

# Applied Dynamical Systems Seminar

**Yuan Yuan,  
Memorial University**

**Thursday, March 9, 2012  
1:00pm, HH-3017**

*A non-nitrogen-fixing/nitrogen-fixing phytoplankton growth  
model with nutrient and light*

## **Abstract:**

We propose a mathematical model with the growth of two kinds of phytoplankton: non-nitrogen-fixing and nitrogen-fixing phytoplankton, competing for light and nutrient. We introduce the two general functional groups F and U to present the nonlinear interactions among the two types of phytoplankton and nutrient through the implicit effect of the light. We give some sufficient conditions for the existence of the single-species survival and the coexistence of two species survival steady states, discuss the influence of nutrient source, light intensity and growth, loss rates on the dynamics of the ecosystem. Numerical results are given to illustrate the qualitative behavior of the system under different environmental conditions. The temporal dynamical behavior have been compared with the constant and changeable water depths in an annual cycle, showing the impact of the water depth.