Cleveland State University
College of Science

COLLOQUIUM

Karen Abbott, Ph.D.

Professor

Department of Biology, Case Western Reserve Univ.

Stability and Tipping Points in Noisy Environments

Friday Nov. 15th at 2:30pm in RT 1516

Bio: Dr. Abbott got her B.S. from Vanderbilt University with a double major in Biology and Mathematics and her Ph.D. from the University of Chicago in Ecology & Evolution. She is a Professor in the Department of Biology at Case Western Reserve University.

Abstract: Sudden, persistent changes in ecosystem state or configuration, known in ecology as regime shifts, are difficult to predict and a cause of great concern. A large, stable prey population may suddenly collapse to an alternative low-density state in response to a stochastic perturbation, for example, or stochasticity may trigger outbreaks in pest populations that were previously stably suppressed. To explain phenomena like these, ecologists have drawn heavily on deterministic theory that emphasizes the nonlinearities that give rise to bifurcation-induced tipping points, while marginalizing the complex role of stochasticity in driving transitions between states. In this talk, I will discuss how different types of tipping points arise, and how we can use potential functions (including their extensions, such as the quasi-potential) to derive stronger stability concepts that allow us to move beyond classical deterministic theory. Given the pervasive influence of large perturbations in nature, this view promises to yield improved insights into the factors that stabilize or destabilize ecological systems.

Coffee available in RT 1517 before the talk at 2:00pm