# CoCo Seminar Series
# Fall 2017

**[CoCo/EvoS Joint Seminar]**

## How Mutation Alters Fitness of Cooperation in Networked Evolutionary Games

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**Monday October 2, 2017 5:15-6:00pm Science I 149**
**(Note the irregular time and location)**

Cooperation is ubiquitous in every level of living organisms. It is known that spatial (network) structure is a viable mechanism for cooperation to evolve. Until recently, it has been difficult to predict whether cooperation can evolve at a network (population) level. To address this problem, Pinheiro et al. proposed a numerical metric, called Average Gradient of Selection (AGoS) in 2012. AGoS can characterize and forecast the evolutionary fate of cooperation at a population level. However, stochastic mutation of strategies was not considered in the analysis of AGoS. Here we analyzed the evolution of cooperation using AGoS where mutation may occur to strategies of individuals in networks. Our analyses revealed that mutation always has a negative effect on the evolution of cooperation regardless of the fraction of cooperators and network structures. Moreover, we found that mutation affects the fitness of cooperation differently on different social network structures.

Dr. Genki Ichinose is an Assistant Professor in the Department of Mathematical and Systems Engineering at Shizuoka University, Japan, and a visiting scholar at the CoCo Research Center. His research interests include agent-based modeling, evolution of cooperation, computational social science, network science, and artificial life.

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