



Reflecting the major advances that have been made in the field over the past decade, this book provides an overview of current models of biological systems. The chapters are self-contained, each exploring key methods and principles for understanding aspects of life through the use of quantitative models.

The focus is on biological regulation, in particular on how dynamics of only a few proteins can govern strategic decisions on the larger scale of a living cell. Encompassing fields such as quantitative molecular biology, systems biology and biophysics, this book will be a valuable tool for students from both biological and physical science backgrounds.

- Outlines the field of small systems biology – the study of biological systems using conceptual models with few parameters.
- Explores phenomena from the worlds of phages, bacteria and yeast.
- Includes coverage of gene regulation, feedbacks, genetic switches, epigenetics, networks and evolution.

End-of-chapter summary sections, along with questions placed throughout chapters, help to explain the key concepts to students. Solutions are available online at www.cambridge.org/sneppen.

'... a 'must-read' for investigators in quantitative biology... The brilliance of the author's analytical mind is on display...'

SANKAR ADHYA, National Cancer Institute, USA

'... a wonderfully friendly and readable book on the principles of biological cells for physicists... pioneering in covering scientific terrain that is largely not covered much elsewhere, but will be in the future... I highly recommend it as a deeply insightful book about the principles of biology.'

KEN DILL, Laufer Center, Stony Brook University, USA

'[This] insightful book... describes biological systems at different time and length scales and levels of resolution... an excellent textbook for courses on systems or evolutionary biology.'

SERGEI MASLOV, Brookhaven National Laboratory, USA

'An excellent book... and a valuable resource for anyone...'

CHAO TANG, Peking University, China

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Cover illustration (front): lichen is a widespread class of symbiotic organisms that typically grow on rocks and stones. Image courtesy of the author; (back): artistic interpretation of phages playing dice. Image courtesy of Mette Høst.

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