

# 2013 International Symposium on Computational Models for Life Sciences

# Sydney, Australia

27-29 November 2013

### **Editors**

**Changming Sun** 

**Tomasz Bednarz** 

CSIRO, North Ryde, Australia

Tuan D. Pham

The University of Aizu, Fukushima, Japan

**Pascal Vallotton** 

**Dadong Wang** 

CSIRO, North Ryde, Australia

### **Sponsoring organization(s):**

Technical Co-Sponsorship:
IEEE Systems, Man and Cybernetics Society
Technical Co-Support:
IEEE-SMC Technical Committee on Computational Life Science
Conference Sponsors:
CSIRO



### **Editors**

### **Changming Sun Tomasz Bednarz**

CSIRO
Computational Informatics
11 Julius Avenue
North Ryde
NSW 2113
Australia
E-mail: changming.sun@csiro.au
tomasz.bednarz@csiro.au

### Tuan D. Pham

The University of Aizu
Aizu Research Cluster for Medical Engineering and Informatics
Center for Advanced Information Science and Technology
Aizuwakamatsu, Fukushima 965-8580
Japan
E-mail: tdpham@u-aizu.ac.jp

### Pascal Vallotton Dadong Wang

CSIRO
Computational Informatics
11 Julius Avenue
North Ryde
NSW 2113
Australia
E-mail: pascal.vallotton@csiro.au
dadong.wang@csiro.au

Authorization to photocopy items for internal or personal use, beyond the free copying permitted under the 1978 U.S. Copyright Law (see statement below), is granted by the AIP Publishing LLC for users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$30.00 per copy is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923, USA: http://www.copyright.com. For those organizations that have been granted a photocopy license by CCC, a separate system of payment has been arranged. The fee code for users of the Transactional Reporting Services is: 978-0-7354-1187-6/13/\$30.00



© 2013 AIP Publishing LLC

No claim is made to original U.S. Government works.

Permission is granted to quote from the AIP Conference Proceedings with the customary acknowledgment of the source. Republication of an article or portions thereof (e.g., extensive excerpts, figures, tables, etc.) in original form or in translation, as well as other types of reuse (e.g., in course packs) require formal permission from AIP Publishing and may be subject to fees. As a courtesy, the author of the original proceedings article should be informed of any request for republication/reuse. Permission may be obtained online using RightsLink. Locate the article online at http://proceedings.aip.org, then simply click on the RightsLink icon/"Permissions/Reprints" link found in the article abstract. You may also address requests to: AIP Publishing Office of Rights and Permissions, Suite 1NO1, 2 Huntington Quadrangle, Melville, NY 11747-4502, USA; Fax: 516-576-2458; E-mail: rights@aip.org.

ISBN 978-0-7354-1187-6'®Qtki kpcriRtkpv+ ISSN 0094-243X Printed in the United States of America

# AIP Conference Proceedings, Volume 1559 2013 International Symposium on Computational Models for Life Sciences

## **Table of Contents**

Preface: 2013 International Symposium on Computational Models for Life Sciences	
Changming Sun, Tomasz Bednarz, Tuan D. Pham, Pascal Vallotton, and Dadong Wang	1
Chairs and Committees	P '1/C
Acknowledgements	P ' <b>1</b> C
INVITED TALKS	
Regulation of NF-kB oscillation by spatial parameters in true	
intracellular space (TiCS) Daisuke Ohshima, Hiroshi Sagara, and Kazuhisa Ichikawa	5
Visualising biological data: Current perspectives Seán I. O'Donoghue	12
SIGNAL ANALYSIS I	
On identification of elementary motion detectors Egi Hidayat, Alexander Medvedev, and Karin Nordström	14
Detection of changes in SEMG signals with myofascial pain using the pattern-classifier	
Ching-Fen Jiang and Pao-Tieh Huang	24
Epileptogenic focus detection in intracranial EEG based on delay permutation entropy	
Guohun Zhu, Yan Li, Peng Paul Wen, Shuaifang Wang, and Min Xi	31
Brain computer interface for operating a robot	
Humaira Nisar, Hari Chand Balasubramaniam, and Aamir Saeed Malik	37

Multi-complexity measures for early detection and monitoring of neurological abnormalities from gait time series	_
Valeriy Gavrishchaka, Kristina Davis, and Olga Senyukova	47
IMAGE ANALYSIS I	
Contact-free heart rate measurement using multiple video data	
Pang-Chan Hung, Kual-Zheng Lee, and Luo-Wei Tsai	57
Shortest path based splitting line finding for touching cells	
Xiangzhi Bai, Changming Sun, Peng Wang, and Fugen Zhou	67
Biomedical image analysis and processing in clouds	
Tomasz Bednarz, Piotr Szul, Yulia Arzhaeva, Dadong Wang, Neil	
Burdett, Alex Khassapov, Shiping Chen, Pascal Vallotton, Ryan	
Lagerstrom, Tim Gureyev, and John Taylor	77
Measure the change of vessel edges across time series retinal images	
Hao Hao, Dinesh Kant Kumar, and Behzad Aliahmad	80
Rib locating on chest direct radiography image using watershed	
algorithm and correlation matching	00
Xuechen Li, Suhuai Luo, and Qingmao Hu	90
SIGNAL ANALYSIS II	
Stochastic anomaly detection in eye-tracking data for quantification of	
motor symptoms in Parkinson's disease	
Daniel Jansson, Alexander Medvedev, Hans Axelson, and Dag Nyholm	98
A hybrid algorithm for multiple change-point detection in continuous	
measurements	
W. J. R. M. Priyadarshana, T. Polushina, and G. Sofronov	108
Development of the equipment measuring the degree of the mental	
activity	
Mayumi Oyama-Higa, Tiejun Miao, and Shigeki Takada	118
Potential of mental disease diagnosis of photoplethysmographic signals	
using SampEn	
Tokihiko Niwa, Mayumi Oyama-Higa, and Tuan D. Pham	128

Can specific transcriptional regulators assemble a universal cancer signature?	
Janine Roy, Zerrin Isik, Christian Pilarsky, and Michael Schroeder	135
PATTERN ANALYSIS	
Contrast/offset-invariant generic low-order MGRF models of uniform	
textures Ni Liu, Georgy Gimel'farb, Patrice Delmas, and Yuk Hin Chan	145
A robust face recognition algorithm under varying illumination using adaptive retina modeling	
Yuen Kiat Cheong, Vooi Voon Yap, and Humaira Nisar	155
Implementation and comparison of PSO-based algorithms for multi- modal optimization problems Pichet Sriyanyong and Haiyan Lu	165
VISUALISATION	
A new GUI based toolbox to compare particle tracking approaches Matthew Payne, Gerald Münch, and Pascal Vallotton	175
Visual analytics of phosphorylation time-series data on insulin response David K. G. Ma, Christian Stolte, Sandeep Kaur, Michael Bain, and Seán I. O'Donoghue	185
Trustworthy information sharing for biosecurity incident management - The AU2EU project	
John Zic	197
Visualization of carrageenan hydrogels by electron tomography Andrew Leis, Sofia Øiseth, Sandra Crameri, and Leif Lundin	206
IMAGE ANALYSIS II	
High precision localization of bacteria Mohammadreza Hosseini, Arcot Sowmya, Pascal Vallotton, and Tomasz Bednarz	215

Development of a motion capture system for measuring hidden points on a human model and its application to aiding a patient to sit upright in bed	
Akemi Nomura, Yasuko Ando, Tomohiro Yano, Yosuke Takami, Shoichiro Itou, Takako Sato, Akinobu Nemoto, and Hiroshi Arisawa	221
Automatic segmentation of equine larynx for diagnosis of laryngeal hemiplegia	
Md. Musfequs Salehin, Lihong Zheng, and Junbin Gao	230
CLASSIFICATION	
Classification of hydration status using electrocardiogram and machine	
learning Anthony Kaveh and Wayne Chung	240
A comparison of classification algorithms within the Classifynder pollen imaging system	
Ryan Lagerstrom, Yulia Arzhaeva, Leanne Bischof, Simon Haberle, Felicitas Hopf, and David Lovell	250
Cardiac data mining (CDM); organization and predictive analytics on biomedical (cardiac) data	
M. Musa Bilal, Masood Hussain, Iqra Basharat, and Mamuna Fatima	260
Classification of protein crystallisation images using texture-based statistical features	
B. M. Thamali Lekamge, Arcot Sowmya, Katarina Mele, Vincent J. Fazio, and Janet Newman	270
IMAGE ANALYSIS III	
Validating a new methodology for strain estimation from cardiac cine	
MRI	
Ahmed Elnakib, Garth M. Beache, Georgy Gimel'farb, Tamer Inanc, and Ayman El-Baz	277
Accurate segmentation framework for the left ventricle wall from	
cardiac cine MRI H. Sliman, F. Khalifa, A. Elnakib, A. Soliman, G. M. Beache, G.	
Gimel'farb, A. Emam, A. Elmaghraby, and A. El-Baz	287

Dynamic MRI-based computer aided diagnostic systems for early detection of kidney transplant rejection: A survey	
Mahmoud Mostapha, Fahmi Khalifa, Amir Alansary, Ahmed Soliman, Georgy Gimel'farb, and Ayman El-Baz	297
Quantification of osteolytic bone lesions in a preclinical rat trial Andrea Fränzle, Maren Bretschi, Tobias Bäuerle, Kristina Giske, Jens Hillengass, and Rolf Bendl	307
L1 and total variation regularized C-arm cardiac cone beam CT reconstruction  Bo Liu and Fugen Zhou	313
Lung segmentation with graph cuts: Graph size versus performance Banafsheh Pazokifard and Arcot Sowmya	315
Performance evaluation of an automatic MGRF-based lung segmentation approach Ahmed Soliman, Fahmi Khalifa, Amir Alansary, Georgy Gimel'farb, and Ayman El-Baz	323
MODELLING	
Modeling of testosterone regulation by pulse-modulated feedback: An experimental data study	
Per Mattsson and Alexander Medvedev	333
Modeling of effects of noise-mediated enhancements of risk perception against normalcy bias	
Miki Hirabayashi, Hiroaki Kojima, Kazuhiro Oiwa, and Hirotada Ohashi	343
Turning data into folds using RNAComposer Marta Szachniuk, Joanna Sarzyńska, and Jacek Blazewicz	353
Assessment of nerve morphology in nerve activation during electrical stimulation	
Jose Gomez-Tames and Wenwei Yu	355
Author Index	359