COLLOQUIUM

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Lattice Effects Observed in Chaotic Dynamics of Experimental Populations

Abstract

Animals and many plants are counted in discrete units. The state space of population numbers is thus a lattice. Despite this fact, many mathematical population models assume a continuum of system states. The complex dynamics, such as chaos, often displayed by such continuous-state models have stimulated much ecological research; yet discrete-state models with bounded population size can display only cyclic behavior. Motivated by data from a population experiment, we compared the predictions of discrete-state and continuous-state population models. Neither the discrete- nor continuous-state models completely account for the data. Rather, the observed dynamics are explained by a stochastic blending of the chaotic dynamics predicted by the continuous-state model and the cycle dynamics predicted by the discrete models. We suggest such lattice effects could be an important component of natural population fluctuations

372 Science and Engineering Building
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(Refreshment at 2:30 to 3:00 P.M. in Room 368,
Science and Engineering Building)

About the speaker

Shandelle Henson received a PhD in mathematics from the University of Tennessee in 1994. She was a Hanno Rund Visiting Assistant Research Professor at the University of Arizona from 1994-1999, and was an American Fellow in 1996-1997. She went to the College of William and Mary in 1999 as an assistant professor of mathematics, and to Andrews University in 2001 as an associate professor of mathematics. Her research is in dynamical systems and bifurcation theory, with applications to ecology. She works with an interdisciplinary team of scientists, mathematicians, and statisticians in the ongoing effort to identify nonlinear phenomena in population dynamics.