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## Research Interests

fluid dynamics, nonlinear dynamics & singularity formation, biologically inspired physics

## Employment

Assistant Professor, Physics Department & James Franck Institute  
The University of Chicago 2003 – present

Postdoctoral Fellow, Center for Nonlinear Dynamics  
The University of Texas at Austin 2002 – 2003

Postdoctoral Fellow, James Franck Institute  
The University of Chicago 2001 – 2002

## Education

**Ph.D.**, Harvard University, Engineering Sciences 2001  
Thesis: Singularities in free surface flows. (Advisor: H. A. Stone)

**Part III Mathematics** (M.Sc. equivalent), *with Distinction* 1997  
Cambridge University, Department of Applied Mathematics & Theoretical Physics

**Honors A.B.**, *magna cum laude*, *Phi Beta Kappa*, Harvard University, Physics 1995

## Honors & Awards

A. P. Sloan Foundation Fellowship 2006

NSF Mathematical Sciences Postdoctoral Research Fellowship 2001 – 2003

Harvard Graduate School of Arts & Sciences Merit Fellowship 2000 – 2001

National Science Foundation Graduate Fellowship 1997 – 2000

Herschel Smith Harvard Fellowship 1996 – 1997

## Teaching

Physics 260: *Fluid Dynamics*, new undergraduate elective Spring 2008

Physics 185: *Intermediate Mechanics*, undergraduate Winter 2006 & 2007

Physics 429: *Nonlinear Dynamics*, graduate Spring 2004

Physics 316: *Classical Mechanics*, graduate Fall 2004

Physics 426: *Topics in Fluid Dynamics*, new graduate elective Fall 2003 & 2005

## Ph.D. Students

Marko Kleine Berkenbusch (co-adviser: Leo P. Kadanoff), Ph.D. 2005

Laura E. Schmidt (GAANN education fellowship), 2003 - present

Robert D. Schroll (NSF graduate fellowship), 2004 - present

**Postdoctoral Fellow**

Francois Blanchette

2004 – 2006

“Partial Coalescence of Drops at Liquid Interfaces”

F. Blanchette & T. Bigioni, *Nature Physics* **2** 254-257 2006.

Current position: Assistant Professor, School of Natural Sciences, UC Merced

Margo Levine

2007 – present

Thesis Topic: *Self-assembly of quantum dots in thin solid films*

Ph.D. Engineering Science &amp; Applied Math, Northwestern University

**Peer-Reviewed Publications**

- “Liquid Transport Due to Light Scattering”

R. D. Schroll, R. Wunenburger, A. Casner, W. W. Zhang, & J. P. Delville,  
*Phys. Rev. Lett.*, **98** 2007, 133601.

- “Breakup of Air Bubbles in Water: Memory and Breakdown of Cylindrical Symmetry”

N. C. Keim, P. Moller, W. W. Zhang & S. R. Nagel, *Phys. Rev. Lett.*, **97** 2006, 144503.

- Reply on “Drop Splashing on a Dry Smooth Surface”

L. Xu, W. W. Zhang & S. R. Nagel, *Phys. Rev. Lett.*, **96** 2006, 179402.

- “Balance of Actively Generated Contractile and Resistive Forces Controls Cytokinesis Dynamics”

W. W. Zhang & D. R. Robinson, *Proc. Natl. Acad. Sci. USA*, **102** 2005, 7186-7191.

- “Drop Splashing on a Dry Smooth Surface”

L. Xu, W. W. Zhang & S. R. Nagel, *Phys. Rev. Lett.*, **94** 2005, 184505.

- “Viscous Entrainment from a Nozzle: Singular Liquid Spouts”

W. W. Zhang, *Phys. Rev. Lett.*, **93** 2004, 184502.

- “Persistence of Memory in Drop Breakup: The Breakdown of Universality”

P. Doshi, I. Cohen, W. W. Zhang, P. Howell, M. Siegel, O. A. Basaran, & S. R. Nagel,  
*Science*, **302** 2003, 1185-1188.

- “Shake-Gels: Shear-Induced Gelation of Laponite-PEO Mixtures”

J. Zebrowski, V. Prasad, W. W. Zhang, L. M. Walker & D. A. Weitz,  
*Colloid & Surface Sci. A*, **213** 2003, 189-197.

- “Pressure-Driven Laminar Flow in Tangential Microchannels: an Elastomeric Microfluidic Switch.”

R. F. Ismagilov, D. Rosmarin, P. J. A. Kenis, W. W. Zhang, H. A. Stone,  
& G. M. Whitesides, *Anal. Chem.* **73** (19) 2001, 4682-4687.

- “Similarity Solutions for Capillary Pinch-off in Fluids of Differing Viscosity.”

W. W. Zhang & J. R. Lister, *Phys. Rev. Lett.* **83** (6) 1999, 1151-1154.

- “Similarity Solutions for Film Rupture on a Plate.”

W. W. Zhang & J. R. Lister, *Phys. Fluids* **11** (9) 1999, 2454-2462.

- “Oscillatory Motions of Circular Disks and Near-Spheres in Viscous Flow.”

W. W. Zhang & H. A. Stone, *J. Fluid Mech.* **367** 1998, 329-358.

- “Mass Transfer at a Microelectrode in Channel Flow.”

W. W. Zhang, H. A. Stone & J. D. Sherwood, *J. Phys. Chem.* **100** (22), 1996,

## Papers in Preparation

- “Surface-Tension-Driven Breakup of an Air Bubble in a Viscous Liquid”  
P. D. Howell, M. Siegel & W. W. Zhang, under revision for *Phys. Fluids*.
- “Liquid interfaces in viscous straining flows: numerical studies of the selective withdrawal transition”  
M. Kleine Berkenbusch, I. Cohen & W. W. Zhang, under revision for *J. Fluid Mech.* (arXiv:physics/0510003)
- “Viscous withdrawal of miscible liquid layers”  
Laura E. Schmidt and Wendy W. Zhang, submitted to *Phys. Rev. Lett.* (arXiv:0708.4293)
- “Selective withdrawal in liquids of uneven viscosities”  
Francois Blanchette and Wendy W. Zhang

## Conference Proceedings

- “Memory and the break-down of cylindrical symmetry in bubble break-up”  
L. E. Schmidt, N. Keim, S. R. Nagel and W. W. Zhang  
*Proc. Euromech 493 on Interface dynamics, stability and fragmentation*, Grenoble, Fr E. Villermaux (ed.) (2007).
- “Liquid Interfaces in Viscous Straining Flows: Numerical Studies of the Selective Withdrawal Transition”  
M. Kleine Berkenbusch, I. Cohen & W. W. Zhang, *Proc. IUTAM Symp. Interactions for Dispersed Systems in Newtonian and Viscoelastic Fluid*, Guanajuato MX G. H. Homsy & R. Zenit (ed.) (2006).
- “A Long-Wavelength Model of Viscous Entrainment”  
W. W. Zhang, *Proc. XXI International Congress of Theoretical and Applied Mechanics, Warsaw Poland* (2004).
- “Similarity Solutions for Capillary Pinch-off in Viscous Fluids.”  
J. R. Lister & W. W. Zhang, *Proc. IUTAM Symp. Nonlinear wave behaviour in multiphase flow, Notre Dame 1999* H. C. Chang (ed.), Kluwer (2000).

## Service

- Co-Organizer of Workshop on “Geometrical singularities and singular geometries” with L. Mahadevan (main organizer), Ed Spiegel & Tom Witten  
Institute for Mathematics and Its Applications, University of Minnesota, MN  
(<http://www.ima.umn.edu/200-2008/SP7.14-25.08>) July 2008
- Co-Organizer of the *Computations in Science* seminar at the University of Chicago.  
([http://mrsec.uchicago.edu/Comp\\_in\\_Sci/schedule.html](http://mrsec.uchicago.edu/Comp_in_Sci/schedule.html)) 2003 – present
- Co-Organizer of Workshop on “Focusing Stresses in a Soft Interface” with Thomas A. Witten, Ka Yee Lee, & Sidney R. Nagel, Chicago IL  
(<http://panza.uchicago.edu/focusing05/>) November 2005
- Organizer of the *Jets, Shocks & Splashes* Focus Session (DFD & GSNP)  
APS March Meeting March 2006
- Acrivos Dissertation Award Committee,

Division of Fluid Dynamics, APS 2006-2008  
 •Member of the University of Chicago Physics Department Research Experiences for Undergraduates (REU) 2003 – present  
 •Referee for Analytical Chemistry, American Journal of Physics, Journal of Fluid Mechanics, Langmuir, Nature, Physics of Fluids, Physica D, Physical Review Letters, Physical Review E, and SIAM J. Applied Mathematics.

## Selected Invited Talks

•Thayer School of Engineering at Dartmouth  
 Jones Lecture on Science, Technology & Society March 2008  
 •Euromech 493 Colloquia on “Interface Dynamics, Stability and Fragmentation”  
 Grenoble France August 2007  
 •Yale University, Physics Colloquim February 2007  
 •University of Chicago, Physics Colloquim October 2006  
 •University of Arizona, Applied Mathematics Colloquim September 2006  
 •Northwestern University September 2006  
 Engineering Science & Applied Mathematics Seminar  
 •Public Lecture at Boulder Summer School on Physics of Soft Matter July 2006  
 •University of Illinois at Urbana-Champaign June 2006  
 Mechanical Engineering Seminar  
 •Workshop in the “Microfluidic Flows in Nature and Microfluidic Technologies” series  
 “Cells and Materials: At the Interface between Mathematics, Biology and Engineering”  
 Institute for Pure and Applied Mathematics, UCLA, CA April 2006  
 •“Interactions for Dispersed Systems in Newtonian & Viscoelastic Fluids”  
 Symposium IUTAM, Guanajuato, Mexico March 2006  
 •APS March Meeting, Focus Session on “Soft Interfaces” March 2006  
 •Applied Mathematics Seminar, Columbia University March 2006  
 •Dynamics Days Conference Bethesda, MD January 2006  
 •University of Illinois at Urbana-Champaign September 2005  
 Applied/Interdisciplinary Mathematics Seminar  
 •Los Alamos National Lab August 2005  
 Center for Nonlinear Sciences (CNLS) colloquim  
 •Université Bordeaux I, France July 2005  
 Centre de Physique Moléculaire Optique et Hertzienne (CPMOH)  
 •New Jersey Institute of Technology  
 Frontiers in Applied & Computational Mathematics (FACM’05) May 2005  
 •Banff International Research Station for Mathematical Innovation & Discovery (BIRS)  
 Workshop on Analysis, Computations and Experiments on Pinch-off in Liquid Jets  
 Alberta, Canada March 2005  
 •APS March Meeting March 2004  
*Sheets, Spouts, Jets: Small-scale structures* Invited Colloquia  
 •University of California at Santa Barbara  
 Department of Mechanical & Environmental Engineering May 2004  
 •Harvard University, Applied Mechanics Colloquim May 2004

- École Supérieure de Physique et de Chimie Industrielles, France May 2004  
Laboratoire de Physique et Mécanique des Milieux Hétérogènes
- Universités d'Aix-Marseille I et II, France May 2004  
Institute de Recherche sur les Phénomènes Hors Equilibre (IRPHE)
- Cornell University, Theoretical & Applied Mechanics Seminar April 2004
- Georgia Institute of Technology, Center for Nonlinear Science February 2005
- Fields Institute for Research in Mathematical Sciences November 2003  
Workshop on Pattern in Physics, Toronto Canada
- Universite Pierre & Marie Curie, Paris France, LMM group fluids seminar June 2003
- Université Paris VII, Paris France June 2003  
Geophysical Institute (IPGP) Physics of Natural Systems Seminar
- Johns Hopkins University Mechanical Engineering Thermo-Fluids Talk April 2003
- University of Delaware Applied Mathematics Seminar March 2003
- University of Texas at Austin Chemical Engineering Fluids Seminar March 2003
- University of Twente, Netherlands, Physics Department Colloquium February 2003
- University of Texas at Austin Nonlinear Dynamics Seminar January 2003
- Museum of Science & Industry brownbag seminar, Chicago IL October 2002
- Purdue University Chemical Engineering seminar May 2002
- Duke University Mathematics Seminar February 2002
- Northwestern University Interdisciplinary Nonlinear Science Seminar January 2002
- Courant Institute New York University, Applied Math Lab Seminar November 2001
- University of Pennsylvania Condensed Matter Seminar March 2001
- University of Twente, Netherlands, Fluid Dynamics Group Seminar February 2001
- Massachusetts Institute of Technology Physical Mathematics Seminar March 1998
- Cambridge University DAMTP Continuum Mechanics Seminar October 1996
- Massachusetts Institute of Technology Physical Mathematics Seminar May 1996

## Selected Contributed Talks

- APS Division of Fluid Dynamics Annual Meeting, Salt Lake City, UT November 2007
- APS Division of Fluid Dynamics Annual Meeting, Tampa FL November 2006
- APS Division of Fluid Dynamics Annual Meeting, Chicago IL November 2005
- Frontiers in Research Lecture Series, MRSEC REU program, Chicago IL August 2005
- SIAM Conference on Applications of Dynamical Systems, Snowbird, UT May 2005  
Scaling, Self-similarity and Shocks Symposium
- APS Division of Fluid Dynamics Meeting, Seattle WA November 2004
- International Congress of Theoretical & Applied Mechanics, Poland August 2004
- APS Division of Fluid Dynamics Meeting, Meadowlands NJ November 2003
- APS Division of Fluid Dynamics Annual Meeting, Dallas TX November 2002
- SIAM Materials Meeting Mini-Symposium, Philadelphia PA July 2002
- APS Division of Fluid Dynamics Annual Meeting, San Diego, CA November 2001
- American Institute of Chemical Engineers Annual Meeting, Reno, NV November 2001
- APS Division of Fluid Dynamics Annual Meeting, Washington D.C. November 2000
- APS Division of Fluid Dynamics Annual Meeting, New Orleans, LA November 1999