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**PROCEEDINGS OF  
THE 2012 INTERNATIONAL CONFERENCE ON  
BIOINFORMATICS & COMPUTATIONAL BIOLOGY**

# **BIOCOMP 2012**

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**Hamid R. Arabnia  
Quoc-Nam Tran**

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**Andy Marsh, Ashu M. G. Solo**



***WORLD COMP'12***

July 16-19, 2012

Las Vegas Nevada, USA

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# Foreword

It gives us great pleasure to introduce this collection of papers to be presented at the 2012 International Conference on Bioinformatics & Computational, July 16 through 19, 2012, at Monte Carlo Resort, Las Vegas, USA.

**The Academic Co-Sponsors, Corporate Co-Sponsors, Co-Sponsors At-Large and Organizers of this year's conference include** (separated by semicolons):

Bioinformatics & Computational Biology Program, George Mason University, Virginia, USA; Biomedical Cybernetics Laboratory, HST of Harvard University and MIT, USA; Minnesota Supercomputing Institute, University of Minnesota, USA; Center for Cyber Defense, NCAT, USA; Argonne's Leadership Computing Facility of Argonne National Laboratory, Illinois, USA; The Center for Advanced Studies in Identity Sciences (CASIS: NC A&T, Carnegie Mellon, Clemson, UNC Wilmington), USA; Knowledge Management & Intelligent System Center (KMIS) of University of Siegen, Germany; Intelligent Cyberspace Engineering Lab., ICEL, Texas A&M University, Commerce, Texas, USA; UMIT, Institute of Bioinformatics and Translational Research, Austria; Hawkeye Radiology Informatics, Department of Radiology, College of Medicine, University of Iowa, Iowa, USA; The International Council on Medical and Care Compunetics, Europe; US Chapter of World Academy of Science (<http://www.world-academy-of-science.org/>); Supercomputer Software Department (SSD), Institute of Computational Mathematics & Mathematical Geophysics, Russian Academy of Sciences, Russia; International Society of Intelligent Biological Medicine, USA; NDSU-CIIT Green Computing and Communications Laboratory, USA; Medical Image HPC & Informatics Lab (MiHi Lab), University of Iowa, Iowa, USA; High Performance Computing for Nanotechnology, USA; Manx Telecom, Europe; Computer Science Research, Education, and Applications Press; World Academy of Biomedical Sciences and Technologies; HoIP Telecom, Europe; Super Micro Computer, Inc., San Jose, California, USA; Intel Corporation; Hodges Health, UK; and OMG™. In addition, a number of university faculty members and their staff (names appear below and also on the cover of the proceedings), several publishers of computer science and computer engineering books and journals, chapters and/or task forces of computer science associations/organizations from 6 countries, and developers of high-performance machines and systems provided significant help in organizing the conference as well as providing some resources.

An important mission of WORLDCOMP (a federated congress to which this conference is affiliated with) includes "Providing a unique platform for a diverse community of constituents composed of scholars, researchers, developers, educators, and practitioners. The Congress makes concerted effort to reach out to participants affiliated with diverse entities (such as: universities, institutions, corporations, government agencies, and research centers/labs) from all over the world. The congress also attempts to connect participants from institutions that have **teaching** as their main mission with those who are affiliated with institutions that have **research** as their main mission. The congress uses a quota system to achieve its institution and geography diversity objectives."

The program committee would like to thank all those who submitted papers for consideration 41% of the submissions were from outside the United States. Each paper was peer-reviewed by two experts in the field for originality, significance, clarity, impact, and soundness. In cases of contradictory recommendations, a member of the conference program committee was charged to make the final decision; often, this involved seeking help from additional referees by using a double-blinded review process. In addition, papers whose authors included a member of the conference program committee were evaluated using the double-blinded review process. The only exception to the above evaluation process was for papers that were submitted directly to chairs/organizers of approved sessions/workshops; in these cases, the chairs/organizers were responsible for the evaluation of such submissions. The overall paper acceptance rate for regular papers was 27%; 9% of the remaining papers were accepted as poster papers (at the time of this writing, we had not yet received the acceptance rate for a few individual tracks.)

We are very grateful to the many colleagues who helped in organizing the conference. In particular, we would like to thank the members of the BIOCAMP'12 Program Committee who we hope will offer their

help again in organizing the next year's conference (BIOCOMP'13). The BIOCOMP'12 Program Committee members were:

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We express our gratitude to keynote, invited, and individual conference/tracks and tutorial speakers - the list of speakers appears on the conference web site. We would also like to thank the followings: UCMSS (Universal Conference Management Systems & Support, California, USA) for managing all aspects of the conference; Dr. Tim Field of APC for managing the printing of the proceedings; and the staff of Monte Carlo Resort in Las Vegas for the professional service they provided. Last but not least, we would like to thank the Co-Editors and Associate Co-Editors of BIOCOMP'12: Prof. Hamid R. Arabnia, Prof. Quoc-Nam Tran, Prof. Andy Marsh, and Ashu M. G. Solo.

We present the proceedings of BIOCOMP'12.

***Steering Committee, BIOCOMP'12***

***<http://www.world-academy-of-science.org/worldcomp12/ws>***

# Contents

## **SESSION: COMPUTATIONAL METHODS FOR MICROARRAY, GENE EXPRESSION ANALYSIS, AND GENE REGULATORY NETWORKS**

<b>Integrative Modeling of Transcriptional Regulatory Networks in Head and Neck Cancer</b>	<b>3</b>
<i>Bin Yan, Huai Li, Zhong Chen, Jiaofang Shao, Ming Zhan</i>	
<b>Fuzzy Relational System For Identification of Gene Regulatory Network</b>	<b>9</b>
<i>Papia Das, Pratyusha Rakshit, Amit Konar, Mita Nasipuri, Atulya K. Nagar</i>	
<b>CUDA-Accelerated Data-Mining for Putative Heteromeric Transcription Factors and Target Genes Using Microarray Gene Expression Profiles</b>	<b>16</b>
<i>Edward Salinas, Amitava Karmaker</i>	
<b>Study of Classification Accuracy of Microarray Data for Cancer Classification using Hybrid, Wrapper and Filter Feature Selection Method</b>	<b>23</b>
<i>Sujata Dash, Bichitrananda Patra</i>	

## **SESSION: BIOINFORMATICS DATABASES, DATA MINING, AND PATTERN DISCOVERY TECHNIQUES**

<b>A Cluster-based Approach for Biological Hypothesis Testing and its Application</b>	<b>33</b>
<i>Jiwon Park, Jin Soung Yoo, Ahmed Mustafa</i>	
<b>Prediction of Proteins' Molecular Surfaces from their Corresponding Amino Acid Sequences</b>	<b>39</b>
<i>Jing Zhao, Eric Paquet, Herna L. Viktor</i>	
<b>Fast Sequence Database Search Using Intra-Sequence Parallelized Smith-Waterman Algorithm</b>	<b>45</b>
<i>Chung-E Wang</i>	
<b>Bimodal Gene Prediction Via Gap Maximisation</b>	<b>51</b>
<i>Abdullatif S. Al-Watban, Zheng Rong Yang</i>	
<b>Optimizing the Analysis of Clustered Data</b>	<b>58</b>
<i>Robert A. Warner</i>	
<b>Transition Initiation Sites (TIS) Recognition in DNA Sequence using Machine Learning</b>	<b>64</b>
<i>Muhammad Hossain, Kanaan Faisal</i>	

## **SESSION: PROTEIN CLASSIFICATION AND STRUCTURE PREDICTION, AND COMPUTATIONAL STRUCTURAL BIOLOGY**



<b>A New Hybrid De Novo Sequencing Method For Protein Identification</b>	<b>75</b>
<i>Penghao Wang, Albert Zomaya, Susan Wilson</i>	
<b>Protein Localization by Integrating Multiple Protein Correlation Networks</b>	<b>82</b>
<i>Ananda Mondal, Jianjun Hu</i>	
<b>Finding Better Partitions and Conserved Modules in WNT Signaling Pathways</b>	<b>89</b>
<i>Losiana Nayak, Rajat K. De</i>	
<b>Identification and Bioinformatic Analyses of Vanillate Operon in Cyanobacterium <i>Synechococcus</i> sp. IU 625</b>	<b>96</b>
<i>Robert Newby , Tin-Chun Chu</i>	
<b>Evolutionary Approach of Ligand Design for Protein-Ligand Docking Problem Using Artificial Bee Colony Optimization</b>	<b>102</b>
<i>Pratyusha Rakshit, Papia Das, Archana Chowdhury, Amit Konar, Mita Nasipuri, Atulya K. Nagar</i>	
<b>Protein Query Language: A Novel Approach</b>	<b>109</b>
<i>Sherif Elfayoumy, Paul Bathen</i>	
<b>Purifying and Filtering the Coupling Matrix Approach for Protein-Protein Interaction Network Analysis</b>	<b>114</b>
<i>Ying Liu</i>	
<b>Bioinformatics Analysis Identify Novel OB Fold Protein Coding Genes in <i>C. elegans</i></b>	<b>118</b>
<i>Daryanaz Dargahi, Dave Baillie, Frederic Pio</i>	
<b>Search in the Tumor Liberated Protein (TLP) for Specific Peptides of Non Small Cell Lung (NSCL) Cancer</b>	<b>131</b>
<i>Giulio Tarro</i>	
 <b>SESSION: COMPARATIVE SEQUENCE, GENOME ANALYSIS, GENOME ASSEMBLY, AND GENOME SCALE COMPUTATIONAL METHODS</b>	
<b>On Identifying Metabolic Functions of Noncoding RNAs in <i>S. cerevisiae</i></b>	<b>137</b>
<i>Eric Struminger, Max Garzon, Sungchul Ji</i>	
<b>De Novo Identification of 'heterotigs' Towards Accurate and In-phase Assembly of Complex Plant Genomes</b>	<b>144</b>
<i>Jared Price, Joshua Udall, Paul Bodily, Judson Ward, Michael Schatz, Justin Page, James Jensen, Quinn Snell, Mark Clement</i>	

<b>On Using Information-Theoretic Quantities in Characterization Dissimilarity of DNA Strings</b>	<b>151</b>
<i>Fairul Mohd-Zaid, Xiaoping Shen, Katheryn A. Farris</i>	
<b>Computational Criteria for the Disablement of Human GAPDH Pseudogenes</b>	<b>158</b>
<i>Christopher Theisen, Kirsten Seidler, Norbert Seidler</i>	
<b>FPGA Based Accelerator For Bioinformatics Haplotype Inference Application</b>	<b>166</b>
<i>Naim Harb, Mazen Saghir, Zaher Dawy, Carlos Valderrama</i>	
<b>Methodological Procedure for Decision-Making Using Fuzzy Inference for SNP Discovery</b>	<b>173</b>
<i>Wagner Arbex, Marta Martins, Marcos Vinicius Silva, Luis Alfredo Carvalho</i>	
<b>Bioinformatic Analysis of Cyanobacterial Mercuric Resistance Related Genes and Identification of Synechococcus sp. IU 625 Putative Mercuric Resistance Genes</b>	<b>178</b>
<i>Lee Lee, Chiedozie Okafor, Matthew Rienzo, Tin-Chun Chu</i>	
<b>Accelerating the Smith-Waterman Algorithm for Bio-sequence Matching on GPU</b>	<b>184</b>
<i>Qianghua Zhu, Fei Xia, Guoqing Jin</i>	
<b>Aligning Highly Variable DNA Sequences Using the W-curve and SQL</b>	<b>190</b>
<i>Steven Lembark, Shadi Beidas, Douglas Cork</i>	
 <b>SESSION: EXPERIMENTAL MEDICINE, COMPUTER-ASSISTED MEDICAL CARE AND SERVICE SYSTEMS, ANALYSIS AND DIAGNOSTIC TOOLS</b>	
<b>Validating Critical Limits of the Universal Brain Injury Criterion</b>	<b>199</b>
<i>Igor Szczyrba, Martin Burtscher, Rafa Szczyrba</i>	
<b>XML in Health Information Systems</b>	<b>206</b>
<i>Justin Brewton, Xiaohong Yuan, Francis Akowuah</i>	
<b>Accurate Proton Beam Localization</b>	<b>213</b>
<i>Yin Chen, Ernesto Gomez, Ford Hurley, Ying Nie, Keith Schubert, Reinhard Schulte</i>	
<b>The HL7 CDA-Based Electronic Form For Physical Examination</b>	<b>218</b>
<i>Po-Yi Lee, Pei-Yuan Hung, Jiun-Hung Lin, Shih-Tsang Tang</i>	
<b>Cloud Computing System for Integrated Electronic Health Records</b>	<b>222</b>
<i>Hebah Mirza, Samir El-Masri</i>	
 <b>SESSION: HIGH PERFORMANCE METHODS, COMPUTATIONAL METHODS FOR FILTERING, NOISE CANCELLATION, AND SIGNAL AND IMAGE PROCESSING</b>	

**Localized Deconvolution: Characterizing NMR-based Metabolomics Spectroscopic Data using Localized High-throughput Deconvolution 229**

*Paul E. Anderson, Ajith H. Ranabahu, Deirdre A. Mahle, Nicholas V. Reo, Michael L. Raymer, Amit P. Sheth, Nicholas J. DelRaso*

**Simulating Anaesthetic Effects on a Network of Spiking Neurons with Graphics Processing Units 236**

*Arno Leist, Chris J. Scogings, Ken A. Hawick*

**Improving Performance of a TFD-based Spectral Estimation Method in Doppler Ultrasound Blood Flow Measurement 243**

*Fabian Garcia Nocetti, Julio Solano Gonzalez, Ernesto Rubio Acosta*

**Real Time Surface Tracking Method for Image Enhancement of Optical Coherence Tomography 249**

*Chul Gyu Song, Dong Ho Shin, Yong Kyun Oh, Jin Kang*

**Software Development Kit to Verify Quality Iris Images 253**

*Isaac Mateos Baltazar, Gualberto Aguilar Torres, Gina Gallegos Garcia*

**SESSION: COMPUTATIONAL METHODS FOR DRUG TARGETS AND SCREENING, AND PHARMACOINFORMATICS**

**Quantitative Analyses of Kinase Inhibitor Selectivity Using Very Small Size Panels 261**

*Quoc-Nam Tran*

**Co-evolutionary Multi Agent Pharmacoinformatics 268**

*Tagelsir Mohamed Gasmelseid*

**Bernstein Operational Matrix Method for Solving Physiology Problems 276**

*Khosrow Maleknejad, Elham Hashemizadeh, Mohammadreza Mohsenyazadeh*

**A Method of Breast Cancer Screening Based on Fractal Analysis 280**

*Roman Andrushkiw, Dmytro Klyushin, D Shervarly, Ekaterina Golubeva, Natalya Boroday*

**SESSION: COMPUTER-BASED MEDICAL SYSTEMS, STATISTICAL METHODS, MODELLING, SIMULATION AND OPTIMIZATION OF BIOLOGICAL SYSTEMS**

**An Agent-Based Modeling and Simulation Environment for Dynamic Biological Systems 285**

*Steven Phung, Rajdeep Singh, Jamie Lawson, Michael Hultner, Brian Peck, Ross Henderson, Dennis Hsu, Desmond Lun, Vijayaraj Nagarajan, Mariam Quinones, Darrell Hurt, Yentram Huyen, Mike Tartakovsky*

<b>Population Structure and Related Attribute-Weighting Schemes Under the Assumption of Infectious Disease Scenarios</b>	<b>292</b>
<i>Iris Gomez-Lopez, Olivia Loza, Armin R Mikler</i>	
<b>Blended HMMs-Reducing Redundancy in the SCOP HMM Database</b>	<b>299</b>
<i>Mingming Liu, Lenwood S. Heath, Layne T. Watson, Liqing Zhang</i>	
<b>Multiscale Discretization for Reaction Diffusion Systems</b>	<b>305</b>
<i>Fei Li, Yang Cao</i>	
<b>Quantum Cellular Combinatorics - An Equilibrium or Non-Equilibrium Approach</b>	<b>312</b>
<i>Wen-Ran Zhang</i>	
<b>Simulated Docking of Laninamavir with the 2009 Pandemic Strain Influenza A/H1N1 Neuraminidase Active Site</b>	<b>319</b>
<i>Jack Horner</i>	
<b>Towards a Motor Ability Training Table for Rehabilitating Children with Obstetric Brachial Plexus Lesion</b>	<b>326</b>
<i>Eduardo Alberti, Sergio Pichorim, Alessandro Brawerman</i>	
<b>A Simulated Docking of Abiraterone with Cytochrome P450 17A1</b>	<b>332</b>
<i>Jack Horner</i>	
<b>The Lymph Node Lymphocytes First Humoral Immune Response as an AnyLogic Agent-Based Model</b>	<b>338</b>
<i>Belkacem Khaldi, Foudil Cherif</i>	
<b>Alternative Two Sample Tests in Bioinformatics</b>	<b>345</b>
<i>Xiaohui Zhong, Kevin Daimi</i>	
<b>Simulated Docking of Oseltamivir with the 2009 Pandemic Strain Influenza A/H1N1 Neuraminidase Active Site</b>	<b>353</b>
<i>Jack Horner</i>	
<b>Simulation of an Implantable Microphone in the Middle Ear Cavity</b>	<b>360</b>
<i>Sang-Hyo Arman Woo, Ji Soon Park, Ji Min Kim, Woon Hwan Na, Byung Seop Song</i>	
<b>Simulated Docking of Zanamivir with the 2009 Pandemic Strain Influenza A/H1N1 Neuraminidase Active Site</b>	<b>364</b>
<i>Jack Horner</i>	

**Developing the Information Architecture for the Outsourcing Physical Examination** 371  
*Pei-Yuan Hung, Po-Yi Lee, Chia-Hung Hsiao, A.J LeeShih-Tsang Tang*

**Simulated Docking of Laninamivir with the 1918 Pandemic Strain Influenza A/H1N1 Neuraminidase Active Site** 375  
*Jack Horner*

**SESSION: SOFTWARE PACKAGES AND OTHER COMPUTATIONAL TOPICS  
IN MEDICIN, BIOINFORMATICS AND COMPUTATIONAL BIOLOGY**

**ScaffoldScaffolder: An Aggressive Scaffold Finishing Algorithm** 385  
*Paul Bodily, Jared Price, Mark Clement, Quinn Snell*

**A Bayesian Network Calculator of the Combined Effect of Climate Change, Chytridiomycosis, and Land-Use Change on Global Amphibian Diversity** 391  
*Jack Horner*

**A Web-based multi-Genome Synteny Viewer for Customized Data** 398  
*Kashi Revanna, Chi-Chen Chiu, Daniel Munro, Alvin Gao, Qunfeng Dong*

**An S-System Analysis of the Light Response of the Microalga *Chlamydomonas reinhardtii* during Biohydrogen Production** 400  
*Jack Horner*

**Taming the Chatroom Bob: The Role of Brain-computer Interfaces that Manipulate Prefrontal Cortex Optimization for Increasing Participation of Victims of Traumatic Sex and other Abuse Online** 407  
*Jonathan Bishop*

**Research on BRATUMSS System of Detecting Transmission Model and Breast Tissues Target Spectrum Distribution** 414  
*Zhifu Tao, Zhonglin Han, Meng Yao, Yizhou Yao, Blair Fleet, Erik D. Goodman, Huiyan Wang, John R. Deller*

**Open-source Dental Laboratories Web Content Management Systems vs. Commercial Web Content Management Systems** 418  
*Reham Alabduljabbar, Samir El-Masri*

**An S-System Analysis of the Sulfur-Deprivation Response of the Microalga *Chlamydomonas reinhardtii* during Biohydrogen Production** 427  
*Jack Horner*

**Pseudoneglect and its Many Faces: Laterality of Motor Control Underpins Asymmetries in Line Bisection, Initial Visual Exploration, Optimal Viewing Position, Point of Subjective Equality and Visual Span** 434  
*Iraj Derakhshan*

<b>In Silico Docking Study of Active Constituents Identified in Morinda Citrifolia Linn as Enzyme Targets of Alzheimer's Disease</b>	<b>441</b>
<i>J Srikanth, S Kavimani, C Uma Maheswara Reddy</i>	
<b>Archaeopteryx Dethroned?</b>	<b>445</b>
<i>Jack Horner</i>	
<b>Bioninformatics Web Services</b>	<b>452</b>
<i>Mohamad Ibrahim Ladan</i>	
<b>Evaluating Spirometric Trends in Patients with Cystic Fibrosis Patients</b>	<b>459</b>
<i>Sara Zarei, Mohammad Abouali, Ali Mirtar, J. Redfield, D. Palmer, D. J. Conrad, Peter Salamon</i>	
<b>Computer Algebra in Pharmaceutical Engineering</b>	<b>465</b>
<i>Juan Carlos Guerrero Sierra</i>	
<b>Analytical Model of the Brain Vascular System for Estimation of the Arterial Input Function (AIF) at the Tissue Level</b>	<b>472</b>
<i>Siamak Nejad Davarani, Hassan Bagher-Ebadian, James Ewing, Michael Chopp, Douglas Noll, Quan Jiang</i>	
<b>Protein Torsion Angle Class Prediction by a Hybrid Architecture of Bayesian and Neural Networks</b>	<b>477</b>
<i>Zafer Aydin, James Thompson, Jeffrey Bilmes, David Baker, William Noble</i>	
<b>Cryptography and Information Protection in the Living World</b>	<b>484</b>
<i>Naya Nagy, Marius Nagy, Paul Hodor</i>	
<b>Comparison of Sequence Similarity Measures for Distant Evolutionary Relationships</b>	<b>493</b>
<i>Abhishek Majukumar, Peter Revesz</i>	
<b>Bioinformatics: an Overview for Cancer Research</b>	<b>499</b>
<i>Murad Al-Rajab, Joan Lu</i>	
<b>In Silico Screening of the Library of Pyrimidine Derivatives as Antitubercular Agent</b>	<b>505</b>
<i>Gopinathan Narasimhan, Chitra Krishnan</i>	
<b>Comparison of Statistical Tools for Microarray Data Analysis</b>	<b>512</b>
<i>Ouafae Kaissi, Ahmed Moussa, Abdellatif Amrani Ghacham, Brigitte Vannier</i>	
<b>Assessment of Variability of the Mouse Myocardial Fiber Structure via Principal Component Analysis</b>	<b>516</b>
<i>Samer Merchant, Yi Jiang, Sarang Joshi, Edward Hsu</i>	

## **Deciphering the Splicing Codes of Spliceosomal Introns**

**521**

*Degen Zhuo, Wenhong Cao, Shoukang Zhu, Chunming Dong, A.D.M Glass*