

Chapman & Hall/CRC
Mathematical and Computational Biology Series

Quantitative methods have a particular knack for improving any field they touch. For biology, computational techniques have led to enormous strides in our understanding of biological systems, but there is still vast territory to cover. Statistical physics especially holds great potential for elucidating the structural-functional relationships in biomolecules, as well as their static and dynamic properties.

Breaking New Ground

Computational Biology: A Statistical Mechanics Perspective is the first book dedicated to the interface between statistical physics and bioinformatics. Introducing both equilibrium and nonequilibrium statistical mechanics in a manner tailored to computational biologists, the author applies these methods to understand and model the properties of various biomolecules and biological networks at the systems level.

Unique Vision, Novel Approach

Blossey combines his enthusiasm for uniting the fields of physics and computational biology with his considerable experience, knowledge, and gift for teaching. He uses numerous examples and tasks to illustrate and test understanding of the concepts, and he supplies a detailed keyword list for easy navigation and comprehension. His approach takes full advantage of the latest tools in statistical physics and computer science to build a strong set of tools for confronting new challenges in computational biology.

Taking a multidisciplinary perspective on biological systems, this book...

- Provides the first detailed application of statistical physics concepts to problems in computational biology
- Illustrates the concepts with simple applications focused exclusively on biological systems
- Focuses on the properties of biomolecules, their stability, and the structures that they form
- Includes a detailed discussion of chromatin and its role in gene regulation, a topic unique among statistical mechanics books
- Uses statistical mechanics models to describe the dynamics and structure of complex gene and protein networks

Ralf Blossey currently heads the research group *Modelling and Simulation of Biological Nanosystems* at the newly founded Interdisciplinary Research Institute on Systems Biology in Lille, France. He is very active in promoting interaction between physicists and computational biologists as well as promoting scientific understanding to the general public.



CRC Press

Taylor & Francis Group
an Informa business

www.crcpress.com

ISBN 978-0-367-39082-2



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