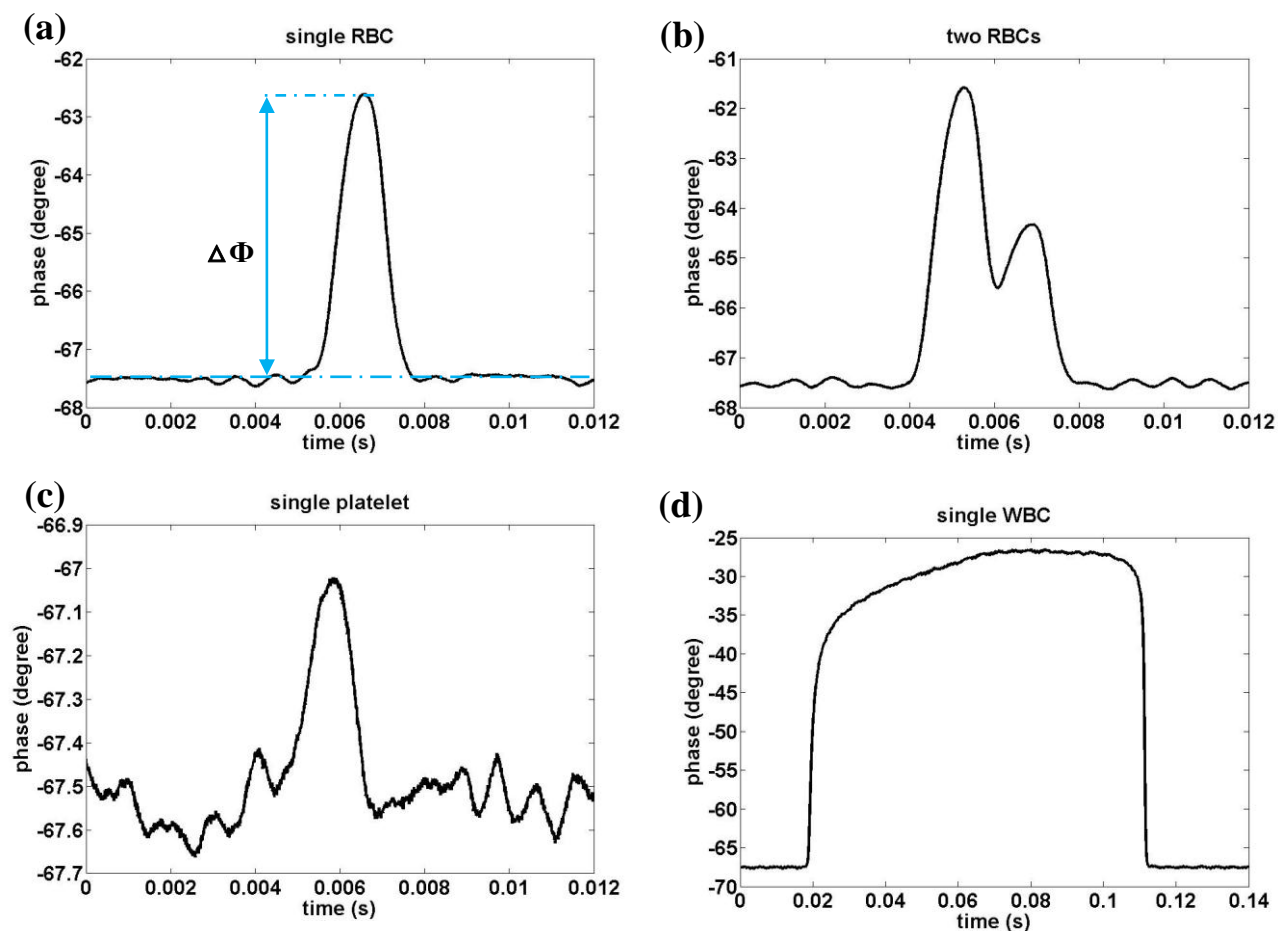
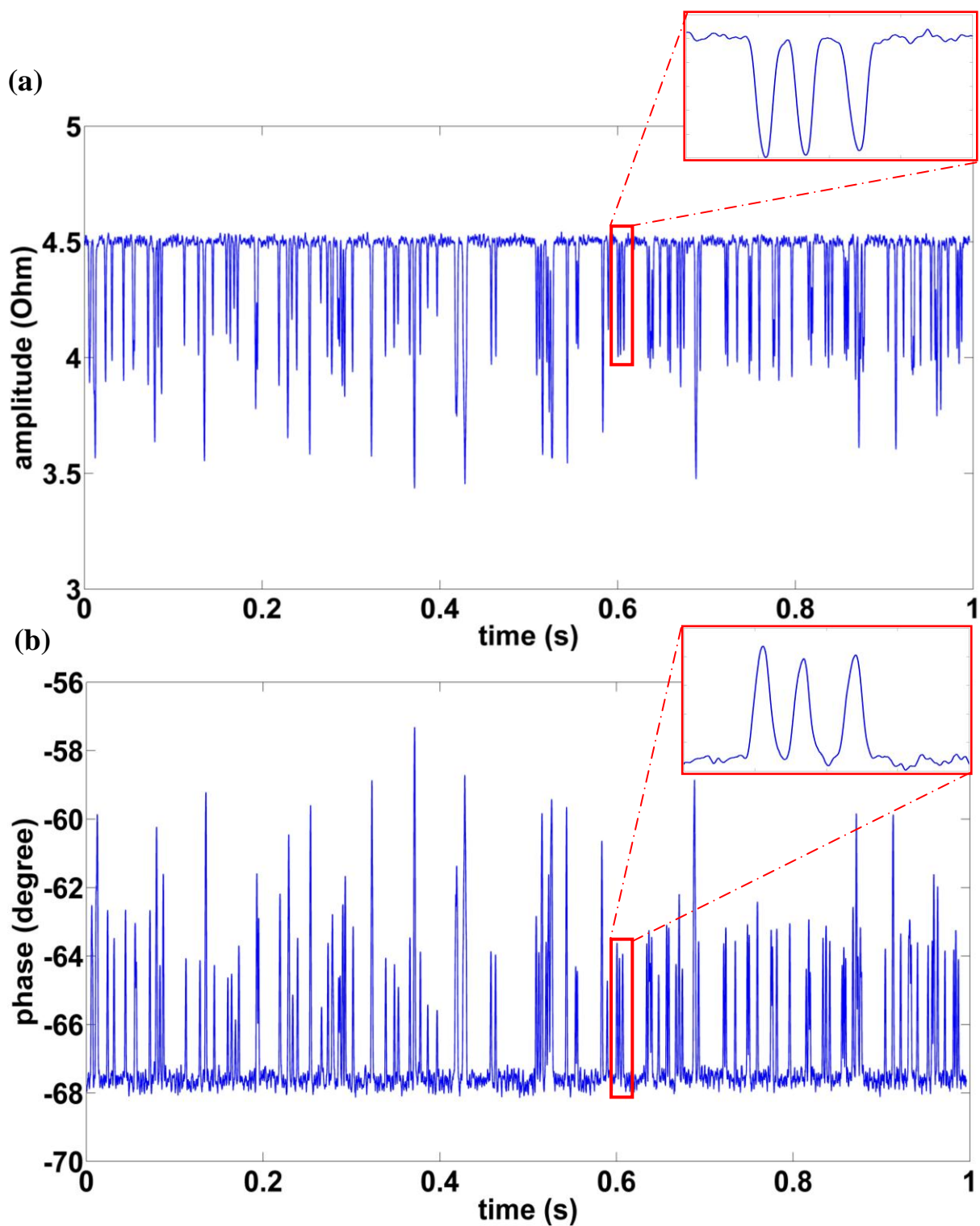


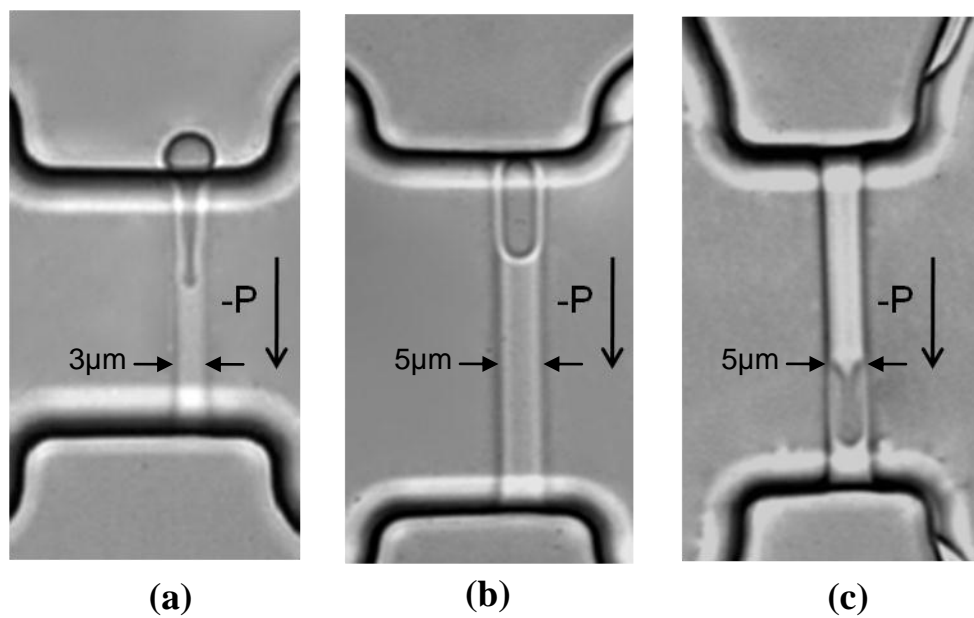
## Supplementary Information



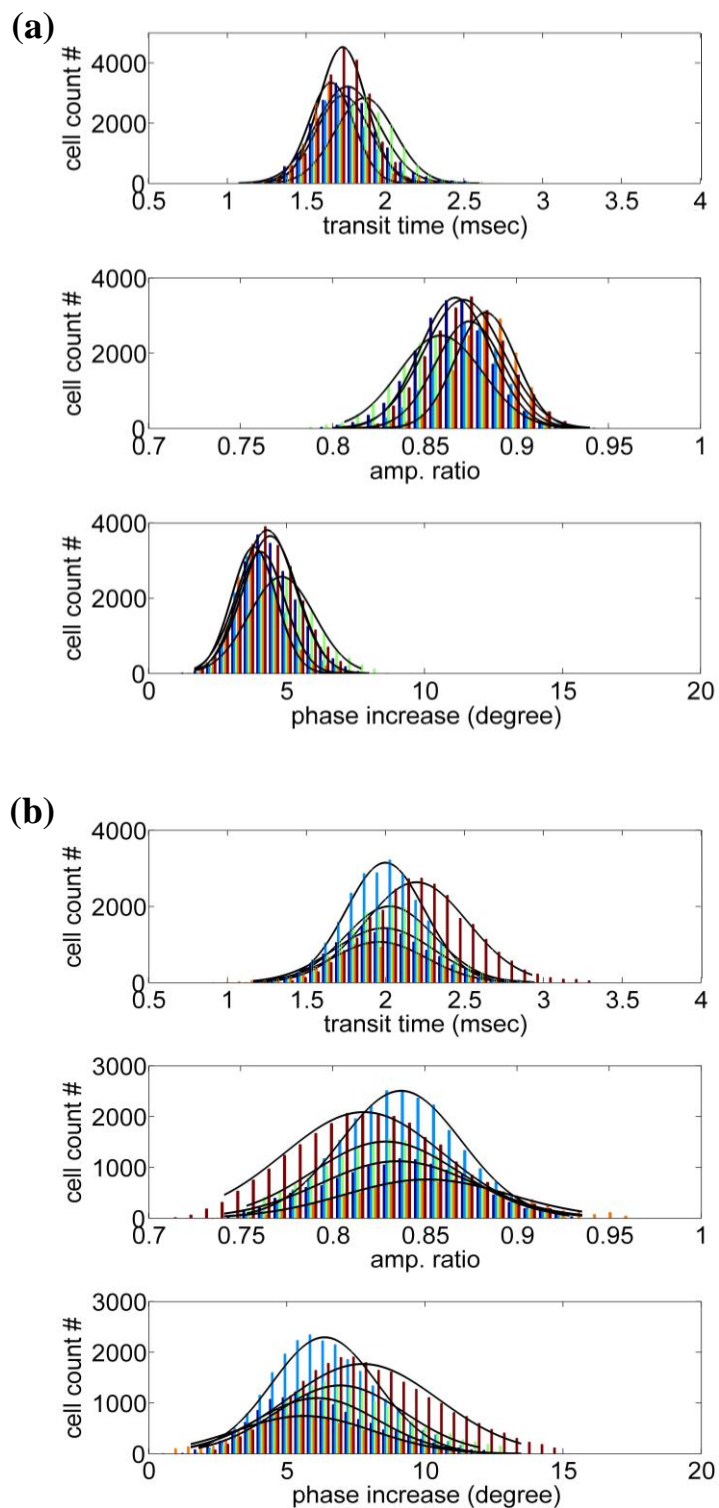
Supplementary Figure S.1: Experimental phase profiles: (a) a single RBC, (b) two RBCs, (c) a single platelet, and (d) a single WBC within the constriction channel.



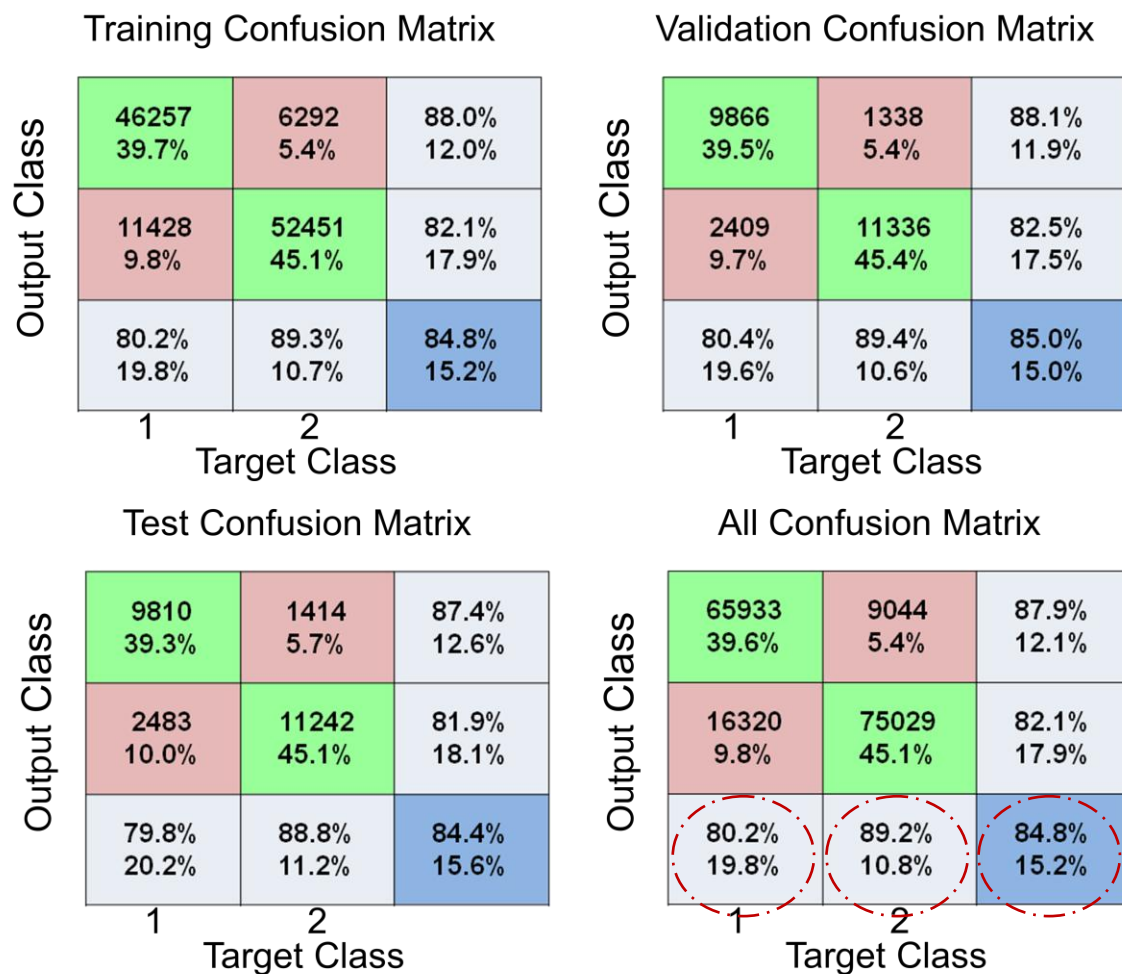
Supplementary Figure S.2: Example data measured within 1 second with 120 RBCs passing through the constriction channel. (a) Amplitude profile. (b) Phase profile. Data segments labeled in the red rectangle are enlarged in the inset figures.



Supplementary Figure S.3: Three types of RBC behavior when RBCs were aspirated through the constriction channel with different cross-sectional areas: (a)  $1\mu\text{m}\times 3\mu\text{m}$ , (b)  $2\mu\text{m}\times 5\mu\text{m}$ , (c)  $3\mu\text{m}\times 5\mu\text{m}$ . “-P” represents negative pressure applied to aspirate cells through the constriction channel.



Supplementary Figure S.4: Histograms of transit time, amplitude ratio, phase increase fitted with normal distributions from individual samples. (a) 5 adult samples; (b) 5 newborn samples.



Supplementary Figure S.5: Pattern recognition using neural network for classifying adult RBCs (n=84,073) and neonatal RBCs (n=82,253). The complete dataset was divided into training data (70%), validation data (15%), and testing data (15%) to quantify cell classification success rates. The success rate, sensitivity, and specificity are labeled in red circles. Sensitivity = true positive/(true positive + false negative); specificity = true negative/(true negative + false positive).

Supplementary Table S.1: Hematologic parameters measured by a commercial hematology analyzer on blood samples tested in this study

Hematologic parameters	Adult (n=5)		Newborn (n=5)	
White Blood Cell	7.19±5.97	×10 <sup>9</sup>	11.15±5.52	×10 <sup>9</sup>
Platelet Count	199.8±49.2	×10 <sup>9</sup>	183.2±90.5	×10 <sup>9</sup>
MCV (mean cell volume)	87.9±3.3	fL	114.0±2.7	fL
Red Blood Cell	4.45±0.18	×10 <sup>12</sup>	4.70±0.30	×10 <sup>12</sup>
MCH (mean cell hemoglobin)	29.76±1.25	pg	39.84±1.39	pg
MCHC (mean corpuscular hemoglobin concentration)	338.6±2.3	g/L	349.4±15.3	g/L
RDW-SD (RBC size-distribution width)	42.38±2.66	fL	70.50±4.18	fL
RDW-CV (RBC size-distribution standard deviation / MCV)	13.18±0.46	%	16.90±1.02	%