



Statistical Physics and Computer Science(Beijing Satellite Meeting of STATPHYS-24)

Date : From 2010-07-08 To 2010-07-11
International coordinators : Mikko Alava,Erik Aurell,Xiaosong Chen, Henri Orland, Ke Xu, Bo Zheng, Haijun Zhou
Local coordinators :

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Recent research efforts demonstrate that very interesting collective behaviors and phase transition phenomena exist in various distributed information systems, such as large constraint satisfaction formulas, low-density-parity-check codes, networks of neurons, peer-to-peer computer networks, and combinatorial optimization problems. The application of statistical physics methods to these system has lead to great progress in understanding the typical computation complexity of random constraint satisfaction/optimization problems, the solution space evolution and phase transitions of random combinatorial satisfaction problems, the performances of low-density-parity-check codes, The interaction of statistical physics and computer/information science has also resulted in the invention of new efficient message-passing algorithms. The developed methods and ideas will also be very valuable for studying the equilibrium and out-of-equilibrium properties of disordered and frustrated systems.

These pioneer research practices of computer scientists, mathematicians, and physicists have created a new interdisciplinary field that is growing fast. Being a satellite meeting for [STATPHYS-24](#), the 2010 Beijing workshop will be a platform for communicating latest research results, for presenting challenging problems, and for open-minded discusses of new research directions. The topics of this workshop will include (but not limited to) the following:

- Phase transitions in combinatorial satisfaction/optimization problems
- Reconstruction of neural and gene-regulation networks from correlation measurements
- Message-passing algorithms
- Glassy dynamics of search processes

Invited Speakers

- **Dimitrio Achilioptas** (Department of Computer Science, UC Santa Cruz, USA)
 - Title: TBA
- **Mikko Alava** (Department of Applied Physics, Helsinki University of Technology, Finland)
 - Title: TBA
- **Erik Aurell** (Department of Computational Biology, Royal Institute of Technology, Sweden)
 - Title: TBA
- **Yong Gao** (Department of Computer Science, University of British Columbia Okanagan, USA)
 - Title: TBA
- **Alexander Hartmann** (Institute for Physics, University of Oldenburg, Germany)

- Title: [Negative weight percolation: shortest paths not the easy way](#)
 - Yoshiyuki Kabashima (Depart. of Comput. Intelligence and Systems Science, Tokyo Institute of Technology, Japan)
 - Title: [Statistical mechanics approach to compressive sensing](#)
 - Florent Krzakala (Ecole Supérieure de Physique et de Chimie Industrielles, Paris, France)
 - Title: TBA
 - Jorge Kurchan (Ecole Supérieure de Physique et de Chimie Industrielles, Paris, France)
 - Title:
 - Chu-Min Li (Université de Picardie Jules Verne, France)
 - Title: TBA
 - Marc Mezard (Laboratoire de Physique Théorique et Modèles Statistiques, France)
 - Title: [Reconstruction of sparse graphical models from data](#)
 - **Bart Selman** (Department of Computer Science, Cornell University, USA)
 - Title: TBA
 - Toshiyuki **Tanaka** (Graduate School of Informatics, Kyoto University)
 - Title: TBA
 - Ke **Xu**/许可; (Department of Computer Science, Beihang University)
 - Title: TBA
 - Chi Ho **Yeung** and K. Y. Michael **Wong** (Hong Kong University of Science and Technology, China)
 - Title: [Optimal location of sources in transportation networks](#)
 - Lenka **Zdeborova** (Los Alamos National Laboratory, USA)
 - Title: TBA
 - Hong **Zhao**/赵鸿 (Department of Physics, Xiamen University)
 - Title: TBA
 - Bo **Zheng**/郑波 (Department of Physics, Zhejiang University)
 - Title: [Non-equilibrium critical dynamics and its applications](#)
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History

This Beijing satellite meeting is preceded by several other related workshops/programs/schools at Beijing:

- 01.03.2008-15.04.2008: [Collective Dynamics in Information Systems](#) (KITPC Program)
 - 03.03.2008-14.03.2008: [Second Asian-Pacific School on Statistical Physics and Interdisciplinary Applications](#) (ITP-ICTP Joint School)
 - 20.09.2009-22.09.2009: International Conference on Recent Advances in the Interdisciplinary Applications of Statistical Physics (ITP-ICTP Joint Workshop)
 - 11.09.2006-19.09.2006: Asian-Pacific School on Statistical Physics and Interdisciplinary Applications (ITP-ICTP Joint School)
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Organizers

- Mikko Alava (Department of Applied Physics, Helsinki University of Technology, Helsinki)
 - Erik Aurell (Department of Computational Biology, Royal Institute of Technology, Stockholm)
 - Xiaosong Chen (Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing)
 - Henri Orland (Service de Physique Théorique, Centre CEA de Saclay)
 - Ke Xu (Department of Computer Sciences, Beihang University, Beijing)
 - Bo Zheng (Department of Physics, Zhejiang University, Hangzhou)
 - [Haijun Zhou](#) (Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing)
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Sponsors:

- Institute of Theoretical Physics, Chinese Academy of Sciences/中国科学院理论物理研究所
- Natural Science Foundation of China/国家自然科学基金委员会

