

## Re-examine the Existence of Dynamic Disorder in Single Molecule Enzymatic Kinetics

*Wednesday, March 8, 2017 11:15 AM (45 minutes)*

Using single-molecule fluorescence approaches, the time series of catalytic events of an enzymatic reaction can be monitored, yielding a sequence of fluorescent “on”- and “off”-states. An accurate on/off-assignment is complicated by the intrinsic and extrinsic noise in every single-molecule fluorescence experiment. Using simulated data, the performance of the most widely employed binning and thresholding approach was systematically compared to change point analysis. It is shown that the underlying on- and off-histograms as well as the off-autocorrelation are not necessarily extracted from the “signal” buried in noise. The shapes of the on- and off-histograms are affected by artifacts introduced by the analysis procedure and depend on the signal-to-noise ratio and the overall fluorescence intensity. When using change point analysis for data of the enzyme  $\alpha$ -chymotrypsin, no characteristics of dynamic disorder was found. In light of these results, dynamic disorder might not be a general sign of enzymatic reactions.

**Presenter:** LI, Chun-Biu (SU)