



Mathematical Biology Seminar

Monday, September 28, 2026

1:00 pm MT – Room UComm 2-108 (in person)

Join Zoom Meeting

<https://ualberta-ca.zoom.us/j/93260471119>

Meeting ID: 932 6047 1119



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Perturbations, transients and stability in ecological systems

Populations and communities can be disrupted by many forms of environmental change. A drought or an epidemic is a short-lived “pulse” perturbation whereas land-use change is better thought of as a “press”, that is a sustained change. In this talk, I will discuss how the form and timescale of perturbations interact with ecological dynamics to determine trajectories, recovery and stability. First, I will present a general framework for multispecies communities that models time-dependent perturbations. The approach allows us to predict how present and past environmental changes are propagated through species interactions, resulting shifts in equilibrium and ecological lag behind changing conditions. I will then connect this framework to our work on structured populations, where we show that the long-term response to a sustained perturbation can be understood as the accumulation of transient responses to past pulses, linking transient dynamics to life history. Finally, I will briefly discuss work with long-term Trinidadian guppy time series, where stochastic dynamical models reveal how density regulation, environmental variability and stochastic bifurcations jointly shape population stability.