

Talk Title:

Markov models reveal host controls of within-host disease dynamics

The within-host processes that govern a parasite's establishment, development, and reproduction are often unknown. Hosts have evolved a series of immunological traits to defend against parasites, but how important are immune defenses for regulating host-parasite interactions? By pairing longitudinal observational data with a continuous-time Markov-model, we evaluated the consequences of immune defenses for infection outcomes in a host-parasite system, the zooplankton host, *Daphnia dentifera*, and its fungal parasite, *Metschnikowia bicuspidata*. Implementation of our Resistance Clearance Markov model (RCM model) shows the importance of multiple immunological defenses for determining infection outcomes and illustrates the within-host dynamics of the *Daphnia-Metschnikowia* interaction.