

Sapporo Winter School PROGRAM

Hokkaido University

Tue 10 February — Sat 14 February, 2009

PART I . Networks of Interacting Machines: From Cell Biology to Models of Industrial Production

Tuesday 10 February, 2009

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| 09:30~09:40 | Opening Remarks |
| 09:40~10:20 | D. Armbruster (Arizona State University Tempe, USA)
“What do biological and production networks have in common?” |
| 10:20~11:00 | H. Aonuma (RIES, Hokkaido University)
“Modelling of experience dependent behavior – Fighting among male crickets” |
| 11:00~11:30 | Coffee Break |
| 11:30~12:10 | R. Kobayashi (Hiroshima University)
“A Mathematical Model of Amoeboid Locomotion” |
| 12:10~12:50 | B. Blasius (University of Oldenburg, Germany)
“Large scale movement on spatial networks: from the global cargo shipping network to bird migration” |
| 12:50~14:00 | Lunch |
| 14:00~14:40 | Th. Gross (Max-Planck Institute for Physics of Complex Systems, Germany)
“Generalized models: Analyzing the dynamics of diagrammatic representations of complex heterogeneous networks.” |
| 14:40~15:20 | Y. Suzuki (Graduate School of Nagoya Univ.)
“A step toward understanding the principle of biological networks” |
| 15:20~15:50 | Coffee Break |
| 15:50~16:30 | H. Nishimori (Hiroshima University)
“Mathematical Model for the Foraging Tactics of Ants Colony under Unsteady Food Supply” |
| 16:30~17:10 | H. Ueda (RIKEN, Osaka University)
“Towards Synthesis of Mammalian Circadian Clocks” |
| 17:10~17:30 | Coffee Break |
| 17:30~18:10 | Y. Nishiura (RIES, Hokkaido University)
“Oblique collisions in dissipative systems” |
| 19:00~21:00 | Welcome Party (Aspen Hotel) |

Wednesday 11 February, 2009

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| 09:30~10:10 | A. Mikhailov (Fritz Haber Institute of the Max Planck Society, Germany)
“Evolutionary engineering of complex functional networks” |
| 10:10~10:50 | K. Fujimoto (Osaka University)
“Network evolution of body plans: a modeling approach for evolutionary developmental biology” |

10:50~11:10	Coffee Break
11:10~11:50	R. Donner (Dresden University of Technology, Germany) “Synchronization effects in transportation networks with biologically inspired self-organized control”
11:50~12:30	K. Nishinari (University of Tokyo) “Jamology — Research on jams of self-driven particles”
13:00~19:00	Lunch and Excursion

Thursday 12 February, 2009

09:30~10:10	K. Kaneko (University of Tokyo) “Consistency Principle for Robust Biological Systems”
10:10~10:50	M.-Th. Hütt (Jacobs University, Germany) “The logistics of metabolism”
10:50~11:20	Coffee Break
11:20~12:00	J. Imura (Tokyo Institute of Technology) “Control of hybrid systems: a new framework for control of complex systems”
12:00~12:30	Round table discussion session
12:30~14:00	Lunch

PART II . Nonequilibrium Pattern Formation in Chemical and Biological Systems

Thursday 12 February, 2009

14:00~14:10	Opening Remarks
14:10~14:50	H. Yokoyama (National Institute of Advanced Industrial Science and Technology) “Collective molecular motor using chiral liquid crystalline thin films”
14:50~15:30	M. Bär (Physikalisch-Technische Bundesanstalt, Germany) “Self-propelled particles with nematic interactions: From simple agent-based models to experiments with rod-shaped bacteria”
15:30~16:00	Coffee Break
16:00~17:00	Short Presentations
17:00~18:30	Poster Session
18:30~20:30	Poster Session + Banquet

Friday 13 February, 2009

- 09:30~10:10 O. Mochizuki (Toyo University)
“Splashes by a frog diving into water”
- 10:10~10:50 H. Liu (Chiba University)
“Integrated study of insect flight: from aerodynamics, maneuverability to optimization”
- 10:50~11:10 Coffee Break
- 11:10~11:50 T. Ishikawa (Tohoku University)
“Fluid dynamics of a suspension of micro-organisms”
- 11:50~12:30 M. Iima (RIES, Hokkaido University)
“Theory of flapping flight using vortices”
- 12:30~14:00 Lunch
- 14:00~14:40 T. Yanagida (Osaka University)
“Single molecule nanoscience: Fluctuation and function of life”
- 14:40~15:20 M. Sano (University of Tokyo)
“Coordination of Cell Shape and Motility in Spontaneous Cell Migration”
- 15:20~15:50 Coffee Break
- 15:50~16:30 V. K. Vanag (Brandeis University, USA)
“Dissipative patterns in heterogeneous BZ systems.”
- 16:30~17:10 T. Ohta (Kyoto University)
“Deformable self-propelled particles”
- 17:10~17:30 Coffee Break
- 17:30~18:10 I. Tsuda (RIES, Hokkaido University)
“Hypotheses on the functional roles of chaotic transitory dynamics”

Saturday 14 February, 2009

- 09:30~10:10 H. Ito (Ochanomizu University)
“Synchronization of a circadian clock in vitro.”
- 10:10~10:50 R. Tönjes (Ochanomizu University)
“Nonequilibrium Phase Transition to Synchronization in Small World Networks of Phase Oscillators”
- 10:50~11:10 Coffee Break
- 11:10~11:50 Y. Kuramoto (Kyoto University)
“Individual vs. Collective Descriptions of Coupled Oscillators”
- 11:50~12:10 H. Kori (Ochanomizu University)
“Linking cell-level and system-level responses in oscillator networks with any network structure”
- 12:10~12:40 Round table discussion and closing

Poster Session

Thursday 12 February, 2009

17:00~20:30 (Banquet starts at 18:30)

- P01 Edgar Avalos, Pik-Yin Lai, Chi-Keung Chan
Spiral wave propagation on the excitable Kuramoto lattice.
- P02 Wei-Yin Chiang, Pik-Yin Lai, C. K. Chan
Effect of coupling strength on frequency enhancement in excitable medium :
Application to Cultured Cardiac Myocyte Synchronization
- P03 Daniel Geberth
Predicting the distribution of spiral waves from cell properties in a model of
Dictyostelium pattern formation
- P04 Marcel Hörning
Controlling of Excitable Waves in Heart Tissue: Two Different Approaches
- P05 Masayo Inoue
Behavior of multi adaptive reaction system and environment-dependent response
- P06 Kenichi Ishiyama
Full Synchronization and Partial Synchronization of a Multi-country Inventory Cycle
Model
- P07 Rumana Akther Jahan, Kosuke Suzuki, Hitoshi Mahara, Tomohiko Yamaguchi
Perturbation of BZ patterns by amphiphiles
- P08 Takeshi Kano
Method to control dynamics of coupled oscillators using multi-linear feedback
- P09 Miki Kobayashi
On the intermittency phenomena in the shell-model turbulence
- P10 Yasuaki Kobayashi
Design principle of multi-cluster and desynchronized states in oscillatory media
- P11 Hiroshi Kori
Dynamical response of oscillator networks: linking cell-level and system-level
responses
- P12 Vasily V. Kuvichkin
The total regulation of gene expression by DNA- membrane complexes formation.
- P13 Chun Biu Li
Multiscale Networks of Interacting Biological Systems: From network constructions
to causality among them
- P14 Ma Yue
Self-sustained Oscillation in a Non-oscillatory Cell Chain and Its Bifurcation Analysis
- P15 Hitoshi Mahara
The relation between thermodynamic indices and pattern formation
- P16 Takashi Mashiko, Yasuhito Imanishi, Ryota Kuwajima, Takashi Nagatani
Freezing transition of unidirectional lattice-gas flow of flexible chainlike objects
- P17 Akira Masumi, Tomoyuki Yamamoto, Takashi Hashimoto
Distribution of residence time at quasi-stationary states in globally coupled map.
- P18 Naoto Nakano
Mathematical analysis on a continuum model for a flow of granular materials

- P19 Ryosuke Nishi, Hiroshi Miki, Akiyasu Tomoeda, Katsuhiro Nishinari
Achievement of Emergent Alternative Configurations of Vehicles
for Easing Traffic Congestion on Weaving Sections
- P20 Kenta Odagiri
Discreteness-induced pattern formation in nonlinear proliferation systems
- P21 Isamu Ohnishi
Memory, hysteresis and oscillation induced by multiple covalent modifications and
its application to circadian rhythm of Cyanobacteria
- P22 Benjamin Pfeuty
Flexible biochemical switches based on mixed feedback loops
- P23 Yoshitaka SAIKI
Time Averaged Properties along Unstable Periodic Orbits in Some Systems of
Differential Equations
- P24 Kuniyasu Shimizu
Heteroclinic cycle and propagating pulse wave in a ring of coupled bistable
oscillators
- P25 Kosuke Suzuki, Tomohiko Yamaguchi
Pattern evolution on the surface of reactive oil droplets
- P26 Dan Tanaka
Swarm Oscillators
- P27 Kazuko Terada
Two-parameter bifurcations in the Hodgkin-Huxley equations for muscle
- P28 Hiroshi Teramoto
Folding patterns of stable/unstable manifolds in high dimensional dynamical
systems
- P29 Yuichi Togashi
Spatiotemporal Pattern Formation in the Molecular Machinery in Biological Systems
- P30 Akiyasu Tomoeda, Daisuke Shamoto, Ryosuke Nishi, Kazumichi Otsuka, Katsuhiro Nishinari
Perturbation Analysis of Anisotropic Traffic Flow Model
- P31 Toshihiro Tsuzuki
Position control of target pattern by annulus illumination on Belousov-Zhabotinsky
reaction.
- P32 Peter van Heijster
Front interactions in a three component system
- P33 Joe Yuichiro Wakano
Self-Organized Pattern Formation of Bacteria Colony
- P34 Takeshi Watanabe
Periodic solution of the cylinder wake
- P35 Miki M. Yamamoto
Nonlocal Complex Ginzburg-Landau equation as a model of single Dictyostelium
discoideum cell
- P36 Tetsuya Yamamoto
Adaptive locomotion to friction change in one-dimensional modular robot
- P37 Daichi Yanagisawa, Ayako Kimura, Akiyasu Tomoeda, Ryosuke Nishi, Yushi Suma, Kazumichi
Ohtsuka, Katsuhiro Nishinari
Effect of Conflicts and Turning on Pedestrian Outflow through an Exit

P38 Xiaohui Yuan, Takashi Teramoto, Yasumasa Nishiura
Spot Dynamics of Reaction-diffusion system in Heterogeneous Media