

Contents

Introduction:

Evolution and Computation: Where Do They Meet?

Erik Winfree and Laura F. Landweber v

Genome System Architecture and Natural Genetic Engineering

James A. Shapiro 1

Evolutionary Computation as a Paradigm for DNA-Based Computing

Thomas Bäck, Joost N. Kok, and Grzegorz Rozenberg 15

Evolution at the Edge of Chaos: A Paradigm for the Maturation of the Humoral Immune Response

*Patricia K. Theodosopoulos and
Theodore V. Theodosopoulos* 41

The Evolutionary Unfolding of Complexity

James P. Crutchfield and Erik van Nimwegen 67

Genetic Programming: Biologically Inspired Computation That Creatively Solves Non-trivial Problems

*John R. Koza, Forrest H. Bennett III, David Andre, and
Martin A. Keane* 95

Is Ours the Best of All Possible Codes?

Stephen J. Freeland 125

The Impact of Message Mutation on the Fitness of a Genetic Code

Guy Sella and David H. Ardell 140

Genetic Code Evolution in the RNA World and Beyond

Robin D. Knight 160

Imposing Specificity by Localization: Mechanism and Evolvability

Mark Ptashne and Alexander Gann 179

Towards a Predictive Biology:

The Example of Bacteriophage T7

Drew Endy 201

Using Artificial Reagents to Dissect Cellular Genetic Networks <i>Roger Brent</i>	210
Computational Aspects of Gene (Un)Scrambling in Ciliates <i>Andrzej Ehrenfeucht, David M. Prescott, and Grzegorz Rozenberg</i>	216
Universal Molecular Computation in Ciliates <i>Laura F. Landweber and Lila Kari</i>	257
Toward <i>in vivo</i> Digital Circuits <i>Ron Weiss, George E. Homsy, and Thomas F. Knight, Jr.</i>	275
Evolution of Genetic Organization in Digital Organisms <i>Charles Ofria and Christoph Adami</i>	296
Toward Code Evolution by Artificial Economies <i>Eric B. Baum and Igor Durdanovic</i>	314



<http://www.springer.com/978-3-540-66709-4>

Evolution as Computation

DIMACS Workshop, Princeton, January 1999

Landweber, L.F.; Winfree, E. (Eds.)

2002, XV, 333 p., Hardcover

ISBN: 978-3-540-66709-4