

2011 IEEE International Conference on Systems Biology (ISB)

Zhuhai, China, September 2–4, 2011

Edited by
Luonan Chen
Xiang-Sun Zhang
Ling-Yun Wu
Yong Wang



©2011 IEEE

2011 IEEE International Conference on Systems Biology (ISB)

Copyright ©2011 by the Institute of Electrical and Electronics Engineers, Inc. All rights reserved.

Copyright and Reprint Permission

Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Operations Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved. Copyright ©2011 by IEEE.

IEEE Catalog Number CFP11ISB-ART

ISBN 978-1-4577-1666-9

Additional copies of this publication are available from

Curran Associates, Inc.

57 Morehouse Lane

Red Hook, NY 12571 USA

+1 845 758 0400

+1 845 758 2633 (FAX)

Email: curran@proceedings.com

ABOUT ISB 2011

THEME AND SCOPE

The 5th IEEE International Conference on Systems Biology (ISB 2011), organized by Chinese Academy of Sciences and Sun Yat-Sen University will be held in Zhuhai, China, September 2-4, 2011. The conference is sponsored by National Natural Science Foundation of China (NSFC), Japan Society for the Promotion of Science (JSPS), Academy of Mathematics and Systems Sciences of CAS (AMSS), Shanghai Institutes for Biological Sciences of CAS (SIBS), Sun Yat-Sen University University, Computational Systems Biology Society of ORSC, Systems Biology Technical Committee of IEEE SMC Society, and also sponsored by IEEE SMC Society.

Systems Biology and Bioinformatics have become intensive research topics in the recent past decade and attracted great many leading scientists working in Biology, Physics, Mathematics and Computer Science. Optimization, Statistics, and many other mathematical methods have been widely used in the field. Following the successful OSB 2007-2009 and ISB 2010, the purpose of ISB 2011 is to extend the international forum for scientists, researchers, educators, and practitioners to exchange ideas and approaches, to present research findings and state-of-the-art solutions in this interdisciplinary field, including mathematical methods and its applications in biosciences and researches on various aspects of Systems Biology, such as integration of genome-wide microarray, proteomic, and metabolomic data, inference and comparison of biological networks, and model testing through design of experiments.

The purpose of ISB 2011 is to provide an international forum for scientists, researchers to exchange ideas and approaches, including theoretical methodology development and its applications in biosciences and researches on various aspects of Computational Systems Biology. Themes of the ISB 2011 will be interdisciplinary by its nature and focus on bridging opportunities between mathematical methods and Systems Biology studies. We are particularly interested in submissions that report on theoretical, experimental and applied research motivated by systems biology problems. Typical, but not exclusive, topics of interest are:

- Gene Regulatory Networks
- Protein Interaction Networks
- Metabolic Networks
- Signaling Networks
- Comparative Genomics
- Functional Genomics
- Metagenomics
- Genome-Wide Association Study
- Promoter Analysis and Discovery
- Biomarker Identification and Drug Discovery
- Evolution and Phylogenetics
- Non-coding RNAs
- Proteomics
- Protein Structures and Functions
- Microbial Community Analysis
- Qualitative Analysis of Biological Systems
- Quantitative Models of Cellular and Multi-Cellular Systems
- Designing and Modeling Synthetic Biological Systems
- Nonlinear Dynamics and Analysis of Biological Systems
- Designing Synthetic Biological Circuits
- High Performance Computing for Biological Data Analysis
- Data Mining and Machine Learning for Biological Data
- Information Theory and Statistical Analysis
- Systems Biology of Cancer and Metastasis
- Brain Systems Biology
- Systems Neuro-Informatics

COMMITTEES

- General Chairs
 - Luonan Chen (Chinese Academy of Sciences, China)

- Kwang-Hyun Cho (Korea Advanced Institute of Science and Technology, Korea)
- Xiang-Sun Zhang (Chinese Academy of Sciences, China)
- Program Chairs
 - Tianshou Zhou (Sun Yat-Sen University, China)
 - Katsuhisa Horimoto (National Institute of Advanced Industrial Science and Technology, Japan)
 - Xianghong Jasmine Zhou (University of Southern California, USA)
- Program Committee
 - Kazuyuki Aihara (University of Tokyo and ERATO, JST, Japan)
 - Tatsuya Akutsu (Kyoto University, Japan)
 - William R. Atchley (North Carolina State University, USA)
 - Xiuli Chao (North Carolina State University, USA)
 - Liang Chen (University of Southern California, USA)
 - Luonan Chen (Shanghai University, China)
 - Runsheng Chen (Chinese Academy of Sciences, China)
 - Kwang-Hyun Cho (Korea Advanced Institute of Science and Technology, Korea)
 - Ali Cinar (Illinois Institute of Technology, USA)
 - Naiyang Deng (China Agricultural University, China)
 - Andreas Dress (CAS-MPG Partner Institute for Computational Biology, China)
 - Ding-Zhu Du (University of Texas at Dallas, USA)
 - Shu-Cherng Fang (North Carolina State University, USA)
 - Susumu Goto (Kyoto University, Japan)
 - Katsuhisa Horimoto (National Institute of Advanced Industrial Science and Technology, Japan)
 - De-Shuang Huang (Chinese Academy of Sciences, China)
 - Jenn-Kang Hwang (National Chiao Tung University, Taiwan)
 - Do Han Kim Gwangju (Institute of Science and Technology, Korea)
 - Christopher Lee (University of California at Los Angeles, USA)
 - Doheon Lee (Korea Advanced Institute of Science and Technology, Korea)
 - Guojun Li (Shandong University, China)
 - Jie Liang (University of Illinois at Chicago, USA)
 - Chun-Chi Liu (National Chung Hsing University, Taiwan)
 - Haiyan Liu (University of Science and Technology of China, China)
 - Jun Liu (Harvard University, USA)
 - Zengrong Liu (Shanghai University, China)
 - Hiroshi Mamitsuka (Kyoto University, Japan)
 - Iven Mareels (University of Melbourne, Australia)
 - Kenji Mizuguchi (National Institute of Biomedical Innovation, Japan)
 - Haruki Nakamura (Osaka University, Japan)
 - Yi Pan (Georgia State University, USA)
 - Yonghong Peng (University of Bradford, UK)
 - Ramakrishna Ramaswamy (Jawaharlal Nehru University, India)
 - Stephen Wong (The Methodist Research Institute & Weill Medical College of Cornell University, USA)
 - Jiarui Wu (Chinese Academy of Sciences, China)
 - Yu Xia (Boston University, USA)
 - Dong Xu (University of Missouri-Columbia, USA)
 - Xiang-Sun Zhang (Chinese Academy of Sciences, China)
 - Yaoqi Zhou (Indiana University-Purdue University Indianapolis, USA)

PROCEEDING PAPERS AND CONTRIBUTING AUTHORS

Sixty-three full papers in this volume cover wide range of computational systems biology. Authors of these papers come from China mainland, Hong Kong, Taiwan, Australia, Canada, Finland, Japan, Korea, Malaysia, Netherlands, New Zealand, Poland, Singapore, Sweden, United Kingdom, United States. Many active researchers in various areas contributed their overview and introduction in their fields besides specific deep research achievements.