

MATHEMATICAL CONCEPTS AND METHODS IN MODERN BIOLOGY

USING MODERN DISCRETE MODELS

EDITED BY
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Based on ongoing research, motivated by a growing need for the use of mathematical approaches to biological questions, and inspired by the national initiative towards the 'new biology,' this work offers a framework to describe, analyze, predict, and control the behavior of biological systems. The book offers a collection of topics designed around the principle of project-based learning, focusing on problem-solving that emphasizes important mathematical concepts and methods in the context of essential questions raised in biology. The use of specialized software as a necessary element of the modern biology skills set is emphasized throughout the book. Exercises and projects that utilize **freely-available applications or mainstream proprietary software are integrated into the presentation, exemplifying the importance of computer implementations of the mathematical theory.**

KEY FEATURES:

- Applications of modern discrete mathematics and algebraic statistics to pressing problems in modern biology
- Diverse mathematical methods and models for use in both mathematics and biology courses
- Real cross-disciplinary collaboration emphasizing creative applications and new mathematical tools in the context of engaging contemporary problems



Raina Robeva was born in Sofia, Bulgaria. She has a PhD in mathematics from the University of Virginia and is currently a Specialty Chief Editor of the journal *Frontiers in Systems Biology*. She is the lead author of the book *An Invitation to Biomathematics* published in 2008 by Academic Press. Raina lives in Charlottesville, Virginia.



Terrell L. Hodge has a PhD in mathematics from the University of Virginia. With Robeva, she was coPI on the NSF-funded curriculum development project leading to the development of this book, and has trained as a researcher in algebraic group representation theory and algebraic biology. A co-organizer of numerous workshops and conferences in representation theory and mathematical biology, she currently serves as an Associate Dean. Terrell lives in Kalamazoo, Michigan.



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