

# **12th International Conference on Bioinformatics and Computational Biology (BICOB 2020)**

EPiC Series in Computing Volume 70

San Francisco, California, USA  
23-25 March 2020

## **Editors:**

**Qin Ding  
Oliver Eulenstein  
Hisham Al-Mubaid**

ISBN: 978-1-7138-0952-4

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2020) by the International Society for Computers and Their Applications  
All rights reserved. Reproduction in any form without the written consent of ISCA is prohibited.

ISBN: 978-1-7138-0952-4

Printed with permission by Curran Associates, Inc. (2020)

For permission requests, please contact the International Society for Computers and Their Applications  
at the address below.

International Society for Computers and Their Applications  
64 White Oak Court  
Winona, MN 55987  
USA

Phone: (507) 458-4517

isca@ipass.net

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: curran@proceedings.com  
Web: www.proceedings.com

# TABLE OF CONTENTS

## **SECTION 1A: CANCER RESEARCH**

IDENTIFICATION OF DEREGULATED TRANSCRIPTION FACTORS INVOLVED IN SPECIFIC BLADDER CANCER SUBTYPES .....	1
<i>Magali Champion, Julien Chiquet, Pierre Neuvial, Mohamed Elati, François Radvanyi, Etienne Birmelé</i>	
RANKING VARIABLE COMBINATIONS TO CHARACTERIZE BREAST CANCER SUBTYPES USING THE IBIF-RF METRIC .....	11
<i>Isis Narvaez-Bandera, Wandaliz Torres-Garcia</i>	
IN SILICO LIBRARY DESIGN, SCREENING AND MD SIMULATION OF COX-2 INHIBITORS FOR ANTICANCER ACTIVITY .....	21
<i>Ankita Sahu, Dibyabhaba Pradhan, Khalid Raza, Sahar Qazi, A K Jain, Saurabh Verma</i>	
BIFURCATION ANALYSIS OF A MATHEMATICAL MODEL OF TUMOR GROWTH IN MCF-7 BREAST CANCER CELL LINE.....	33
<i>Hsiu-Chuan Wei</i>	

## **SECTION 1B: MACHINE LEARNING IN BIOINFORMATICS**

CLASSIFICATION OF FUNCTIONAL NEAR INFRA RED SIGNALS WITH MACHINE LEARNING FOR PREDICTION OF EPILEPSY .....	41
<i>Roberto Rosas-Romero, Edgar Guevara</i>	
PHGC: A MACHINE LEARNING BASED WORKFLOW FOR PHENOTYPE-GENOTYPE CO-ANALYSIS ON AUTISM .....	49
<i>Safa Shubbar, Chen Fu, Zhi Liu, Anthony Wynshaw-Boris, Qiang Guan</i>	
FROM UNSUPERVISED MULTI-INSTANCE LEARNING TO IDENTIFICATION OF NEAR-NATIVE PROTEIN STRUCTURES .....	59
<i>Fardina Alam, Amarda Shehu</i>	
ASSESSING PROTEIN-DRUG RESISTANCE DUE TO MUTATIONS VIA A RIGIDITY ANALYSIS IN SILICO APPROACH .....	69
<i>Dylan Carpenter, Tess Thackray, Cecilia Kalthoff, Filip Jagodzinski</i>	

## **SECTION 1C: BIOINFORMATICS I**

VIRTUAL EXPERIMENTATION COMPLEMENTS REAL-WORLD EXPERIMENTATION.....	79
<i>Andrew Smith, Glen Ropella, C. Anthony Hunt</i>	
VISUALIZING OMICS DATA FROM SPACEFLIGHT SAMPLES USING THE NASA GENELAB PLATFORM .....	89
<i>Daniel Berrios, Eric Weitz, Kirill Grigorev, Sylvain Costes, Samrawit Gebre, Afshin Beheshti</i>	
CLIQUE SELECTION AND ITS EFFECT ON PARACLIQUE ENRICHMENT: AN EXPERIMENTAL STUDY .....	99
<i>Yuping Lu, Charles Phillips, Elissa Chesler, Michael Langston</i>	

GRAPHICAL PROCESSING UNIT - SUPPORTED RNA SECONDARY STRUCTURE COMPARISON.....	109
<i>Mutlu Mete, Abdullah Arslan</i>	

## **SECTION 2A: GENOME ANALYSIS**

CO-EXPRESSION NETWORKS UNCOVER REGULATION OF SPLICING AND TRANSCRIPTION MARKERS OF DISEASE.....	119
<i>Pan Zhang, Bruce Southey, Sandra Rodriguez-Zas</i>	

MINING APPROXIMATE FREQUENT DENSE MODULES FROM MULTIPLE GENE EXPRESSION DATASETS .....	129
<i>San Ha Seo, Saeed Salem</i>	

ANALYSIS OF MUTATION BIAS IN SHAPING CODON USAGE BIAS AND ITS ASSOCIATION WITH GENE EXPRESSION ACROSS SPECIES.....	139
<i>Zhixiu Lu, Michael Gilchrist, Scott Emrich</i>	

MULTI-OBJECTIVE OPTIMISATION OF GENE REGULATORY NETWORKS: INSIGHTS FROM A BOOLEAN CIRCADIAN CLOCK MODEL .....	149
<i>Ozgur Ekim Akman, Jonathan Edward Fieldsend</i>	

## **SECTION 2B: NEURAL NETWORKS AND PREDICTIVE APPROACHES IN BIOINFORMATICS**

CONVOLUTIONAL NEURAL NET LEARNS PROMOTER SEQUENCE FEATURES DRIVING TRANSCRIPTION STRENGTH.....	163
<i>Nicholas Leiby, Ayaan Hossain, Howard M Salis</i>	

EPILEPTIC FOCUS LOCALIZATION BASED ON IEEG PLOT IMAGES BY USING CONVOLUTIONAL NEURAL NETWORK.....	173
<i>Xuyang Zhao, Linfeng Sui, Toshihisa Tanaka, Jianting Cao, Qibin Zhao</i>	

EXPLORING DEEP NEURAL NETWORK ARCHITECTURES: A CASE STUDY ON IMPROVING ANTIMICROBIAL PEPTIDE RECOGNITION.....	182
<i>Manpriya Dua, Daniel Barbara, Amarda Shehu</i>	

ASPECT, AN LDA-BASED PREDICTIVE ALGORITHM FOR IN VITRO SELECTION .....	192
<i>Puzhou Wang</i>	

## **SECTION 2C: BIOINFORMATICS II**

EXPOSURE MEASUREMENTS ON BIOMIMETIC LOBULES USING VIRTUAL EXPERIMENTS TO HELP IMPROVE IVIVE.....	198
<i>Preethi Krishnan, Lopamudra Dutta, Andrew Smith, Glen Ropella, Ryan Kennedy, C. Anthony Hunt</i>	

MEASUREMENT OF SIMILARITY IN C. ELEGANS HEALTHSPAN USING DYNAMIC TIME WARPING ON MOVEMENT FEATURES .....	208
<i>Arun Govindaswamy, Wahhaj Farooq, Yiyang Wang, Ilyas Ustun, Daniela Raicu, Jacob Furst, Hongkyun Kim</i>	

HEPATOCYTE ORGANIZATION AFFECTS THE TRANSLATION OF CLEARANCE FROM  
IN VITRO TO IN VIVO ..... 217  
*Lopamudra Dutta, Preethi Krishnan, Andrew Smith, Ryan Kennedy, Glen Ropella, C.  
Anthony Hunt*

BIOINFORMATICS ANALYSIS OF HEREDITARY DISEASE GENE SET TO IDENTIFY KEY  
MODULATORS OF MYOCARDIAL REMODELING DURING HEART REGENERATION IN  
ZEBRAFISH ..... 226  
*Lawrence Yu-Min Liu, Zih-Yin Lai, Min-Hsuan Lin, Yu Shih, Yung-Jen Chuang*

PREDICTING MICROVASCULAR INVASION OF HEPATOCELLULAR CARCINOMA BY  
TEXTURE ANALYSIS OF MULTI-PHASE MR IMAGE ..... 238  
*Qin Yu, Geng Chen, Jiaqi Li, Xiaolong Liu, Xuegong Zhang, Haiming Lu*

**Author Index**