

**Supplementary movies legends:**

**Supplementary movie 1.** Identification of active presynaptic boutons. The movie corresponds to the experiment presented in Fig.1. Top, raw SF-iGluSnFR fluorescence. Blinking square in the left top corner corresponds to the timing of action potentials. Middle, band-pass filtered SFiGluSnFR signal. Bottom, cumulative maximal projection of the band-pass filtered response.

**Supplementary movie 2:** Sub-pixel localisation of synchronous and asynchronous release events. Animated version of Fig. 5c. Scale bar 500 nm.