

## Stochastic Simulation Service: Towards an Integrated Development Environment for Modeling and Simulation of Stochastic Biochemical Systems

Linda Petzold ([petzold@cs.ucsb.edu](mailto:petzold@cs.ucsb.edu)), Chandra Krintz ([krintz@cs.ucsb.edu](mailto:krintz@cs.ucsb.edu))

In recent years it has become increasingly clear that stochasticity plays an important role in many biological processes. Examples include bistable genetic switches, noise enhanced robustness of oscillations, and fluctuation enhanced sensitivity or "stochastic focusing". In many cellular systems, local low species populations can create stochastic effects even if total cellular levels are high. Numerous cellular systems, including development, polarization and chemotaxis, rely on spatial stochastic noise for robust performance. In this talk we report on our progress in developing next-generation algorithms and software for modeling and simulation of stochastic biochemical systems, and in building an integrated development environment that will enable researchers to build a such a model and scale it up to increasing levels of complexity.