

# *Mathematics, Evolution, and Development*

## Preliminary Program

March 21-27, 2010

### Program Outline

Monday, March 22: Morning	9:00	Opening Ceremony
	9:15	Mechanisms of evolution I
Monday, March 22: Afternoon	13:30	Mechanisms of Evolution II
	15:30	Molecular Evolution I
Tuesday, March 23: Morning	9:00	Signing Ceremonies with U Tübingen and Malahayati U
	9:45	Genome Research
Tuesday, March 23: Afternoon	13:30	Gene Expression, Networks, and their Evolution I
	15:30	Gene Expression, Networks, and their Evolution II
Tuesday, March 23: Evening	20:15	After Dinner Talk
Wednesday, March 24: Morning	9:00	RNA Research: Introduction and Talks
Wednesday, March 24: Afternoon		Free Afternoon
Thursday, March 25: Morning	9:00	Phylogenomics Combinatorics I
Thursday, March 25: Afternoon	13:30	Phylogenomics Combinatorics II
	15:30	Towards Genome Semantics
Thursday, March 25: Evening	18:30	Snacks and Posters
Friday, March 26: Morning	9:00	Molecular Evolution II
Friday, March 26: Afternoon	13:30	Molecular Evolution III
	14:15	Mathematics and Protein Structure
	15:30	Evolution, Genetics and Epigenetics
Saturday, March 27: Morning	9:30	XU Guangqi Lecture
Saturday, March 27: Morning	11:00	Closing Session
Saturday, March 27: Morning	13:00	Farewell

**Monday Morning, March 22, 2010, 9:00-9:15**

### Opening Ceremony

<b>JIN Li</b> PICB, Shanghai, PR China	9:00-9:05	<i>Welcome</i>
<b>Suzanne Bertrand,</b> <b>Johanna Pierre</b> MoRST NZ	9:05-9:15	<i>Greetings from NZ</i>

Monday Morning, March 22, 2010, 9:15-12:00

**Mechanisms of evolution I: 3 talks**

<b>David Penny</b> The AWC for Mol. Ecol. & Evol., Massey U, Palmerston North, NZ	9:15-9:45	<i>Integrating molecular evolution over different time scales</i>
	9:45-10:00	<i>Discussion</i>
<b>Burkhard Morgenstern</b> Dept. of Bioinformatics, U Göttingen, Germany	10:00-10:30	<i>Phylogenomics sheds light on deep metazoan phylogeny</i>
	10:30-10:45	<i>Discussion</i>
	10:45-11:15	<b>Coffee Break</b>
<b>Bai-Lian (Larry) Li</b> Ecol. Complexity Laboratory, UC Riverside, USA	11:15-11:45	<i>Self-Sustained Optimality: A Novel Concept of Life's Supply/Demand Scaling</i>
	11:45-12:00	<i>Discussion</i>
	12:00-12:05	<b>Group Photo</b> <i>in front of SIBS main building</i>
	12:05-13:30	<b>Lunch Break</b>

Monday Early Afternoon, March 22, 2010, 13:30-15:00

**Mechanisms of evolution II: 2 more talks**

<b>Pete Lockhart</b> The AWC for Mol. Ecol. & Evol., Massey U, Palmerston North, NZ	13:30-14:00	<i>Using studies of gene expression to investigate adaptive diversification of New Zealand alpine plants</i>
	14:00-14:15	<i>Discussion</i>
<b>Hamish G. Spencer</b> Dept of Zoology, U of Otago, Dunedin, NZ	14:15-14:45	<i>The Evolution of Phenotypic Plasticity: Untangling Waiting and Development Times</i>
	14:45-15:00	<i>Discussion</i>
	15:00-15:30	<b>Coffee Break</b>

Monday Late Afternoon, March 22, 2010, 15:30-17:45

Molecular evolution I: 3 talks

<b>Naruya Saitou</b> Saitou Lab, Nat. Inst. of Genetics, Mishima, Japan	15:30-16:00 16:00-16:15	<i>Blurring distinction between ortholog and paralog through frequent duplog homogenization</i> <i>Discussion</i>
<b>Mike Steel</b> Biomath. Research Centre, U of Canterbury, CHC, NZ.	16:15-16:45 16:45-17:00	<i>The combinatorics of gene content and their role in phylogenetics</i> <i>Discussion</i>
<b>Kenta Sumiyama</b> Saitou Lab, Nat. Inst. of Genetics, Mishima, Japan	17:00-17:30 17:30-17:45	<i>Evolutionary study of the vertebrate cis-regulatory elements in development with special reference to the Dlx gene system</i> <i>Discussion</i>

Tuesday Morning, March 23, 2010, 9:00-9:45

## Signing of Cooperation Agreements

<b>XU Zhang, SIBS</b> Shanghai, PR China	9:00-9:05	<i>Signing of the Cooperation Agreement with U of Tübingen, Germany</i>
<b>JIN Li, PICB</b> Shanghai, PR China	9:05-9:10	<i>Signing of the Cooperation Agreement with Malahayati U, Lampung, Indonesia</i>
<b>Hermann Schlüsener</b> Inst. for Brain Research, Med. School, U of Tübingen, Germany	9:10-09:30	<i>The Shanghai-Tübingen Research School for Computational Methods in the Life Sciences and Medicine: A vision for the future</i>
	09:30-09:45	<i>Discussion</i>

Tuesday Morning, March 23, 2010, 9:45-12:15

## Genome Research: 3 talks

<b>FENG Jianfeng</b> U of Warwick, UK, and Comp. Systems Biology, Fudan U, Shanghai	09:45-10:15	<i>Transcription Dynamics in Nucleus</i>
	10:15-10:30	<i>Discussion</i>
	10:30-10:45	<b>Coffee Break</b>
<b>Hon Wai Leong</b> Dept of CS, NUS, Singapore	10:45-11:15	<i>Spatial Gene Clusters: Two Models and Applications</i>
	11:15-11:30	<i>Discussion</i>
<b>Yukuto Sato</b> Saitou Lab, Nat. Inst. of Genetics, Mishima, Japan	11:30-12:00	<i>Molecular evolutionary study with pathway simulation on gene dosage effect</i>
	12:00-12:15	<i>Discussion</i>
	12:15-13:30	<b>Lunch Break</b>

**Tuesday Early Afternoon, March 23, 2010, 13:30-15:00**

**Gene Expression, Networks, and their Evolution I: 2 talks**

<b>Martin Vingron</b> MPI for Mol. Genetics, Berlin-Dahlem, Germany, and PICB, Shanghai	13:30-14:00	<i>Transcription factor binding site analysis and histone modifications point at two classes of promoters</i>
	14:00-14:15	<i>Discussion</i>
<b>Lesley Collins</b> The AWC for Mol. Ecol. & Evol., Massey U, Palmerston North, NZ	14:15-14:45	<i>Investigating ancestral RNA-Protein networks in eukaryotes</i>
	14:45-15:00	<i>Discussion</i>
	15:00-15:30	<b>Coffee Break</b>

**Tuesday Late Afternoon, March 23, 2010, 15:30-17:45**

**Gene Expression, Networks, and their Evolution II: 3 more talks**

<b>Xinguang ZHU</b> PICB, Shanghai, PR China	15:30-16:00	<i>Evolution of plant metabolic network revealed through genomic and expression analysis</i>
	16:00-16:15	<i>Discussion</i>
<b>YAN Jun</b> PICB, Shanghai, PR China	16:15-16:45	<i>Flux analysis of metabolism and inter-organ transport in mammals</i>
	16:45-17:00	<i>Discussion</i>
<b>Olgert Denas</b> Dept. of Math. & CS, Emory U, Atlanta, USA	17:00-17:30	<i>Adapting the maximum b-matching problem to gene network reconstruction</i>
	17:30-17:45	<i>Discussion</i>
	18:00-20:00	<b>Conference Dinner</b>

**Tuesday Evening, March 23, 2010, 20:15**

**After-Dinner talk**

<b>David Penny</b> The AWC for Mol. Ecol. & Evol., Massey U, Palmerston North, NZ	20:15-21:00	<i>The continuity of mind, from great apes to humans</i>
	21:00	<i>Discussion</i>

Wednesday, March 24, 2010, 9:00-13:15

## RNA Research: Introduction and 5 talks

<b>Axel Mosig</b> PICB, Shanghai, PR China	9:00-9:15	<i>Introduction</i>
<b>Ming Chen</b> Zhejiang U, Hangzhou, PR China	9:15-9:45	<i>Computational analysis of RNA editing and small RNA characterization in plants</i>
	9:45-10:00	<i>Discussion</i>
<b>Lihui Lai</b> East China Normal University, Shanghai, PR China	10:00-10:30	<i>MicroRNA-145 modulates tumor growth and angiogenesis in breast cancer through translational repression of DDR1, NRAS and VEGF</i>
	10:30-10:45	<i>Discussion</i>
	10:45-11:00	<b>Coffee Break</b>
<b>Christian Reidys</b> Center for Comb., Nankai U, Tianjin, PR China	11:00-11:30	<i>Robustness and Plasticity in the RNA world</i>
	11:30-11:45	<i>Discussion</i>
<b>Ming Zhang</b> Theor. Biology and Biophys., Los Alamos National Laboratory	11:45-12:15	<i>Interplay between microRNAs and cis-antisenses</i>
	12:15-12:30	<i>Discussion</i>
<b>Lesley Collins</b> The AWC for Mol. Ecol. & Evol., Massey U, Palmerston North, NZ	12:30-13:00	<i>Graph theoretical and algorithmic problems related to genome research, with particular emphasis on RNA (secondary) structure and RNA interaction.</i>
	13:00-13:15	<i>Discussion</i>
	13:15-14:15	<b>Lunch Break</b>

Wednesday Afternoon, March 24, 2010, 14:15

**Free Afternoon — Options: Visiting the Shanghai Museum or the Shanghai Botanical Garden or ..., perhaps also the Peking Opera House in Shanghai in the evening presenting the Shaoxing Opera “Fish Pursue”**

Thursday Morning, March 25, 2010, 9:00-12:15

Phylogenetic combinatorics I: 4 talks

<b>David Bryant</b> Math. Dept, U of Auckland, NZ	9:00-9:30	<i>The tight span of Boolean functions</i>
	9:30-9:45	<i>Discussion</i>
<b>Vincent Moulton</b> School of CS, U of East Anglia, Norwich, UK	9:45-10:15	<i>Phylogenetic networks and multi-labeled trees</i>
	10:15-10:30	<i>Discussion</i>
	10:30-10:45	<b>Coffee Break</b>
<b>Stefan Gruenewald</b> PICB, Shanghai, PR China	10:45-11:15	<i>A Quartet Version of Split Decomposition</i>
	11:15-11:30	<i>Discussion</i>
<b>Katharina Huber</b> School of CS, U of East Anglia, Norwich, UK	11:30-12:00	<i>Recent results on phylogenetic networks of bounded level</i>
	12:00-12:15	<i>Discussion</i>
	12:15-13:30	<b>Lunch Break</b>

Thursday Early Afternoon, March 25, 2010, 13:30-15:00

Phylogenetic combinatorics II: 2 more talks

<b>Jack Koolen</b> Math. Dept, POSTECH, Pohang, Korea	13:30-14:00	<i>On the minimal number of quartets in a maximal 2-compatible split system</i>
	14:00-14:15	<i>Discussion</i>
<b>Mike Steel</b> Biomath. Res. Centre, U of Canterbury, CHC, NZ.	14:15-14:45	<i>Extracting evolutionary signal from patchy genomic data</i>
	14:45-15:00	<i>Discussion</i>
	15:00-15:30	<b>Coffee Break</b>

Thursday Late Afternoon, March 25, 2010, 15:30 -17:45

**Towards Genome Semantics: 3 talks**

<b>Alberto Apostolico</b> College of Comp., Georgia Tech, Atlanta, USA	15:30-16:00	<i>The Quest for Succinct Pattern Generators</i>
	16:00-16:15	<i>Discussion</i>
<b>Raymond Chan</b> Math. Dept, The Chinese University of Hong Kong	16:15-16:45	<i>Maximum Entropy Principle for Composition Vector Method in Phylogenetics</i>
	16:45-17:00	<i>Discussion</i>
<b>JIN Li</b> PICB, Shanghai, PR China	17:00-17:30	<i>Identifying mutational hot spots of copy number variations in human genomes: A phylogeny approach</i>
	17:30-17:45	<i>Discussion</i>

Thursday Evening, March 25, 2010, 18:30

**Snacks and Posters**



**Friday Morning, March 26, 2010, 9:00-12:30**

**Molecular evolution II: 4 talks**

<b>Mick Roberts</b> IIMS & NZIAS, Massey U, Auckland, NZ	9:00-9:30	<i>Virus evolution - escaping immunity</i>
	9:30-9:45	<i>Discussion</i>
<b>Alex Grossmann</b> Lab Statistique et Genome, Evry, France	9:45-10:15	<i>Words, words, words</i>
	10:15-10:30	<i>Discussion</i>
	10:30-11:00	<b>Coffee Break</b>
<b>James Degnan</b> Dept. of Math. and Stat., U of Canterbury, CHC, NZ	11:00-11:30	<i>Identifiability of rooted species trees from unrooted gene tree distributions</i>
	11:30-11:45	<i>Discussion</i>
<b>Louxin Zhang</b> Math. Dept., NUS, Singapore	11:45-12:15	<i>Reconciling gene trees with the deep coalescence cost</i>
	12:15-12:30	<i>Discussion</i>
	12:30-13:30	<b>Lunch Break</b>

**Friday Early Afternoon, March 26, 2010, 13:30-14:15**

**Molecular evolution III: 1 talk**

<b>Wim Hordijk</b> World Wanderer (currently Comp. Systems Biology, Fudan U, Shanghai)	13:30-14:00	<i>Adventures in Phylogenetics</i>
	14:00-14:15	<i>Discussion</i>

**Friday Early Afternoon, March 26, 2010, 14:15-15:00**

**Mathematics and Protein Structure: one talk**

<b>Deok-Soo Kim</b> Voronoi Diagram Research Center, Hanyang U, Seoul, Korea	14:15-14:45	<i>BioGeometry and Beta-complexes: What, and how useful, are they?</i>
	14:45-15:00	<i>Discussion</i>
	15:00-15:15	<b>Coffee Break</b>

**Friday Late Afternoon, March 26, 2010, 15:15-18:30**  
**Evolution, Genetics, and Epigenetics: 4 talks**

<b>Philipp Khaitovich</b> PICB, Shanghai, PR China, khaitovich@eva.mpg.de	15:15-15:45	<i>A molecular survey across lifespan: the role of developmental timing in human brain evolution and aging</i>
	15:45-16:00	<i>Discussion</i>
<b>FU XinYuan</b> Dept Biochem NUS, Singapore, Dept Microbiol. and Immun., Indiana U, Indianapolis, USA	16:00-16:30	<i>Evolution and Functional Analysis of Networks Regulated by the STAT Signaling Pathway</i>
	16:30-16:45	<i>Discussion</i>
	16:45-17:00	<b>Coffee Break</b>
<b>Liping Zhao</b> Systems Biomedicine Center, Shanghai Jiao Tong U, Shanghai, PR China	17:00-17:30	<i>Whole-Body Systems Biology</i>
	17:30-17:45	<i>Discussion</i>
<b>XU Shuhua</b> PICB, Shanghai, PR China	17:45-18:15	<i>Chromosome-Wide Haplotype Sharing: Integrating Recombination Information into Studies on Human Population Genetic Relationship</i>
	18:15-18:30	<i>Discussion</i>

**Saturday, March 27, 2010, 9:30-11:00**  
**Evolutionary Medicine: A XU Guangqi Lecture**

<b>Sir Peter Gluckmann, FRS</b> The Liggins Institute, and the NZ Prime Minister's Chief Science Advisor	9:30-10:30	<i>Echoes of the past - an evolutionary perspective on medicine and its relevance to public health in Asia</i>
	10:30 -11:00	<i>Discussion</i>

**Saturday, March 27, 2010, 11:00 - 13:15**  
**Closing Session**

<b>All Participants</b> from all over this planet  <b>Andreas Dress</b> PICB, Shanghai, PR China	11:00-13:00	<i>A general discussion on how to forge national and international alliances to meeting current challenges in mathematics arising in the study of the molecular evolution of genes and genomes, their control, and their correlation with metabolic, developmental, morphological, and environmental issues.</i>
	13:00-13:15	<i>Farewell</i>