

## The 2008 James "Duke" Sehnert Memorial Lecture

### Chaos From Simplicity

Thursday, November 6, 2008 at 7:30 p.m.  
Otto Budig Theatre (University Center)

Scholars have remarked that the chaos theory ranks in the top ten scientific discoveries of the 20th century. Some have said it lies in the top three. What is chaos theory and why is it considered so important? Why did it disturb and reshape the thinking of many scientists from virtually all disciplines? One fundamental reason is that mathematical chaos is an example of how complexity -- indeed extreme complexity -- can result from quite simple rules and mechanisms.

We will have a quick look at the history of chaos theory and at some of the basic concepts and mathematics involved. Using a decade long, inter-disciplinary biomathematics/experimental research project (involving the dynamics of cannibalistic beetles!) as a context, we'll explore some of the mysteries and surprises of chaos. We will ponder whether chaos is a good thing or a bad thing; whether it is a troublesome problem or can be put to good use.



### J. M. Cushing

*Department of Mathematics, Program in Applied Mathematics  
University of Arizona*

Professor Jim Cushing, University of Arizona, is a world-renowned expert on mathematical ecology and population dynamics. One of his favorite species of study is the cannibalistic flour beetle *Tribolium*, which he and his colleagues characterize as

"an effective tool of discovery". They use mathematics, statistics, and experiments with *Tribolium* to guide their investigations into how populations change and grow.

Jim is an author of *Chaos in Ecology: Experimental Nonlinear Dynamics*, which has been characterized as "the definitive source on chaos in ecology". He has authored other books as well, such as *An Introduction to Structured Population Dynamics*.

His outside interests include traveling the world (especially on foot, with a backpack slung over his shoulders), trail running, piano playing, and an annual game of billiards with members of the NKU math faculty -- followed by a good rest at his cabin on the Wyoming/Colorado border.

Sponsored by the NKU Department of Mathematics and the NKU Center for Integrative Natural Science and Mathematics. For further information, contact Dr. Andy Long at [longa@nku.edu](mailto:longa@nku.edu) or by phone at (859) 572-5974 or (859) 572-5377.

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