

Eco-Evolutionary Dynamics in a Randomly Switching Environment

Mauro Mobilia

Environmental variability greatly influences how the size and the composition of a population evolve, i.e. its eco-evolutionary dynamics. In this talk, we consider a population of finite and fluctuating size whose growth is limited by a randomly switching carrying capacity. This models the environmental fluctuations between states of resources abundance and scarcity. The population consists of two strains, one slightly faster than the other, competing under two scenarios: one in which competition is solely for resources, and one in which the slow ("cooperating") strain produces a public good. We investigate how the coupling of demographic and environmental (external) noise affects the population's eco-evolutionary dynamics. In particular, we study how environmental variability influences the fixation probability of the slow/cooperative strain and the average population size, yielding a "social dilemma" of sorts in the public good scenario.