

# Summer School & Workshop on “Information Processing in Biology”

## Lecturers & Speakers:

Luonan Chen	Shanghai University&Osaka Sangyo University
Pablo Iglasias	Johns Hopkins U
Kunihiko Kaneko	Tokyo University
Hao Li	QB3, UCSF
Yixue Li	Shanghai Center for Bioinformatics Technology
Zhirong Liu	PKU
Wenzhe Ma	CTB, UCSF
Ilya Nemenman	Los Alamos National Laboratory
Qi Ouyang	CTB, PKU
Matthieu Piel	Institut Curie, CNRS
Hana El-Samad	QB3, UCSF
Kim Sneppen	Niels Bohr Instite, University of Copenhagen
Chao Tang	QB3, UCSF
Letian Tao	College of Life Sciences PKU
Yuhai Tu	IBM, CTB
Hongli Wang	PKU
Wei Wang	Nanjing University
Lingchong You	Duke University
Haijun Zhou	Institute of Theoretical Physics, CAS
Tianshou Zhou	Sun Yat-Sen University



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中国

# 2009

### Summer School

Date: 13<sup>th</sup>~17<sup>th</sup>, July

Venue: No. 205/213, Building of Sciences

### Workshop

Date: 19<sup>th</sup> ~21<sup>th</sup>, July

Venue: The View Lake Hotel, PKU

### Organizers:



Chao Tang(UCSF/CTB) Yuhai Tu(IBM/CTB)

Qi Ouyang (CTB) Luhua Lai(CTB)

Taddei Francois(ENS, Paris 7&5 Universities)



# Information Processing in Biology

BEIJING, CHINA JULY 13<sup>TH</sup> ~17<sup>TH</sup> , 19<sup>TH</sup> ~21<sup>TH</sup> , 2009

## ORGANIZERS

**Chao TANG**  
UNIVERSITY OF CALIFORNIA, USA/PEKING  
UNIVERSITY, CHINA



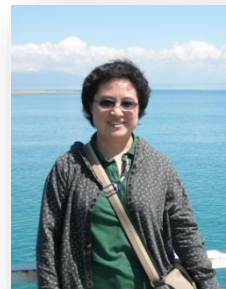
**Yuhai TU**  
WATSON RESEARCH CENTER, IBM,  
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CENTER FOR THEORETICAL BIOLOGY,  
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**Luhua LAI**  
CENTER FOR THEORETICAL BIOLOGY,  
COLLEGE OF CHEMISTRY OF PEKING  
UNIVERSITY



**Taddei FRANCOIS**  
ECOLE NORMALE SUPERIEURE, PARIS 7&5 UNIVERSITIES, FRANCE



# Summer School Program

<b>MONDAY</b>	<b>JULY 13<sup>th</sup> (Place: No. 205)</b>
07:30-08:20	Registration at Classroom
08:20-08:30	Opening Talk Qi Ouyang (PKU, CTB)
08:30-10:00	<i>Introduction I</i> Minghua Deng (Math School, PKU, CTB)
10:00-10:30	Break
10:30-12:00	<i>Introduction II</i> Minghua Deng(Math School, PKU, CTB)
12:00-14:00	Lunch
14:00-15:30	<i>Introduction III</i> Huaiqiu Zhu(Mech School, PKU, CTB)
15:30-16:00	Break
16:00-17:30	<i>Introduction IV</i> Huaiqiu Zhu(Mech School, PKU, CTB)
<b>TUESDAY</b>	<b>JULY 14<sup>th</sup> (Place: No. 213)</b>
08:30-10:00	Yuhai Tu(IBM, CTB)
10:00-10:30	Break
10:30-12:00	Yuhai Tu(IBM, CTB)
12:00-14:00	Lunch
14:00-15:30	Yuhai Tu(IBM, CTB)
15:30-16:00	Break
16:00-17:30	Yuhai Tu(IBM, CTB)
<b>WEDSDAY</b>	<b>JULY 15<sup>th</sup> (Place: No. 213)</b>
08:30-10:00	Hana El-Samad (QB3, UCSF)
10:00-10:30	Break
10:30-12:00	Hana El-Samad (QB3, UCSF)
12:00-14:00	Lunch
14:00-15:30	Lingchong You(Duke U)
15:30-16:00	Break
16:00-17:30	Lingchong You(Duke U)
<b>THURSDAY</b>	<b>JULY 16<sup>th</sup> (Place: No. 213)</b>
08:30-10:00	Pablo Iglesias (Johns Hopkins U)
10:00-10:30	Break
10:30-12:00	Pablo Iglesias (Johns Hopkins U)
12:00-14:00	Lunch
14:00-15:30	<i>Signal Processing in Stochastic Biochemical Networks: Information Theory, Noise Filtering, Adaptation, Form</i>

	<i>vs. Function, And All That</i> Ilya Nemenman (Los Alamos National Laboratory)
15:30-16:00	Break
16:00-17:30	<i>Signal Processing in Stochastic Biochemical Networks: Information Theory, Noise Filtering, Adaptation, Form vs. Function, And All That</i> Ilya Nemenman (Los Alamos National Laboratory)
<b>FRIDAY</b>	<b>JULY 17th (Place: No. 205)</b>
08:30-10:00	<i>Complex Systems Biology: In Pursuit of Answers to General Questions on Reproduction, Adaptation, Differentiation, and Evolution</i> Kunihiko Kaneko (Tokyo University)
10:00-10:30	Break
10:30-12:00	<i>Complex Systems Biology: In Pursuit of Answers to General Questions on Reproduction, Adaptation, Differentiation, and Evolution</i> Kunihiko Kaneko (Tokyo University)
12:00-14:00	Lunch
14:00-15:30	<i>Dynamics on small networks</i> Kim Sneppen (Niels Bohr Institute, University of Copenhagen)
15:30-16:00	Break
16:00-17:30	<i>Dynamics on small networks</i> Kim Sneppen (Niels Bohr Institute, University of Copenhagen)

# Workshop Program

<b>Sunday July 19<sup>th</sup></b>	
<b>08:00-09:00</b>	<b>On-site registration</b>
<b>Session I</b>	<b>Chair: Chao Tang (QB3, UCSF)</b>
<b>9:00-9:45</b>	<b>Pablo Iglasias (Johns Hopkins U)</b> <i>“Information theory and signal transduction pathways”</i>
<b>9:45-10:30</b>	<b>Tianshou Zhou (Sun Yat-Sen University School of Mathematics and Computational Science)</b> <i>“Combinatorial signal integration: Geometric characteristics of dynamic correlations and the effect of cis-regulatory modules on population behavior”</i>
<b>10:30-10:50</b>	<b>Coffee break</b>
<b>Session II</b>	<b>Chair: Lingchong You (Duke University)</b>
<b>10:50-11:35</b>	<b>Hana El-Samad (QB3, UCSF)</b> <i>“Tuning the activation threshold of a kinase network by nested feedback loops”</i>
<b>11:35-12:00</b>	<b>Zhirong Liu (CTB, PKU)</b> <i>“The kinetic advantage of intrinsically disordered proteins in binding process”</i>
<b>12:00-14:00</b>	<b>Lunch break and <u>Poster session (for odd numbers)</u></b>
<b>Session III</b>	<b>Chair: Ilya Nemenman (Los Alamos National Laboratory)</b>
<b>14:00-14:45</b>	<b>Lingchong You (Duke University)</b> <i>“Biology by design: reduction and synthesis of cellular networks”</i>
<b>14:45-15:30</b>	<b>Luonan Chen (Shanghai University &amp; Osaka Sangyo University)</b> <i>“Towards designing and modeling gene regulatory networks”</i>
<b>15:30-16:00</b>	<b>Coffee break</b>
<b>Session IV</b>	<b>Chair: Kunihiro Kaneko (Tokyo University)</b>
<b>16:00-16:45</b>	<b>Kim Sneppen (Niels Bohr Institute, University of Copenhagen)</b> <i>“Modeling nucleosome mediated epigenetics and gene regulation”</i>
<b>17:45</b>	<b><u>Leave for Summer Palace (just for the invited speakers)</u></b>

	Gather at the hotel lobby
18:00-19:30	Boat tour
19:30	Conference banquet
<b>Monday</b>	<b>July 20<sup>th</sup></b>
Session I	Chair: Pablo Iglesias(Johns Hopkins U)
9:00-9:45	Hao Li (QB3, UCSF) <i>“Dynamics and design principles of a general regulatory architecture in metabolic networks”</i>
9:45-10:30	Wenzhe Ma(CTB, UCSF) <i>“Defining network topologies that can achieve biochemical adaptation”</i>
10:30-10:50	Coffee break
Session II	Chair: Kim Sneppen (Niels Bohr Institute, University of Copenhagen)
10:50-11:35	Ilya Nemenman (Los Alamos National Laboratory) <i>“Are complex biological networks really complex?”</i>
11:35-12:00	Hongli Wang(CTB, PKU) <i>“Stochastic simulation of the mating pathway in budding yeast”</i>
12:00-14:00	Lunch break and <u>Poster session(for even numbers)</u>
Session III	Chair: Hana El-Samad (QB3, UCSF)
14:00-14:45	Feng Liu (Nanjing University) <i>“Cell fate decision mediated by p53 pulses”</i>
14:45-14:30	Qi Ouyang (CTB, PKU) <i>“Decision Making on Cell Survival and Death”</i>
14:30-16:00	Coffee break
Session IV	Chair: Qi Ouyang (CTB, PKU)
16:00-16:45	Matthieu Piel(Institut Curie, CNRS) <i>“Simple micro-tools to study complex cell behaviors: From yeast morphogenesis to dendritic cell migration and orientation of the mitotic spindle in mammalian cells”</i>
16:45-17:30	Kunihiko Kaneko (Tokyo University) <i>“Plasticity, evolvability and robustness: A macroscopic theory in terms of phenotypic fluctuations”</i>
<b>Tuesday</b>	<b>July 21<sup>th</sup></b>
Session I	Chair: Matthieu Piel(Institut Curie, CNRS)
9:00-9:45	Yuhai Tu (IBM, CTB) <i>“Learn locally but act globally: How the bacterial chemosensory system adapts and responds to mixed signals”</i>
9:45-10:30	Haijun Zhou (The Institute of Theoretical Physics, CAS) <i>“Finding solutions for a constraint satisfaction problem: Belief propagation with reinforcement and field cutoff”</i>
10:30-10:50	Coffee break

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<b>Session II</b>	<b>Chair: Luhua Lai (CTB, PKU)</b>
<b>10:50-11:35</b>	<b>Letian Tao(College of Life Sciences Peking University)</b> <i>“Low-Dimensional Characterization of Brain-Scale Seizures in the Zebrafish Larvae”</i>
<b>11:35-12:20</b>	<b>Chao Tang (QB3, UCSF)</b> <i>“Robust, switch-like G1/S transition in yeast cell cycle is ensured by multiple positive feedback loops”</i>
<b>12:30-13:30</b>	<b>Lunch</b>
<b>13:30</b>	<b>Leave for sightseeing tour( just for invited speakers)</b> <b>Gather at the hotel lobby</b>

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