Contact

Physics Building 201
Department of Physics
Syracuse University
Syracuse, NY 13244 USA

voice: (315) 443-3752
fax: (315) 443-9103
e-mail: jdpaulse@syr.edu
web: paulsengroup.wordpress.com

Research Interests

Soft condensed matter experiment. *Elasticity and geometry of thin sheets. Memory formation and self-organization in disordered materials. Capillary and wetting phenomena.*

Education

University of Chicago, Chicago, IL, USA
Ph.D., Physics, December 2013
Thesis: The Approach and Coalescence of Liquid Drops in Air
Advisor: Sidney R. Nagel

St. Olaf College, Northfield, MN, USA
B.A., Physics, *with distinction*, 2007
B.A., Mathematics, *with distinction*, 2007
Salutatorian, Summa Cum Laude

Academic Positions

2015-present	Assistant Professor, Syracuse University
April 2016	Joliot Chair (4 week visiting professorship), ESPCI ParisTech
2013-2015	Postdoctoral Research Associate, University of Massachusetts, Amherst *Mentors: Narayanan Menon and Thomas P. Russell*

Awards & Fellowships

2017	Physics Department Teaching Award, Phys 212, Syracuse University
2017	National Science Foundation CAREER Award
2016	ACS Petroleum Research Fund Doctoral New Investigator
2015	Poster Award, Gordon Research Conference on Soft Condensed Matter Physics
2011	Grainger Foundation Fellowship, Physics Department, University of Chicago
2009, 2010	Robert A. Millikan Fellowship for Research and Teaching, University of Chicago
2006	Thomas D. Rossing Physics Scholarship, St. Olaf College
2006	Barry M. Goldwater Scholarship, St. Olaf College
2006	Elected to Phi Beta Kappa, St. Olaf College
2006	Elected to Sigma Pi Sigma, St. Olaf College
2006	Top 500 Scorer, William Lowell Putnam Mathematics Competition
2001	National Council of Teachers of English (NCTE) Writing Award

Publications

[15] Wrapping liquids, solids, and gases in thin sheets.
J. D. Paulsen
Invited submission to Annual Review of Condensed Matter Physics, vol. 10.
arXiv 1804.07425 (2018).

[14] Geometric stiffening and softening of an indented floating thin film.
M. M. Ripp, V. Démery, T. Zhang, and **J. D. Paulsen**
arXiv 1804.02421 (2018).

[13] Hyperuniformity with no fine tuning in sheared sedimenting suspensions.
J. Wang, J. M. Schwarz, and **J. D. Paulsen**
Nature Communications 9, 2836 (2018).

[12] Wrapping with a splash: High-speed encapsulation with ultrathin sheets.
D. Kumar, **J. D. Paulsen**, T. P. Russell, and N. Menon
Science 359, 775 (2018).

[11] A model for approximately stretched-exponential relaxation with continuously varying stretching exponents.
J. D. Paulsen and S. R. Nagel
Journal of Statistical Physics 167, 749 (2017).

[10] Geometry-driven folding of a floating annular sheet.
J. D. Paulsen*, V. Démery*, K. B. Toga, Z. Qiu, T. P. Russell, B. Davidovitch, and N. Menon
Physical Review Letters 118, 048004 (2017).

[9] Curvature-induced stiffness and the spatial variation of wavelength in wrinkled sheets.
J. D. Paulsen*, E. Hohlfeld*, H. King, J. Huang, Z. Qiu, T. P. Russell, N. Menon, D. Vella, and B. Davidovitch
Proceedings of the National Academy of Sciences U.S.A. 113, 1144 (2016).
- Highlighted in UMass Amherst Press Release, picked up by news sites

[8] Optimal wrapping of liquid droplets with ultrathin sheets.
J. D. Paulsen, V. Démery, C. D. Santangelo, T. P. Russell, B. Davidovitch, and N. Menon
Nature Materials 14, 1206 (2015).
- Cover photo (December 2015 issue)
- Highlighted in UMass Amherst Press Release, picked up by numerous news sites
- News articles in Gizmodo, nanotechweb.org, AIMResearch, and prophysik.de

[7] Multiple transient memories in experiments on sheared non-Brownian suspensions.
J. D. Paulsen, N. C. Keim, and S. R. Nagel
Physical Review Letters 113, 068301 (2014).
- Recommended on condmatjournalclub.org
- Editors' Suggestion

[6] Coalescence of bubbles and drops in an outer fluid.
J. D. Paulsen, R. Carmigniani, A. Kannan, J. C. Burton, and S. R. Nagel
Nature Communications 5, 3182 (2014).

[5] Approach and coalescence of liquid drops in air.
J. D. Paulsen
Physical Review E 88, 063010 (2013).

[4] Multiple transient memories in sheared suspensions: Robustness, structure, and routes to plasticity.
N. C. Keim*, **J. D. Paulsen***, and S. R. Nagel
Physical Review E 88, 032306 (2013).

[3] The inexorable resistance of inertia determines the initial regime of drop coalescence.
J. D. Paulsen, J. C. Burton, S. R. Nagel, S. Appathurai, M. T. Harris, and O. A. Basaran
Proceedings of the National Academy of Sciences U.S.A. 109, 6857 (2012).

[2] Viscous to inertial crossover in liquid drop coalescence.
J. D. Paulsen, J. C. Burton, and S. R. Nagel
Physical Review Letters 106, 114501 (2011).
• Editors' Suggestion

[1] Energy-dependent Ps-He momentum-transfer cross section at low energies.
J. J. Engbrecht, M. J. Erickson, C. P. Johnson, A. J. Kolan, A. E. Legard, S. P. Lund, M. J. Nyflot, and **J. D. Paulsen**
Physical Review A 77, 012711 (2008).

(*equal contribution)

Funding

"Ultrathin sheets on curved liquid surfaces: Stress focusing and interfacial assembly"
CAREER Award, *National Science Foundation, DMR-CMP* **2017-2022**

"Hyperuniform dispersal of non-Brownian particles in viscous liquids"
Doctoral New Investigator, *American Chemical Society Petroleum Research Fund* **2016-2018**

Invited Talks

[28] The wrinkle to crumple transition in confined sheets **2018**
SIAM Conference on Mathematical Aspects of Materials Science, Portland, OR

[27] Better living through frustration or: Shaping liquid surfaces with thin elastic sheets **2018**
Applied and Interdisciplinary Mathematics Seminar
University of Michigan, Ann Arbor, Michigan

[26] Between a droplet and a soft place: The extreme mechanics of thin sheets **2018**
Biomaterials Seminar, Syracuse University, Syracuse, NY

[25] Between a droplet and a soft place: The extreme mechanics of thin sheets **2018**
Physics Department Colloquium, McMaster University, Hamilton, ON

[24] Multiple memory formation in a sheared non-Brownian suspension **2018**
Memory Formation in Matter
Kavli Institute for Theoretical Physics, UC Santa Barbara

[23] The wrinkle to crumple transition in confined sheets **2017**
Packing of Continua, Aspen Center for Physics, Aspen, CO

[22] Sheets shaping liquids and liquids shaping sheets **2017**
APS March Meeting, New Orleans, LA

[21] Making do with less: Optimal wrapping of liquid droplets with ultrathin sheets **2016**
Physics Department Colloquium, University of Rochester, NY

[20] No instructions necessary: Thin sheets are optimal wrappers of liquid drops **2016**
Surface activity driven by material geometry and elasticity
University of Massachusetts, Amherst, MA

[19] Optimal coverage of liquid interfaces with thin polymer sheets **2016**
Gordon Research Conference on Thin Film & Small Scale Mechanical Behavior

[18] Making do with less: Optimal wrapping of liquid droplets with ultrathin sheets **2016**
67th New England Complex Fluids Workshop, MIT

[17] Multiple memory formation in a sheared granular suspension **2016**
14th Northeast Granular Workshop, University of Massachusetts Amherst

[16] Making do with less: Optimal wrapping of liquid droplets with ultrathin sheets **2016**
DAMPT Fluids Seminar, Cambridge University

[15] Noise stabilization of multiple memories in sheared non-Brownian suspensions **2016**
Gulliver Seminar, ESPCI ParisTech

[14] The wavelength of wrinkles in elastic sheets on curved topographies **2016**
Séminaire PMMH, ESPCI ParisTech

[13] The wavelength of wrinkles in curved tensioned sheets **2016**
Geometry, Elasticity, Fluctuations, and Order in 2D Soft Matter
Kavli Institute for Theoretical Physics, UC Santa Barbara

[12] No instructions necessary: Thin sheets are optimal wrappers of liquid drops **2015**
Short talk selected from posters
Gordon Research Conference on Soft Condensed Matter Physics

[11] No instructions necessary: Thin sheets are optimal wrappers of liquid drops **2015**
Condensed Matter Seminar, University of Massachusetts Amherst

[10] Covering liquids with thin sheets or: How I learned to stop worrying about mechanics and love geometry **2015**
Physics Department Colloquium, Syracuse University

[9] The two-fluid coalescence problem: It's what's inside that counts **2013**
Computations in Science Seminar, University of Chicago

[8] Things come together: Ultrafast experiments on liquid drop coalescence **2013**
PREM Seminar, City College of New York

[7] Things come together: Experiments on liquid drop coalescence **2013**
Special Seminar, University of Massachusetts Amherst

[6] Transient memories in sheared non-Brownian suspensions **2013**
Special Seminar, Cornell University

[5] Transient memories in experiments on sheared non-Brownian suspensions **2013**
Soft Matter Seminar, Georgetown University

[4] Things come together: Experiments on liquid drop coalescence **2013**
MRSEC Seminar, Brandeis University

[3] Ultrafast experiments on liquid drop coalescence **2013**
Physics Department Colloquium, St. Olaf College

[2] Transient memories in non-equilibrium disordered systems **2012**
Special Seminar, Purdue University

[1] Experimental analysis of liquid drop coalescence **2011**
Computations in Science Seminar, University of Chicago

Contributed Talks

[12] Sheets shaping liquids and liquids shaping sheets **2016**
Society of Engineering Science Annual Meeting, College Park, MD

[11] Geometry-driven folding transitions in floating thin films **2016**
APS March Meeting, Baltimore, MD

[10] Capillarity-driven folding of a thin floating annular film **2015**
APS Division of Fluid Dynamics Meeting, Boston, MA

[9] Optimal wrapping of liquids with ultrathin sheets **2015**
Statistical Physics and Mechanics of Forms and Shapes, Mariehamn, Finland

[8] Thin sheets achieve optimal wrapping of liquids **2015**
APS March Meeting, San Antonio, TX

[7] Wrapping a liquid drop with a thin elastic sheet **2014**
APS Division of Fluid Dynamics Meeting, San Francisco, CA

[6] Stretched exponential relaxation in sheared non-Brownian suspensions **2014**
APS March Meeting, Denver, CO

[5] Coalescence of two drops surrounded by an outer fluid **2013**
APS March Meeting, Baltimore, MD

[4] Transient memories in non-equilibrium disordered systems **2012**
APS March Meeting, Boston, MA

[3] Viscous to inertial crossover in liquid drop coalescence **2010**
APS Division of Fluid Dynamics Meeting, Long Beach, CA

[2] Coalescence of low-viscosity liquids **2009**
APS Division of Fluid Dynamics Meeting, Minneapolis, MN

[1] Coalescence and pinch-off in viscous liquids **2009**
APS March Meeting, Pittsburgh, PA

Outreach Talks

[12] Between a droplet and a soft place: The extreme mechanics of thin sheets **2017**
SUPA Seminar for high school physics teachers, Syracuse University, Syracuse, NY

[11] Between a droplet and a soft place: The extreme mechanics of thin sheets **2017**
SUPA Seminar for high school physics teachers, New York, NY

[10] The extreme mechanics of thin sheets **2017**
Undergraduate Colloquium (one of four speakers), Syracuse University, Syracuse, NY

[9] Buckling under pressure: Draping & wrapping with thin elastic sheets **2017**
Physics Alliance of Central New York Meeting, Syracuse University, Syracuse, NY

[8] Tailoring non-Brownian suspensions with shear **2017**
NSF IGERT Social, Syracuse University, Syracuse, NY

[7] Wrinkling on a curve **2017**
Mechanical and Aerospace Engineering Graduate Seminar, Syracuse University

[6] Think Fast! The rapid motions of everyday liquids **2016**
Café Junior Scientifique, Museum of Science and Technology, Syracuse, NY

[5] Self-organization of non-Brownian spheres or: Writing memories in sludge **2016**
Talk, Undergraduate Research Day, Syracuse University, Syracuse, NY

[4] Buckling under pressure: Draping & wrapping with thin elastic sheets **2015**
Talk, Undergraduate Research Day, Syracuse University, Syracuse, NY

[3] What the heck is soft condensed matter? **2013**
Public Outreach Talk, Lunch & Learn Series, Centro Media Inc., Chicago, IL

[2] Transient memories in sheared non-Brownian suspensions **2013**
Guest Lecture, PHYS 399: Senior Seminar, St. Olaf College, Northfield, MN

[1] Transient memories in non-equilibrium disordered systems **2012**
Seminar, Society of Physics Students, University of Chicago, Chicago, IL

Teaching & Outreach

Syracuse University, Syracuse, NY, USA

- Instructor: Thermodynamics and Statistical Mechanics, General Physics II
- Talks for undergraduates and public (see *Outreach Talks*, above)

University of Chicago, Chicago, IL, USA

- Director of Education, NSF Research Experiences for Undergraduates **2009-2011**
- "Physics with a BANG!": *Annual physics demo show and open house for community. High speed camera operator, lab tour guide, demo operator.* **2009-2012**
- After School Science Club, Andrew Carnegie Elementary School **2008-2010**

Service

- National Science Foundation Review Panelist — **one time since 2016**
  Division of Chemical, Bioengineering, Environmental, & Transport Systems
- Faculty Mentor, Society of Physics Students, Syracuse University — **2016-present**
- Organizer, Soft Matter Journal Club, *University of Massachusetts, Amherst* — **2014-2015**
- Graduate Physics Admissions Committee, *University of Chicago* — **2011**
- Founder & Organizer, Soft Matter Journal Club, *University of Chicago* — **2010-2013**
- Peer reviewer for 13 scientific journals

Society Memberships

- American Association of Physics Teachers — **2013-present**
- American Physical Society — **2006-present**