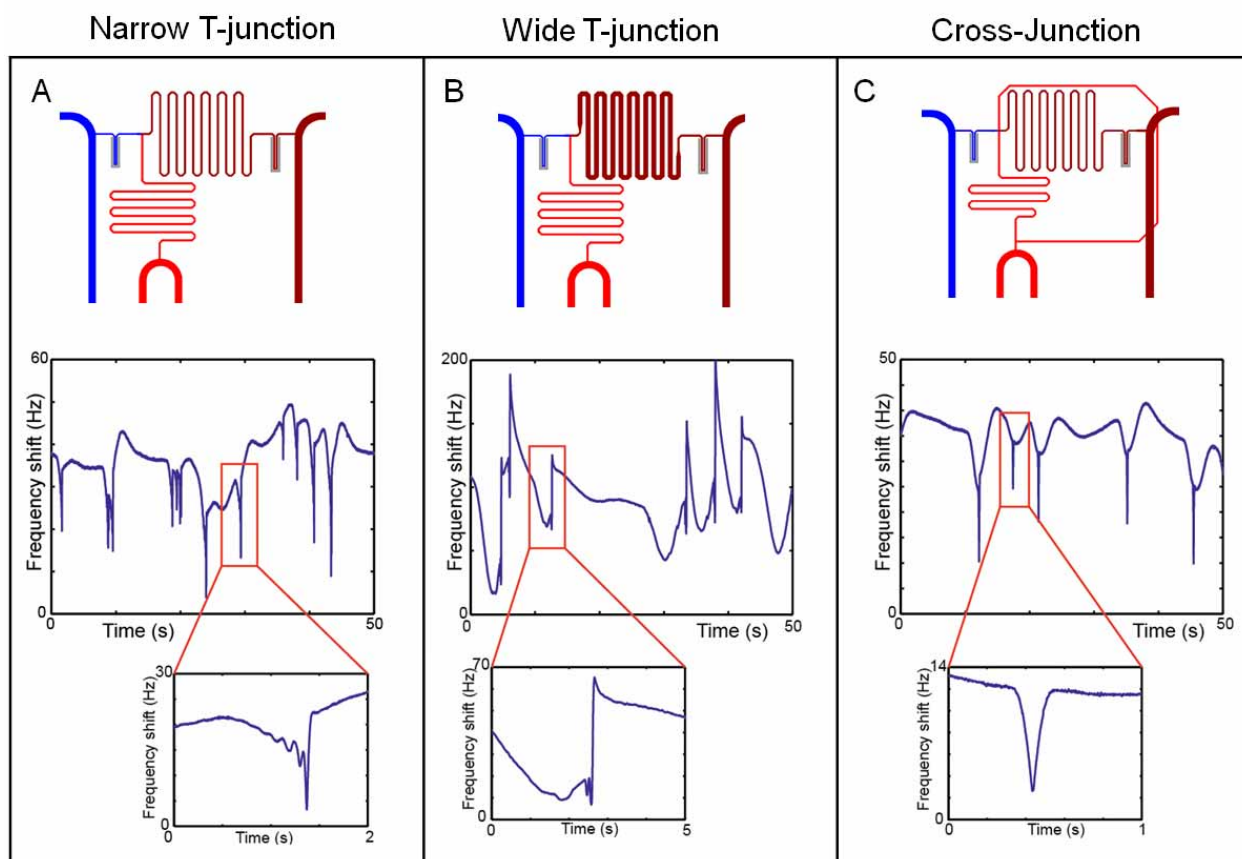


Figure S2 Comparison between the narrow T-junction (A), wide T-junction (B), and cross-junction (C) dual SMR designs. Schematic of channel design shown in top of figure. Fifty seconds of acquired frequency data from SMR₂ is shown in the middle section. Insets are of peaks highlighted by red boxes in each frequency trace. The uniform peak shape and low baseline variation in the cross-junction design demonstrate its superiority over the narrow T-junction and wide T-junction.

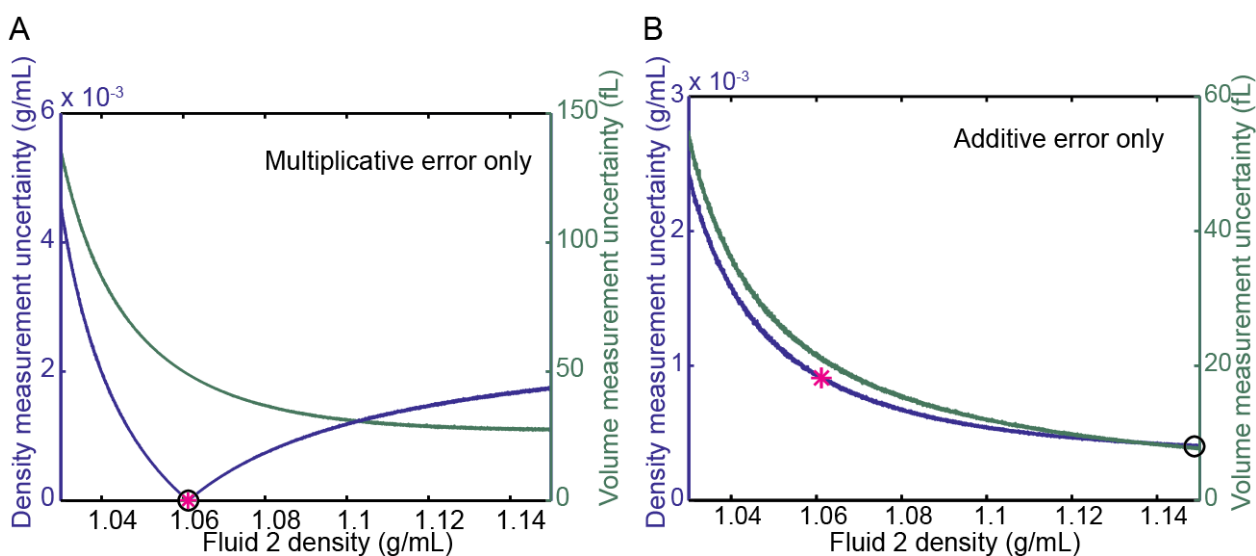


Figure S3 Measurement uncertainty of cell density (blue) or cell volume (green) as a function of Fluid 2 density in the case of purely multiplicative (A) or purely additive (B) error. The cell density is indicated by a pink asterisk. The minimum uncertainty in the density measurement is indicated with a black circle.

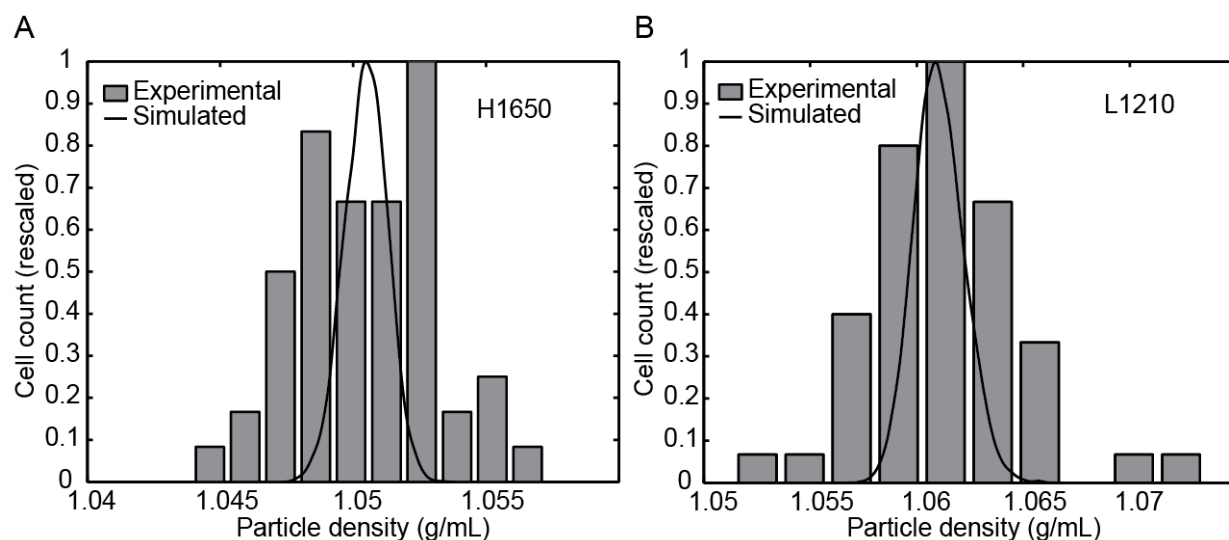


Figure S4 Measured and estimated distributions of cell density. Estimated distributions consider only the error due to the measurement and were obtained by applying both multiplicative and additive errors to the average buoyant mass of cells in SMR_1 and SMR_2 . The narrower width of the estimated distribution compared to the measured data indicates that variation in the cell data is due to inherent biological variability, not measurement error.