

## **Project Summary**

### **Sara Friedman**

University of California, Berkeley

Mentors: Jeffrey Brantingham, SFI; Cosma Shalizi, SFI; and Jim Crutchfield, SFI

Co-Evolution of a Society and an Ecosystem

The goal of Sara Friedman's main project at SFI this summer is to formulate a two-player meta-agent game theory model to describe the co-evolution of a society and ecosystem within a circumscribed location. To this end she is working with SFI researchers Jeff Brantingham, Jim Crutchfield, Cosma Shalizi and Sam Bowles.

Strategies will be emergent from behavior of individual humans and other species, but described in terms of their global characteristics. Decisions are binary: Ecosystem "chooses" Resistant or Tolerant, Society "chooses" Restrained or Unrestrained. Payoffs are in terms of secure bioproductivity for Ecosystem, and secure, high-quality food and shelter for Society. The idea is to provide a framework for conceptualizing the evolution of a mutually resilient outcome (restrained/tolerant), and the potential pitfalls along the way. Sara is also participating in research projects within the Dynamical Learning and Computational Mechanics research group.