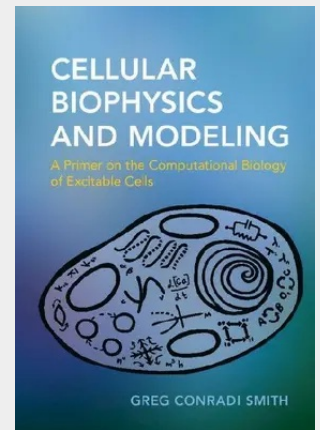


Cellular Biophysics and Modeling

What every neuroscientist should know about the mathematical modeling of excitable cells. Combining empirical physiology and nonlinear dynamics, this text provides an introduction to the simulation and modeling of dynamic phenomena in cell biology and neuroscience. It introduces mathematical modeling techniques alongside cellular electrophysiology. Topics include membrane transport and diffusion, the biophysics of excitable membranes, the gating of voltage and ligand-gated ion channels, intracellular calcium signalling, and electrical bursting in neurons and other excitable cell types. It introduces mathematical modeling techniques such as ordinary differential equations, phase plane, and bifurcation analysis of single-compartment neuron models. With analytical and computational problem sets, this book is suitable for life sciences majors, in biology to neuroscience, with one year of calculus, as well as graduate students looking for a primer on membrane excitability and calcium signalling.

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