Modeling the statistics of elementary calcium release events\textsuperscript{1}

GHANIM ULLAH, PETER JUNG, Ohio University — Elementary Ca\textsuperscript{2+} signals, such as 'Ca\textsuperscript{2+} puffs', which arise from the release of Ca\textsuperscript{2+} from Endoplasmic Reticulum through small clusters of inositol 1,4,5-trisphosphate receptors, are the building blocks for intracellular Ca\textsuperscript{2+} - signaling. The small number of release channels involved during a Ca\textsuperscript{2+} puff renders the puffs stochastic with distributed amplitudes, durations and frequency, well characterized experimentally. We present a stochastic model that accurately describes simultaneously the statistical properties of the duration, amplitudes, frequencies, and spatial spread with a single set of parameters.

\textsuperscript{1}NSF Grant No. (IOB-0345500)