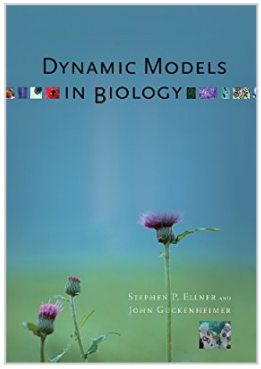

Dynamic Models in Biology

By Stephen P. Ellner, John Guckenheimer

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From controlling disease outbreaks to predicting heart attacks, dynamic models are increasingly crucial for understanding biological processes. Many universities are starting undergraduate programs in computational biology to introduce students to this rapidly growing field. In *Dynamic Models in Biology*, the first text on dynamic models specifically written for undergraduate students in the biological sciences, ecologist Stephen Ellner and mathematician John Guckenheimer teach students how to understand, build, and use dynamic models in biology.

Developed from a course taught by Ellner and Guckenheimer at Cornell University, the book is organized around biological applications, with mathematics and computing developed through case studies at the molecular, cellular, and population levels. The authors cover both simple analytic models--the sort usually found in mathematical biology texts--and the complex computational models now used by both biologists and mathematicians.

Linked to a Web site with computer-lab materials and exercises, *Dynamic Models in Biology* is a major new introduction to dynamic models for students in the biological sciences, mathematics, and engineering.

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Dynamic Models in Biology By Stephen P. Ellner, John Guckenheimer Bibliography

- Rank: #902513 in eBooks
- Published on: 2011-09-19
- Released on: 2011-09-19
- Format: Kindle eBook

Editorial Review

Review
"What is remarkable about *Dynamic Models in Biology* is that it truly speaks to students of biological sciences. It puts biology first, and then tries to explain how mathematical tools can explain biological phenomena. Nothing else I've seen does this anywhere near as well. The authors have combined their experience to produce and excellent textbook."**--Bill Satzer, *MAA Reviews***

"This is a great book and I expect that it will play an important role in the teaching of mathematical biology and the development of the next generation of mathematical biologists for many years to come."**--Marc Mangel, *SIAM Review***

"*Dynamic Models in Biology* stands apart from existing textbooks in mathematical biology largely because of its interdisciplinary approach and its hands-on, project-oriented case studies and computer laboratories. In an effort to explore biology in more detail, the authors bravely chose a style that differs from the classical biomath texts . . . whose focus is more on formal mathematics."**--Lewi Stone, *BioScience***

"The book begins with a stellar overview of the purpose of modeling, contrasting statistical with dynamical models, and theoretical with practical models both clearly and even-handedly...[E]ngaging the full breadth and depth of this book could be an education for both instructors and students alike."**--Frederick R. Adler, *Mathematical Biosciences***

"[S]tudents from both biology and mathematics can gain much from this book. *Dynamic Models in Biology* would be appropriate for use in a semester or two-quarter course; however, with judicious selection of topics, it can be used in a quarter. My students included undergraduates in biology with knowledge only of calculus, undergraduates in mathematics, and graduate students and academic staff in biology, all enrolled on a ten-week course. . . . Overall, *Dynamic Models in Biology* fills an important niche in the biological modeling canon. It occupies a place on my shelf next to Edelstein-Keshet (1988) and Murray (1989), and like them, will become a well-thumbed reference."**--Carole L. Hom, *Environmental Conservation***

From the Back Cover

"This book is written with the reality of biology students and their apprehension about mathematics in mind. The applications of mathematical models to real biological problems are not contrived, as they are in a number of other texts. And the biology examples are taken from the current literature--a wonderful help to those who will be teaching with this book."**--Jim Keener, University of Utah, author of *Principles of***

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"*Dynamic Models in Biology* is a new and significant contribution to the field. Very well written and clearly presented, it fulfills its goal of bringing dynamic models into the undergraduate biology curriculum. Indeed it puts biology first, and then seeks to show how biological phenomena can be explained in mathematical terms."**--Martin Henry H. Stevens, Miami University**

"This excellent book is a major contribution to the literature. Strong biologically and mathematically, well-organized, and engagingly written, it introduces the subject of dynamical models in biology in as coherent a way as I have seen anywhere. Few authors could approach this topic as authoritatively as do Ellner and Guckenheimer."**--Simon Levin, Princeton University, author of *The Importance of Species* and *The Encyclopedia of Biodiversity***

About the Author
Stephen P. Ellner is Professor of Ecology and Evolutionary Biology at Cornell University. He has published numerous papers on subjects from measles epidemics to bumblebee behavior, in publications including "Science" and "Nature". John Guckenheimer is Professor of Mathematics at Cornell University. He is the coauthor of "Nonlinear Oscillations, Dynamical Systems, and Bifurcations of Vector Fields".

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