

Applied Dynamical Systems Seminar

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**Wednesday, November 30, 2016
2:00-3:00pm, HH-3017**

Host mobility affects the evolution of parasite virulence: Can a mobility cost explain the emergence of highly pathogenic avian influenza viruses?

Abstract:

Parasite infection can result in a wide range of detrimental effects, including host mortality and decreases in host fecundity and host mobility (known as lethargy), which are frequently used as a measure for parasite virulence. Mathematical models have been proposed to investigate the evolution of parasite virulence when parasite infection induces host death (lethal virulence), however, the evolution of virulence when parasite infection induces decreased host mobility (parasite-induced host lethargy) which we term "non-lethal virulence" is overlooked. Moreover, very few works attempted to combine both lethal and non-lethal virulence components in a unified model. In this talk, I will present an epidemiological model which includes both parasite-induced host mortality and parasite-induced host lethargy, that we used to investigate the effects of host mobility on the evolution of virulence. We investigated the ecological dynamics, the evolutionary dynamics, performed an Evolutionary Invasion Analysis, and determined Evolutionary Stable and Convergence Stable Strategies (ESS/CSS). I will present the results for a case where parasite infection induces host lethargy which eventually results in host death (both lethal and non-lethal virulence) and a case where parasite infection induces only host lethargy (non-lethal virulence). Finally, I will discuss how our results can help understand the emergence of highly pathogenic avian influenza strains in poultry. This talk is based on a joint work with Dr. Amy Hurford.