

REPORT DOCUMENTATION PAGE

AFRL-SR-AR-TR-05-

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1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE Final	3. REPORT TYPE AND DATES COVERED 4-1-05 to 9-30-05	
4. TITLE AND SUBTITLE Slam Conference on Application of Dynamical Systems			5. FUNDING NUMBERS FA9550-05-1-0260	
6. AUTHOR(S) Dr. Crowley				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Society for Industrial and Applied Mathematics 3600 University City Science Center Philadelphia, PA 19104-2688			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) AFOSR 801 North Randolph Street Arlington, VA 22203-1977			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION AVAILABILITY STATEMENT Approved for Public Release. Distribution Unlimited. NA			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) Eighth SIAM Conference on Applications of Dynamical Systems (22-26 May 2005 in Snowbird/Utah) The Snowbird 2005 conference was the eighth of a series of highly successful meetings organized by SIAM through its Activity Group on Dynamical Systems. The biannual Snowbird conference is arguably one of the broadest and most important meetings for mathematicians, engineers and scientists interested in nonlinear dynamics and its interdisciplinary applications.				
14. SUBJECT TERMS			15. NUMBER OF PAGES	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT			18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT
				20. LIMITATION OF ABSTRACT

Final Technical Report (DS05)

Eighth SIAM Conference on Applications of Dynamical Systems (22-26 May 2005 in Snowbird/Utah)

The Snowbird 2005 conference was the eighth of a series of highly successful meetings organized by SIAM through its Activity Group on Dynamical Systems. The biannual Snowbird conference is arguably one of the broadest and most important meetings for mathematicians, engineers and scientists interested in nonlinear dynamics and its interdisciplinary applications.

This year's meeting continued in this tradition. Noteworthy aspects of the 2005 meeting are the first DSWeb graduate student competition for dynamical systems tutorials and the increased number of industry related mini-symposia (seven mini-symposia had organizers from industry). Compared with the 2003 meeting, the number of mini-symposium submissions increased by 15%, making it necessary for the first time in the history of these meetings to combine or reject sessions due to space and time limitations.

Snowbird 2005 drew 640 participants coming from 28 countries. About 594 of the attendees came from academia, 27 from Government, 15 from industry and 4 indicated none of these categories. The program consisted of 10 plenary presentations, 108 mini-symposia comprising 544 speakers, 55 contributed sessions with 152 talks, and a poster session with 46 posters. Fifteen mini-symposia involved organizers from industry, non-profit organizations, and various US and non-US government agencies or laboratories. At a ceremony on the first evening of the conference, the SIAM Activity Group awarded both the Jürgen Moser Lecture Prize and the JD Crawford Prize. Later a second ceremony was held to announce the winners of the DSWeb Contest for dynamical systems tutorials and the "Red Sock Award" for the best posters.

Some of the plenary talks covered topics in core dynamical systems areas ranging from theoretical results in ergodic theory, Hamiltonian maps and dispersive PDEs to new phenomena in pattern-forming systems. Others addressed interdisciplinary projects in turbulence, molecular dynamics and robotic locomotion to real-life problems applications to electric power blackouts and call-center management. This diversity reflected the broad research interests of the Snowbird community, which were very visible in the topics represented in the mini-symposia and contributed sessions. The overwhelming part of talks focused on how dynamical systems can be used in interdisciplinary research and how conversely applications generate new mathematical ideas and techniques.

Among the specific applications in industrial mathematics were the control and design of satellites, modeling issues in the biotech industry, and the dynamics of structures ranging from microwave devices to ships. Mathematical biology was again strongly represented with many sessions on neuroscience, synchrony, cardiac arrhythmias, angiogenesis, infectious disease spreading, swarming and slime molds, to name but a few. This year the number of minisymposia covering stochastic processes saw a sharp increase, with applications in oceanography, biology, networks, and even one session discussing probabilistic models in sports. There was a good balance between sessions in more "traditional" application areas such fluid dynamics and nonlinear optics, and newer emerging topics such as the equation-free coarse-grained simulation of multiscale problems and topological methods to classify patterns in Rayleigh-Benard convection and other systems. Theoretical core areas were represented as well with topics ranging from normal forms, Lyapunov exponents, nontwist Hamiltonian systems to hyperbolic dynamics. The contributed sessions were of very high quality and very well attended.

The 2005 Jürgen Moser Lecture Prize was awarded to

Stephen Smale (Toyota Technological Institute at Chicago).

The Moser Lecture Prize was inaugurated in 2001 to honor the memory of Jürgen Moser, one of the world's leading mathematicians in celestial mechanics and dynamical systems. It is awarded to a person who has made distinguished contributions to nonlinear science (including dynamical systems theory and its applications, experiments and computations/simulations).

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The recipient of the 2005 JD Crawford Prize is

Dwight Barkley (University of Warwick).

The JD Crawford Prize, inaugurated also in 2001, is awarded to one individual for recent outstanding work on a topic in nonlinear science, as evidenced by a publication in English in a peer-reviewed journal within the four calendar years preceding the SIAG/DS meeting at which the prize is awarded. The prize is dedicated to the memory of John David Crawford, a former co-chair of this conference.

The evening poster session, with desert and coffee, has continued to be a very well attended, successful event. Jim Yorke, together with Robert Ghrist, Mark Levi, Paul Milewski, Wim van Saarloos and William Troy who served as judges, awarded four "Red Sock Awards" for the most outstanding posters. The recipients of a (new) pair of red socks and a cash prize of \$100 each were

- o Margaret Beck (Boston University)
- o Maria Leite (University of Houston)
- o Maria Carmen Romano and Marco Thiel (University of Potsdam)
- o Yulia Timofeeva (Heriot-Watt University)

This year, DSWeb, the website of the SIAM Activity Group on Dynamical Systems, ran for the first time a graduate student competition for tutorials on dynamical systems. Evelyn Sander (DSWeb Tutorials Editor) announced the winners of this contest:

1. Sam Reid (University of Colorado at Boulder)
 2. David M. Winterbottom (University of Nottingham)
 3. Shawn C. Shadden (California Institute of Technology)
- Runner-up: Brian Bockelman (University of Nebraska at Lincoln)
- Honorable mentions: Sebastian M. Marotta (Boston University)
Gouhei Tanaka (University of Tokyo)

The plenary talks represented a broad cross-section of recent mathematical results in dynamical systems theory as well as engineering and scientific applications of nonlinear dynamics. The ten speakers and their topics were:

- o Rafael de la Llave, University of Texas, Austin
Invariant Manifolds: Theorems, Algorithms and Conjectures
- o Ian Dobson, University of Wisconsin, Madison
Cascading Failure and Complex Dynamics in Large Blackouts
- o Charles Doering, University of Michigan
Turbulent Transport, Dissipation and Drag
- o William A. Massey, Princeton University
A Dynamical Systems Analysis for Stochastic Models of Call Centers
- o Yasumasa Nishiura, Hokkaido University, Japan
Dynamics of Particle Patterns in Dissipative Systems
- o Andy Ruina, Cornell University
The Existence and Stability of Limit Cycles as a Means to Understanding Animal- and Designing Robotic Locomotion
- o Christof Schütte, Free University of Berlin, Germany
Metastability in Complex Systems
- o Gigliola Staffilani, Massachusetts Institute of Technology
Recent Results on Local and Global Well-Posedness for some Dispersive Equations
- o Shankar Venkataramani, University of Arizona
Non-convex Variational Problems: Multiple-scale Behaviors in Equilibrium
- o Amie Wilkinson, Northwestern University
Stable Ergodicity: A Little Hyperbolicity is Often Enough

The Jürgen Moser Lecture was given by

Stephen Smale (Toyota Technological Institute at Chicago)
Dynamics and Learning.

The 108 mini-symposia were:

- *Pattern Formation in Surface Catalysis: Stochastic Effects and Inhomogeneous Materials*
Hannes Uecker, University of Karlsruhe, Germany
Jens Starke, University of Heidelberg, Germany
- *Multiscale Approaches to Transport Modeling and Computation - Parts I and II*
Peter R. Kramer, Rensselaer Polytechnic Institute
- *Topological Analysis of Patterns - Parts I and II*
Thomas Wanner, George Mason University
Konstantin Mischaikow, Georgia Institute of Technology
- *Geometric Hamiltonian PDEs and Ferromagnetism*
Chongchun Zeng, University of Virginia
- *Models of Biological Aggregations*
Chad M. Topaz, University of California, Los Angeles
Anke Ordemann, Philipps-Universität, Marburg, Germany
- *Dynamics of Central Pattern Generators*
Amitabha K. Bose, New Jersey Institute of Technology
- *Mixing in 3-D Volume-Preserving Systems and Maps - Parts I and II*
Dmitri L. Vainchtein, University of California, Santa Barbara
Oreste Piro, Universidad de las Islas Baleares, Spain
- *Dynamical Systems and Industry: Dynamic Interactions - Parts I and II*
Andrzej Banaszuk, United Technologies Research Center
Michael Dellnitz, University of Paderborn, Germany
- *Applied Symbolic Dynamics*
Ned J. Corron, US Army RDECOM
Shawn Pethel, US Army RDECOM
- *Distributed Motion Coordination - Parts I and II*
Jorge Cortes, University of California, Santa Cruz
Francesco Bullo, University of California, Santa Barbara
- *Pattern Formation Under Control - Parts I and II*
Alexander A. Golovin, Northwestern University
Alexander Nepomnyashchy, Technion - Israel Institute of Technology, Israel
- *Stable Patterns in Evolution Equations*
Michael Grinfeld, University of Strathclyde, United Kingdom
Gabriel J. Lord, Heriot-Watt University, United Kingdom
- *Topology and Nonlinear Dynamics*
Marc Lefranc, PhLAM/Université Lille I, France
Robert Gilmore, Drexel University
- *Dynamics of Localized Patterns in Reaction-Diffusion Systems*
Jens Rademacher, University of British Columbia, Canada
Michael Ward, University of British Columbia, Canada
- *Instabilities and Complexity in the Heart: Models, Experiments, and Simulations - Parts I and II*
Elizabeth M. Cherry, Hofstra University
Flavio Fenton, Beth Israel Medical Center & Hofstra University
- *Stochastic Dynamics in Biology - Parts I and II*
Paul Atzberger, Rensselaer Polytechnic Institute
Peter R. Kramer, Rensselaer Polytechnic Institute
- *Robust Flow Stability and Control*
Kumar M. Bobba, University of Massachusetts
John Doyle, California Institute of Technology
- *Pattern Formation and Wave Dynamics in the Brain*
Steven J. Schiff, George Mason University
Ernest Barreto, George Mason University
- *Chaos for Radar and Sonar*
Thomas Carroll, US Naval Research Laboratory
Alan Fenwick, QinetiQ, United Kingdom

- *Delay Effects in Applications*
Jan Sieber, University of Bristol
Bernd Krauskopf, University of Bristol, United Kingdom
Jacques Belair, Universite de Montreal, Canada
- *Synchronization of Complex Networks*
Stefano Boccaletti, Istituto Nazionale di Ottica Applicata, Italy
Louis M. Pecora, Naval Research Laboratory
- *On the Validity of Envelope Equations*
Joceline Lega, University of Arizona
Nicholas Ercolani, University of Arizona
- *Nontwist Hamiltonian Systems: Theory and Applications* - Parts I and II
Alexander Wurm, University of Texas at Austin
Philip J. Morrison, University of Texas at Austin
- *Cellular Waves and Rhythms in True Slime Mold: Experiments and Dynamics*
Toshiyuki Nakagaki, Hokkaido University, Japan
- *Propagation in Neural Fields* - Parts I and II
Jonathan E. Rubin, University of Pittsburgh
Stephen Coombes, University of Nottingham, United Kingdom
- *Nonautonomous Dynamical Systems* - Parts I and II
Jinqiao Duan, Illinois Institute of Technology
Stefan Siegmund, University of Frankfurt, Germany
- *Scaling and Self-Similarity in Dynamical Systems*
Shankar C. Venkataramani, University of Arizona
Govind Menon, Brown University
- *The Canard Phenomenon: Mechanisms in Chemical, Biochemical and Biological Systems* - Parts I and II
Horacio Rotstein, Boston University
Martin Wechselberger, Ohio State University
- *Control of Hamiltonian Systems*
Igor Mezic, University of California, Santa Barbara
James D. Meiss, University of Colorado, Boulder
- *Waves and Turbulence in Stratified Flows*
Paul A. Milewski, University of Wisconsin
David J. Muraki, Simon Fraser University, Canada
- *Lattice Solitons in Discrete Equations* - Parts I and II
Dmitry Pelinovsky, McMaster University, Canada
Alan Champneys, University of Bristol, United Kingdom
- *Spatio-Temporal Dissipative Structures Induced by Non-Local Interactions*
Mustapha Tlidi, Université Libre de Bruxelles, Belgium
Axel Hutt, Humboldt University at Berlin, Germany
- *Dynamics of Chaotic RF/Microwave Devices*
Jonathan N. Blakely, US Army RDECOM
- *Hyperbolic Dynamical Systems*
Matthew Nicol, University of Houston
Andrew Torok, University of Houston
- *Synchrony in Neuroscience*
Stefano Boccaletti, Istituto Nazionale di Ottica Applicata, Italy
Kresimir Josic, University of Houston
Mario Chavez, Istituto Nazionale di Ottica Applicata, Italy
- *New Twists on Solitary Wave in Excitable Media*
Alan Champneys, University of Bristol, United Kingdom
Vivien Kirk, University of Auckland, New Zealand
Edgar Knobloch, University of California, Berkeley
- *Equation-free Coarse-grained Simulation and Applications* - Parts I and II
Peter J. Mucha, Georgia Institute of Technology
Giovanni Samaey, Katholieke Universiteit Leuven, Belgium

- *Parabolic Equations, Topology and the Conley Index*
Jan Bouwe Van Den Berg, VU University, Amsterdam
Robert Vandervorst, VU University, Amsterdam
- *Adaptation in Biological Systems From a Dynamical System's Perspective*
Ulrike Feudel, University of Oldenburg, Germany
Thilo Gross, Universität Potsdam, Germany
- *Recent Progress in Wave Turbulence*
Yuri V. Lvov, Rensselaer Polytechnic Institute
- *Diffusive Mixing in Fluid Flows: Theory and Applications - Parts I and II*
Arjendu K. Pattanayak, Carleton College
George Haller, Massachusetts Institute of Technology
- *Recent Applications of Dynamics Systems in Industrial Settings*
Richard Braun, University of Delaware
- *Coupled Cell Systems, Synchrony and Patterns - Parts I and II*
Andrew Torok, University of Houston
LieJune Shiau, University of Houston, Clear Lake
- *Mathematical Methods for Spatiotemporal Infectious Disease Spread*
Richard Jordan, Dynamics Technology, Inc.
- *Lyapunov Exponents and Stability Spectrum for Infinite Dimensional Dynamical Systems*
Erik Van Vleck, University of Kansas
Mike Jolly, Indiana University
- *Geometric Dynamics and its Applications - Parts I and II*
Melvin Leok, University of Michigan, Ann Arbor
Dmitry V. Zenkov, North Carolina State University
Anthony M. Bloch, University of Michigan
- *Cell Oriented Biological Models of Development*
James A. Glazier, Indiana University
Roeland Merks, Indiana University
- *Mean Flows in Dynamical Systems*
Yuan-Nan Young, New Jersey Institute of Technology
Maria Higuera, Universidad Politécnica de Madrid, Spain
- *Reduced Neuronal Models and Complex Neurodynamics*
Maxim Bazhenov, Salk Institute
Nikolai Rulkov, University of California, San Diego
- *Nondestructive System Health Monitoring*
Mary Ann F. Harrison, Institute for Scientific Research, Inc.
- *Random Dynamical Systems and Stochastic Resonance*
Ying-Cheng Lai, Arizona State University
- *Synchronization in Complex Neural Systems*
John R. Terry, Loughborough University, United Kingdom
Juergen Kurths, Universität Potsdam, Germany
- *Propagation By Reaction and Diffusion: Theory and Applications - Parts I and II*
Georgi S. Medvedev, Drexel University
Cyrill B. Muratov, New Jersey Institute of Technology
- *Rigorous Computational Dynamics - Parts I and II*
Sarah Day, Cornell University
Oliver Junge, University of Paderborn, Germany
William D. Kalies, Florida Atlantic University
- *Modeling and Simulation of Angiogenesis*
Scott Kelly, University of Illinois, Urbana-Champaign
Marialuisa Ruiz, Entelos Incorporated
- *Stochastic Modeling of Oceanic Transport*
Peter R. Kramer, Rensselaer Polytechnic Institute
Emilio Castronovo, Rensselaer Polytechnic Institute
- *Complex Dynamics of Systems with Multiple Time Scales*
Andrey Shilnikov, Georgia State University

- Arkady Pikovsky, University of Potsdam, Germany
- *Extreme Ship Dynamics - Parts I and II*
Leigh Mccue, Virginia Tech
Armin Troesch, Naval Architecture and Marine Engineering at the University of Michigan
- *Normal Forms and Averaging in ODEs and PDEs*
James A. Murdock, Iowa State University
- *Geometric Blow-up and Stability of Nonlinear Waves*
Mariana Haragus, Universite de Franche-Comte, France
Arnd Scheel, University of Minnesota, Minneapolis
- *Extended Stochastic Dynamical Systems*
Jonathan C. Mattingly, Duke University
Luc Rey Bellet, University of Massachusetts
- *Transient Chaos and Applications*
Ying-Cheng Lai, Arizona State University
Tamas Tel, Eötvös Loránd University, Hungary
- *Dynamics and Control of Fishlike Locomotion*
Scott Kelly, University of Illinois, Urbana-Champaign
Clancy W. Rowley, Princeton University
- *Issues in Cancer Therapy Modelling*
Michael Grinfeld, University of Strathclyde, United Kingdom
Eliezer Shochat, Weizmann Institute of Science, Israel
- *Chaotic Advection and Anomalous Diffusion in Reactive Flows*
Diego Del-Castillo-Negrete, Oak Ridge National Laboratory
Tom Solomon, Bucknell University
- *Modeling and Simulation of Photonic Bandgap Structures*
Roy H. Goodman, New Jersey Institute of Technology
- *Waves and Coherent Structures in Neural Systems - Parts I and II*
Louis Tao, New Jersey Institute of Technology
Tim Lewis, University of California, Davis
- *Modeling in the Biotech Industry*
Eric N. Cytrynbaum, University of British Columbia, Canada
- *Theory and Numerical Analysis of Bifurcations in Piecewise Smooth Dynamical Systems*
Piotr Kowalczyk, University of Bristol, United Kingdom
Petri T. Piiroinen, University of Bristol, United Kingdom
- *Synchronization in Oscillator Arrays and Nonlinear Signal Processing*
Michael L. Larsen, Information Systems Labs
Michael Gabbay, Information Systems Labs
- *Patterns and Dynamics of Turbulence*
Dwight Barkley, University of Warwick, United Kingdom
Laurette S. Tuckerman, LIMS-CNRS, France
- *Nonlinear Dynamics of Microelectromechanical Systems*
Jeff Moehlis, University of California, Santa Barbara
Kimberly Turner, University of California, Santa Barbara
Steven Shaw, Michigan State University
- *Nonlinear Methods in Ecology and Population Dynamics*
Linda J. Moniz, U. S. Geological Survey
James Nichols, U. S. Geological Survey
- *Discrete and Continuous Models in Nonlinear Optics*
Milena Stanislavova, University of Kansas, Lawrence
Jamison Moeser, University of Colorado
- *Numerical Methods for Dynamical Systems with Multiple Timescales*
Hinke M. Osinga, University of Bristol, United Kingdom
- *Randomly Influenced Dynamical Systems - Parts I and II*
Kening Lu, Brigham Young University
Bjorn Schmalfuss, University of Paderborn, Germany
- *Seizure Dynamics*

- Steven J. Schiff, George Mason University
- *Patterns in Extended Systems*
Ziad Musslimani, University of Central Florida
Roy Choudhury, University of Central Florida
- *Stochastic Modeling and Statistical Description of Spatially Extended Nonlinear Systems*
Ilya Timofeyev, University of Houston
Daan Crommelin, Courant Institute, New York University
- *Emergence and Breakup of Tori*
Ferdinand Verhulst, University of Utrecht, Netherlands
Alois Steindl, Vienna University of Technology, Germany
- *Dynamics and Control of Microelectromechanical Devices*
John A. Pelesko, University of Delaware
Eihab Abdel-Rahman, Virginia Institute of Technology
- *Dynamics and Control of Fluid Flows*
Troy R. Smith, California Institute of Technology
- *Probabilistic Models for Sports*
Paul K. Newton, University of Southern California
Peter J. Mucha, Georgia Institute of Technology
- *Transverse effects in Liquid Crystal Light Valve with optical feedback*
Majid Taki, PHLAM - Universite de Lille, France
Mustapha Tlidi, Université Libre de Bruxelles, Belgium
- *Non-Hyperbolic Problems in Singular Perturbation Theory*
Weishi Liu, University of Kansas
Martin Krupa, New Mexico State University
- *High-dimensional Chaos Versus Synchronization: Applications to Neurophysiology and Physics*
Peter A. Tass, Research Centre Juelich, Germany
Yuri L. Maistrenko, Institute of Mathematics, Kiev, Ukraine
Arkady Pikovsky, University of Potsdam, Germany

We are grateful to SIAM's conference staff who efficiently and professionally organized and managed all logistical aspects of this meeting.

Respectfully submitted,

Rachel Kuske and Björn Sandstede
Co-Chairs, DS05