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**Yang Cao\*** ([ycao@cs.vt.edu](mailto:ycao@cs.vt.edu)), 2160L Torgerson Hall, Computer Science Department (0106), Virginia Tech, Blacksburg, VA 24061. *Multiscale Challenges in Stochastic Simulation of Biochemical Systems.*

Random effects in cells have been a concern in systems biology in recent years due to low copy numbers of DNAs, RNAs and proteins in a single cell. Stochastic simulation algorithms have been developed to simulate biochemical models. In these biochemical models, they often contain species and reaction channels across a large scale range. A system could have species with populations of a million and species with population around a dozen. Some reactions will fire orders of magnitude faster than others. These features characterize the computational challenges we face when designing stochastic simulation methods for biochemical systems. In this talk I will give a review for the current progress in the development of stochastic simulation algorithms and discuss different efforts to answer the multiscale challenges. (Received September 03, 2010)