Interaction times change evolutionary outcomes

Evolutionary game theory was developed under a number of simplifying assumptions. One that is not often explicitly stated is that each interaction among individuals takes the same amount of time no matter what strategies these individuals use. When interaction time is strategy-dependent, it is more realistic to take individual fitness as the payoff received per unit time. For instance, two Hawks interacting in the standard two-player Hawk-Dove game are assumed to engage in a fight, implying that they may be involved in fewer interactions than Doves who avoid such contests.

The talk will characterize how interaction times affect the evolutionary outcome (e.g. the evolutionarily stable strategy (ESS) and Nash equilibrium (NE)) in general two-strategy symmetric games (i.e. matrix games) and apply the results to the Hawk-Dove game. I will also show that cooperation can evolve in the repeated Prisoner’s Dilemma game when the number of rounds is under the players’ control. If time permits, this outcome will be related to the results from game experiments based on the corresponding opting out game.