Project (9): Predator-Prey Models and Their Applications to Economics and Insurance

**Project description:** Using the mathematics underlying the dynamics of the ecological predator-prey relationship, the group will explore this framework as the potential basis for modeling the interactions of competitive business firms.

**Faculty leader:** Rick Gorvett  
**Student participants (5):** Yelei Chen, Yimin Ge, Zhiyi Guo, Zaza Fahmeeda Binti Mohd Zainee, Xiaochun Wang

**Progress report:**

- We began with students reading selected articles, both mathematical and ecological, to familiarize themselves with the mathematics and applications of the predator-prey dynamical framework.
- Each student did a brief literature search for recent relevant research, and wrote brief summaries of articles which they shared with the entire group.
- Based on our review of the literature, we had a brainstorming session to determine one or two specific applications of the predator-prey framework to insurance or economics.

**Future plans and intended deliverables:**

- Determining data needs, and then accumulating data, for the selected applications.
- Developing a computer program to scenario test and simulate the dynamics of the applications, and to test the impact on the dynamics of changing assumed parameter values.
- An article summarizing our findings and conclusions.
- An annotated bibliography of the predator-prey framework literature.
- A simple, lay-person’s article summarizing the project topic.

**Status:** Prof. Rick Gorvett will be summarizing this research into a working paper during the summer of 2015.