



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



Wednesday, January 5, 2011¹

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 - 10:40 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 - 2:00 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

12:20 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: Robert Behringer, Duke University

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!**
