



181 Longwood Avenue  
Boston, Massachusetts 02115-5804

Department of Medicine  
Channing Division of Network Medicine

## Channing Network Science Seminar

Feb 06, 2015, 11am @ 5th floor conference room



Speaker: Avi M. Shapiro, Ph.D.  
Preceptor in Applied Mathematics  
Harvard University

Webpage: <http://people.seas.harvard.edu/~ashapiro/>

### Title: **Coevolutionary Dynamics of a Public Goods Game on a Network**

**Abstract:** Productive societies feature high levels of cooperation and strong connections between individuals. Public Goods Games are used frequently to highlight the development of social connections and cooperative behavior in model societies. Generally, in such games, contributions to the public good are made only by cooperators, while all players, regardless of their contributions, can reap public good benefits. Many classic results of game theory show that mutual defection, as opposed to cooperation, is a Nash Equilibrium in well-mixed populations. We explore the coevolutionary dynamics of a public goods game on a network, without spatial constraints, in which players adapt to their environment in order to increase individual payoffs. Players adapt by changing their strategies, either to cooperate or to defect, and by altering their social connections, either breaking old connections or forming new connections to other players. We find that even if players do not have information about other players' strategies and connectivity, cooperation can arise and persist.

**Bio:** Avi Shapiro is a Preceptor in Applied Mathematics at Harvard University. Prior to coming to Harvard, he was a Visiting Assistant Professor at the University of California, Merced, where he worked on computational fluid dynamics. Avi received his Ph.D. in Applied Mathematics from Columbia University in 2010, where he studied wave propagation due to an oscillating gas bubble.

Hosted by Yang-Yu Liu