

## Contents

Foreword *vii*

Preface *ix*

Contributors *xi*

About the Companion Website *xvii*

- 1 Biological Sequence Databases** 1  
*Andreas D. Baxevanis*
- 2 Information Retrieval from Biological Databases** 19  
*Andreas D. Baxevanis*
- 3 Assessing Pairwise Sequence Similarity: BLAST and FASTA** 45  
*Andreas D. Baxevanis*
- 4 Genome Browsers** 79  
*Tyra G. Wolfsberg*
- 5 Genome Annotation** 117  
*David S. Wishart*
- 6 Predictive Methods Using RNA Sequences** 155  
*Michael F. Sloma, Michael Zuker, and David H. Mathews*
- 7 Predictive Methods Using Protein Sequences** 185  
*Jonas Reeb, Tatyana Goldberg, Yanay Ofran, and Burkhard Rost*
- 8 Multiple Sequence Alignments** 227  
*Fabian Sievers, Geoffrey J. Barton, and Desmond G. Higgins*
- 9 Molecular Evolution and Phylogenetic Analysis** 251  
*Emma J. Griffiths and Fiona S.L. Brinkman*
- 10 Expression Analysis** 279  
*Marieke L. Kuijjer, Joseph N. Paulson, and John Quackenbush*
- 11 Proteomics and Protein Identification by Mass Spectrometry** 315  
*Sadhna Phanse and Andrew Emili*
- 12 Protein Structure Prediction and Analysis** 363  
*David S. Wishart*
- 13 Biological Networks and Pathways** 399  
*Gary D. Bader*

- 14 Metabolomics 437**  
*David S. Wishart*
- 15 Population Genetics 481**  
*Lynn B. Jorde and W. Scott Watkins*
- 16 Metagenomics and Microbial Community Analysis 505**  
*Robert G. Beiko*
- 17 Translational Bioinformatics 537**  
*Sean D. Mooney and Stephen J. Mooney*
- 18 Statistical Methods for Biologists 555**  
*Hunter N.B. Moseley*
  
- Appendices 583**
  
- Glossary 591**
- Index 609**