

Contents

<i>Foreword</i>	<i>vii</i>
<i>Preface</i>	<i>ix</i>
<i>Contributors</i>	<i>xiii</i>

SECTION I: SYSTEMS BIOLOGY OF PLANT GENE EXPRESSION

1. Gene-Specific and Genome-Wide ChIP Approaches to Study Plant Transcriptional Networks	3
<i>Kengo Morohashi, Zidian Xie, and Erich Grotewold</i>	
2. Genome-Wide Analysis of RNA-Protein Interactions in Plants	13
<i>Alice Barkan</i>	
3. Whole-Genome Microarrays: Applications and Technical Issues	39
<i>Brian D. Gregory and Dmitry A. Belostotsky</i>	
4. Manipulating Large-Scale <i>Arabidopsis</i> Microarray Expression Data: Identifying Dominant Expression Patterns and Biological Process Enrichment	57
<i>David A. Orlando, Siobhan M. Brady, Jeremy D. Koch, José R. Dinneny, and Philip N. Benfey</i>	
5. Applications of Ultra-high-Throughput Sequencing	79
<i>Samuel Fox, Sergei Filichkin, and Todd C. Mockler</i>	
6. Isolation of Plant Polysomal mRNA by Differential Centrifugation and Ribosome Immunopurification Methods	109
<i>Angelika Mustroph, Piyada Juntawong, and Julia Bailey-Serres</i>	
7. Chromatin Charting: Global Mapping of Epigenetic Effects	127
<i>Chongyuan Luo and Eric Lam</i>	
8. Clone-Based Functional Genomics	141
<i>Annick Bleys, Mansour Karimi, and Pierre Hilson</i>	

SECTION II: NETWORKS, PATHWAYS, STATISTICAL ISSUES, AND NOVEL COMPUTATIONAL TOOLS

9. Challenges and Approaches to Statistical Design and Inference in High-Dimensional Investigations	181
<i>Gary L. Gadbury, Karen A. Garrett, and David B. Allison</i>	
10. Discrete Dynamic Modeling with Asynchronous Update, or How to Model Complex Systems in the Absence of Quantitative Information	207
<i>Sarah M. Assmann and Réka Albert</i>	
11. Quantification of Variation in Expression Networks	227
<i>Daniel J. Kliebenstein</i>	
12. Co-expression Analysis of Metabolic Pathways in Plants	247
<i>Ann Lorraine</i>	
13. Integration of Metabolic Reactions and Gene Regulation	265
<i>Chen-Hsiang Yeang</i>	

14. Applying Word-Based Algorithms: The IMeter	287
<i>Ian F. Korf and Alan B. Rose</i>	
SECTION III: IMAGING	
15. Live-Imaging and Image Processing of Shoot Apical Meristems of <i>Arabidopsis thaliana</i>	305
<i>G. Venugopala Reddy and A. Roy-Chowdhury</i>	
16. Computer Vision as a Tool to Study Plant Development	317
<i>Edgar P. Spalding</i>	
SECTION IV: CHEMICAL GENETIC, METABOLOMIC, AND INTEGRATIVE METHODS FOR PLANT SYSTEMS BIOLOGY	
17. Metabolomics of Plant Volatiles	329
<i>Anthony V. Qualley and Natalia Dudareva</i>	
18. Chemical Genomics Approaches in Plant Biology.	345
<i>Lorena Norambuena, Natasha V. Raikbel, and Glenn R. Hicks</i>	
19. Comparison of Quantitative Metabolite Imaging Tools and Carbon-13 Techniques for Fluxomics	355
<i>Totte Niittylae, Bhavna Chaudhuri, Uwe Sauer, and Wolf B. Frommer</i>	
20. Democratization and Integration of Genomic Profiling Tools	373
<i>Michael R. Sussman, Edward L. Huttlin, and Dana J. Wohlbach</i>	
<i>Index</i>	395