

Contents

<i>Preface</i>	<i>v</i>
<i>Contributors</i>	<i>ix</i>
PART I INTRODUCTION	
1 What Is Synthetic Biology?	3
<i>Karen M. Polizzi</i>	
PART II DNA ASSEMBLY	
2 Gene Synthesis Method Based on Overlap Extension PCR and DNAWorks Program	9
<i>Gang Li, Bing-Xue Dong, Yu-Huan Liu, Chang-Jie Li, and Li-Ping Zhang</i>	
3 BioBrick™ Assembly Using the In-Fusion PCR Cloning Kit	19
<i>Sean C. Sleight and Herbert M. Sauro</i>	
4 Overlap Extension PCR Cloning	31
<i>Anton Bryksin and Ichiro Matsumura</i>	
5 One-Step Isothermal Assembly of DNA Fragments	43
<i>Rui T.L. Rodrigues and Travis S. Bayer</i>	
PART III PART, PATHWAY, AND GENOME ENGINEERING	
6 Creation and Characterization of Component Libraries for Synthetic Biology	51
<i>Tim Weenink and Tom Ellis</i>	
7 In Vivo and In Vitro Characterization of σ^{70} Constitutive Promoters by Real-Time PCR and Fluorescent Measurements	61
<i>James Chappell and Paul Freemont</i>	
8 In Vivo Screening of Artificial Small RNAs for Silencing Endogenous Genes in <i>Escherichia coli</i>	75
<i>Vandana Sharma and Yobei Yokobayashi</i>	
9 Construction and Engineering of Large Biochemical Pathways via DNA Assembler	85
<i>Zengyi Shao and Huimin Zhao</i>	
10 Assembly of Multi-gene Pathways and Combinatorial Pathway Libraries Through ePathBrick Vectors	107
<i>Peng Xu and Mattheos A.G. Koffas</i>	
11 Tandem Recombineering by SLIC Cloning and Cre-LoxP Fusion to Generate Multigene Expression Constructs for Protein Complex Research	131
<i>Matthias Haffke, Cristina Viola, Yan Nie, and Imre Berger</i>	

12	Combinatorial DNA Assembly Using Golden Gate Cloning	141
	<i>Carola Engler and Sylvestre Marillonnet</i>	
13	Construction of Synthetic Gene Circuits in the <i>Escherichia coli</i> Genome	157
	<i>Bei-Wen Ying, Yuya Akeno, and Tetsuya Yomo</i>	
14	Shuffling of DNA Cassettes in a Synthetic Integron	169
	<i>David Bikard and Didier Mazel</i>	

PART IV COMPUTATIONAL TOOLS FOR MODELLING BIOLOGICAL SYSTEMS

15	Systematic Methodology for the Development of Mathematical Models for Biological Processes	177
	<i>Cleo Kontoravdi</i>	
16	SOBOLHDMR: A General-Purpose Modeling Software	191
	<i>Sergei Kucherenko</i>	
	<i>Index</i>	225