

Title: Seeing Through the Fog - Why Biologists Need Mathematical Models

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Abstract: Mathematical modeling is a tool that has been used in biology for many years, but its utility became very obvious when, in 1952, Alan Hodgkin and Andrew Huxley founded the modern field of neuroscience with a series of publications that describe the biophysical mechanism for electrical impulse generation in a neural axon. This work, which won them the Nobel Prize in Physiology or Medicine in 1963, relied heavily on a mathematical model to interpret the electrophysiology data that they had collected and develop a theory for impulse generation which is now universally accepted. This seminar will focus on a different type of electrically active cell, the insulin-secreting pancreatic beta-cell. I will demonstrate how the use of a mathematical model can help explain counter-intuitive recent data on beta-cell electrical activity, and overturn decades-old dogma with a single mathematical figure.

Short Biography: Richard Bertram is the Tam Family Professor of Mathematics and a Distinguished Research Professor at Florida State University. He directs the graduate program in biomathematics, which has graduated 52 doctoral students since its inception in 2001. His research uses mathematics, primarily tools from nonlinear dynamical systems, to understand the behavior of cells and networks of cells. Dr. Bertram served as the chair of the Life Sciences activity group of the Society for Mathematical Biology, and is on the editorial board of the Bulletin of Mathematical Biology and the associate editor of Mathematical Biosciences