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*A Reaction-Diffusion Model of Harmful Algae and Zooplankton in An Ecosystem*

In this talk, I will report our recent research on an unstirred chemostat system modeling the interactions of two essential nutrients (i.e., nitrogen and phosphorus), harmful algae (i.e., *P. parvum* and cyanobacteria), and a small-bodied zooplankton in an ecosystem. To obtain a weakly repelling property of a compact and invariant set on the boundary, we introduce an associated elliptic eigenvalue problem. It turns out that the model system admits a coexistence steady state and is uniformly persistent provided that the trivial steady state, two semi-trivial steady states and a global attractor on the boundary are all weak repellers. This talk is based on a joint work with Drs. Sze-Bi Hsu and Feng-Bin Wang.