

Special Colloquium Series, Spring & Fall 2005:

**Between Nature and Science:
Advanced Modeling Concepts for Environmental Sciences**



Don Turcotte
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UC Davis

Natural hazards as self-organizing complex systems

November 3rd

4:00-5:00pm

PES 300I

Light refreshments provided

A sequence of cellular automata models have been proposed as examples of "self-organized criticality". Three of these have direct applications to natural hazards: the sand-pile model to landslides, the forest-fire model to forest and wild fires, and the slider-block model to earthquakes. The relationship of these models to critical point phenomena will be discussed, in particular the relationship of the forest-fire model to the critical-point behavior of the site percolation model. An inverse cascade model that explains the behavior of both SOC and natural hazards will be shown. In addition to discussing the frequency area statistics of landslides, forest and wild fires, and earthquakes; the recurrence statistics of floods will be considered. It will be shown that the current application of log Pearson type 3 statistics to flood frequency analyses is fundamentally flawed.

Professor Turcotte joined the faculty of the Department of Geology at UC Davis in 2003 after spending 44 years on the faculty of Cornell University. He was educated as an aerospace engineer, receiving his PhD from Caltech, and spent his first 14 year on the faculty of aerospace engineering at Cornell before transferring to the geology department where he was chair for ten years. He is a member of the National Academy of Sciences, has won numerous medals, and will be receiving an Honorary Doctors Degree for the University of Paris in a few weeks.

Upcoming Speakers:

11/10	Melanie Mitchell	The prospects and perils of complex systems modeling
11/17	Michelle Girvan	Insights into Complex Networks
12/1	Elizabeth Bradley	Nonlinear dynamics, modeling, and the environmental sciences: ideas and tools

Sponsored By: John Muir Institute for the Environment, Computational Science and Engineering Center, Department of Civil and Environmental Engineering, Department of Land, Air, and Water Resources, Department of Chemical Engineering and Materials Science, Soil Sciences, Atmospheric Sciences, and Hydrologic Sciences Graduate Groups, College of Agriculture and Environmental Sciences, U.C. Cooperative Extension