

---

# Contents

<i>Preface</i> .....	<i>v</i>
<i>Contributors</i> .....	<i>ix</i>
1 Bacterial Molecular Networks: Bridging the Gap Between Functional Genomics and Dynamical Modelling .....	1
<i>Jacques van Helden, Ariane Toussaint, and Denis Thieffry</i>	
PART I EXPERIMENTAL AND IN SILICO APPROACHES TO UNRAVEL NETWORK COMPONENTS	
2 Bacterial Interactomes: From Interactions to Networks.....	15
<i>Emmanuelle Bouveret and Christine Brun</i>	
3 From Bacterial to Microbial Ecosystems (Metagenomics).....	35
<i>Shannon J. Williamson and Shibu Yooseph</i>	
4 Prokaryote Genome Fluidity: Toward a System Approach of the Mobilome .....	57
<i>Ariane Toussaint and Mick Chandler</i>	
5 Reticulate Classification of Mosaic Microbial Genomes Using NeAT Website .....	81
<i>Gipsi Lima-Mendez</i>	
6 From Metabolic Reactions to Networks and Pathways.....	93
<i>Masanori Arita</i>	
7 Predicting Metabolic Pathways by Sub-network Extraction .....	107
<i>Karoline Faust and Jacques van Helden</i>	
8 Directed Module Detection in a Large-Scale Expression Compendium .....	131
<i>Qiang Fu, Karen Lemmens, Aminael Sanchez-Rodriguez, Inge M. Thijs, Pieter Meysman, Hong Sun, Ana Carolina Fierro, Kristof Engelen, and Kathleen Marchal</i>	
9 Using Phylogenetic Profiles to Predict Functional Relationships .....	167
<i>Matteo Pellegrini</i>	
10 Extracting Regulatory Networks of <i>Escherichia coli</i> from RegulonDB .....	179
<i>Heladia Salgado, Irma Martínez-Flores, Alejandra López-Fuentes, Jair Santiago García-Sotelo, Liliana Porrón-Sotelo, Hilda Solano, Luis Muñoz-Rascado, and Julio Collado-Vides</i>	
11 Browsing Metabolic and Regulatory Networks with BioCyc .....	197
<i>Mario Latendresse, Suzanne Paley, and Peter D. Karp</i>	
PART II TOPOLOGICAL ANALYSIS OF BACTERIAL NETWORKS	
12 Algorithms for Systematic Identification of Small Subgraphs .....	219
<i>Joseph Geraci, Geoffrey Liu, and Igor Jurisica</i>	
13 The Degree Distribution of Networks: Statistical Model Selection .....	245
<i>William P. Kelly, Piers J. Ingram, and Michael P.H. Stumpf</i>	

14	MAVisto: A Tool for Biological Network Motif Analysis . . . . .	263
	<i>Henning Schwöbbermeyer and Röbbe Wünschiers</i>	
15	Using MCL to Extract Clusters from Networks . . . . .	281
	<i>Stijn van Dongen and Cei Abreu-Goodger</i>	
16	Protein Complex Prediction with RNSC . . . . .	297
	<i>Andrew D. King, Nataša Pržulj, and Igor Jurisica</i>	
17	Network Analysis and Protein Function Prediction with the PRODISTIN Web Site . . . . .	313
	<i>Anaïs Baudot, Ouissem Souiai, and Christine Brun</i>	
18	Using the NeAT Toolbox to Compare Networks to Networks, Clusters to Clusters, and Network to Clusters . . . . .	327
	<i>Sylvain Brohée</i>	
19	Analyzing Biological Data Using R: Methods for Graphs and Networks. . . . .	343
	<i>Nolwenn Le Meur and Robert Gentleman</i>	
PART III DYNAMICAL MODELLING		
20	Detecting Structural Invariants in Biological Reaction Networks . . . . .	377
	<i>Jörn Behre, Luís Filipe de Figueiredo, Stefan Schuster, and Christoph Kaleta</i>	
21	Petri Nets in Snoopy: A Unifying Framework for the Graphical Display, Computational Modelling, and Simulation of Bacterial Regulatory Networks . . . . .	409
	<i>Wolfgang Marwan, Christian Rohr, and Monika Heiner</i>	
22	Genetic Network Analyzer: A Tool for the Qualitative Modeling and Simulation of Bacterial Regulatory Networks . . . . .	439
	<i>Grégory Batt, Bruno Besson, Pierre-Emmanuel Ciron, Hidde de Jong, Estelle Dumas, Johannes Geiselman, Regis Monte, Pedro T. Monteiro, Michel Page, François Rechenmann, and Delphine Ropers</i>	
23	Logical Modelling of Gene Regulatory Networks with GINsim. . . . .	463
	<i>Claudine Chaouiya, Aurélien Naldi, and Denis Thieffry</i>	
24	Modelling the Evolution of Mutualistic Symbioses . . . . .	481
	<i>Maren L. Friesen and Emily I. Jones</i>	
25	Modelling the Onset of Virulence in Pathogenic Bacteria. . . . .	501
	<i>Wilfred D. Kepsu, Frédérique Van Gijsegem, and Jacques-Alexandre Sepulchre</i>	
26	Spatial and Stochastic Cellular Modeling with the Smoldyn Simulator . . . . .	519
	<i>Steven S. Andrews</i>	
	<i>Index</i> . . . . .	543



<http://www.springer.com/978-1-61779-360-8>

Bacterial Molecular Networks

Methods and Protocols

van Helden, J.; Toussaint, A.; Thieffry, D. (Eds.)

2012, XI, 546 p., Hardcover

ISBN: 978-1-61779-360-8

A product of Humana Press