

Do you like biology *and* math?

## **Cellular Biophysics and Modeling — Fall 06**

**Prof. Gregory D. Smith (Applied Science)**

**APSC 451/651 — TR 3:30–4:50**

*Cellular Biophysics and Modeling* is an introduction to mathematical modeling in cellular physiology and neuroscience.

Topics covered include: membrane transport and diffusion, classical biophysics of the squid giant axon, the gating of voltage- and ligand-gated ion channels, metabotropic receptors, signal transduction, intracellular calcium responses, and plasma membrane and endoplasmic reticulum excitability, bistability, oscillations, and bursting.

Each topic will be studied from the perspective of nonlinear dynamics. Mathematical idealizations of each phenomena will be constructed, simulated, and analyzed using computer simulation (numerical integration) and graphical techniques (phase-plane analysis).



*Computational Cell Biology: An Introduction to Computer Modeling in Molecular Cell Biology.* Chris Fall et al., eds. 2002.

*Ionic Channels of Excitable Membranes.* Bertil Hille. 2001.



*Cellular Biophysics and Modeling* is a *Neuroscience* elective and a required course in the Applied Science *Computational Biology* minor.