

# Table of Contents

---

## I Invited Papers

---

Cells as Computation .....	1
<i>Amitai Regev and Ehud Shapiro</i>	
Formal Modeling of <i>C. elegans</i> Development: A Scenario-Based Approach ...	4
<i>Na'aman Kam, David Harel, Hillel Kugler, Rami Marely, Amir Pnueli, E. Jane Albert Hubbard, and Michael J. Stern</i>	

---

## II Regular Papers

---

Causal $\pi$ -Calculus for Biochemical Modelling .....	21
<i>Michele Curti, Pierpaolo Degano, and Cosima Tatiana Baldari</i>	
Graphs for Core Molecular Biology .....	34
<i>Vincent Danos and Cosimo Laneve</i>	
Contribution of Computational Tree Logic to Biological Regulatory Networks: Example from <i>Pseudomonas Aeruginosa</i> .....	47
<i>Sabine Peres and Jean-Paul Comet</i>	
Modeling Cellular Behavior with Hybrid Automata: Bisimulation and Collapsing .....	57
<i>Marco Antoniotti, Bhubaneswar Mishra, Carla Piazza, Alberto Policriti, and Marta Simeoni</i>	
Multiscale Modeling of Alternative Splicing Regulation .....	75
<i>Damien Eveillard, Delphine Ropers, Hidde de Jong, Christiane Branstert, and Alexander Bockmayr</i>	
A Method for Estimating Metabolic Fluxes from Incomplete Isotopomer Information .....	88
<i>Juho Rousu, Ari Rantanen, Hannu Maaheimo, Esa Pitkänen, Katja Saarela, and Esko Ukkonen</i>	
Dynamic Bayesian Network and Nonparametric Regression for Nonlinear Modeling of Gene Networks from Time Series Gene Expression Data .....	104
<i>SunYong Kim, Seiya Imoto, and Satoru Miyano</i>	

## VIII Table of Contents

Discrete Event Simulation for a Better Understanding of Metabolite Channeling – A System Theoretic Approach .....	114
<i>Daniela Degenring, Mathias Röhl, and Adelinde M. Uhrmacher</i>	
Mathematical Modeling of the Influence of RKIP on the ERK Signaling Pathway .....	127
<i>Kwang-Hyun Cho, Sung-Young Shin, Hyun-Woo Kim, Olaf Wolkenhauer, Brian McFerran, and Walter Kolch</i>	
A Method to Identify Essential Enzymes in the Metabolism: Application to <i>Escherichia Coli</i> .....	142
<i>Ney Lemke, Fabiana Herédia, Cláudia K. Barcellos, and José C. M. Mombach</i>	
Symbolic Model Checking of Biochemical Networks .....	149
<i>Nathalie Chabrier and François Fages</i>	

---

## III Presentation Abstracts

---

Coupled Oscillator Models for a Set of Communicating Cells .....	163
<i>Will Casey</i>	
Representing and Simulating Protein Functional Domains in Signal Transduction Using Maude .....	164
<i>Steven Eker, Keith Laderoute, Patrick Lincoln, M.G. Sriram, and Carolyn Talcott</i>	
A Core Modeling Language for the Working Molecular Biologist .....	166
<i>Marc Chiaverini and Vincent Danos</i>	
Integrating Simulation Packages via Systems Biology Mark-Up Language .....	167
<i>Manuel Corpas</i>	
Recreating Biopathway Databases towards Simulation .....	168
<i>Masao Nagasaki, Atsushi Doi, Hiroshi Matsuno, and Satoru Miyano</i>	
How to Synthesize an Optimized Genetic $\lambda$ -Switching System? A System-Theoretic Approach Based on SQP .....	170
<i>Kwang-Hyun Cho, Jong-Ho Cha, and Olaf Wolkenhauer</i>	
Simulation Study of the TNF $\alpha$ Mediated NF- $\kappa$ B Signaling Pathway .....	171
<i>Kwang-Hyun Cho, Sung-Young Shin, Hyeon-Woo Lee, and Olaf Wolkenhauer</i>	
Detection and Analysis of Unexpected State Components in Biological Systems .....	172
<i>Anastasia Pagnoni and Andrea Visconti</i>	

Model Validation of Biological Pathways Using Petri Nets – Demonstrated for Apoptosis .....	173
<i>Monika Heiner, Ina Koch, and Jürgen Will</i>	
An Overview of Data Models for the Analysis of Biochemical Pathways .....	174
<i>Yves Deville, David Gilbert, Jacques van Helden, and Shoshana Wodak</i>	
Discrete Event Systems and Client-Server Model for Signaling Mechanisms .....	175
<i>Gabriel Ciobanu and Dorin Huzum</i>	

---

#### **IV Position Papers**

---

Enhanced Operational Semantics in Systems Biology .....	178
<i>Pierpaolo Degano and Corrado Priami</i>	
Issues in Computational Methods for Functional Genomics and Systems Biology .....	182
<i>Magali Roux-Rouquié, Leroy Hood, Sandrine Imbeaud, and Charles Auffray</i>	
Integrating Biological Process Modelling with Gene Expression Data and Ontologies for Functional Genomics (Position Paper) .....	187
<i>Liviu Badea and Doina Tilivea</i>	
Computer Simulation of Protocells .....	194
<i>Doron Lancet</i>	
How to Solve Semantic Puzzles of Systems Biology .....	198
<i>Olaf Langmack</i>	
Evolution as Design Engineer .....	202
<i>David L. Dill and Patrick Lincoln</i>	
Inference, Modeling and Simulation of Gene Networks .....	207
<i>Satoru Miyano</i>	
<b>Author Index .....</b>	<b>213</b>