

2011 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology

(CIBCB 2011)

**Paris, France
11-15 April 2011**



IEEE Catalog Number: CFP11CIB-PRT
ISBN: 978-1-4244-9896-3

TABLE OF CONTENTS

CIBCB 2011 COMMITTEE.....	viii
CIBCB 2011 TUTORIAL.....	ix
CIBCB 2011 TECHNICAL SESSIONS	1

Tuesday, April 12

C23: CIBCB - Tutorial

Introduction to Bioinformatics

Jason Moore (Dartmouth College, USA)

Wednesday, April 13

8:30 – 10:30

S24: Sequence Analysis and Gene Finding

Chair: Clare Bates Congdon (University of Southern Maine, USA)

Predicting coding region candidates in the DNA sequence based on visualization without training	1
---	---

Bo Chen (The Hong Kong Polytechnic University, Hong Kong);
Ping Ji (The Hong Kong Polytechnic University, Hong Kong)

Protein Secondary Structure Prediction Using BLAST and Relaxed Threshold Rule Induction From Coverings	7
--	---

Leong Lee (University of North Carolina at Greensboro, USA)
Jennifer L. Leopold (Missouri University of Science and Technology, USA)
Ronald L. Frank (Missouri University of Science and Technology, USA)

Regularized Linear Discriminant Analysis and Its Recursive Implementation for Gene Subset Selection.....	15
--	----

K.Z. Mao (Nanyang Technological University, Singapore)
Feng Yang (Nanyang Technological University, Singapore)
Wenyin Tang (Nanyang Technological University, Singapore)

Combined Covariance Model for Non-Coding RNA Gene Finding.....	22
--	----

Wenbo Jiang (Simon Fraser University, Canada)
Kay C. Wiese (Simon Fraser University, Canada)

Secondary Structure Element Voting for RNA Gene Finding.....	27
--	----

Nicholas Erho (Simon Fraser University, Canada)
Kay C. Wiese (Simon Fraser University, Canada)

Comparative Analysis of Machine Learning Techniques for the Prediction of LogP	35
--	----

Edward W. Lowe, Jr. (Vanderbilt University, USA)
Mariusz Butkiewicz (Vanderbilt University, USA)
Matthew Spellings (Vanderbilt University, USA)
Albert Omlor (Saarland University, Germany)
Jens Meiler (Vanderbilt University, USA)

10:30 – 16:30

PS2: CIBCB -2011

Poster Session

Organizational Texts Classification Using Artificial Immune Recognition Systems	41
Nafiseh Forouzideh (University of Tehran, Iran)	
Maryam Tayefeh Mahmoudi (University of Tehran, Iran)	
Kambiz Badie (Iran Telecom Research Center, Iran)	
Illumination field estimation through background detection in optical microscopy	49
Alessandro Gherardi (University of Bologna, Italy)	
Alessandro Bevilacqua (University of Bologna, Italy)	
Filippo Piccinini (University of Bologna, Italy)	
An Incremental Method for Mosaicing of Optical Microscope Imagery.....	55
Ludovico Carozza (University of Bologna, Italy)	
Alessandro Bevilacqua (University of Bologna, Italy)	
Filippo Piccinini (University of BOLOGNA, Italy)	
A Simulation of Bacterial Communities	61
Daniel Ashlock (University of Guelph, Canada)	
Andrew McEachern (University of Guelph, Canada)	
Generalized Operators and Its Application to A Nonlinear Fuzzy Clustering Model	69
Mika Sato-Ilic (University of Tsukuba, Japan)	
11:00 – 12:40	
S25: Novel Applications of Computational Intelligenc	
Chair: Daniel A Ashlock (University of Guelph, Canada)	
Fitting Contact Networks to Epidemic Behavior with an Evolutionary Algorithm	76
Daniel A. Ashlock (University of Guelph, Canada)	
Elisabeth Shiller (University of Guelph, Canada)	
Tackling the Challenging Motif Problem through Hybrid Particle Swarm Optimized	
Alignment Clustering	84
Chengpeng Bi (Children's Mercy Hospital, USA)	
Comparative Study of Protein Interaction Networks for Virulence Factors of Co-existing Bacteria	
responsible for Nosocomial Infections	B#5
Namit Bharija (Nanyang Technological University, Singapore)	
Kwoh Chee Keong (Nanyang Technological University, Singapore)	
Optimizing the Salmon Algorithm for the Construction of DNA Error-Correcting Codes	102
John Orth (Brock University, Canada)	
Sheridan Houghten (Brock University, Canada)	
Designing Artificial Organisms For Use In Biological Simulations	109
Wendy Ashlock (York University, Canada)	
Daniel Ashlock (University of Guelph, Canada)	

14:00 – 16:00

S26: Computational Solutions of Biological Problems

Chair: Jennifer Smith (Boise State University, USA)

Maximum Likelihood Phylogenetic Reconstruction Using Gene Order Encodings 117

Fei Hu (University of South Carolina, USA)
Nan Gao (University of South Carolina, USA)
Meng Zhang (Jilin University, China)
Jijun Tang (University of South Carolina, USA)

Tensor Decomposition Methods for the Classification of Three-Dimensional Microarray Data.....B#5

Yifeng Li (University of Windsor, Canada)
Alioune Ngom (University of Windsor, Canada)

Derivation of Minimum Best Sample Size from Microarray Data Sets: A Monte Carlo Approach 129

Chengpeng Bi (University of Missouri, USA)
Mara Becker (University of Missouri, USA)
Steve Leeder (University of Missouri, USA)

Isolating - A New Resampling Method for Gene Order Data..... 135

Jian Shi (University of South Carolina, USA)
William Arndt (University of South Carolina, USA)
Fei Hu (University of South Carolina, USA)
Jijun Tang (University of South Carolina, USA)

Discovery of MicroRNA Markers: An SVM-based Multiobjective Feature Selection Approach 141

Anirban Mukhopadhyay (University of Kalyani, India)
Ujjwal Maulik (Jadavpur University, India)
Sanghamitra Bandyopadhyay (Indian Statistical Institute, India)

16:30 – 18:00

S27: Applications of CI to Biomedical Problems

Chair: Steven Corns (Missouri University of Science and Technology, USA)

Improving the transparency in fuzzy modelling of radiotherapy margins in cancer treatment..... 146

Bongile Mzenda (University of Portsmouth, United Kingdom)
David J Brown (University of Portsmouth, United Kingdom)
Alexander Gegov (University of Portsmouth, United Kingdom)

Accelerating Kernel Clustering for Biomedical Data Analysis 154

Andrej Gisbrecht (University of Bielefeld, Germany)
Barbara Hammer (University of Bielefeld, Germany)
Frank-Michael Schleif (University of Bielefeld, Germany)
Xibin Zhu (University of Bielefeld, Germany)

Utilization of Gene Ontology in Semi-supervised Clustering 162

Duong D. Doan (University of New Brunswick, Canada)
Yunli Wang (National Research Council Canada, Canada)
Youlian Pan (National Research Council Canada, Canada)

A Comparison of Finite State Classifier and Mahalanobis-Taguchi System for Multivariate Pattern Recognition in Skin Cancer Detection	169
Elizabeth Cudney (Missouri University of Science and Technology, USA)	
Steven Corns (Missouri University of Science and Technology, USA)	
ROAR: A Reference Ontology for Anatomical Relations	176
Alton B. Coalter (Missouri University of Science and Technology, USA)	
Jennifer L. Leopold (Missouri University of Science and Technology, USA)	
Reverse Engineering of Gene Regulatory Networks: A Systems Approach	184
Zhen Wang (Queen's University, Canada)	
Parvin Mousavi (Queen's University, Canada)	
AUTHOR INDEX	190