Seminar Announcement

Wednesday, August 28, 2013
10:30 am
Bldg. 362 Room E356

Pattern formation - a missing link in understanding the complex relationships between ecosystem function, biodiversity and the environment

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Self-organization processes leading to pattern formation phenomena are ubiquitous in nature. Cloud streets, sand ripples, stone patterns and animal-coat patterns are a few examples. Intensive theoretical and experimental research efforts during the past few decades have resulted in a mathematical theory of pattern formation whose predictions are well confirmed by controlled laboratory experiments. There is increasing observational evidence that pattern formation also plays an important role in shaping dryland landscapes. Depending on the rainfall regime, self-organized vegetation patchiness in the form of nearly periodic spot, stripe and gap patterns has been reported. Supporting these observations are studies of spatially explicit vegetation models that have reproduced many of the observed patterns.

The relevance of spatial heterogeneity to biodiversity is well recognized but the role of self-organized patchiness in driving or modifying this heterogeneity and the concomitant implications on biodiversity and ecosystem function have hardly been addressed. In this talk I will review the state of art in studies of vegetation pattern formation, and delineate manners by which pattern formation processes can affect the relationships between abiotic factors, biodiversity and ecosystem function.

Ehud Meron is a Professor of Physics at Ben-Gurion University, jointly affiliated with the Blaustein Institutes for Desert Research and the Physics Department. He received his PhD in 1986 from the Weizmann Institute of Science, spent three years at the University of Chicago (Physics Department) and at Columbia University (Astronomy Department) as a postdoctoral fellow, and another three years as a visiting assistant professor at the University of Arizona (Department of Mathematics) before joining Ben-Gurion University. His field of expertise is nonlinear dynamics and pattern formation. Prof. Meron has been studying general mathematical aspects of pattern formation as well as particular realizations in physical, chemical and biological systems. Currently, he is applying the concepts and tools of pattern formation theory to problems in spatial ecology by developing and studying models of dryland landscapes. These problems include vegetation patchiness in homogeneous and heterogeneous landscapes, desertification and restoration, spatial mechanisms of species coexistence and biodiversity dynamics.

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