JEFF SHAMMA

School of Electrical and Computer Engineering
Georgia Institute of Technology

Title: Stability & Selection in Game Theoretic Learning

Abstract: Game theory is well known for its traditional role as a modeling framework in social sciences, and it is seeing growing interest as a design approach for networked engineered systems. Typically, one presumes some sort of solution concept to describe the outcome of a game, with the most prevalent notion being Nash equilibrium. In game theoretic learning, the attention is shifted away from equilibrium in favor of analyzing dynamic processes that may, or may not, lead to such an outcome. For social systems, the objective is to understand how players using naive learning rules could plausibly approach an equilibrium, thereby reinforcing its predictive quality. For engineered systems, these dynamics can be used as online algorithms for distributed self configuration. This talk explores two themes within game theoretic learning. The first theme is the effect of dynamics in shaping whether or not learning converges to equilibrium. Of specific interest is the role of "transient effects", i.e., how dynamic phenomena such as trends can dramatically influence conclusions regarding stability. The second theme is the role of dynamics as an equilibrium selection device, and in particular, how stochastic exploration can cause some equilibria to be favored over others. The talk presents a sampling of prior and recent results in these areas and provides examples from distributed coordination, self assembly, and network formation.

Bio: Jeff Shamma received a BS in Mechanical Engineering from Georgia Tech in 1983 and a PhD in Systems Science and Engineering from the Massachusetts Institute of Technology in 1988. He has held faculty positions at the University of Minnesota, Minneapolis; University of Texas, Austin; and University of California, Los Angeles; and visiting positions at Caltech and MIT. In 2007, Jeff returned to Georgia Tech where he is a Professor of Electrical and Computer Engineering and Julian T. Hightower Chair in Systems & Controls. Jeff's general research interest is feedback control and systems theory, and most recently, game theory and decision making for multiagent models in engineered and societal networked systems. He is a recipient of an NSF Young Investigator Award and the American Automatic Control Council Donald P. Eckman Award, and a Fellow of the IEEE.