

# Applied Dynamical Systems Seminar

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**Thursday, March 10, 2016**  
**12-1pm, HH-3017**

## **Dynamics of a Stream Population Model in An Open Environment**

### **Abstract:**

We use a Lotka-Volterra competition system to describe the dynamics of two aquatic species in a river with unidirectional water flow, where two species are supposed to be identical except their movement strategies distinguished by diffusion and advection rates. We further assume that the downstream end is open, and due to the differing drifting effects caused by water flow, they may have different magnitude of loss of individuals at the downstream end. We prove that when the downstream loss rates are small, the strategy of a combination of faster diffusion but smaller advection is always beneficial for species to win the competition; while the movement of both faster diffusion and advection can be favorable or unfavorable depending on the difference between two advection rates. We also illustrate that when the downstream loss becomes severe, there maybe some different dynamics.