

DISCOVER HOW SYSTEMS AND ENGINEERING THEORIES COMBINE TO SOLVE COMPLEX PROBLEMS IN BIOLOGY

Systems biology and synthetic biology have emerged as two complementary approaches that invite the application of engineering principles. Emphasizing the similarity between biology and engineering at the systems level, *Systems Biology and Synthetic Biology* demonstrates the benefits of integrating systems and engineering theories to understand and solve complex biology problems. Readers discover how synthetic biology technologies are used in systems biology to study biological systems. At the same time, readers learn how synthetic biology depends on information gleaned from systems biology approaches.

Systems Biology and Synthetic Biology consists of twenty chapters, each one written by one or more noted experts. Contributions are based on a thorough examination and analysis of the literature as well as the authors' own firsthand experience in the lab. Among the topics covered are:

- High-throughput technologies and functional genomics
- From recombinant genes to recombinant genomes for systems biology
- Mathematical modeling of genetic regulatory networks: stress responses in *Escherichia coli*
- Synthetic biology: putting engineering into bioengineering
- The synthetic approach for regulatory and metabolic circuits
- Potential applications of synthetic biology in marine microbial functional ecology and biotechnology

Ending with a chapter dedicated to outstanding issues in systems and synthetic biology, the book points the direction to new research efforts and new solutions.

By emphasizing the link between biology and engineering at the systems level, this book helps practitioners and students in biology, bioengineering, chemical engineering, and molecular biology develop innovative ways to combine systems and engineering theories to advance their own research.

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