

CAMBRIDGE TEXTS IN BIOMEDICAL ENGINEERING

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Simulation and analysis of biochemical systems is at the heart of computational and systems biology. This textbook covers mathematical and computational approaches to biochemical systems based on rigorous physical principles. Written with an interdisciplinary audience in mind, this book shows the natural connection between established disciplines of chemistry and physics and the emerging field of systems biology, enabling the reader to take an informed approach to quantitative biochemical systems analysis.

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- **Concepts in Physical Chemistry** – this section introduces kinetics and thermodynamics of biochemical networks, providing a strong foundation to understand biological systems and applications to well-conceived biochemical models.
- **Analysis and Modeling of Cellular Biochemical Systems** – topics covered include enzyme-mediated reactions, metabolic networks, signaling systems, biological transport processes, and electrophysiological systems.
- **Advanced Topics** – explores spatially distributed systems, constraint-based analysis for large-scale networks, protein-protein interaction, and stochastic phenomena in biochemical networks.

Featuring end-of-chapter exercises, with problems ranging in scope from straightforward calculations to small computational simulation projects, this book will be suitable for advanced undergraduate or graduate-level courses in systems biology, computational bioengineering, and molecular biophysics.

Daniel A. Beard is Associate Professor in the Department of Physiology, at the Biotechnology and Bioengineering Center, Medical College of Wisconsin.

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"This is one of the most useful and readable accounts of biochemical thermodynamics that I have seen for a long time, if indeed ever."

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ISBN 978-0-521-87070-2



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