The New Science of Chaos  
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In the 1970s the scientific world was awakened to the fact that very simple nonlinear dynamical systems can have such complicated behavior that it looks almost random. Tiny changes in the initial conditions cause enormous changes at a later time, making prediction impossible. This has been called the “butterfly effect” since a butterfly flapping its wings in Brazil can cause a tornado in Texas a few weeks later. Such “chaos” has now been observed in simple pendulums, electrical circuits, planetary motion, predator-prey dynamics, economic models, and countless other systems.

Some of my research has been involved with finding new examples of chaos in systems that are even simpler than those previously known. This typically involves setting up a system of ordinary differential equations with a number of adjustable parameters and programming the computer to solve these equations, looking for parameters that give chaotic solutions, and then to study the resulting system and perhaps find applications.

Many resources are available for the student who is interested in chaos research:

1. I can hardly do better than to recommend my own textbook, *Chaos and Time-Series Analysis*, Oxford University Press (2003), copies of which are available in the Physics Library. It is written at the upper undergraduate level.
2. Also in the Physics Library is an entire section (Q172.5) of other books on chaos at many different levels.
3. See also my interactive computer program, *Chaos Demonstrations*, on display in the Physics Museum.
4. I have an extensive website with much information about chaos and my own research at [http://sprott.physics.wisc.edu/](http://sprott.physics.wisc.edu/).
5. There are many journals in the Physics Library that have articles about chaos, some of which are freely available on-line to UW students. See, for example, the AIP journal *Chaos*.
6. Every Tuesday noon during the academic year in 4274 Chamberlin Hall is the *Chaos and Complex Systems Seminar* where speakers from various disciplines talk about their research at an elementary level. The talks are fascinating, no registration is required, everyone is welcome, and refreshments are served.
7. The Math Department every fall offers an undergraduate course, Math 415 -- *Applied Dynamical Systems, Chaos and Modeling*.
8. I frequently work with undergraduates on topics that can lead to publishable research. If you are a crack computer programmer and willing to commit to a multiyear effort, stop by my office (3285 Chamberlin Hall) to talk about the possibilities.