

The Practical Bioinformatician

Computer scientists have increasingly been enlisted as "bioinformaticians" to assist molecular biologists in their research. This book is a practical introduction to bioinformatics for these computer scientists. The chapters are in-depth discussions by expert bioinformaticians on both general techniques and specific approaches to a range of selected bioinformatics problems.

The book is organized into clusters of chapters on the following topics:

- Overview of modern molecular biology and a broad spectrum of techniques from computer science — data mining, machine learning, mathematical modeling, sequence alignment, data integration, workflow development, etc.
- In-depth discussion of computational recognition of functional and regulatory sites in DNA sequences.
- Incisive discussion of computational prediction of secondary structure of RNA sequences.
- Overview of computational prediction of protein cellular localization, and selected discussions of inference of protein function.
- Overview of methods for discovering protein-protein interactions.
- Detailed discussion of approaches to gene expression analysis for the diagnosis of diseases, the treatment of diseases, and the understanding of gene functions.
- Case studies on analysis of phylogenies, functional annotation of proteins, construction of purpose-built integrated biological databases, and development of workflows underlying the large-scale-effort gene discovery.