Program
(final version)

Dynamics Days 2011
30th Annual International Conference on Nonlinear Dynamics
January 5-8, 2011
The Carolina Inn
Chapel Hill, North Carolina

Invited Speakers

Rosalind Allen
Bruno Andreotti
Martine Ben Amar
Andrea Bertozzi
Karen Daniels
Barbara Drossel
Jerry Gollub
Philip Holmes
Edgar Knobloch

Jurgen Kurths
Wolfgang Losert
Amala Mahadevan
Takashi Nishikawa
Corey O’Hern
Ed Ott
Jeffrey Rogers
Leah Shaw
Lawrie Virgin

http://www.math.duke.edu/conferences/DDays2011

Deadlines:
Contributed presentations: November 15, 2010
Conference registration: December 1, 2010
Schedule

Wednesday, January 5, 2011

8:45 Opening Remarks

9:00 – 10:40 Session 1, Chair: Joshua Socolar, Duke University

9:00 I3 – Statistical Mechanics of Packing: From Proteins to Cells to Grains
Corey O’Hern, Yale University
9:40 I2 – Spatially localized structures in two dimensions
Edgar Knobloch, University of California, Berkeley
10:20 C1 – An Elementary Model of Torus Canards
Anna Barry, Boston University

10:40 Break

11:00 – 12:40 Session 2, Chair: Thomas Witelski, Duke University

11:00 I6 – The Path to Fracture: Dynamics of Broken Link Networks in Granular Flows
Wolfgang Losert, University of Maryland
11:40 C2 – Flexibility Increases Energy Efficiency of Digging in Granular Substrates
Dawn Wendell, MIT
12:00 I4 – Ripples, dunes, bars and meanders
Bruno Andreotti, ESPCI

12:40 Lunch

2:00 – 4:00 Session 3, Chair: Joshua Socolar, Duke University

2:00 I5 – The Nonlinear Population Dynamics of Pacific Salmon
Barbara Drossel, University of Darmstadt
2:40 I8 – Erosional Channelization in Porous Media
Amala Mahadevan, Boston University
3:20 C3 – Determining the onset of chaos in large Boolean networks
Andrew Pomerance, University of Maryland
3:40 C4 – Exploring mesoscopic network structure with communities of links
James Bagrow, Northeastern University

4:00 Break

4:20 – 5:20 Session 4, Chair: Thomas Witelski, Duke University

4:20 I7 – Swarming by Nature and by Design
Andrea Bertozzi, UCLA
5:00 C5 – Sub-wavelength position-sensing using a wave-chaotic cavity with nonlinear feedback
Hugo Cavalcante, Duke University

5:20 Break for Dinner

1 General Guidelines: Invited presentations are 40 minutes total (35 minutes presentation, 5 minutes questions). Contributed presentations are 20 minutes total (16 minutes presentation, 4 minutes questions), space for poster presentations is limited to a maximum size of 4 feet by 4 feet for each poster.
Thursday, January 6, 2011

9:00 – 9:40 Session 5, Chair: Robert Behringer, Duke University

9:00 I1 – Still Running! Recent Work on the Neuromechanics of Insect Locomotion
Phillip Holmes, Princeton University

9:40 C6 – Fluid rope tricks
Stephen Morris, University of Toronto

10:00 C7 – Three-dimensional structure of a sheet crumpled into a sphere
Anne Dominique Cambou, University of Massachusetts, Amherst

10:20 Break

10:40 – 12:00 Session 6, Chair: Edward Ott, University of Maryland

10:40 I9 – Evolutionary Dynamics for Migrating Populations
Rosalind Allen, University of Edinburgh

11:20 C8 – Predicting criticality and dynamic range in complex networks: effects of topology
Daniel Larremore, University of Colorado at Boulder

11:40 C10 – Creating Morphable Logic Gates using Logical Stochastic Resonance in an Engineered Gene Regulatory Network
Anna Dari, Arizona State University

12:00 Lunch

2:00 - 3:40 Session 7, Chair: Brian Utter, James Madison University

2:00 I10 – Stochastic Extinction along an Optimal Path
Leah Shaw, College of William and Mary

2:40 C9 – Chaos Elimination of Fluctuations in Quantum Tunneling Rates
Louis Pecora, Naval Research Laboratory

3:00 I14 – Dynamics and Interactions of Swimming Cells
Jerry Gollub, Haverford College

3:40 – 7:30 Break for afternoon and dinner

7:30 – 8:10 Session 8, Chair: Karen Daniels, NCSU

7:30 I12 – Low Dimensional Dynamics in Large Systems of Coupled Oscillators
Edward Ott, University of Maryland

8:15 – 10:00 Poster Session 1 - Setup and Desserts
Friday, January 7, 2011

9:00 – 10:20 Session 9, Chair: Joshua Socolar, Duke University

9:00 I13 – Nonlinear programs and DARPA
Jeffrey Rogers, DARPA

9:40 C11 – Measuring Information Flow in Anticipatory Systems
Shawn Pethel, U.S. Army RDECOM

10:00 C12 – Time delays in the synchronization of chaotic coupled systems with feedback
José Rios Leite, Universidade Federal de Pernambuco

10:20 Break

10:40 – 12:20 Session 10, Chair: Thomas Witelski, Duke University

10:40 I11 – Compensatory structures in network synchronization
Takashi Nishikawa, Clarkson University

11:20 C13 – Folding: the nonlinear step in fluid mixing
Douglas Kelley, Yale University

11:40 C14 – Trapping of Swimming Particles in Chaotic Fluid Flow
Nicholas Ouellette, Yale University

12:00 Lunch

2:00 – 4:00 Session 11, Chair: Joshua Socolar, Duke University

2:00 I15 – Network of Networks and the Climate System
Jurgen Kurths, University of Potsdam

2:40 C15 – What is the front velocity in wave propagation without fronts? Epidemics on complex networks provide an answer
Dirk Brockmann, Northwestern University

3:00 I16 – Shape instability of growing tumors
Martine Ben Amar, University of Paris

3:40 C16 – Reconstruction of Cardiac Action Potential Dynamics using Computer Modeling with Feedback from Experimental Data
Laura Munoz, Cornell University

4:00 – 6:00 Poster Session 2

6:00 Break for dinner
Saturday, January 8, 2011

9:30 – 10:30 Session 12, Chair: Robert Behringer, Duke University

  9:30  I17 – Faults & Earthquakes as Granular Phenomena: Controls on Stick-Slip Dynamics
        Karen Daniels, North Carolina State University

  10:10 C17 – Effects of Shape on Diffusion
           Rob Shaw, Santa Fe Complex

10:30 Break

10:50 – 11:50 Session 13, Chair: Michael Shearer, NCSU

  10:50  C18 – Crowd behavior: Synchronization of multistable chaotic systems by a common external force
           Alexander Pisarchik, Centro de Investigaciones en Optica

  11:10  I18 – Rocking and Rolling
           Lawrie Virgin, Duke Univ. Engineering

11:50 End of Conference. Have a safe trip home!
Invited Talks

- Evolutionary Dynamics for Migrating Populations
  Rosalind Allen, University of Edinburgh

- Ripples, dunes, bars and meanders
  Bruno Andreotti, École Supérieure de Physique et de Chimie Industrielles

- Swarming by Nature and by Design
  Andrea Bertozzi, University of California, Los Angeles

- Shape instability of growing tumors
  Martine Ben Amar, University of Paris

- Faults & Earthquakes as Granular Phenomena: Controls on Stick-Slip Dynamics
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- Low Dimensional Dynamics in Large Systems of Coupled Oscillators
  Edward Ott, Maryland

- Nonlinear Programs and DARPA
  Jeff Rogers, DARPA

- Stochastic Extinction along an Optimal Path
  Leah Shaw, William and Mary

- Rocking and Rolling
  Lawrie Virgin, Duke
Contributed Talks

Exploring mesoscopic network structure with communities of links,
James Bagrow, Northeastern University

An Elementary Model of Torus Canards,
Anna Barry, Boston University

What is the front velocity in wave propagation without fronts? - Epidemics on complex networks provide an answer,
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Sub-wavelength position-sensing using a wave-chaotic cavity with nonlinear feedback,
Hugo Cavalcante, Duke University

Three-dimensional structure of a sheet crumpled into a sphere,
Anne Dominique Cambou, University of Massachusetts, Amherst

Creating Morphable Logic Gates using Logical Stochastic Resonance in an Engineered Gene Regulatory Network,
Anna Dari, Arizona State University

Folding: the nonlinear step in fluid mixing,
Douglas Kelley, Yale University

Predicting criticality and dynamic range in complex networks: effects of topology,
Daniel Larremore, University of Colorado at Boulder

Fluid rope tricks,
Stephen Morris, University of Toronto

Reconstruction of Cardiac Action Potential Dynamics using Computer Modeling with Feedback from Experimental Data,
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Trapping of Swimming Particles in Chaotic Fluid Flow,
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Chaos Elimination of Fluctuations in Quantum Tunneling Rates,
Louis Pecora, Naval Research Laboratory

Measuring Information Flow in Anticipatory Systems,
Shawn Pethel, U.S. Army RDECOM

Crowd behavior: Synchronization of multistable chaotic systems by a common external force,
Alexander Pisarchik, Centro de Investigaciones en Óptica

Determining the onset of chaos in large Boolean networks,
Andrew Pomerance, University of Maryland

Time delays in the synchronization of chaotic coupled systems with feedback,
José Rios Leite, Universidade Federal de Pernambuco

Effects of Shape on Diffusion,
Rob Shaw, Santa Fe Complex

Flexibility Increases Energy Efficiency of Digging in Granular Substrates,
Dawn Wendell, MIT
Posters

Robustness of modular network and overlapping communities,
Yong-Yeol Ahn, Northeastern University

Chaotic Ionization of Bidirectionally Kicked Rydberg Atoms,
Korana Burke, University of California Merced

Homoclinic Snaking in Plane Couette Flow,
John Burke, Boston University

Jet-Induced Granular 2-D Crater Formation with Horizontal Symmetry Breaking,
Abe Clark, Duke University

Couette Shear for Elliptical Particles Near Jamming,
Somaiyeh Farhadi, Duke University

Measuring information flow in anticipatory systems,
Daniel Hahs, US Army RDECOM

Experimental and theoretical evidence for fluctuation driven activations in an excitable chemical system,
Harold Hastings, Hofstra University

Bifurcations of 2D Rayleigh-Taylor Unstable Flames,
Elizabeth Hicks, University of Chicago

Pattern formation in coating flows of suspensions,
Justin Kao, Massachusetts Institute of Technology

Spike-Time Reliability of Pulse-Coupled Oscillator Networks,
Kevin Lin, University of Arizona

Depinning of localized structures in a forced dissipative system,
Yi-Ping Ma, University of California, Berkeley

Clustering of particles in turbulence,
Julian Martinez Mercado, University of Twente

Invariant manifolds in chaotic advection-reaction-diffusion pattern formation,
Kevin Mitchell, University of California, Merced

Fluctuations in an agitated granular liquid,
Kiri Nichol, Leiden University / North Carolina State University

Stability and Bifurcations in a Dynamical System Associated with Membrane Kinetics Underlying Cardiac Arrhythmias,
Irina Popovici, USNA

Nonlinear Waves in Granular Crystals,
Mason Porter, University of Oxford

Density-dependent particle clustering on a Faraday wave,
Ceyda Sanli, University of Twente

The Buckley-Leverett Equation with Dynamic Capillary Pressure,
Michael Shearer, North Carolina State University

Spatiotemporal Dynamics of Calcium-Driven Alternans in Cardiac Tissue,
Per Sebastian Skardal, University of Colorado at Boulder

Fingering instability down the outside of a vertical cylinder,
Linda Smolka, Bucknell University
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Alessio Guarino, Université de la Polynésie Française

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