



The Department of Mathematics

Presents

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11:00AM – 12:00PM

PB 390

Balls, cups, and quasi-potentials: A new mathematical framework for understanding ecosystem stability

Abstract:

Many ecosystems exhibit abrupt shifts between alternative stable states. For example, a lake can rapidly transition from a healthy, diverse state to a eutrophic, algae-dominated state, and a savanna can quickly switch from an open, grassy state to a dense, woody state. Transitions between stable states can have catastrophic consequences, so it is important to develop mathematical models to understand how, why, and when they occur. In this talk, I describe how a concept from stochastic analysis called the quasi-potential provides a helpful framework for studying ecological models with alternative stable states. This framework allows us to make predictions about the probability, frequency, duration, and dynamics of ecosystem shifts, and it provides a new way of understanding the concept of stability in ecology.