SANLING YUAN, University of Shanghai for Science and Technologgy; University of Victoria
Dynamics of a stochastic model for algal bloom with and without distributed delay

In this talk, two stochastic models for algal bloom with and without distributed delay are investigated. We introduce white noise into the equation of algae population to describe the effects of environmental random fluctuations, and a delay into the nutrient equation to account for the time needed for the conversion of detritus into nutrient. The existence and uniqueness of the global positive solutions for both models are proved. By constructing Lyapunov function(al)s, sufficient conditions for the stochastic stability of the washout equilibrium are obtained for both models. Furthermore, for the model without delay, we give an estimate of the deviation of the solutions to the stochastic model from the positive equilibrium of its corresponding determinate model; for the delayed model, our theoretical results show that it has the same long term behavior as the one without delay, which means that the delay does not affect the long term behavior of the system, though the numerical simulations reveal that it may reduce the level of algae population initially.