IEEE

ICCABS 2015

2015 IEEE 5th International Conference on Computational Advances in Bio and medical Sciences (ICCABS)

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Sofitel Luxury Hotels,
Miami, FL
http://www.iccabs.org

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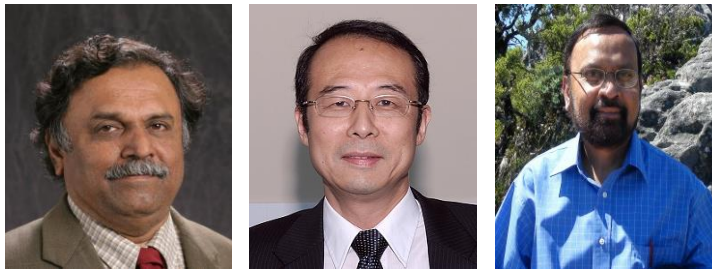
Welcome to the Fifth IEEE International Conference on Computational Advances in Bio and medical Sciences (ICCABS 2015)! Computational techniques are revolutionizing the way in which research is conducted in science and engineering. Unsurpassed advances have been made in myriads of application domains. This is particularly true in the areas of biology, medicine, and drug discovery. Even though a number of conferences exist today in the general area of bioinformatics, they focus on computational biology to a large extent. ICCABS has the goal of bringing together scientists in all the three areas and hence serving as a platform for bridging the research efforts in these areas. The response from these communities to the ICCABS call for papers has been indeed gratifying. We are honored to serve these international communities by bringing together researchers, scientists, and students from academia, laboratories, and industry to this premier meeting held in the ever exciting city of Miami, FL.

We are thankful to the steering committee members (Srinivas Aluru, Reda A. Ammar, Tao Jiang, Vipin Kumar, Ming Li, and John Reif) who have been instrumental in getting this conference approved by IEEE.

We would like to thank Program Chairs John Reif and Alex Zelikovsky for assembling an outstanding technical program. The program committee members have done a wonderful job of reviewing all the submitted papers thoroughly within a short period of time. We are thankful to them as well as all the authors who have expressed their faith in ICCABS by submitting the fruits of their hard work. ICCABS features two keynote speeches (from Srinivas Aluru and S. CenkSahinlap) and three invited speakers (GiriNarasimhan, SheidaNabavi ,and Ion Mandoiu). We are grateful to these well-established and highly successful researchers for taking time out of their busy schedules to make ICCABS a great success.

Thanks are also due to: Financial Chairs (Reda Ammar, Mukul Bansal, and Yufeng Wu), Local Arrangements Chair (Shu-Ching Chen), Workshops Chairs (Ion Mandoiu and Alex Zelikovsky), Proceedings Chair (Soumitra Pal), and Webmaster (Soumitra Pal) for their tireless efforts.

Selected papers from ICCABS 2015 will appear as special issues in BMC Genomics and BMC Bioinformatics. We are grateful to the editors of these journals and Sarah Bauer for their efforts in this regard. Last but not least, we would like to thank UConn and the Booth Engineering Center for Advanced Technology (BECAT) for the constant administrative support rendered to ICCABS. In particular, we offer our special thanks to Debra Mielczarek and Karen Slater for their incessant support. We hope you'll continue to support ICCABS in future! Have a wonderful time in the conference!

Ram Iyengar, Florida International University, *Yi Pan*, Georgia State University, *Sanguthevar Rajasekaran*, University of Connecticut

Message from the Program Chairs
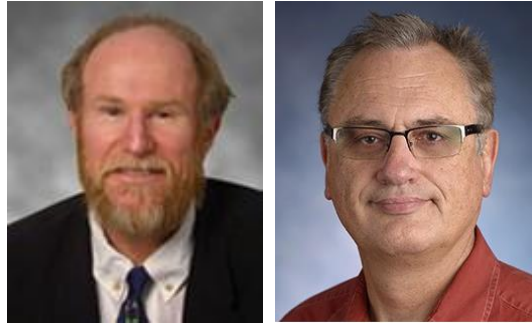
We would like to welcome you to the 5th IEEE International Conference on Computational Advances in Bio and medical Sciences (ICCABS 2015) in Miami, Florida. This year, the conference program includes 23 extended abstracts selected by the Program Committee from a number of 48 submissions received in response to the call for papers. The program features keynote talks by two distinguished speakers: Srinivas Aluru of Georgia Institute of Technology and S. CenkSahinlap of Simon Fraser University and three invited speakers: SheidaNabavi of University of Connecticut , GiriNarasimhan of Florida International University, and Ion Mandoiu of University of Connecticut. The conference also includes several posters and research highlights.

We would like to thank the Program Committee members and external reviewers for volunteering their time to review and discuss submitted abstracts. We would like to extend special thanks to the General Chairs, Ram Iyengar, Yi Pan and Sanguthevar Rajasekaran, for their leadership, and to the Workshop, Local Organization, Finance, and Proceedings Chairs, for their hard work in making ICCABS 2015 a successful event. Last but not least we would like to thank all authors for presenting their work at the conference.

We hope that you will find the ICCABS 2015 technical program interesting and intellectually stimulating, and that you will enjoy meeting with and interacting with researchers from around the world.

John Reif, Duke University, North Carolina, USA
Alex Zelikovsky, Georgia State University, Atlanta, GA, USA

Message from CANGS Workshop Chairs

Welcome to the 5th Workshop on Computational Advances for Next Generation Sequencing, held on October 15-17, 2014 in Miami, Florida in conjunction with ICCABS 2015. Massively parallel DNA and RNA sequencing have become widely available, placing the capacity to generate gigabases to terabases of sequence data into the hands of individual investigators. These next-generation technologies have the potential to dramatically accelerate biological and biomedical research by enabling the comprehensive analysis of genomes and transcriptomes to become inexpensive, routine and widespread.

The CANGS workshop aims to accelerate progress in the field by bringing together experts to discuss new directions of research and exchange ideas on the many mathematical and computational challenges presented by analysis of the exploding volume of next-generation sequencing data. This year's workshop program includes two sessionscomprising 8 invited talks on a variety of current research topics.

We would like to thank ICCABS General Chairs Ram Iyengar, Yi Pan and Sanguthevar Rajasekaran for the opportunity to organize CANGS 2015, and all speakers for presenting their work at the workshop.

Ion Mandoiu, University of Connecticut
Alex Zelikovsky, Georgia State University

Conference Organization

Steering Committee

Srinivas Aluru - Iowa State University
Reda A. Ammar - University of Connecticut
Tao Jiang - U.C. Riverside
Vipin Kumar - University of Minnesota
Ming Li - University of Waterloo
S. Rajasekaran (Chair) - University of Connecticut
John Reif - Duke University
SartajSahni - University of Florida

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Yi Pan - Georgia State University
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Pavel Skums
Sing-Hoi Sze
Ugo Vaccaro
Jianxin Wang
Li-San Wang
Fang Xiang Wu
Yufeng Wu

ICCABS 2015 Program

Thursday, October 15, 2015

8:50am - 9:00am	**Opening Remarks**

9:00am- 10:00am	**Keynote Talk** **Chair:** *Sang.thevar Rajasekaran*

Srinivas Aluru (Georgia Institute of Technology)
Title: Approximate Sequence Matching: Algorithms and Applications

10:00am - 10:30am	**Coffee break**

10:30am - 12:30pm	**Parallel Sessions**

Session 1A: ICCABS 1
Chair: *Max Alexeyev*

- *Trevor Cickovski, Eli Peake, Vanessa Aguiar-Pulido and GiriNarasimhan. ATria: A Novel Centrality Algorithm Applied to Biological Networks*

- *AmirhosseinJabalameli and AmanBehal. A Constrained Linear Approach to Identify a Multi-timescale Adaptive Threshold Neuronal Model*

- *Ekaterina Nenastyeva, YurijIonov, Ion Mandoiu and Alex Zelikovsky. Identification of Cancer-Specific Motifs in Mimotope Profiles of Serum Antibody Repertoire*

- *CintiaPalu, Leandra Linhares-Lacerda, Marcelo Ribeiro-Alves and Wilson Savino. Genetic Modulation During Thymocyte Development: an Integrative Approach Based on Microarray Meta-analysis*

Session 1B: ICCABS 2
Chair: *Rahul Singh*

- *Chunchun Zhao and SartajSahni. Cache and Energy Efficient Alignment of Very Long Sequences*

- *Da Zhang, Hao Wang, KaixiHou, Jing Zhang and Wu-Chun Feng. Accelerating InDel Detection on Modern Multi-Core SIMD CPU Architecture*

- *ShaileshAppukuttan, Rohan Sathe and RohitManchanda. Modular Approach to Modeling Homotypic and Heterotypic Gap Junctions*

- *ZhichaoLian, Xiang Li, Yi Pan, Xuan Guo, Le Chen, Guantao Chen, Zhihui Wei, Tianming Liu and Jing Zhang. Dynamic Bayesian Brain Network Partition and Connectivity Change Point Detection*

12:30pm - 02:00pm	**Lunch**

2:00pm - 2:50pm	**Invited Talk** **Chair:** *Alex Zelikovsky*

GiriNarisimhan(Florida International University)
Title: Microbiome Analysis: Past, Present and Future

2:50pm - 3:30pm	**Coffee break**

3:30pm - 5:30pm	**Parallel Sessions**

Session 2A: ICCABS 3
Chair: *James Lara*

- *Inna Rytsareva, David S Campo, Yueli Zheng, Seth Sims, CansuTetik, Jain Chirag, SriramChockalingam, Sharma Thankachan, Amanda Sue, Srinivas Aluru and YuryKhudyakov.* Efficient Detection of Viral Transmission with Threshold-based Methods

- *Pavel Skums, Olga Glebova, David Campo, Nana Li, ZoyaDimitrova, Seth Sims, Leonid Bunimovich, Alex Zelikovsky and YuryKhudyakov.* Algorithms for Detection of Viral Transmissions Using Analysis of Intra-Host Viral Populations

- *Alexander Artyomenko, Nicholas Wu, SergheiMangul, EleazarEskin, Ren Sun and Alex Zelikovsky.* 2SNV: Quasispecies Reconstruction from PacBio Reads

- *James Lara, Livia Rossi, Gilberto Vaughan and YuryKhudyakov.* Predicting the Cross-immunoreactivity of Hepatitis C Virus Hypervariable Region 1 Peptides using Polynomial Neural Networks

Session 2B: ICCABS 4
Chair: *GiriNarisimhan*

- *Faraz Hussain, ZubirHusein, NeslisahTorosdagli, NarsinghDeo, SumantaPattanaik, Chung-Che Jeff Chang and Sumit Kumar Jha.* SANJAY:Automatically Synthesizing Visualizations of Flow Cytometry Data Using Decision Procedures

- *Bogdan Armaselu, Harish Arunachalam, OvidiuDaescu, John-Paul Bach, Kevin Cederberg, Dinesh Rakheja, Anita Sengupta, Stephen Shapek and Patrick Leavey.* Whole Slide Images Stitching for Osteosarcoma Detection

- *Sanguthevar Rajasekaran.* Efficient Techniques for k-mer Counting

Friday, October 16, 2015

9:00am-9:50am	**Invited Talk** **Chair:** *Ion Mandoiu*

SheidaNabavi(University of Connecticut)
Title: Machine Learning for Identifying Candidate Biomarkers of Resistant to Anti-Cancer Drugs

9:50am - 10:30am	**Coffee break**

10:30am - 12:30pm	**Parallel Sessions**

Session 3A: ICCABS 5
Chair: *SheidaNabavi*

- *Sharma V. Thankachan, SriramChockalingam, Yongchao Liu, Ambujam Krishnan and Srinivas Aluru.* A Greedy Alignment-free Distance Estimator for Phylogenetic Inference

- *Michael Coulombe, Kristian Stevens and Dan Gusfield.* Construction, Enumeration, and Optimization of Perfect Phylogenies on Multi-state Data.

- *Nikita Alexeev and Max Alekseyev.* Estimation of the True Evolutionary Distance under the Fragile Breakage Model

- *Lauren Assour and Scott Emrich.* GlobalMaximum-Parsimony Based Ancestral Reconstruction with Non-Universal Genes

Session 3B: CANGS 1
Chair: *Sing-Hoi Sze*

- *Sing-Hoi Sze, Meaghan Pimsler, Jeffery Tomberlin, Corbin Jones and Aaron Tarone.* A Scalable and Memory-Efficient Algorithm for De Novo Transcriptome Assembly of Non-Model Organisms

- *David Seifert, Monica Dragan and Niko Beerenwinkel.* MinPEPCo: Inferring Viral Haplotypes by Paired-end Sequencing using Minimal Path Covers

- *Siu Ming Yiu.* Metagenomics Binning and Annotation: Issues and Challenges

- *Erin-Elizabeth Durham, Chinua Umoja and Robert Harrison.*A Novel Approach to Determine Protein Docking Locations Using Fuzzy Shape Recognition

12:30pm - 2:00pm	**Lunch**

2:00pm - 3:00pm	**Keynote Talk** **Chair:** *Sanguthevar Rajasekaran*

S. CenkSahinlap(Simon Fraser University)
Title: Algorithms for Data Driven Cancer Research

3:00pm - 3:30pm	**Coffee break**

3:30pm - 5:30pm	**Parallel Sessions**

Session 4A: ICCABS 6
Chair: *S. Cenk Sahinlap*

- *Rahul Singh and Thomas Olson.*Computational Prediction of ATC Codes of Drug-Like Compounds Using Tiered Learning

- *Oyetunji Enoch Ogundijo, Dan He and LaxmiParida.* Performance Evaluation of Different Encoding Strategies for Quantitative Genetic Trait Prediction

- *Hamid Ismail, Ahoi Jones, Jung Kim, Robert Newman and Dukka KC.* Phosphorylation Site Prediction using Random Forest

- *Ning Yu, Xuan Guo, Alexander Zelikovsky and Yi Pan.*GaussianCpG: A Gaussian Model for Detection of Human CpG Island

Session 4B: CANGS 2
Chair:*John Malone*

- *Sergey Aganezov and Max Alekseyev.* Scaffold Assembly Based on the Analysis of Gene Orders and Genomic Repeats

- *Tak-Wah Lam.* A Simple and Economical Method for Improving Whole-genome Alignment

- *Steffen Heber.* Using PacBio Long-read Sequencing to Investigate Genes with Complex Splicing Behavior

- *John Malone.* Gene Dose, Compensation, and Phenotype

6:00pm - 9:00pm	**Banquet**

Saturday, October 17, 2015

09:00am- **09:50am**	**ICCABS Invited Talk** **Chair:** *Alex Zelikovsky*

Ion Mandoiu(University of Connecticut)
Title: Computational Methods for Genomics-guided Immunotherapy

9:50am - **10:10am**	**Coffee break**

10:10am - **11:40pm**	**Plenary Session** ICCABS 7 **Chair:** *Ion Mandoiu*

- *Qiwen Hu, Catharina Merchante, Anna Stepanova, Jose Alonso and Steffen Heber.* Mining Transcript Features Related to Translation in Arabidopsis Using LASSO and Random Forest

- *Eric C.H. Chen, Annie Morin, Jean-HuguesChauchat and David Sankoff.* Statistical Analysis of Fractionation Resistance by Functional Category and Expression

- *Yinjiao Ma, Lingling Zhang, Christian Geneus and Haijun Gong.* Weighted Gene Coexpression Network Analysis of Prostate Cancer

11:40am - **1:00pm**	**Plenary Session** ICCABS POSTER **Chair:** *Alex Zelikovsky*

- *Yuanyuan Feng, Vandana P. Janeja, Yelena Yesha, Naphtali Rishe, Michael A. Grasso and Amanda Niskar.* Poster: Classifying Primary Outcomes in Rheumatoid Arthritis: Knowledge Discovery from Clinical Trial Metadata

- *Igor Mandric, Yvette TemateTiagueu, Adriano Senatore, Paul Katz and Alex Zelikovsky*. Poster: DORFA: Database-guided ORFeome Assembly from RNA-Seq Data

- *Michael Robinson and Naphtali Rishe.* Poster: Finding Unknown Genes

- *YinaCifuentes, Sergio Latorre, Mario Velasquez and Andrés Pinzón.* Poster: Draft Genome Sequence of a Natural Isolated Saccharomyces Cerevisiae from Colombia