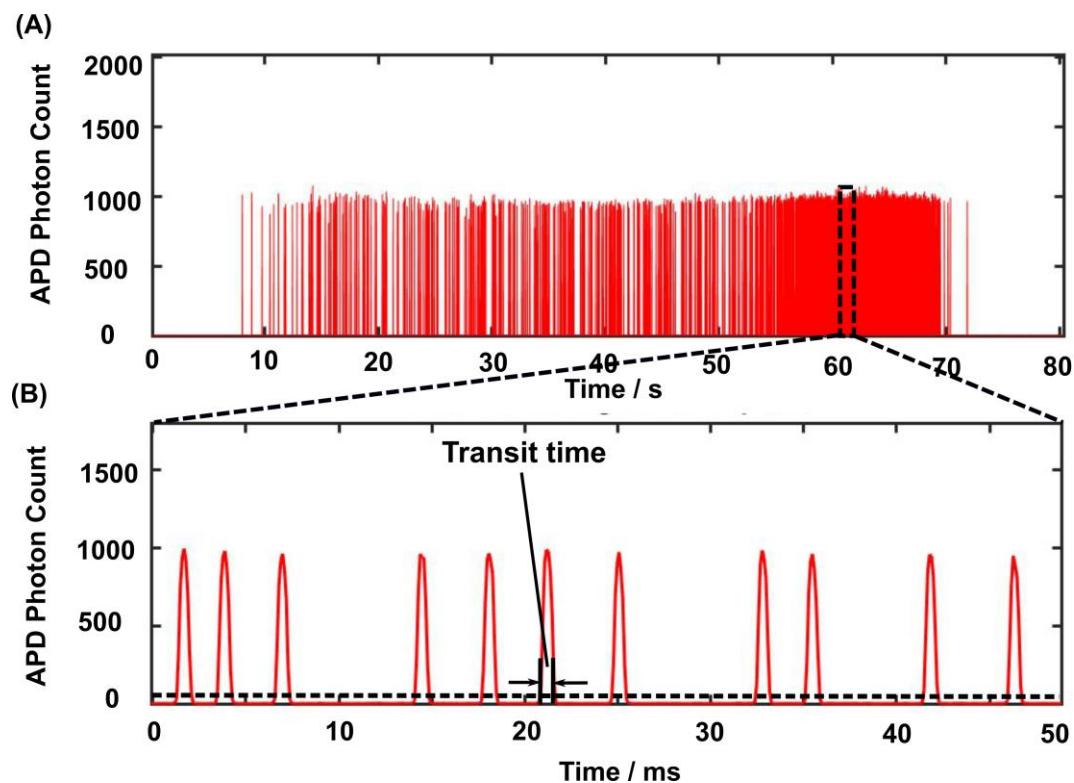


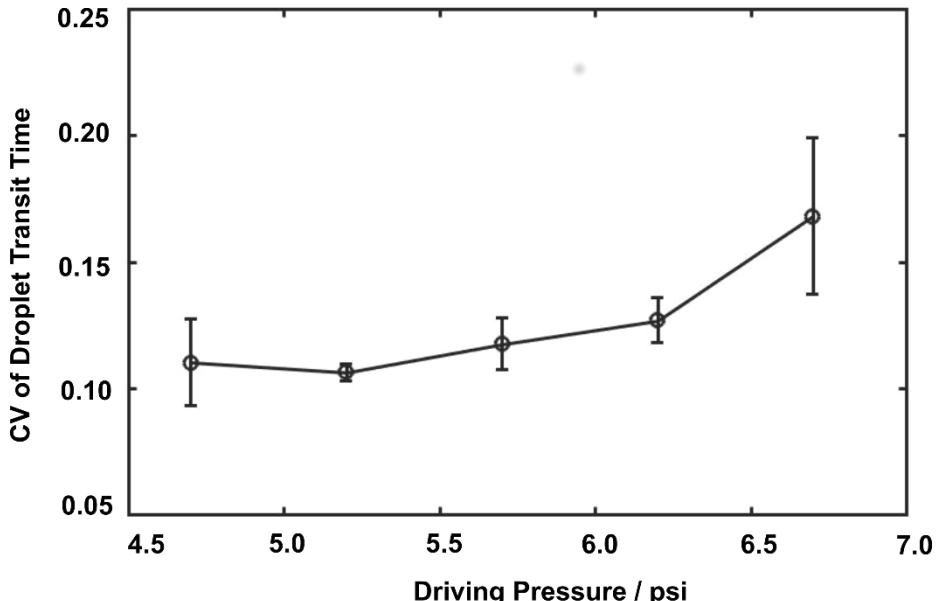
1 Supporting Information

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4 **Customizing Droplet Contents and Dynamic Ranges via Integrated**  
5 **Programmable Picodroplet Assembler**

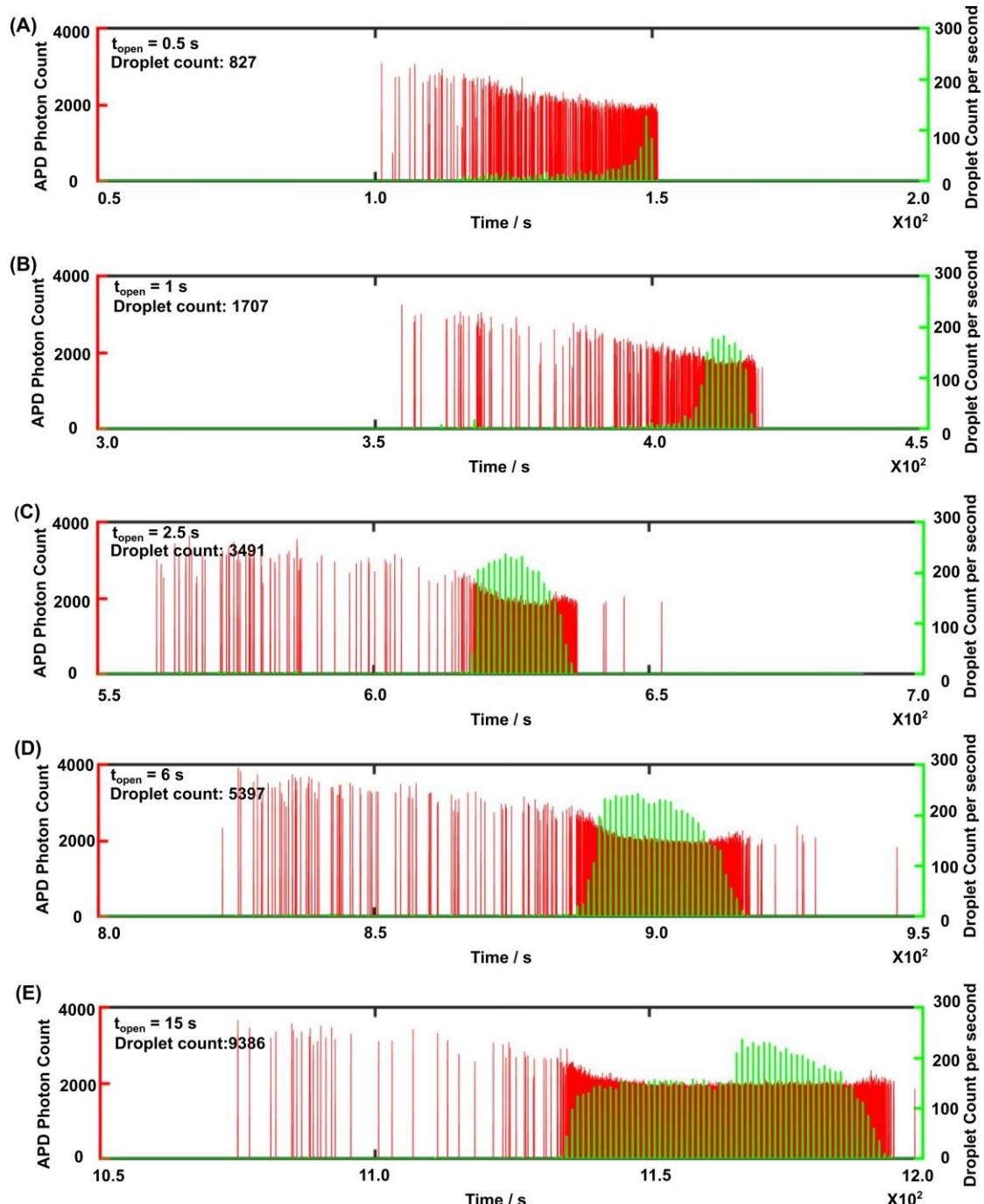
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7 *Pengfei Zhang, Aniruddha Kaushik, Kuangwen Hsieh, and Tza-Huei “Jeff” Wang\**  
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11 Figure S1. Time trace of picodroplet fluorescence. (A) Fluorescence from picodroplets  
12 traversing the detection region of our device is measured by our custom LIF detector and plotted  
13 against time. (B) The width of picodroplet peaks, or the transit time of picodroplets flowing  
14 through detection point, is used to characterize droplet volume  
15



16  
17 Figure S2. Optimizing driving pressure of nanoplugs. As a measure of monodispersity, CV  
18 (standard deviation/mean) of droplet transit time is plotted for 5 distinct picodroplet groups  
19 generated at 5 different driving pressures. At 5.2 psi, we generate the most monodisperse  
20 picodroplet group with the least chip-to-chip variation ( $n=3$ ).  
21



22

23 Figure S3. Raw time trace of droplet fluorescence represents mostly uniform fluorescence  
24 intensity in each group. (A) - (E) Left: The droplet fluorescence for each group is measured by  
25 our custom LIF detector and plotted against time individually. (A) – (E) Right: droplet number  
26 detected in each second was plotted to show that only small fraction of picodroplets in each  
27 group shows noticeably higher fluorescence. The droplet number in each group increases  
28 because of increased  $t_{open}$ .

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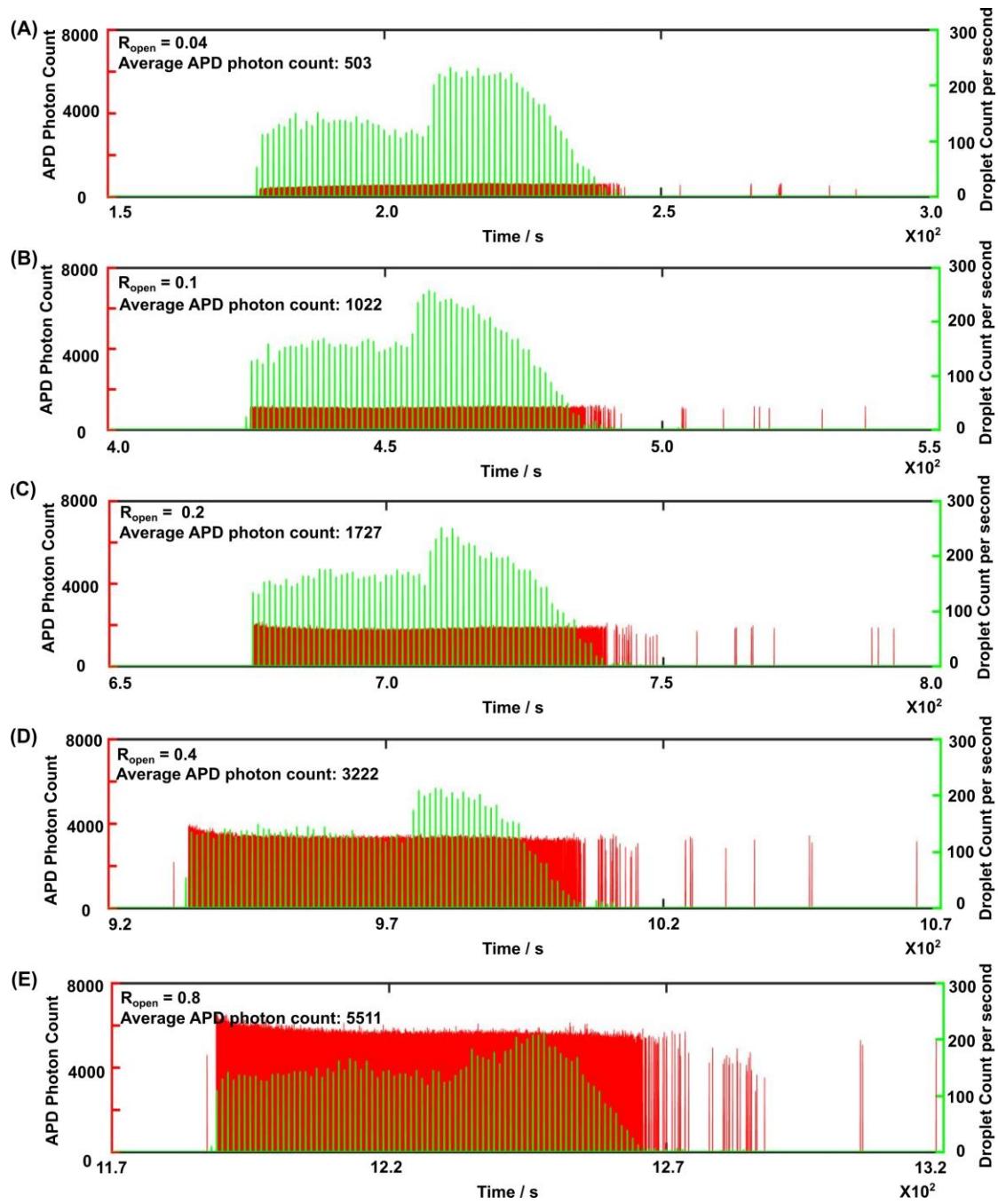


Figure S4. Extended time trace of droplet fluorescence and uniform signal intensity in picodroplet groups with different concentrations. (A) - (E) Left: The droplet fluorescence in each group is measured by our custom LIF detector and plotted against time individually. (A) – (E) Right: droplet counts detected in each signal were plotted to show that only small fraction of droplets in each group shows noticeable higher or lower fluorescence. The droplet fluorescence intensity increases gradually due to higher  $R_{open}$  value