

## **Project Summary**

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In games with multiple equilibria which are left unaffected by standard refinements, selection principles such as payoff dominance of Harsanyi and Selten (1988) and security can fail to predict a unique outcome. One way of addressing this problem is to allow for costless preplay communication, where players engage in non-binding "cheap talk" prior to the game. Following Miller and Moser (2003) and Miller et. al (2002), I am investigating the evolution of finite automata representing communicating players in the context of coordination games with multiple, Pareto-ranked equilibria (e.g. of Van Huyck et. al (1990)). With the recent increasing interest in the experimental study of pre-play communication (Blume and Ortmann, 2002; Burton and Sefton, 2002; Cooper, et. al, 1992), this study aims to complement from a computational point of view the understanding of the role of communication in games.

While an evolutionary approach serves as an important metaphor for the evolution of communication, meaning, and coordination, another approach is to model directly the dynamics of communication of interacting agents. In such a framework, agents change their beliefs in the time scale of repeated trials in a stage game, as opposed to strategies which change on an evolutionary time scale. The behavioral game theory community actively has pursued just such a framework for games without communication in various forms such as reinforcement learning, belief-based models, and rule-based models over past ten years (see Chapter 6 of Camerer, 2003, for an extensive review). To adopt this approach for games with communication, I may be working with Yuzuro Sato to apply reinforcement learning models extended to include communication, from a dynamical systems perspective (Sato and Crutchfield, 2003, and Sato et. al, 2002). Sato and colleagues found that chaotic trajectories of propensities of actions can emerge in simple, nontransitive, single equilibrium games. How communication might affect such dynamics is an open area of investigation.