

CONTRIBUTORS.....	vii
INTRODUCTION.....	xiii

## SECTION I • Synthesis and Engineering Tools in Synthetic Biology

<b>CHAPTER 1</b> New Tools for Cost-Effective DNA Synthesis .....	3
<i>Nicholas Tang, Siying Ma and Jingdong Tian</i>	
<b>CHAPTER 2</b> Protein Engineering as an Enabling Tool for Synthetic Biology.....	23
<i>Patrick C. Cirino and Shuai Qian</i>	
<b>CHAPTER 3</b> Pathway Engineering as an Enabling Synthetic Biology Tool.....	43
<i>Dawn T. Eriksen, Sijin Li and Huimin Zhao</i>	
<b>CHAPTER 4</b> From Biological Parts to Circuit Design .....	63
<i>Joao C. Guimaraes, Chang C. Liu and Adam P. Arkin</i>	

## SECTION II • Computational and Theoretical Tools in Synthetic Biology

<b>CHAPTER 5</b> Theoretical Considerations for Reprogramming Multicellular Systems.....	81
<i>Joseph Xu Zhou and Sui Huang</i>	
<b>CHAPTER 6</b> Computational Protein Design for Synthetic Biology .....	101
<i>Florian Richter and David Baker</i>	
<b>CHAPTER 7</b> Computer-Aided Design of Synthetic Biological Constructs with the Synthetic Biology Software Suite.....	123
<i>Katherine Volzing, Konstantinos Biliouris, Patrick Smadbeck and Yiannis Kaznessis</i>	
<b>CHAPTER 8</b> Computational Methods for Strain Design .....	141
<i>Sang Yup Lee, Seung Bum Sohn, Yu Bin Kim, Jae Ho Shin, Jin Eyun Kim and Tae Yong Kim</i>	

## SECTION III • Applications in Synthetic Biology

<b>CHAPTER 9</b> Design and Application of Synthetic Biology Devices for Therapy .....	159
<i>Boon Chin Heng and Martin Fussenegger</i>	
<b>CHAPTER 10</b> Drug Discovery and Development via Synthetic Biology .....	183
<i>Ryan E. Cobb, Yunzi Luo, Todd Freestone and Huimin Zhao</i>	
<b>CHAPTER 11</b> Synthetic Biology of Microbial Biofuel Production: From Enzymes to Pathways to Organisms.....	207
<i>Gregory Bokinsky, Dan Groff and Jay Keasling</i>	
<b>CHAPTER 12</b> Tools for Genome Synthesis.....	225
<i>Mitsuhiro Itaya</i>	
<b>CHAPTER 13</b> Synthetic Microbial Consortia and their Applications .....	243
<i>Robert P. Smith, Yu Tanouchi and Lingchong You</i>	

## SECTION IV • Future Prospects

<b>CHAPTER 14</b> Semi-Synthetic Minimal Cells: Biochemical, Physical, and Technological Aspects .....	261
<i>Pasquale Stano, Tereza Pereira de Souza, Yutetsu Kuruma, Paolo Carrara and Pier Luigi Luisi</i>	
<b>CHAPTER 15</b> Transforming Synthetic Biology with Cell-Free Systems .....	277
<i>Arnaz Ranji, Jeffrey C. Wu, Bradley C. Bundy and Michael C. Jewett</i>	
<b>CHAPTER 16</b> Towards Engineered Light–Energy Conversion in Nonphotosynthetic Microorganisms .....	303
<i>Ilya Tikh and Claudia Schmidt-Dannert</i>	
<b>CHAPTER 17</b> Applications of Engineered Synthetic Ecosystems .....	317
<i>Harris H. Wang, Michael T. Mee and George M. Church</i>	
INDEX .....	327