

# Contents

## Part I Computational Methods for Microarray, Gene Expression Analysis, and Gene Regulatory Networks

<b>1</b>	<b>A Technical Platform for Generating Reproducible Expression Data from <i>Streptomyces coelicolor</i> Batch Cultivations</b> .....	<b>3</b>
	F. Battke, A. Herbig, A. Wentzel, Ø.M. Jakobsen, M. Bonin, D.A. Hodgson, W. Wohlleben, T.E. Ellingsen, the STREAM Consortium, and K. Nieselt	
<b>2</b>	<b>MiRNA Recognition with the <i>yasMiR</i> System: The Quest for Further Improvements</b> .....	<b>17</b>
	Daniel Pasailă, Andrei Sucilă, Irina Mohorianu, Ștefan Panțiru, and Liviu Ciortuz	
<b>3</b>	<b>Top Scoring Pair Decision Tree for Gene Expression Data Analysis</b> .....	<b>27</b>
	Marcin Czajkowski and Marek Krętowski	
<b>4</b>	<b>Predictive Minimum Description Length Principle Approach to Inferring Gene Regulatory Networks</b> .....	<b>37</b>
	Vijender Chaitankar, Chaoyang Zhang, Preetam Ghosh, Ping Gong, Edward J. Perkins, and Youping Deng	
<b>5</b>	<b>Parsimonious Selection of Useful Genes in Microarray Gene Expression Data</b> .....	<b>45</b>
	Félix F. González-Navarro and Lluís A. Belanche-Muñoz	
<b>6</b>	<b>Hierarchical Signature Clustering for Time Series Microarray Data</b> .....	<b>57</b>
	Lars Koenig and Eunseog Youn	

<b>7</b>	<b>Microarray Database Mining and Cell Differentiation Defects in Schizophrenia</b> .....	67
	Aurelian Radu, Gabriela Hristescu, Pavel Katsel, Vahram Haroutunian, and Kenneth L. Davis	
<b>8</b>	<b>miRNA Prediction Using Computational Approach</b> .....	75
	A.K. Mishra and D.K. Lobiyal	
<b>9</b>	<b>Improving the Accuracy of Gene Expression Profile Classification with Lorenz Curves and Gini Ratios</b> .....	83
	Quoc-Nam Tran	
<b>10</b>	<b>Feature Selection in Gene Expression Data Using Principal Component Analysis and Rough Set Theory</b> .....	91
	Debahuti Mishra, Rajashree Dash, Amiya Kumar Rath, and Milu Acharya	
<b>11</b>	<b>Dramatically Reduced Precision in Microarray Analysis Retains Quantitative Properties and Provides Additional Benefits</b> .....	101
	William C. Ray	
<b>12</b>	<b>Algebraic Model Checking for Boolean Gene Regulatory Networks</b> .....	113
	Quoc-Nam Tran	
<b>13</b>	<b>Comparative Advantages of Novel Algorithms Using MSR Threshold and MSR Difference Threshold for Biclustering Gene Expression Data</b> .....	123
	Shyama Das and Sumam Mary Idicula	
<b>14</b>	<b>Performance Comparison of SLFN Training Algorithms for DNA Microarray Classification</b> .....	135
	Hieu Trung Huynh, Jung-Ja Kim, and Yonggwon Won	
<b>15</b>	<b>Clustering Microarray Data to Determine Normalization Method</b> .....	145
	Marie Vendettuoli, Erin Doyle, and Heike Hofmann	
<b>Part II Bioinformatics Databases, Data Mining, and Pattern Discovery Techniques</b>		
<b>16</b>	<b>Estimation, Modeling, and Simulation of Patterned Growth in Extreme Environments</b> .....	157
	B. Strader, K.E. Schubert, M. Quintana, E. Gomez, J. Curnutt, and P. Boston	

<b>17</b>	<b>Performance of Univariate Forecasting on Seasonal Diseases: The Case of Tuberculosis</b> .....	171
	Adhistya Erna Permanasari, Dayang Rohaya Awang Rambli, and P. Dhanapal Durai Dominic	
<b>18</b>	<b>Predicting Individual Affect of Health Interventions to Reduce HPV Prevalence</b> .....	181
	Courtney D. Corley, Rada Mihalcea, Armin R. Mikler, and Antonio P. Sanfilippo	
<b>19</b>	<b>Decision Tree and Ensemble Learning Algorithms with Their Applications in Bioinformatics</b> .....	191
	Dongsheng Che, Qi Liu, Khaled Rasheed, and Xiuping Tao	
<b>20</b>	<b>Pattern Recognition of Surface EMG Biological Signals by Means of Hilbert Spectrum and Fuzzy Clustering</b> .....	201
	Ruben-Dario Pinzon-Morales, Katherine-Andrea Baquero-Duarte, Alvaro-Angel Orozco-Gutierrez, and Victor-Hugo Grisales-Palacio	
<b>21</b>	<b>Rotation of Random Forests for Genomic and Proteomic Classification Problems</b> .....	211
	Gregor Stiglic, Juan J. Rodriguez, and Peter Kokol	
<b>22</b>	<b>Improved Prediction of MHC Class I Binders/Non-Binders Peptides Through Artificial Neural Network Using Variable Learning Rate: SARS Corona Virus, a Case Study</b> .....	223
	Sudhir Singh Soam, Bharat Bhasker, and Bhartendu Nath Mishra	
<b>Part III Protein Classification and Structure Prediction, and Computational Structural Biology</b>		
<b>23</b>	<b>Fast Three-Dimensional Noise Reduction for Real-Time Electron Tomography</b> .....	233
	José Antonio Martínez and José Jesús Fernández	
<b>24</b>	<b>Prediction of Chemical-Protein Binding Activity Using Contrast Graph Patterns</b> .....	243
	Andrzej Dominik, Zbigniew Walczak, and Jacek Wojciechowski	
<b>25</b>	<b>Topological Constraint in High-Density Cells' Tracking of Image Sequences</b> .....	255
	Chunming Tang, Ling Ma, and Dongbin Xu	

<b>26</b>	<b>STRIKE: A Protein–Protein Interaction Classification Approach</b> .....	263
	Nazar Zaki, Wassim El-Hajj, Hesham M. Kamel, and Fadi Sibai	
<b>27</b>	<b>Cooperativity of Protein Binding to Vesicles</b> .....	271
	Francisco Torrens and Gloria Castellano	
<b>28</b>	<b>The Role of Independent Test Set in Modeling of Protein Folding Kinetics</b> .....	279
	Nikola Štambuk and Paško Konjevoda	
<b>Part IV Comparative Sequence, Genome Analysis, Genome Assembly, and Genome Scale Computational Methods</b>		
<b>29</b>	<b>Branch-and-Bound Approach for Parsimonious Inference of a Species Tree from a Set of Gene Family Trees</b> .....	287
	Jean-Philippe Doyon and Cedric Chauve	
<b>30</b>	<b>Sequence-Specific Sequence Comparison Using Pairwise Statistical Significance</b> .....	297
	Ankit Agrawal, Alok Choudhary, and Xiaoqiu Huang	
<b>31</b>	<b>Modelling Short Time Series in Metabolomics: A Functional Data Analysis Approach</b> .....	307
	Giovanni Montana, Maurice Berk, and Tim Ebbels	
<b>32</b>	<b>Modeling of Gene Therapy for Regenerative Cells Using Intelligent Agents</b> .....	317
	Aya Sedky Adly, Amal Elsayed Aboutabl, and M. Shaarawy Ibrahim	
<b>33</b>	<b>Biomarkers Discovery in Medical Genomics Data</b> .....	327
	A. Benis and M. Courtine	
<b>34</b>	<b>Computer Simulation on Disease Vector Population Replacement Driven by the Maternal Effect Dominant Embryonic Arrest</b> .....	335
	Mauricio Guevara-Souza and Edgar E. Vallejo	
<b>35</b>	<b>Leukocytes Segmentation Using Markov Random Fields</b> .....	345
	C. Reta, L. Altamirano, J.A. Gonzalez, R. Diaz, and J.S. Guichard	

## Part V Experimental Medicine and Analysis Tools

- 36 Ontology-Based Knowledge Discovery in Pharmacogenomics** .....357  
 Adrien Coulet, Malika Smaïl-Tabbone, Amedeo Napoli,  
 and Marie-Dominique Devignes
- 37 Enabling Heterogeneous Data Integration and Biomedical Event Prediction Through ICT: The Test Case of Cancer Reoccurrence** .....367  
 Marco Picone, Sebastian Steger, Konstantinos Exarchos,  
 Marco De Fazio, Yorgos Goletsis, Dimitrios I. Fotiadis,  
 Elena Martinelli, and Diego Ardigò
- 38 Complexity and High-End Computing in Biology and Medicine** .....377  
 Dimitri Perrin
- 39 Molecular Modeling Study of Interaction of Anthracenedione Class of Drug Mitoxantrone and Its Analogs with DNA Tetrameric Sequences** .....385  
 Pamita Awasthi, Shilpa Dogra, Lalit K. Awasthi,  
 and Ritu Barthwal
- 40 A Monte Carlo Analysis of Peritoneal Antimicrobial Pharmacokinetics** .....401  
 Sanjukta Hota, Philip Crooke, and John Hotchkiss

## Part VI Computational Methods for Filtering, Noise Cancellation, and Signal and Image Processing

- 41 Histopathology Tissue Segmentation by Combining Fuzzy Clustering with Multiphase Vector Level Sets** .....413  
 Filiz Bunyak, Adel Hafiane, and Kannappan Palaniappan
- 42 A Dynamically Masked Gaussian Can Efficiently Approximate a Distance Calculation for Image Segmentation** .....425  
 Shareef M. Dabdoub, Sheryl S. Justice, and William C. Ray
- 43 Automatic and Robust System for Correcting Microarray Images' Rotations and Isolating Spots** .....433  
 Anlei Wang, Naima Kaabouch, and Wen-Chen Hu

<b>44</b>	<b>Multimodality Medical Image Registration and Fusion Techniques Using Mutual Information and Genetic Algorithm-Based Approaches</b> .....	441
	Mahua Bhattacharya and Arpita Das	
<b>45</b>	<b>Microcalcifications Detection Using Fisher's Linear Discriminant and Breast Density</b> .....	451
	G.A. Rodriguez, J.A. Gonzalez, L. Altamirano, J.S. Guichard, and R. Diaz	
<b>46</b>	<b>Enhanced Optical Flow Field of Left Ventricular Motion Using Quasi-Gaussian DCT Filter</b> .....	461
	Slamet Riyadi, Mohd. Marzuki Mustafa, Aini Hussain, Oteh Maskon, and Ika Faizura Mohd. Nor	
<b>47</b>	<b>An Efficient Algorithm for Denoising MR and CT Images Using Digital Curvelet Transform</b> .....	471
	S. Hyder Ali and R. Sukanesh	
<b>48</b>	<b>On the Use of Collinear and Triangle Equation for Automatic Segmentation and Boundary Detection of Cardiac Cavity Images</b> .....	481
	Riyanto Sigit, Mohd. Marzuki Mustafa, Aini Hussain, Oteh Maskon, and Ika Faizura Mohd. Nor	
<b>49</b>	<b>The Electromagnetic-Trait Imaging Computation of Traveling Wave Method in Breast Tumor Microwave Sensor System</b> .....	489
	Zhi-fu Tao, Zhong-ling Han, and Meng Yao	
<b>50</b>	<b>Medical Image Processing Using Novel Wavelet Filters Based on Atomic Functions: Optimal Medical Image Compression</b> .....	497
	Cristina Juarez Landin, Magally Martinez Reyes, Anabelem Soberanes Martin, Rosa Maria Valdovinos Rosas, Jose Luis Sanchez Ramirez, Volodymyr Ponomaryov, and Maria Dolores Torres Soto	
<b>51</b>	<b>Cancellation of Artifacts in ECG Signals Using Block Adaptive Filtering Techniques</b> .....	505
	Mohammad Zia Ur Rahman, Rafi Ahamed Shaik, and D.V. Rama Koti Reddy	
<b>52</b>	<b>Segmentation of Medical Image Sequence by Parallel Active Contour</b> .....	515
	Abdelkader Fekir and Nacéra Benamrane	

- 53 Computerized Decision Support System for Mass Identification in Breast Using Digital Mammogram: A Study on GA-Based Neuro-Fuzzy Approaches .....523**  
Arpita Das and Mahua Bhattacharya

## **Part VII Computer-Based Medical Systems**

- 54 Optimization-Based Technique for Separation and Detection of Saccadic Movements and Eye-Blinking in Electrooculography Biosignals .....537**  
Robert Krupiński and Przemysław Mazurek
- 55 A Framework for Lipoprotein Ontology .....547**  
Meifania Chen and Maja Hadzic
- 56 Verbal Decision Analysis Applied on the Optimization of Alzheimer's Disease Diagnosis: A Case Study Based on Neuroimaging .....555**  
Isabelle Tamanini, Ana Karoline de Castro, Plácido Rogério Pinheiro, and Mirian Calíope Dantas Pinheiro
- 57 Asynchronous Brain Machine Interface-Based Control of a Wheelchair .....565**  
C.R. Hema, M.P. Paulraj, Sazali Yaacob, Abdul Hamid Adom, and R. Nagarajan
- 58 Toward an Application to Psychological Disorders Diagnosis.....573**  
Luciano Comin Nunes, Plácido Rogério Pinheiro, Tarcísio Cavalcante Pequeno, and Mirian Calíope Dantas Pinheiro
- 59 Enhancing Medical Research Efficiency by Using Concept Maps .....581**  
Varadraj P. Gurupur, Amit S. Kamdi, Tolga Tuncer, Murat M. Tanik, and Murat N. Tanju
- 60 Analysis of Neural Sources of P300 Event-Related Potential in Normal and Schizophrenic Participants .....589**  
Malihe Sabeti, Ehsan Moradi, and Serajeddin Katebi
- 61 Design and Development of a Tele-Healthcare Information System Based on Web Services and HL7 Standards.....599**  
Ean-Wen Huang, Rui-Suan Hung, Shwu-Fen Chiou, Fei-Ying Liu, and Der-Ming Liou

<b>62</b>	<b>Fuzzy Logic Based Expert System for the Treatment of Mobile Tooth</b> .....	<b>607</b>
	Vijay Kumar Mago, Anjali Mago, Poonam Sharma, and Jagmohan Mago	
<b>63</b>	<b>A Microcomputer FES System for Wrist Moving Control</b> .....	<b>615</b>
	Li Cao, Jin-Sheng Yang, Zhi-Long Geng, and Gang Cao	
<b>64</b>	<b>Computer-Aided Decision System for the Clubfeet Deformities</b> .....	<b>623</b>
	Tien Tuan Dao, Frédéric Marin, Henri Bensahel, and Marie Christine Ho Ba Tho	
<b>65</b>	<b>A Framework for Specifying Safe Behavior of the CIIP Medical System</b> .....	<b>637</b>
	Seyed Morteza Babamir	
 <b>Part VIII Software Packages and Other Computational Topics in Bioinformatics</b>		
<b>66</b>	<b>Lotka–Volterra System with Volterra Multiplier</b> .....	<b>647</b>
	Klaus G�rlebeck and Xinhua Ji	
<b>67</b>	<b>A Biological Compression Model and Its Applications</b> .....	<b>657</b>
	Minh Duc Cao, Trevor I. Dix, and Lloyd Allison	
<b>68</b>	<b>Open Source Clinical Portals: A Model for Healthcare Information Systems to Support Care Processes and Feed Clinical Research</b> .....	<b>667</b>
	Paolo Locatelli, Emanuele Baj, Nicola Restifo, Gianni Origgi, and Silvia Bragaglia	
<b>69</b>	<b>Analysis and Clustering of MicroRNA Array: A New Efficient and Reliable Computational Method</b> .....	<b>679</b>
	Luca Sterpone, Federica Collino, Giovanni Camussi, and Claudio Loconsole	
<b>70</b>	<b>Stochastic Simulations of Mixed-Lipid Compartments: From Self-Assembling Vesicles to Self-Producing Protocells</b> .....	<b>689</b>
	Kepa Ruiz-Mirazo, Gabriel Piedrafita, Fulvio Ciriaco, and Fabio Mavelli	
<b>71</b>	<b>A New Genetic Algorithm for Polygonal Approximation</b> .....	<b>697</b>
	Cecilia Di Ruberto and Andrea Morgera	



<b>72</b>	<b>Challenges When Using Real-World Bio-data to Calibrate Simulation Systems</b> .....	<b>709</b>
	Elaine M. Blount, Stacie I. Ringleb, and Andreas Tolk	
<b>73</b>	<b>Credibility of Digital Content in a Healthcare Collaborative Community</b> .....	<b>717</b>
	Wail M. Omar, Dinesh K. Saini, and Mustafa Hasan	
<b>74</b>	<b>Using Standardized Numerical Scores for the Display and Interpretation of Biomedical Data</b> .....	<b>725</b>
	Robert A. Warner	
<b>75</b>	<b>ImagCell: A Computer Tool for Cell Culture Image Processing Applications in Bioimpedance Measurements</b> .....	<b>733</b>
	Alberto Yúfera, Estefanía Gallego, and Javier Molina	
<b>76</b>	<b>From Ontology Selection and Semantic Web to an Integrated Information System for Food-borne Diseases and Food Safety</b> .....	<b>741</b>
	Xianghe Yan, Yun Peng, Jianghong Meng, Juliana Ruzante, Pina M. Fratamico, Lihan Huang, Vijay Juneja, and David S. Needleman	
<b>77</b>	<b>Algebraic Analysis of Social Networks for Bio-surveillance: The Cases of SARS-Beijing-2003 and AH1N1 Influenza-México-2009</b> .....	<b>751</b>
	Doracelly Hincapié and Juan Ospina	
	<b>Index</b> .....	<b>763</b>



<http://www.springer.com/978-1-4419-7045-9>

Software Tools and Algorithms for Biological Systems

Arabnia, H.R.; Tran, Q.-N. (Eds.)

2011, XLIV, 776 p., Hardcover

ISBN: 978-1-4419-7045-9