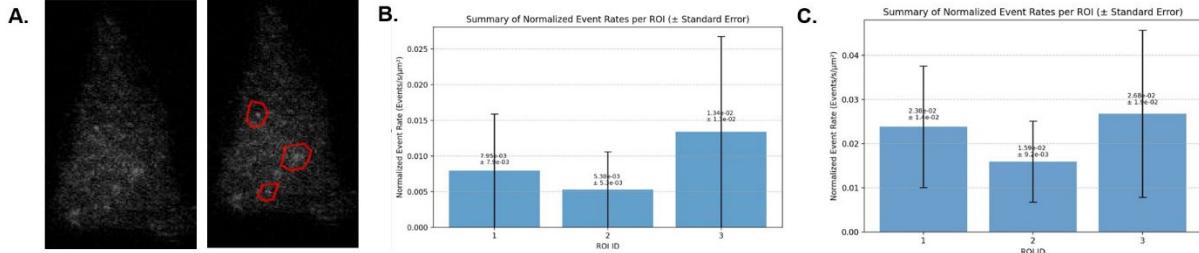


Fig S1. Adaptive parameter estimation is critical for robust detection of synaptic vesicle fusion events.



Note. (A) Representative maximum intensity projection of the time-lapse recording showing three manually selected Regions of Interest (ROIs 1–3). (B) Representative Bar charts shows normalized event rates ($\text{Events s}^{-1} \mu\text{m}^{-2}$) for each ROI, with data expressed as mean \pm SEM manually enabled Threshold, Difference of Gaussians (DoG), and Scission-like detectors but without automated parameter estimation. (C) Bar charts represent normalized event rates ($\text{Events s}^{-1} \mu\text{m}^{-2}$) for each ROI, with data expressed as mean \pm SEM with Auto-set parameters enabled.,.