

## Conference Program

### Monday, June 22

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- 8:30 – 9:45 Registration
- 9:45 – 10:00 Opening: K. Krischer  
E. Rank (Director IAS)
- 10:00 – 11:00 **Symposium: Active Particles I**  
organized by R. Kapral (Toronto, CA) & K. Showalter (West Virginia, USA)
- 10:00 – 10:30 **A. Sen** (Pennsylvania, USA), *Collective Behavior of Self-Powered Single Molecules and Nanoparticles*, invited talk
- 10:30 – 11:00 **G. Gompper** (Jülich, DE), *Active Particles near Surfaces*, invited talk
- 11:00 – 11:30 Coffee break
- 11:30 – 12:30 **Symposium: Active Particles II**  
organized by R. Kapral & K. Showalter
- 11:30 – 12:00 **S. Sanchez** (Stuttgart, DE), *Engineering Chemically Active Nano- and Micro-motors*, invited talk
- 12:00 – 12:30 **H. Stark** (Berlin, DE): *Exploring active particles as a new class of soft-matter systems*, invited talk
- 12:30 – 14:00 Lunch
- 14:00 – 16:00 **Symposium: Fluctuations Far From Equilibrium**  
organized by F. Sagues (Barcelona, E) & L. Schimansky-Geier (Berlin, DE)
- 14:00 – 14:30 **G. Oshanin** (Paris, F), *Active microrheology in dense crowded systems*, invited talk
- 14:30 – 15:00 **K. Kroy** (Leipzig, DE), *Hot Brownian motion*, invited talk
- 15:00 – 15:30 **L. Dagdug** (Iztapalapa, MX), *Description of diffusion in confined environments placing the coordinate frame at the tube's axis*, invited talk
- 15:30 – 16:00 **I. Sokolov** (Berlin, DE), *Stationarity, ergodicity and fluctuations in simple models of anomalous diffusion*, invited talk
- 16:00 – 16:30 Coffee break
- 16:30 – 17:30 **Plenary Lecture Harry L. Swinney (Austin, USA)**  
*Collective dynamics and competition in single and competing bacterial colonies*
- 17:30 - 19:00 Welcome reception

9:00 – 11:00 **Symposium: Synchronization Phenomena**

organized by I. Kiss (St. Louis, USA) & A. Pikovsky (Potsdam, DE)

9:00 – 9:20 **I. Kiss** (St. Louis, USA), *Optimal Entrainment Control of Electrochemical Oscillations*, organizer introduction

9:20 – 09:55 **H. Nakao** (Tokyo, J), *Synchronization of rhythmic spatiotemporal patterns and network dynamics*, invited talk

9:55 – 10:30 **L. Tsimring** (San Diego, USA), *Synchronization of synthetic gene oscillators*, invited talk

10:30 – 10:45 **J. F. Totz** (Berlin, DE), *Permutation symmetries and phase wave synchronization on networks of heterogeneous chemical oscillators*

10:45 – 11:00 **Y. Maistrenko** (Darmstadt, DE und Kiev, Ukraine) *Scroll Wave Chimeras*

11:00 - 11:30 Coffee break

11:30 - 12:30 **Contributed Talk Session I**

11:30 – 11:45 **P. Magaretti** (Stuttgart, DE), *Active particles at and close to fluid-fluid interfaces*, [Active Particles](#)

11:45 – 12:00 **T. Ouldridge** (London, UK), *On the connection between computational and biochemical measurement*, [Fluctuations Far From Equilibrium](#)

12:00 – 12:15 **T. Hermans** (Strasbourg, F), *Dissipative self-assembly steady states: from batch to open systems* [Control of Chemical Self-Organization](#)

12:15 – 12:30 **K. Shitara** (Fukuoka, J), *Influence of Time-Delayed Feedback on a Solitary Domain in an Excitable Reaction-Diffusion System* [Control of Chemical Self-Organization](#)

12:30 – 14:00 Lunch

14:00 - 16:00 **Symposium: Mathematical & Computational Methods**

organized by B. Fiedler (Berlin, DE) & Y. Kevrekidis (Princeton, USA)

14:00 – 14:30 **Y. Kevrekidis** (Princeton, USA), *Data mining and fusion for complex / multiscale dynamical systems*, organizer talk

14:30 – 15:00 **A. Mochizuki** (Tokyo, J), *Sensitivity of chemical reaction networks: A structural approach*, invited talk

15:00 – 15:30 **Y. Nishiura** (Sendai, J), *What is An Amorphous Structure? – Topological View Point*

15:30 – 16:00 **S. Shvartsman** (Princeton, USA), *Simple kinetics of complex biochemical systems*, invited talk

16:00 – 16:30 Coffee break

16:30 – 19:30 **Poster session and snacks**

- 8:45 – 10:30 **Symposium: Control of Chemical Self-Organization**  
organized by E. Schöll (Berlin, DE) & O. Steinbock (Florida, USA)
- 8:45 – 9:15 **O. Steinbock** (Florida, USA), *Hierarchical Self-Organization: From Nanorods to Microscopic Biomorphs and Macroscopic Tubes*, organizer talk
- 9:15 – 9:45 **A. Estévez-Torres** (Paris), *Writing down reaction-diffusion equations with DNA*, invited talk
- 9:45 – 10:15 **A. Zakharova** (Berlin, DE), *Control of Symmetry-breaking Patterns: Oscillation Death and Chimera States*, invited talk
- 10:15 – 10:30 **S. Martens** (Berlin, DE), *Front propagation in channels with spatially modulated cross-section*, contributed talk

10:30 – 11:00 Coffee break

- 11:00 – 13:00 **Symposium: Electrochemistry & Surface Reactions**  
organized by K. Krischer (München, DE) & H. H. Rotermund (Halifax, Canada)
- 11:00 – 11:30 **R. Imbihl** (Hannover, DE), *Travelling Vanadium Oxide Islands in a Catalytic Reaction*, invited talk
- 11:30 – 12:00 **S. Wehner** (Koblenz-Landau, DE), *Noisy CO oxidation on Iridium(111) and Palladium(111) surfaces*, invited talk
- 12:00 – 12:30 **S. Nakanishi** (Osaka, J), *Electrochemical Regulation and Detection of the Cyanobacterial Circadian*, invited talk
- 12:30 – 13:00 **K. Fukami** (Kyoto, J), *Spatial pattern formation in electrochemical dissolution of silicon*, invited talk

13:15 **Excursion to Freising (Departure Buses)**

- 17:30 – 19:30 **Special Symposium on the Occasion of the 65th Birthday of Alexander Mikhailov**  
(Special location Weihestephan)
- R. Kapral** (Toronto, CA), *How nonequilibrium conditions influence the dynamics of synthetic motors*
- C. Beta** (Potsdam, DE), *Oscillations and waves in the actin system of motile cells*
- H. Kori** (Tokyo, J), *Theoretical Study on Clustering near Hopf Bifurcation, Reentrant Transition with Strong Coupling, and Jet lag*

19:30 **Conference Dinner**

- 9:00 – 11:00 **Symposium: Synthetic Molecular Biology**  
organized by A. Mikhailov (Berlin, DE) & P. Schwille (München, DE)
- 9:00 – 9:30 **P. Schwille** (München, DE), *Pattern formation in minimal biological systems*, organizer talk
- 9:30 – 10:00 **M. Dogterom** (Delft, NL), *A minimal system to establish microtubule-based cell polarity in fission yeast*, invited talk
- 10:00 – 10:30 **F. Simmel** (München, DE), *Dynamics of synthetic gene circuits in vitro and in vivo*, invited talk
- 10:30 – 10:45 **D. Braun** (München, DE), *Driving molecular life with a thermal disequilibrium inside rock pores?*
- 10:45 – 11:00 **J. Young** (Tokyo, J), *Duration Robustness of Linear Signaling*

Cascades

11:00 - 11:30 Coffee break

11:30 – 12:30 **Contributed Talk Session II**

- 11:30 – 11:45 **A. Yochelis** (Midreshet Ben-Gurion, IL), *Solid/Liquid Interfaces in Ionic Liquids: From Scientific Debates to Electrochemical Energy based Applications*; [Electrochemistry & Surface Reactions](#)
- 11:45 – 12:00 **A. Bonnefont** (Strasbourg, F), *Oscillatory behaviour in an array of globally coupled noisy bistable microelectrodes*; [Electrochemistry & Surface Reactions](#)
- 12:00 – 12:15 **M. Budroni** (Sassari, I), *Classification of cross-diffusion-driven convection in 2-component double-layer systems: Theory and Experiments*. [Control of Chemical Self-Organization](#)
- 12:15 – 12:30 **V. Zykov** (Göttingen, DE), *Unusually simple way to create spiral wave in an excitable medium* [Control of Active Media](#)

12:30 – 14:00 Lunch

14:00 – 16:00 **Symposium: Waves and Patterns in Active Media**  
organized by M. Bär (Berlin, DE) & H. Engel (Berlin, DE)

- 14:00 – 14:30 **J. Käs** (Leipzig, DE), *Self-organisation and Pattern Formation in Carcinomas and their Microenvironment*, invited talk
- 14:30 – 15:00 **L. Pismen** (Haifa, IL), *Patterns in Polarisable Elastic Active Layers*, invited talk
- 15:00 – 15:30 **M. Hauser** (Magdeburg, DE), *Migratory behaviour of Physarum polycephalum microplasmidia*, invited talk
- 15:30 – 16:00 **J. Löber** (Berlin, DE), *Modeling crawling cell motility*, invited talk

16:00 - 16:30 Coffee break

- 16:30 – 18:30 **Symposium: Self-Organization in Biological Cells**  
organized by A. Bausch (München, DE) & M. Falcke (Berlin, DE)
- 16:30 – 17:10 **G. Salbreux** (London, UK), *Active mechanics of epithelia during morphogenesis*, invited talk
- 17:10 – 17:50 **P. ten Wolde** (Amsterdam, NL), *Fundamental limits to sensing*, invited talk
- 17:50 – 18:10 **M. Stich** (Birmingham, UK), *Chemical and chiral oscillations in simple polymerization models*
- 18:10 – 18:30 **F. Ogushi** (Tokyo, J), *Cell fate decisions using a simple multi-cell model with inhibitory cell-cell interaction and noise*

### Friday, June 26

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- 9:00 – 11:00 **Symposium: Collective Cell Migration and Chemotaxis**  
organized by C. Beta (Potsdam, DE) & S. C. Müller (Magdeburg, DE)
- 9:00 – 9:40 **V. Sourjik** (Marburg, DE), *Role of chemotaxis in surface attachment and self-aggregation of Escherichia coli*, invited talk
- 9:40 – 10:20 **W. Losert** (Maryland, USA), *Physical guidance of Cell Migration*, invited talk
- 10:20 – 10:40 **W. Pönisch** (Dresden, DE), *Formation of microcolonies in N. gonorrhoeae bacteria*
- 10:40 – 11:00 **T. Hiraiwa** (Tokyo, J), *Theory on chemotactic migration of eukaryotic cells*
- 11:00 - 11:30 Coffee break
- 11:30 – 12:30 **Plenary Lecture Alexander S. Mikhailov (Berlin, DE)**  
*Simple models for complex systems*
- 12:30 – 12:40 Closing

Abstracts of talks and posters in all symposia are available online at the conference web site.

## Posters

### Active Particles

- P 1.1**    **A. Geiseler**            *Kramers Escape Problem for Self-Propelled Particles*
- P 1.2**    **N. Oyama**                    *Direct Numerical Simulation of Active Matter System - Phonon-Mode Dynamics -*
- P 1.3**    **M. Tarama**                *Oscillatory motion of active deformable particles*

### Fluctuations Far From Equilibrium

- P 2.1**    **L. Keil**                      *Length selection and replication in a thermal flow chamber*
- P 2.2**    **M. Ueda**                    *Replica symmetry breaking in trajectories of a driven Brownian particle*
- P 2.3**    **V. Voorluijs**              *Emergence of chaos in a low-dimensional reactive system*

### Synchronization Phenomena

- P 3.1**    **A. Birzu**                    *Edge to edge synchronization of electrochemical oscillations in microfluidic flow cells*
- P.3.2**    **D. Heger**                  *Robust pattern recognition with oscillatory neural networks*
- P 3.3**    **F. Mori**                    *Quantification of Precision of Collective Oscillations in Complex Dynamical Systems with Noise*
- P 3.4**    **A. Pikovsky**              *Maximizing coherence of oscillations by external locking*
- P 3.5**    **V. Vanag /P. Smelov** *Dynamical Regimes of Four Almost Identical Chemical Oscillators Circularly Coupled Via Pulse Inhibitory Coupling with Time Delay*

### Mathematical & Computational Methods

- P 4.1**    **R. Rico-Martinez**        *Induced Coherence Resonance in Electrochemical System using a Reference Model*

### Control of Chemical Self-Organization

- P. 5.1**    **Ch. Mast**                  *Continuous, sequence dependent gelation of nucleic acids driven by a thermal gradient*
- P. 5.2**    **M. Salman**                *Turning Spirals into Fingers with Advection*
- P. 5.3**    **G. Urtel**                    *Population dynamics on the nanoscale*

### Electrochemistry & Surface Reactions

- P 6.1**    **F. Cosi**                    *Stochastic Simulations of Potential Oscillations on Nanoelectrodes*
- P 6.2**    **A. Crespo-Yapur**        *Potential fluctuation on Pt microelectrodes during the galvanostatic electro-oxidation of CO*
- P 6.3**    **K. Schönleber / M. Patzauer / L.Schmidt**  
*Silicon electrodisolution as a model system for self-organized pattern formation*

### Synthetic Molecular Biology

- P 7.1 H. Ito** *Reconstitution of contractile actomyosin cortex inside a cell-sized lipid interface*

### Waves and Patterns in Active Media

- P 8.1 S. Haugland** *Self-organized Alternating Chimera States in Oscillatory Media*
- P 8.2 C. Lenk** *Theoretical and Experimental Investigations of Multiple-period Oscillations in Arrays of Oscillators undergoing the Belousov-Zhabotinsky Reaction*
- P 8.3 M. Orlik** *Induction and Control of Luminescent Spatiotemporal Patterns in the Hydrogen Peroxide-Thiocyanate-Copper(II) Homogeneous Oscillator*
- P 8.4 E. Ramirez Alvarez** *Bi-dimensional Study of the Liesegang Pattern Formation in a Gaseous System*

### Self-Organization in Biological Cells

- P 9.1 S. Schnyder** *Self-organized ordering in skin tissue*
- P 9.2 K. Sugimura** *Role of oscillation in periodic pattern formation in a noisy system*