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The 12th Annual International Conference on Research in Computational Molecular Biology (RECOMB2008)

30th March – 2nd April 2008

University Cultural Centre
National University of Singapore

Conference Programme

Welcome

The Annual International Conference on Research in Computational Molecular Biology (RECOMB) was founded in 1997 by Sorin Istrail, Pavel Pevzner and Michael Waterman. It has since become one of the best scientific forums on advances in computational biology and their applications in molecular biology and medicine. The School of Computing and the Bioinformatics Programme at the National University of Singapore are honoured to jointly host RECOMB 2008. We are delighted to give you a warm welcome to Singapore.

The technical programme for RECOMB 2008 comprises 7 keynote lectures, 35 technical presentations from the selected papers, and 2 poster viewing sessions with over 140 posters. The 7 keynote lectures are: the Ulam Lecture by Temple Smith (Boston University, Boston), the Distinguished Technology Lecture by Edison Liu (Genome Institute of Singapore, Singapore), the Distinguished Biology Lecture by Suzanne Cory (Walter and Eliza Hall Institute of Medical Research, Melbourne), and the remaining keynotes by Howard Cedar (Hebrew University, Jerusalem), Vivian Cheung (University of Pennsylvania, Philadelphia), Sang Yup Lee (Korea Advanced Institute of Science and Technology, Daejeon), and Andrei Lupas (Max Planck Institute for Developmental Biology, Tübingen). The 35 technical talks were selected from 193 submitted papers. The selection was made by a 46-member PC led by Martin Vingron.

The non-technical programme for RECOMB 2008 comprises the Lilly Welcome Reception on Sunday 30 March, the RECOMB Business Meeting on Monday 31 March, the Conference Banquet and Malay Cultural Performance on Tuesday 1 April, and the Farewell Tea on 2 April.

We hope you will also have time to explore Singapore---a city that is rich in contrast and colour. You'll find a harmonious blend of culture and cuisine here. Some says "This little dynamo in Southeast Asia embodies the finest of both East and West". Enjoy!

Limsoon Wong, *Conference Chair &*
Martin Vingron, *PC Chair*

Acknowledgements

We appreciate the generous sponsorships and support from the National University of Singapore, the Institute for Infocomm Research (A*STAR), and the Bioinformatics Institute (A*STAR), Lilly Singapore Center for Drug Discovery, IBM, ISCB, World Scientific Publishing Company, Taylor & Francis Asia Pacific, TechSource, and MIT Press.

We gratefully acknowledge the ISCB and the US Department of Energy for their magnanimous provision of travel grant awards for students presenting full papers and posters.

RECOMB 2008 Conference Programme @ University Cultural Centre, NUS

Day 1: Sunday 30 March 2008

08.00-09.00 **Breakfast**

09.00-09.15 **Welcome Address**
Limsoon Wong & Martin Vingron

Session 1 (Chair: Michael Waterman)

09.15-10.15 **Keynote 1 (Ulam Lecture)**

Computational Biology: Its Challenges Past, Present & Future
Temple F. Smith

10.15-10.40 **Bootstrapping the interactome: Unsupervised identification of protein complexes in yeast**
Caroline C. Friedel, Jan Krumsiek, Ralf Zimmer

10.40-11.10 **Tea Break**

Session 2 (Chair: Eleazar Eskin)

11.10-11.35 **CompostBin: A DNA composition-based algorithm for binning environmental shotgun reads**
Sourav Chatterji, Ichitaro Yamazaki, Zhaojun Bai, Jonathan Eisen

11.35-12.00 **Reconstructing the evolutionary history of complex human gene clusters**
Yu Zhang, Giltae Song, Tomas Vinar, Eric Green, Adam Siepel, Webb Miller

12.00-12.25 **Ab Initio Short Read Assembly With Mate Pair Data**
Paul Medvedev, Michael Brudno

12.25-14.20 **Lunch Break and Poster Session**

Session 3 (Chair: Michal Linial)

14.20-15.20 **Keynote 2**

Orchestration of DNA Methylation
Howard Cedar

15.20-15.45 **BayCis: a Bayesian hierarchical HMM for cis-regulatory module decoding in metazoan genomes**
Tien-ho Lin, Pradipta Ray, Geir K. Sandve, Selen Uguroglu, Eric Xing

15.45-16.15 **Tea Break**

Session 4 (Chair: Jens Stoye)

16.15-16.40 **A Combined Expression-Interaction Model for Inferring the Temporal Activity of Transcription Factors**
Yanxin Shi, Itamar Simon, Tom Mitchell, Ziv Bar-Joseph

16.40-17.05 **A fast, alignment-free, conservation-based method for transcription factor binding site discovery**
Raluca Gordan, Leelavati Narlikar, Alexander Hartemink

17.05-17.30 **The Statistical Power of Phylogenetic Motif Models**
John Hawkins, Timothy Bailey

Bus Transfer
18.00-21.00

Lilly Welcome Reception
@ Kent Ridge Guild House

Day 2: Monday 31 March 2008

08.00-09.00 **Breakfast**

Session 1 (Chair: Thomas Lengauer)

09.00-10.00 **Keynote 3 (Distinguished Technology Lecture)**

Transcriptional Regulation and Cancer Genomics
Edison Liu

10.00-10.25 **Automatic Recognition of Cells (ARC) for 3D Images of *C. elegans***
Fuhui Long, Hanchuan Peng, Xiao Liu, Stuart Kim, Eugene Myers

10.25-10.55 **Tea Break**

Session 2 (Chair: Knut Reinert)

10.55-11.20 **Spectrum Fusion: Using Multiple Mass Spectra for De**

Novo Peptide Sequencing

Ritendra Datta, Marshall Bern

11.20-11.45 **A Fragmentation Event Model for Peptide Identification by Mass Spectrometry**

Yu Lin, Yaotao Qiao, Chungong Yu, Shiwei Sun, Dongbo Bu

11.45-12.10 **A Bayesian approach to protein inference problem in shotgun proteomics**

Yong Li, Randy Arnold, Yixue Li, Predrag Radivojac, Quanhu Sheng, Haixu Tang

12.10-12.35 **De Novo Sequencing of Nonribosomal Peptides**

Nuno Bandeira, Julio Ng, Dario Meluzzi, Roger Linington, Pieter Dorrestein, Pavel Pevzner

12.35-14.00 **Lunch Break**

Session 3 (Chair: Serafim Batzoglou)

14.00-15.00 **Keynote 4**

Chair:

Serafim Batzoglou

Systems Metabolic Engineering

Sang Yup Lee

15.00-15.25 **Protein Function Prediction based on Patterns in Biological Networks**

Mustafa Kirac, Gultekin Ozsoyoglu

15.25-15.55 **Tea Break**

Session 4 (Chair: Gaston Gonnet)

15.55-16.20 **Automatic Parameter Learning for Multiple Network Alignment**

Chair:

Gaston Gonnet

Jason Flannick, Antal Novak, Chuong B. Do, Balaji S. Srinivasan, Serafim Batzoglou

16.20-16.45 **An Integrative Network Approach To Map the Transcriptome to the Phenome**

Michael Mehan, Juan Nunez-Iglesias, Mrinal Kalakrishnan, Michael Waterman, Jasmine Zhou

16.45-17.10 **Fast and Accurate Alignment of Multiple Protein Networks**

Maxim Kalaev, Vineet Bafna, Roded Sharan

- 17.10-17.35 **High-Resolution Modeling of Cellular Signaling Networks**
Michael Baym, Chris Bakal, Norbert Perrimon, Bonnie Berger
- 17.35-18.00 **Tea Break**
- 18.00-19.00 **RECOMB Business Meeting**

Day 3: Tuesday 1 April 2008

08.00-09.00 **Breakfast**

Session 1 (Chair: Martin Vingron)

- 09.00-10.00 **Keynote 5**

At the Origin of Life: How Did Folded Proteins Evolve?
Andrei Lupas
- 10.00-10.25 **Locating Multiple Gene Duplications Through Reconciled Trees**
Gordon Burleigh, Oliver Eulenstein, Mukul Bansal, Andre Wehe
- 10.25-10.55 **Tea Break**

Session 2 (Chair: Jerzy Tiuryn)

- 10.55-11.20 **Rapid and Accurate Side Chain Prediction with Local Backbone Information**
Jing Zhang, Xin Gao, Jinbo Xu, Ming Li
- 11.20-11.45 **Algorithms for Joint Optimization of Stability and Diversity in Planning Combinatorial Libraries of Chimeric Proteins**
Wei Zheng, Alan Friedman, Chris Bailey-Kellogg
- 11.45-12.10 **Lateral Gene Transfer Detection Using Pairwise Evolutionary Distances in a Statistical Framework**
Christophe Dessimoz, Daniel Margadant, Gaston Gonnet
- 12.10-12.35 **Computation of Median Gene Clusters**
Sebastian Boecker, Katharina Jahn, Julia Mixtacki, Jens Stoye

12.35-14.20 **Lunch Break and Poster Session**

Session 3 (Chair: Terry Speed)

14.20-15.20 **Keynote 6 (Distinguished Biology Lecture)**

BCL-2: From Translocation to Therapy

Suzanne Cory

15.20-15.45 **Detecting disease-specific disregulated pathways via analysis of clinical expression profiles**

Igor Ulitsky, Richard M. Karp, Ron Shamir

15.45-16.15 **Tea Break**

Session 4 (Chair: John Kececioglu)

16.15-16.40 **Constructing Treatment Portfolios Using Affinity Propagation**

Delbert Dueck, Brendan Frey, Nebojsa Jojic, Vladimir Jojic, Guri Giaever, Andrew Emili, Gabe Musso, Robert Hegele

16.40-17.05 **Bubbles, blobs and galls: Alternative Splicing Events of Dimension k in Splicing Graphs**

Michael Sammeth, Gabriel Valiente, Roderic Guigo

17.05-17.30 **More Efficient Algorithms for Closest String and Substring Problems**

Bin Ma, Xiaoming Sun

Bus Transfer

18.30-21.00

Banquet

@ Tepak Sireh Restaurant

Day 4: Wednesday 2 April 2008

08.00-09.00 **Breakfast**

Session 1 (Chair: Ron Shamir)

09.00-10.00 **Keynote 7**

Disruption of a Transcriptional Regulatory Pathway Contributes to Phenotypes in Carriers of Ataxia Telangiectasia

Vivian G. Cheung

10.00-10.25 **Accounting for Non-Genetic Factors Improves the Power of eQTL Studies**
Oliver Stegle, Anitha Kannan, Richard Durbin, John Winn

10.25-10.55 **Tea Break**

Session 2 (Chair: Wing-Kin Sung)

10.55-11.20 **Effect of Genetic Divergence in Identifying Ancestral Origin using HAPAA**
Andreas Sundquist, Eugene Fratkin, Chuong B. Do, Serafim Batzoglou

11.20-11.45 **A Switching HMM for Inferring Ancestries in Admixed Populations**
Sriram Sankararaman, Gad Kimmel, Eran Halperin, Michael I. Jordan

11.45-12.10 **Increasing Power in Association Studies by using Linkage Disequilibrium Structure and Molecular Function as Prior Information**
Eleazar Eskin

12.10-13.30 **Lunch Break**

Session 3 (Chair: Limsoon Wong)

13.30-13.55 **Panel Construction for Mapping in Admixed Populations via Expected Mutual Information**
Sivan Bercovici, Dan Geiger, Liran Shlush, Karl Skorecki, Alan Templeton

13.55-14.20 **Constructing Level-2 Phylogenetic Networks from Triplets**
Leo van Iersel, Judith Keijsper, Steven Kelk, Leen Stougie, Ferry Hagen, Teun Boekhout

14.20-14.45 **Accurate Computation of Likelihoods in the Coalescent with Recombination via Parsimony**
Rune Lyngsoe, Yun Song, Jotun Hein

14.45-15.00 **Award Ceremony**
15.00-15.30 **Farewell Tea**

Brief Information on Keynote Speakers



Temple F. Smith, Boston Univ. Dr. Temple Smith graduated with a Ph.D. in Nuclear Physics from University of Colorado. He did a joint postdoctoral fellowship under the direction of the mathematician, Stanislaw Ulam and the molecular biologist, John Sadler. He was one of the founders of GenBank at Los Alamos. Dr. Smith has been the Director of the BioMolecular Engineering Research Center in the College of Engineering at Boston University since 1991. He is a professor in the Department of Biomedical Engineering and co-founder of the company, Modular Genetics, Inc. Dr. Smith is a co-developer of the Smith-Waterman sequence alignment algorithm, the standard tool used in most DNA and protein sequence comparison. His research is centered on the application of various computer science and mathematical methods to the discovery of the syntactic and semantic patterns in nucleic acid and amino acid sequences. These include the development of new sequence pattern extraction tools, multidomain dissection methods, and protein inverse folding prediction algorithms. In addition, Dr. Smith has carried out research in the application of many such methods ranging from the time calibration of HIV viral evolution analysis and modeling of the WD repeat family of proteins, to ribosomal protein evolution.



Edison Liu, Genome Institute of Singapore. Professor Edison Liu graduated from Stanford University and its medical school. From 1987-96, he was professor of medicine, biochemistry and epidemiology at the University of North Carolina, and Director of its Specialized Program of Research Excellence in Breast Cancer. From 1996-2001, Prof Liu was the Division Director of Clinical Sciences (Intramural program) at the US National Cancer Institute. In 2001, he was appointed the executive director for the Genome Institute of Singapore. He has received the Rosenthal Award from the American Association of Cancer Research and the Brinker International Award from Susan Komen Foundation for his breast cancer research. He is currently the President of the Human Genome Organization (HUGO).



Suzanne Cory, WEHI. Professor Suzanne Cory is one of Australia's most distinguished molecular biologists. She was born in Melbourne, Australia and graduated in biochemistry from The University of Melbourne. She gained her PhD from the University of Cambridge, England and then continued studies at the University of Geneva before returning to Melbourne in 1971, to a research position at The Walter and Eliza Hall Institute of Medical Research. She is currently Director of The Walter and Eliza Hall Institute and Professor of Medical Biology of The University of Melbourne. Her research has had a major impact in the fields of immunology and cancer and her scientific achievements have attracted numerous honours and awards.



Howard Cedar, Hebrew Univ. Dr. Howard Cedar was born in New York, received a B.Sc. degree in mathematics from M.I.T. and M.D., Ph.D. degrees from N.Y.U. After an internship he continued as a Public health fellow at the N.I.H. In 1973 he immigrated to Israel where he became a full Professor of Molecular Biology in 1981. Dr. Cedar has received a number of awards including the Israel Prize and is a member of the Israel Academy of Sciences.



Vivian G. Cheung, Univ of Pennsylvania.

Vivian Cheung is an investigator of the Howard Hughes Medical Institute and an Associate Professor of Pediatrics and Genetics at the University of Pennsylvania. She received her bachelor degree from the University of California, Los Angeles, and her MD from Tufts University. She received clinical training in Pediatrics and Neurology at the University of California, Los Angeles and The Children's Hospital of Philadelphia. Her research focuses on identifying the genetic determinants of human traits and developing tools that facilitate such studies. Her lab has contributed to understanding the genetic basis of variation in human gene expression and characterizing gene expression phenotypes in carriers of autosomal recessive diseases, such as ataxia telangiectasia. Her group is also studying the genetic basis of variation in the frequencies and locations of human meiotic recombination.



Sang Yup Lee, KAIST. Dr. Sang Yup Lee is Distinguished Professor and LG Chem Chair Professor at the Department of Chemical and Biomolecular Engineering, KAIST, Korea. He is also the Director of Center for Systems and Synthetic Biotechnology, Director of BioProcess Engineering Research Center, Director of Bioinformatics Research Center, and Co-Director of the Institute for the BioCentury. He has published more than 230 journal papers, 40 books/book chapters, 270 patents, and presented more than 900 papers at conferences. He is currently serving as Senior Editor, Editor, Associate Editor, or Board Member of 12 journals including Biotechnology and Bioengineering.



Andrei Lupas, Max-Planck-Institute for Developmental Biology, Tübingen.

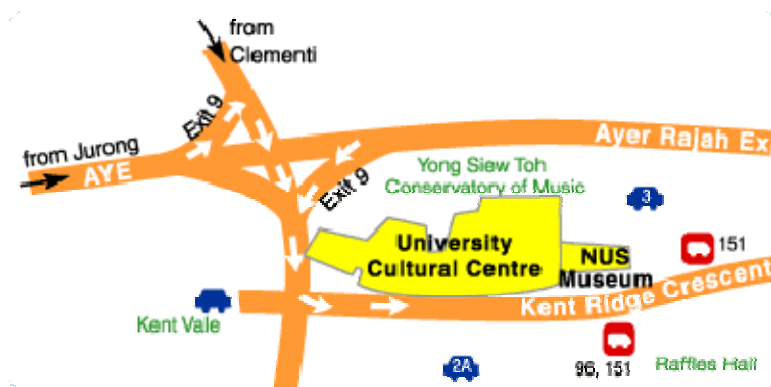
Born on September 6, 1963 in Bucharest (Romania). Studies in Biology at the Technical University Munich (1982-1985) and in Molecular Biology at Princeton University (1985-1990); PhD with Jeff Stock on the mechanism of signal transduction in bacterial chemotaxis (1991). Postdoctoral fellow with Andreas Plückthun at the Gene Center of the University, Munich (1992-1993), working on antibody engineering. Research assistant with Wolfgang Baumeister at the Max-Planck-Institute for Biochemistry, Martinsried (1992-1997), working on the development and application of sequence analysis tools, and on the structure and function of the proteasome. Senior Computational Biologist, later Assistant Director of Bioinformatics, at SmithKline Beecham Pharmaceuticals, Collegeville, USA (1997-2001). Since 2001, director of the department of protein evolution at the Max-Planck-Institute for Developmental Biology, Tübingen.

Venue and Location

RECOMB 2008 will be held at the University Cultural Centre (UCC) in the National University of Singapore (NUS) during Sunday 30th March – Wednesday 2nd April 2008

Address of UCC: 50 Kent Ridge Crescent, Singapore 119279.

Getting to UCC: By Car: The UCC is located on the campus of NUS, at the intersection of Kent Ridge Crescent and Clementi Road, opposite Kent Vale and is only fifteen minutes away from the City Centre. Cars proceeding along the Ayer Rajah Expressway should turn at Exit 9 / Exit 9A into Clementi Road. Cars proceeding along Clementi Road may access Kent Ridge Crescent nearest the junction with Kent Vale. **By Bus:** SBS No. 96 from Clementi MRT Station. **By Taxi:** Instruct the taxi driver to take you to “NUS” by using the “Clementi Road NUS Main Entrance”; the UCC is the first building on your left as you enter the NUS Main Entrance.



RECOMB 2008 Banquet will be held at the Tepak Sireh Restaurant, 73 Sultan Gate, Singapore 198497. Tepak Sireh is housed in a historical monument called Gedung Kuning built more than 150 years ago. It was home to the Bendahara (Prime Minister) of “ancient” Singapore. The Banquet will be accompanied by a Malay cultural performance.

Bus Transfer To/From Conference Hotel

We have arranged the complementary bus transfers to/from the conference venue (UCC) and to/from the main conference hotel (Swissotel The Stamford). Specifically,

- Each morning the conference bus will come to Swissotel at 7.45am. It will leave from Swissotel to UCC by 7.50am sharp. Please be at the lobby of Swissotel and look out for the bus. If you are staying at the second conference hotel (Grand Plaza Park Hotel), you can walk to Swissotel to catch the bus---the walk is about 10 minutes. Alternatively, you can catch the bus provided by Grand Plaza Park Hotel at 7.45am -- - please enquire at the hotel reception when you check in. If you are not staying at either hotel, you are still welcome to catch the bus by coming to Swissotel.
- On Sunday 30 March, the conference bus will leave from UCC to Kent Ridge Guild House for the Lilly Welcome Reception at about 5.45pm. After the reception, the conference bus will go to Swissotel.
- On Monday 31 March, the conference bus will leave at about 7.15pm from UCC to Swissotel after the RECOMB Business Meeting.
- On Tuesday 1 April, the conference bus will leave at about 5.45pm from UCC to the RECOMB Banquet venue (Tepak Sireh Restaurant). After the banquet, the conference bus will go to Swissotel.
- On Wednesday 2 April, the conference bus will leave at about 3.45pm, after the Farewell Tea, from UCC for Swissotel.

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