

SOE 8: Plenary talk Jorge Pacheco

Time: Tuesday 8:30–9:15

Location: H1

Plenary Talk

SOE 8.1 Tue 8:30 H1

Linking Individual to Collective Behavior in Complex Adaptive Networks — •JORGE M. PACHECO — Departamento de Matemática e Aplicações, Universidade do Minho, 4710 - 057 Braga, Portugal

A central problem in Physics is to understand how collective behavior results from a given two- or N- body fundamental interaction. Similarly, in a society, a central problem is to understand the link between individual social behavior and emergent collective phenomena (vaccination, epidemics, crowd behavior, diffusion of innovations, etc). Here I address this problem by letting individuals engage in pair-wise inter-

actions by means of a well-defined social dilemma (a prisoners dilemma of cooperation). These individuals are embedded in a social network that is both complex and adaptive. Adaptation here allows individuals to manifest preferences and resolve conflicts of interest, reshaping the network accordingly. Exact Monte-Carlo simulations reveal the inadequacy of any of the tools developed to date (mostly in the realm of Physics) to predict the co-evolutionary dynamics of the population at large. I will present and discuss in detail an adaptive-network-sensitive observable that is capable of predicting the collective, population-wide dynamics, given prior knowledge of the fundamental rules that govern the social interaction between 2 individuals in a social network.