# Statistical challenges in nanoscale biophysics

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**Abstract**

Recent advances in nanotechnology allow scientists to follow a biological process on a single molecule basis. These advances also raise many challenging stochastic modeling and statistical inference problems. First, by zooming in on single molecules, recent nanoscale experiments reveal that some classical stochastic models derived from oversimplified assumptions are no longer valid. Second, the stochastic nature of the experimental data and the presence of latent processes much complicate the statistical inference. In this talk we will use the modeling of enzymatic reaction and the inference of biochemical kinetics to illustrate the statistical and probabilistic problems in single-molecule biophysics.