

**Describes important modelling and computational methods
for systems biology research to enable practitioners to
select and use the most suitable technique**

Systems Biology Modelling and Analysis provides an overview of state-of-the-art techniques and introduces related tools and practices to formalize models and automate reasoning for systems biology. The authors present and compare the main formal methods used in systems biology for modelling biological networks, including discussion of their advantages, drawbacks, and main applications.

Each chapter includes an intuitive presentation of the specific formalism, a brief history of the formalism and of its applications in systems biology, a formal description of the formalism and its variants, at least one realistic case study, some applications of formal techniques to validate and make deep analysis of models encoded with the formalism, and a discussion on the kind of biological systems for which the formalism is suited, along with concrete ideas on its possible evolution.

Edited by a highly qualified expert with significant experience in the field, some of the methods and techniques covered in *Systems Biology Modelling and Analysis* include:

- Petri nets, an important tool for studying different aspects of biological systems, ranging from simple signaling pathways to metabolic networks and beyond
- Pathway Logic, a formal, rule-based system and interactive viewer for developing executable models of cellular processes
- Boolean networks, a mathematical model which has been widely used for decades in the context of biological regulation networks
- Answer Set Programming (ASP), which has proven to be a strong logic programming paradigm to deal with the inherent complexity of biological models

For systems biologists, biochemists, bioinformaticians, molecular biologists, pharmacologists, and computer scientists, *Systems Biology Modelling and Analysis* is a comprehensive all-in-one resource to understand and harness the field's current models and techniques while also preparing for their potential developments in coming years with the help of the author's expert insight.


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