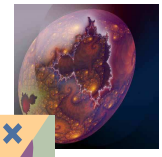
UCDAVIS UNIVERSITY OF CALIFORNIA Hydrologic Sciences Graduate Group Presents

Special Colloquium Series, Spring & Fall 2005:

Between Nature and Science:
Advanced Modeling Concepts for Environmental Sciences



Elizabeth Bradley
University of Colorado

Nonlinear dynamics, modeling, and the environmental sciences: ideas and tools

December 1st
4:00-5:00pm
PES 3001
Light refreshments provided

Nonlinearity and chaos are ubiquitous and fascinating. Chaotic systems, in particular, are exquisitely sensitive to small perturbations, but their behavior has a fixed and highly characteristic pattern. Understanding this somewhat counterintuitive combination of effects is important to one's ability to model the physical world. One can even exploit these effects to obtain design improvements in engineered systems: spacecraft trajectories that require less fuel, for example, or fuel injectors that mix gasoline and air more effectively.

This talk will begin with a review of some of the most basic ideas and tools of the field of nonlinear dynamics, and then cover a variety of interesting examples, ranging from environmental science and engineering to dance. Most of these tools were developed for low-dimensional systems and many of them require perfect models: situations that are rare in the environmental sciences. For practitioners in these fields, then, it is important to understand how and when to use which one, how to interpret the results, and how to recognize their failure modes.

Elizabeth Bradley *did her undergraduate and graduate work at MIT, interrupted by a one-year leave of absence to row in the 1988 Olympic Games, and has been with the Department of Computer Science at the University of Colorado at Boulder since January of 1993. She currently serves as Chair. Her research interests include nonlinear dynamics, artificial intelligence, and control theory. Bradley is a member of the external faculty of the Santa Fe Institute and the recipient of a National Young Investigator award, a Packard Fellowship, and the 1999 University of Colorado College of Engineering "innovation in teaching" award.*

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