Contribution ID: **50** Type: **oral**

Coordination games on networks

Friday, September 8, 2017 9:30 AM (20 minutes)

One of the key contributions of Marian Smoluchowski was to show that even small, apparently random, contributions from individuals can combine to produce significant shifts in the collective behaviour. This paradigm is not limited to physics but has become increasingly influential in biological and social sciences. Models have been developed to describe such diverse systems like the market failure or spread and control of infectious diseases. We present a model that combines game theoretical framework for decision-making process involved in controlling plant infection or pest spread with a network model. We study a repeated cooperation game describing actions of plant nursery managers. We show that although the cooperation strategy is not stable (due to the existence of a risk-dominant strategy), the decay rate non-trivially depends on the initial density of cooperators, on the weight they assign to past events, and whether the decision involves an element of a chance. By considering an agent quantal response learning process, we also study how 'irrationality' of decisions influence potential for collaborative actions. Finally, we show that the network structure also impacts on the emergence of cooperation.

Primary author: KLECZKOWSKI, Adam (University of Stirling, Scotland)

Co-authors: REDENTI, Michael (University of Stirling, Scotland); HANLEY, Nicholas (University of St Andrews, Scotland)

Presenter: KLECZKOWSKI, Adam (University of Stirling, Scotland)

Session Classification: Session 12