

Laura E. Schmidt

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RESEARCH INTERESTS: Fluid interfaces and singularities, non-linear dynamics, asymptotics, self-similarity, stratified flows, thin films and conduits, geophysical flows, biological fluid systems.

EDUCATION and HONORS:

- Ph. D. Dept. of Physics, University of Chicago, Chicago, IL. Sept. 2003 – present.
Thesis *Azimuthal asymmetries in bubble break-up*, supervised by Prof. Wendy Zhang.
- B. Sc. Dept. of Physics, with Minor from Dept. of Chemical Engineering, University of Rochester, Rochester, NY. May 2003.
- Sept. 2006–7 U.S. Dept. of Education Graduate Assistance in Areas of National Need Fellowship
- Jan. 2006 Student Poster Award, Dynamics Days 2006 Conference, Bethesda, MD
- May 2003 Stoddard Prize for best senior thesis, Dept. of Physics, U. of Rochester
- May 2003 Fulbright Award for best advanced laboratory work, Dept. of Physics, U. of Rochester
- May 2003 Undergraduate Teaching Internship Award, Dept. of Physics, U. of Rochester
- May 2003 John F. Flagg Award for highest GPA in Physics, Dept. of Physics, U. of Rochester
- 1999-2003 Rush Rhees Scholarship for overall academic achievement, U. of Rochester
- May 2002 Catherine Block Memorial Fund Prize for woman in junior class, U. of Rochester
- June 1999 Universal Oil Products education scholarship
- Member of Phi Beta Kappa, Sigma Pi Sigma and Golden Key Honor Societies

SCIENTIFIC RESEARCH:

- 2003– Ph.D. student, Dept. of Physics, University of Chicago (advisor: Prof. Wendy W. Zhang)
- *Memory in bubble breakup – predicted that a collapsing neck of air in water will undergo shape vibrations if cylindrical symmetry is perturbed, a signature of precise memory in this Hamiltonian system. I worked closely with Prof. Sid Nagel whose lab observed these vibrations.*
 - *Thin tendrils entrained from the interface of miscible viscous liquids – examined the effects of the geometry of the large-scale withdrawal flow on the entrainment dynamics, using a long-wavelength model, and derived a new scaling law for the volume flux of liquid through a tendril.*
 - *Cytokinesis – Dictyostelium cells form a slender furrow connecting the two daughter cells just before cell division. In collaboration with experimental cell biologist, Prof. Doug Robinson (Johns Hopkins University), we use simple models of the cell as a visco-elastic fluid to understand how a cell generates the forces needed to divide, in the absence of an acto-myosin force generating belt.*
- 2002 REU summer student, Dept. of Physics and MRSEC, University of Chicago:
With Prof. Todd Dupont, I analyzed a mathematical model of a drying colloid mixture (the coffee-drop problem) and simulated the process to see a ring of residue left behind.
- 2001 REU summer student, Dept. of Physics and Astronomy, University of Rochester:
I studied climatology and constructed a global climate model based on simple energy conservation laws under Prof. Robert S. Knox and Prof. H. L. Helfer.

TEACHING, SERVICE, and LEADERSHIP EXPERIENCE:

- 2007 Teaching Assistant for Intermediate Mechanics, Dept. of Physics, U. of Chicago
- 2006 Training workshop for teaching assistants in the College, U. of Chicago
- 2003–5 Student organizer for *Computations in Science* seminar series, U. of Chicago
- 2004–7 Science Club leader (1st–6th grade) for *Science and Technology Outreach and Mentoring Program* at the North-Kenwood-Oaklawn Charter Elementary School
- 2003–4 Staff administrator for Museum Presentations of Science Program
- 2001–3 Teaching Intern for Electricity and Magnetism and Modern Physics Labs, Dept. of Physics and Astronomy, U. of Rochester
- 2002–3 Student Tutor for physics and math, U. of Rochester
- 2002–3 Elected Secretary for Society of Physics Students, U. of Rochester
- 2000 Teaching Assistant for Calculus, Dept. of Mathematics, U. of Rochester

PAPERS:

- “Vibrational modes of an implosion singularity” L. E. Schmidt, N. Keim, W. W. Zhang and S. R. Nagel (draft).
- “Viscous Withdrawal of Miscible Liquid Layers” L. E. Schmidt and W. W. Zhang, *Phys. Rev. Lett.* 100, 044502 (2008).
- “Electron transport through porphyrin-based molecular wires”, University of Rochester Senior thesis under advisor, Prof. R. S. Knox, completed in May 2003.
- “Development of an Elementary Climate Model: Two – Layer Cellular Case”, L. E. Schmidt, H. L. Helfer, and R. S. Knox, *Laboratory for Laser Energetics (LLE) Review*, Volume 94, Jan. –Mar. 2003, pgs. 128-138.

SELECTED TALKS:

- Feb. 2008 “Non-universality of an implosion singularity”, *Computations in Science Seminar*, U. of Chicago.
- Feb. 2008 “Vibrational modes of an implosion singularity”, *RTG seminar*, Department of Engineering Sciences and Applied Mathematics, Northwestern University, Evanston, IL.
- Nov. 2007 “Memory and inertial oscillations in bubble break-up”, *APS Division of Fluid Dynamics Annual Meeting*, Salt Lake City, UT.
- Nov. 2007 “Formation of a cylindrical bridge in cell division”, *APS Division of Fluid Dynamics Annual Meeting*, Salt Lake City, UT.
- Nov. 2006 “Breakup of an air bubble in water: Memory of azimuthal asymmetry”, *APS Division of Fluid Dynamics Annual Meeting*, Tampa, FL.
- Sept. 2006 “Collapsing a Thread of Air”, *MRSEC Baglunch Seminar*, U. of Chicago, Chicago, IL.
- Mar. 2006 “Length-scale selection in viscous entrainment of stratified fluid layers”, *Institut de Physique du Globe de Paris Seminar series*, Paris, France.
- Jan. 2006 “Length-scale selection in viscous entrainment of stratified fluids”, *UCLA-IPAM-NSF Workshop on Thin Films and Fluid Interfaces*, Los Angeles, CA (poster).
- Jan. 2006 “Viscous Entrainment: Thin Threads Without Surface Tension”, *MRSEC Baglunch Seminar*, U. of Chicago, Chicago, IL.
- Jan. 2006 “Length-scale selection in viscous entrainment of stratified fluids”, *Dynamics Days 2006 Conference*, Bethesda, MD (poster).
- Nov. 2005 “Length-scale selection in viscous entrainment of stratified fluids”, *APS Division of Fluid Dynamics Annual Meeting*, Chicago, IL.
- Nov. 2005 “Length-scale selection in viscous entrainment of stratified fluids”, *Focusing Stress in a Soft Interface workshop*, U. Chicago, Chicago, IL.
- Nov. 2004 “Viscous entrainment of stratified layers of two miscible fluids”, *APS Division of Fluid Dynamics Annual Meeting*, Seattle, WA.
- Apr. 2002 “Elementary Climate Modelling”, *Rochester Symposium for Physics Students — Astronomical Society of New York joint session*, U. of Rochester, Rochester, NY.