

Jonathan P. Rothstein

Associate Professor
University of Massachusetts
Dept. of Mechanical and Industrial Engineering
160 Governors Drive
Amherst, MA 01003

email: rothstein@ecs.umass.edu
phone: 413.577.0110
fax: 413.545.1027

Education

Massachusetts Institute of Technology **Cambridge, MA**
Doctor of Philosophy in Mechanical Engineering 6/2001
Advisor: Gareth H. McKinley, Professor of Mechanical Engineering
Thesis Title: *The Stability of Viscoelastic Fluids in Complex Flows: The Role of Shear and Extensional Rheology*

Harvard University **Cambridge, MA**
Masters of Science in Engineering and Applied Sciences 3/1998
Advisor: Gareth H. McKinley, John L. Loeb Associate Professor of Natural Sciences

The Cooper Union **New York, NY**
Bachelor of Engineering in Mechanical Engineering 5/1996

Academic Experience

University of Massachusetts (2007-) **Amherst, MA**
Associate Professor in the Department of Mechanical and Industrial Engineering

Katholieke Universiteit Leuven (2007-2008) **Leuven, Belgium**
Visiting Professor in the Department of Chemical Engineering

University of Massachusetts (2001-2007) **Amherst, MA**
Assistant Professor in the Department of Mechanical and Industrial Engineering

Courses Taught

- MIE 230 Thermodynamics (2001, 2003, 2005)
- MIE 354 Introduction to Heat Transfer (2003, 2004, 2008)
- MIE 402 Mechanical Engineering Labs II (2005-2009)
- MIE 440 Fluid Dynamics II (2002, 2004)
- MIE 606 Graduate Heat Transfer (2002, 2005)
- MIE 707 Viscous (and Viscoelastic) Fluid Dynamics (2004, 2006)

Graduate Students

- Sheng Chen, M.S. (2001-2003) “Extensional Flow of a Wormlike Micelle Solution Past a Sedimenting Sphere”
- Erik Miller, M.S. (2002-2004) “Control of the Sharkskin Instability in the Extrusion of Polymer Melts using Induced Temperature Gradients”
- Jia Ou, M.S. (2002-2004) “Laminar Drag Reduction Using Ultrahydrophobic Surfaces”
- Avinash Bhardwaj, M.S (2005-2006) “Extensional Rheology of Wormlike Micelle Solutions”

Erik Miller, Ph.D (2004-2007) “Shear-Banding in Wormlike Micelle Solutions”

Jia Ou, Ph.D. (2004-2007) “Drag Reduction and Enhanced Mixing in Laminar Flows Past Ultrahydrophobic Surfaces”

Manujkumar Chellamuthu, Ph.D. (2006-) “Extensional Rheology of Branched Wormlike Micelle Solutions”

Robert Daniello, M.S./Ph.D. (2006-) “Experimental Drag Reduction Measurements in Turbulent Flows Past Superhydrophobic Surfaces”

Michael Martell, M.S. (2006-2008) “Numerical Simulation of Drag Reduction in Turbulent Flows Past Superhydrophobic Surfaces”

Molly Mulligan, M.S. (2006-) “Self-Assembly of Nanoparticles and Fluid Interfaces.”

Jackson Feng, Ph.D. (2007-) “Capillary Force Lithography”

Sandeep Menon, Ph.D. (2007-9) “Modeling Continuous Inkjet Printing”

Geoffrey Moss, M.S. (2007-9) “Complex Flows of Wormlike Micelle Solutions”

Michael Nilsson, Ph.D. (2009-) “Dynamics of Drops on Superhydrophobic Surfaces”

*Undergraduate
Independent
Study Advisees*

Joshua Lampe (2002-2003)

Robert DiLalla (2003)

Jason Grimaldi (2003-2004)

Beau Gibson (2004)

Francisco Lopes (2004)

Ryan Lepard (2004-2005)

Erik McWilliams (2004)

Nicole Nichols (2004-2005)

Sung Lee Kim (2004)

Geoffrey Moss (2005-2006)

Jeffrey Thompson (2005-2006)

David Richter (2005-2006)

Igor Popstefanija (2005-2006)

Anthony Santamaria (2006-2007)

Andrew Theriault (2006-2007)

Patrick Dunbeck (2006)

Nicholas Waterhouse (2007-)

Eric Arndt (2008)

Justin DeBlois (2008)

Erica Bischoff-White (2009)

John Gabour (2009)

Other Activities

Developed short course with Henning Winter entitled “Rheology Practice” taught annually at the University of Massachusetts since 2004.

Developed a seminar series on undergraduate research activities in the MIE Department through Pi Tau Sigma which has run since 2003.

Massachusetts Institute of Technology (1998-2001) **Cambridge, MA**
Research Assistant supported by NASA Glenn Microgravity Research Center.

Massachusetts Institute of Technology (1998, 2000) **Cambridge, MA**
Teaching Assistant for short course entitled Rheological Behavior of Polymeric Fluids.

Harvard University (1997) **Cambridge, MA**
Teaching Fellow for Thermodynamics and Introduction to Statistical Mechanics.

Professional Experience

Jonathan P. Rothstein and Associates (1999-Present) **Belchertown, MA**
Proprietor and founder of a scientific consulting company with a broad and diverse client base including Schlumberger, PGI Nonwoven, Sage Engineering Associates, Polaroid Corporation and Nashua Corporation.

Exa Corporation (1993-4, 1996) **Lexington, MA**
Design engineer assisting in the development and application of a lattice-Boltzman computation fluid dynamics (CFD) simulation package.

Northrop Grumman (1995) **Bethpage, NY**
Intern engineer assisting in the design of and fluid dynamics testing of lift improvement devices for the V/STOL application of Northrop Grumman's Joint Advanced Strike Technology fighter competition entry.

Honors and Awards

- 2009 Arthur B. Metzner Early Career Award from the Society of Rheology in recognition of outstanding accomplishments in the field of rheology.
- 2007 Barbara H. and Joseph I. Goldstein Outstanding Junior Faculty Award from the University of Massachusetts College of Engineering
- 2006 Nominated for the Presidential Early Career Award for Scientists and Engineers (PECASE)
- 2006 Received Office of Naval Research (ONR) Young Investigator Program (YIP) Award
- 2006 Received National Science Foundation (NSF) Faculty Early Career Development (CAREER) Award
- 2006 Received the Advisor of the Year Award from the Mechanical Engineering Department at the University of Massachusetts.
- 2004 Received the Professor of the Year Award from the Mechanical Engineering Department at the University of Massachusetts.
- 2004 With Erik Miller, received the Young Scientists Award within the Rheofutures™ Initiative 2004 for "outstanding and innovative contribution in the area of material characterization."
- 2003 Received 3M Nontenured Faculty Award
- 2003 With Joshua Lampe received a University of Massachusetts Engineering Alumni Association scholarship for excellence in undergraduate student-faculty research projects

- 2002 Received the Frenkiel Award from the American Physics Society Division of Fluid Dynamics in recognition of significant contributions to fluid mechanics published in Physics of Fluids.
- 2001 Awarded NATO postdoctoral fellowship (declined)
- 1996 Division of Engineering and Applied Sciences Graduate Fellowship from Harvard University
- 1996 Received honorable mention for a National Science Foundation Fellowship
- 1996 Graduated Summa Cum Laude from The Cooper Union
- 1994 Granted membership in Tau Beta Pi, the national engineering honor society
- 1992 Four year full tuition scholarship to The Cooper Union

Publications

- Rothstein, J. P. "*Slip on superhydrophobic surfaces*," in press in Annual Review of Fluid Mechanics **42**, (2010).
- Nilsson, M., Daniello, R. and Rothstein, J. P. "A novel and inexpensive technique for creating superhydrophobic surfaces using teflon and sandpaper," submitted to Nature Materials (2009).
- Moss, G. R., and Rothstein, J. P., "*Flow of Viscoelastic Wormlike Micelle Solutions past a Cylinder*," in preparation for J. Non-Newtonian Fluid Mech., (2009).
- Martell, M. B., Rothstein, J. P. and Perot, J. B. "*The effect of Reynolds number on turbulent flows over superhydrophobic surfaces*," in preparation for Phys. Fluids (2009).
- Martell, M. B., Perot, J. B., and Rothstein, J. P., "*Direct numerical simulations of turbulent flows over drag-reducing ultrahydrophobic surfaces*," J. Fluid Mech., **620**, 31-41 (2009).
- Daniello, R., and Rothstein, J. P., "*Turbulent drag reduction using ultrahydrophobic surfaces*," accepted in Phys. Fluids, (2009).
- Chellamuthu, M., Arndt, E. M., and Rothstein, J. P., "*Extensional rheology of shear-thickening nanoparticle suspensions*," in press in Soft Matter, (2009).
- Miller, E., Clasen, C., and Rothstein, J. P., "*The effect of step-stretch parameters on capillary breakup extensional rheology (CaBER) measurements*," in press in Rheol. Acta (2009).
- Moss, G. R., and Rothstein, J. P., "*Flow of Viscoelastic Wormlike Micelle Solutions through a Periodic Array of Cylinders*," accepted in J. Non-Newtonian Fluid Mech., (2009).
- J. P. Rothstein, "*Strong flows of viscoelastic wormlike micelle solutions*," in Annual Rheology Reviews edited by D. M. Binding and K. Walters, The British Society of Rheology, Aberystwyth, Wales, UK, 2009.
- Chellamuthu, M., and Rothstein, J. P., "*Extensional rheology of branched wormlike micelle solutions*," J. Rheology, **52** (2008) 865-884.
- Ou, J., and Rothstein, J. P., "*A three-dimensional three-component micro particle image velocimetry technique utilizing conservation of mass*," submitted to Experiments in Fluids, (2007).
- Thompson, J., and Rothstein, J. P., "*The atomization of viscoelastic fluids in flat-fan and hollow-cone spray nozzles*," J. Non-Newtonian Fluid Mechanics, **147** (2007) 11-22.
- Ou, J., Moss, G. R., and Rothstein, J. P., "*Enhanced mixing in laminar flows using*

- ultrahydrophobic surfaces*," Physical Reviews E, **76** (2007) 016304.
- Miller, E., and Rothstein, J. P., "*Transient evolution of shear banding in wormlike micelle solutions*," J. Non-Newtonian Fluid Mechanics, **143** (2007) 22-37.
- Bhardwaj, A., Richter, D., Chellamuthu, M., and Rothstein, J. P., "*The effect of preshear on the extensional rheology of wormlike micelle solutions*," Rheologica Acta, **46** (2007) 861-875.
- Bhardwaj, A., Miller, E., and Rothstein, J. P., "*Filament stretching and capillary breakup extensional rheometry measurements of viscoelastic wormlike micelle solutions*," J. Rheology, **51** (2007) 693-719.
- Edmond, K. V., Marquez, M., Schofield, A. B., Rothstein, J. P., and Dinsmore, A. D., "*Stable jets of viscoelastic fluids and self-assembled cylindrical capsules by hydrodynamic focusing*," Langmuir, **22** (2006) 9052-9056.
- Ou, J., and Rothstein, J. P., "*Detailed velocity measurements of the flow past drag-reducing ultrahydrophobic surfaces*," Virtual J. Nanoscale Science and Technology, **12** (2005).
- Miller, E., Lee, S. J., and Rothstein, J. P., "*The effect of temperature gradients on the sharkskin surface instability in polymer extrusion through a slit die*," Rheologica Acta, **45** (2006) 943-950.
- Ou, J., and Rothstein, J. P., "*Direct velocity measurements of the flow past drag-reducing ultrahydrophobic surfaces*," Physics of Fluids, **17** (2005) 103606.
- Miller, E., Gibson, B., McWilliams, E., and Rothstein, J.P., "*The Collision of Viscoelastic Jets and the Formation of Fluid Webs*," Applied Physics Letters **87** (2005) 014101.
- Lampe, J., DiLalla, R., Grimaldi, J., and Rothstein, J. P., "*The impact dynamics of droplets on thin films of viscoelastic wormlike micelle solutions*," J. Non-Newtonian Fluid Mechanics **125** (2005) 11-23.
- Ou, J., Perot, J.B. and Rothstein, J.P., "*Laminar drag reduction in microchannels using ultrahydrophobic surfaces*," Physics of Fluids **16** (2004) 4635-4643.
- Miller, E. and Rothstein, J.P., "*Characterization and control of the sharkskin instability through localized thermal modification*," Rheologica Acta, **44** (2004) 160-173.
- Ou, J., Perot, J. B., and Rothstein, J. P., "*Laminar drag reduction in microchannels using ultrahydrophobic surfaces*," Virtual J. Nanoscale Science and Technology, **10** (2004).
- Chen, S., and Rothstein, J. P., "*Flow of a wormlike micelle solution past a falling sphere*," J. Non-Newtonian Fluid Mechanics, **116** (2004) 205-234
- Rothstein, J. P., "*Transient extensional rheology of wormlike micelle solutions*," J. Rheology, **47** (2003) 1227-1247.
- Rothstein, J. P., and McKinley, G. H., "*Inhomogeneous transient uniaxial extensional rheometry*," J. Rheology, **46** (2002) 1419-1444.
- Rothstein, J. P., and McKinley, G. H., "*A comparison of the stress and birefringence growth of dilute, semi-dilute and concentrated polymer solutions in uniaxial extensional flows*," J. Non-Newtonian Fluid Mechanics, **108** (2002) 275-290.
- Rothstein, J. P., and McKinley, G. H., "*The axisymmetric contraction-expansion: The role of extensional rheology on vortex growth dynamics and the enhanced pressure drop*," J. Non-Newtonian Fluid Mechanics, **98** (2001) 33-63.
- Rothstein, J. P., and McKinley, G. H., "*Non-isothermal modification of purely elastic flow instabilities in torsional flows of polymeric fluids*," Physics of Fluids, **13** (2001) 382-396.

Rothstein, J. P., and McKinley, G. H., “*Extensional flow of a polystyrene Boger fluid through a 4:1:4 axisymmetric contraction-expansion*,” *J. Non-Newtonian Fluid Mechanics*, **86** (1999) 61-88.

Rothstein, J. P., and McKinley, G. H., “*Axisymmetric flow-induced birefringence measurements for the flow of a polystyrene Boger fluid into an abrupt contraction-expansion*,” *Proceedings of the XIIIth International Congress on Rheology*, (2000).

Rothstein, J. P., and Gilbert, B., “*An investigation of the interference forces on Northrop Grumman candidate JAST V/STOL aircraft configurations with a study of the effectiveness of various lift improvement devices*.” Northrop Grumman internal publication # RM-915, (1995).

Rothstein, J.P. and Molvig, K.. “*Simulation of a high Reynolds Number backward-facing step using DIGITALPHYSICS technology*.” Exa Corporation internal publication (1994).

Invited Lectures

J.P. Rothstein. “Dynamics and Stability of Viscoelastic Wormlike Micelle Solutions in Strong Shear and Extensional Flows,” New England Complex Fluids Workshop, New Haven, March 2009.

M. Martell, B. Perot, and J.P. Rothstein. “DNS of Turbulent Channel Flow Past Ultrahydrophobic Surfaces with Periodic Microfeatures,” 8th World Congress on Computational Mechanics, Venice, Italy, July 2008.

J. Ou, R. Daniello, M. Martell, B. Perot, and J.P. Rothstein. “Drag Reduction in Laminar and Turbulent Flows Past Superhydrophobic Surfaces,” Micro and Nanofluid Workshop, Leiden, Netherlands, June 2008.

J.P. Rothstein. “Drag Reduction and Enhanced Mixing in Flows Past Ultrahydrophobic Surfaces,” ESPCI, Paris, France, December 2007.

J.P. Rothstein. “Stability of Viscoelastic Wormlike Micelle Solutions in Shear and Extensional Flows,” Université Catholique de Louvain, Louvain-La-Neuve, December 2007.

J.P. Rothstein. “Dynamics of Complex Fluids: From Rheology to Self-Assembly to Drag Reduction and Beyond,” Katholieke Universiteit Leuven, Belgium, June 2007.

J.P. Rothstein. “Drag Reduction and Enhanced Mixing in Flows Past Ultrahydrophobic Surfaces,” University of Lyon, Lyon, France, June 2007.

J.P. Rothstein. “Drag Reduction and Enhanced Mixing in Flows Past Ultrahydrophobic Surfaces,” University of Tennessee, Knoxville, TN, April 2007.

J.P. Rothstein. “Stability of Viscoelastic Wormlike Micelle Solutions in Shear and Extensional Flows,” University of Wisconsin, Madison, WI, February 2007.

J.P. Rothstein. “Self-Assembly of Nanoparticles at Fluid Interfaces and in the Bulk: From Rheology Modification to Encapsulation and Drug Delivery,” Northeastern University, Boston, MA, Nov. 2006.

J.P. Rothstein. “Stability of Viscoelastic Wormlike Micelle Solutions in Shear and Extensional Flows,” TA Users Conference, Newport, RI, May 2006.

J.P. Rothstein. “Self-Assembly of Nanoparticles at Fluid Interfaces and in the Bulk: From Rheology Modification to Encapsulation and Drug Delivery,” 3M Corporation Non-tenured Faculty Award Lecture, St. Paul, MN, Jan. 2006.

J.P. Rothstein. “Self-Assembly of Nanoparticles at Fluid Interfaces and in the Bulk: From

Rheology Modification to Encapsulation and Drug Delivery,” IGERT Seminar Series, Amherst, MA, Nov. 2005.

J.P. Rothstein. “Drag Reduction and μ -PIV Measurements of the Flows Past Ultrahydrophobic Surfaces,” American Mathematical Society Eastern Section Meeting, Newark, DE, April 2005.

J.P. Rothstein. “Drag Reduction in Flows Past Ultrahydrophobic Surfaces,” 3M Corporation Non-tenured Faculty Award Lecture, St. Paul, MN, Nov. 2004.

J.P. Rothstein. “Extensional Flow Of A Wormlike Micelle Solutions,” Brown University, Fluid, Thermal and Chemical Processing Seminar Series, Providence, RI, Oct. 2004.

J.P. Rothstein. “Drag Reduction in Flows Past Ultrahydrophobic Surfaces,” University of Massachusetts, Department of Chemical Engineering Seminar Series, Amherst, MA, Sept. 2004.

E. Miller and J.P. Rothstein, “Control of the Sharkskin Instability in the Extrusion of Polymer Melts using Induced Temperature Gradients,” Presented for the Young Scientist Award at Rheofuture™ Initiative Conference, Karlsruhe, Germany, July 1-2, 2004.

J.P. Rothstein. “Extensional Flow Of A Wormlike Micelle Solutions,” 3M Corporation Non-tenured Faculty Award Lecture, St. Paul, MN, Nov. 2003.

J.P. Rothstein. “Extensional Flow Of A Wormlike Micelle Solutions,” University of Massachusetts, Polymer Science and Engineering Seminar Series, Amherst, MA, Sept. 2003.

J.P. Rothstein. “Extensional Flow Of A Wormlike Micelle Solutions,” Harvard University, Division of Engineering and Applied Sciences Seminar Series, Cambridge, MA, Aug. 2003.

J.P. Rothstein. “Extensional Flow Of Complex Fluids,” University of Massachusetts, Condensed Matter Physics Seminar Series, Amherst, MA, Nov. 2002

Conference Presentations ([‡] presenter)

S. Menon[‡], J. P. Rothstein and D. P. Schmidt, “A numerical study of axi-symmetric droplet formation using a moving mesh approach,” in ICLASS 2009, 11th Triennial International Annual Conference on Liquid Atomization and Spray Systems, Vail, CO, USA, 2009.

M. Martell,[‡] Blair Perot, and J.P. Rothstein, “DNS of Turbulent Channel Flow past Ultrahydrophobic Surfaces with Periodic Microfeatures” Presented at APS Division of Fluid Dynamics Annual Meeting, San Antonio, TX, November 2008.

R. Daniello[‡] and J.P. Rothstein, “Experimental Measurements of Turbulent Drag Reduction Using Ultrahydrophobic Surfaces with Periodic Microfeatures” Presented at APS Division of Fluid Dynamics Annual Meeting, San Antonio, TX, November 2008.

J.P. Rothstein[‡], E. Miller, P. Moldenaers, and C. Clasen. “The effect of step-stretch parameters on capillary breakup extensional rheology (CaBER) measurements,” The XVth International Congress on Rheology, Monterey, CA August 2008.

Molly Mulligan[‡], C. Clasen and J.P. Rothstein. “Morphology development of immiscible polymer blends in extensional flows developed within a microfluidic device,” The XVth International Congress on Rheology, Monterey, CA August 2008.

G. Moss[‡] and J.P. Rothstein. “Flow of viscoelastic wormlike micelle solutions through a periodic array of cylinders,” The XVth International Congress on Rheology, Monterey, CA August 2008.

M. Chellamuthu[‡] and J.P. Rothstein. “Extensional rheology Of branched wormlike micelle solutions,” The XVth International Congress on Rheology, Monterey, CA August 2008.

- M. Martell, B. Perot, and J.P. Rothstein[‡]. “DNS of Turbulent Channel Flow Past Ultrahydrophobic Surfaces with Periodic Microfeatures,” 8th World Congress on Computational Mechanics, Venice, Italy, July 2008.
- J. Ou, R. Daniello, M. Martell, B. Perot, and J.P. Rothstein[‡]. “Drag Reduction in Laminar and Turbulent Flows Past Superhydrophobic Surfaces,” Micro and Nanofluid Workshop, Leiden, Netherlands, June 2008.
- S. Menon, J.P. Rothstein, D.P. Schmidt[‡], and Z. Tukovic, "Simulating Non-Newtonian Droplet Formation With A Moving-Mesh Method," Presented at ILASS Americas, Orlando, Florida, May 2008.
- M. Martell,[‡] Blair Perot, and J.P. Rothstein, “DNS of Turbulent Channel Flow past Ultrahydrophobic Surfaces with Periodic Microfeatures” Presented at APS Division of Fluid Dynamics Annual Meeting, Salt Lake City, November, 2007.
- R. Daniello[‡] and J.P. Rothstein, “Experimental Measurements of Turbulent Drag Reduction Using Ultrahydrophobic Surfaces with Periodic Microfeatures” Presented at APS Division of Fluid Dynamics Annual Meeting, Salt Lake City, November, 2007.
- M. Chellamuthu[‡] and J.P. Rothstein, “Extensional Rheology of Branched Wormlike Micelle Solutions” Presented at Society of Rheology Annual Meeting, Salt Lake City, October, 2007.
- G. Moss[‡] and J.P. Rothstein, “Flow of Viscoelastic Wormlike Micelle Solutions through a Periodic Array of Cylinders” Presented at Society of Rheology Annual Meeting, Salt Lake City, October, 2007.
- J. Ou, G.R. Moss and J.P. Rothstein[‡], “Drag Reduction and Enhanced Mixing in Flows Past Ultrahydrophobic Surfaces,” European Coatings Symposium, Paris, France, September 2007.
- J. Thompson, E. Miller, J. Lampe and J.P. Rothstein[‡], “Atomization of Thin Films And Fluid Sheets of Viscoelastic Fluids,” European Coatings Symposium, Paris, France, September 2007.
- E. Miller and J.P. Rothstein[‡], “Transient Evolution of the Shear Banding Flow of Wormlike Micelle Solutions” Presented at European Mechanics Society Meeting, London, England, September, 2007.
- M. Chellamuthu[‡] and J.P. Rothstein, “Extensional Rheology of Branched Wormlike Micelle Solutions” Presented at Gordon Conference on Elastomers, Networks and Gels, NH, June 2007.
- J. Ou[‡], G.R. Moss and J.P. Rothstein, “Drag Reduction and Enhanced Mixing in Pressure Driven Flow through Microfluidic Devices using Ultrahydrophobic Surfaces” Presented at APS Division of Fluid Dynamics Annual Meeting, Tampa, FL, November 2006.
- A. Bhardwaj, D. Richter, M. Chellamuthu and J.P. Rothstein[‡], “The Effect of Pre-shear on the Extensional Rheology of Wormlike Micelle Solutions” Presented at APS Division of Fluid Dynamics Annual Meeting, Tampa, FL, November 2006.
- J. Ou[‡], G.R. Moss and J.P. Rothstein, “Drag Reduction and Enhanced Mixing in Pressure Driven Flow through Microfluidic Devices using Ultrahydrophobic Surfaces” Presented at Society of Rheology Annual Meeting, Portland, ME, October, 2006.
- A. Bhardwaj, D. Richter, M. Chellamuthu and J.P. Rothstein[‡], “The Effect of Pre-shear on the Extensional Rheology of Wormlike Micelle Solutions” Presented at Society of Rheology Annual Meeting, Portland, ME, October, 2006.
- K. Edmund, M. Marquez, A. Dinsmore and J.P. Rothstein[‡], “Stable Jets of Viscoelastic Fluids and Self-Assembled Cylindrical Capsules by Hydrodynamic Flow Focusing” Presented at Society of Rheology Annual Meeting, Portland, ME, October, 2006.

- E. Miller[‡] and J.P. Rothstein, “Transient Evolution of the Shear Banding Flow of Wormlike Micelle Solutions” Presented at Society of Rheology Annual Meeting, Portland, ME, October, 2006.
- J. Ou, G.R. Moss and J.P. Rothstein[‡], “Drag Reduction in Pressure Driven Flow through Microfluidic Devices using Ultrahydrophobic Surfaces” Presented at ACS Colloid and Surface Science Symposium, Boulder, CO, June 18-21, 2006.
- K. Edmund, M. Marquez, A. Dinsmore and J.P. Rothstein[‡], “Stable Jets of Viscoelastic Fluids and Self-Assembled Cylindrical Capsules by Hydrodynamic Flow Focusing” Presented at ACS Colloid and Surface Science Symposium, Boulder, CO, June 18-21, 2006.
- J. Ou[‡], G.R. Moss and J.P. Rothstein, “Drag Reduction and Enhanced Mixing in Laminar Flows over Ultrahydrophobic Surfaces” Presented at APS Division of Fluid Dynamics Annual Meeting, Chicago, IL, Nov. 20-22, 2005.
- K. Edmund, M. Marquez, A. Dinsmore and J.P. Rothstein[‡], “Stable Jets of Viscoelastic Fluids and Self-Assembled Cylindrical Capsules by Hydrodynamic Flow Focusing” Presented at APS Division of Fluid Dynamics Annual Meeting, Chicago, IL, Nov. 20-22, 2005.
- J. Grimaldi, R. Lepard, F. Lopes and J.P. Rothstein[‡], “The Dynamics of Droplet Impact on Thin Films of Wormlike Micelle Solutions” Presented at Society of Rheology Annual Meeting, Vancouver, BC, Oct. 17-20, 2005.
- J. Ou and J.P. Rothstein[‡], “Drag Reduction in Laminar Flows over Ultrahydrophobic Surfaces” Presented at Society of Rheology Annual Meeting, Vancouver, BC, Oct. 17-20, 2005.
- E. Miller[‡] and J.P. Rothstein, “Temporal and Spatial Visualization of Shear Band Formation in Wormlike Micelle Solutions” Presented at Society of Rheology Annual Meeting, Vancouver, BC, Oct. 17-20, 2005.
- J. Ou and J.P. Rothstein, “Drag Reduction and m-PIV Measurements of the Flows Past Ultrahydrophobic Surfaces.” Presented at the American Mathematical Society Eastern Section Meeting, Newark, DE, April 2005.
- J.P. Rothstein. “Extensional Flows Of Wormlike Micelle Solutions.” Presented at the International Workshop of Numerical Methods in Non-Newtonian Fluids, Santa Fe, NM, June 2005.
- J. Ou, J.B. Perot and J.P. Rothstein[‡], “Drag Reduction in Flows Past Ultrahydrophobic Surfaces” Presented at APS Division of Fluid Dynamics Annual Meeting, Seattle, WA, Nov. 21-23, 2004.
- J. Lampe, R. DiLalla, J. Grimaldi and J.P. Rothstein[‡], “Impact Dynamics of Droplets on Thin Films of Viscoelastic Wormlike Micelle Solutions.” Presented at APS Division of Fluid Dynamics Annual Meeting, Seattle, WA, Nov. 21-23, 2004.
- E. Miller[‡] and J.P. Rothstein, “Modification of Elastic Flow Instabilities through Temperature-Induced Stratification of Rheological Properties.” Presented at APS Division of Fluid Dynamics Annual Meeting, Seattle, WA, Nov. 21-23, 2004.
- J. Lampe, R. DiLalla, J. Grimaldi, J.P. Rothstein. “Impact dynamics of droplets on thin films of wormlike micelle solutions” Presented at the 14th International Congress on Rheology, Seoul, South Korea, Aug. 2004.
- E. Miller[‡] and J.P. Rothstein, “Control of the Sharkskin Instability in the Extrusion of Polymer Melts using Induced Temperature Gradients.” Presented for the Young Scientist Award at Rheofuture™ Initiative Conference, Karlsruhe, Germany, July 1-2, 2004.
- J. Lampe, R. DiLalla, J. Grimaldi and J.P. Rothstein[‡], “Impact Dynamics of Droplets on Thin

Films of Viscoelastic Wormlike Micelle Solutions.” Presented in the general session of 78th American Chemical Society Colloid and Surface Science Symposium, New Haven, CT, June 20-23, 2004.

J. Ou, J.B. Perot and J.P. Rothstein[‡], “Laminar Drag Reduction in the Flow through Microchannels Using Ultrahydrophobic Surfaces” Presented in the general session of 78th American Chemical Society Colloid and Surface Science Symposium, New Haven, CT, June 20-23, 2004.

K.V. Edmond[‡], J. P. Rothstein, M. Marquez, A. D. Dinsmore. “Stability of Flowing Non-Newtonian Liquids of Cylindrical Shape” Annual APS March Meeting, Montreal, Quebec, Canada, March 2004.

J. Ou, J.B. Perot and J.P. Rothstein[‡], “Laminar Drag Reduction using Ultrahydrophobic Surfaces in Microchannels” Presented in the general session of APS Division of Fluid Dynamics Annual Meeting, Meadowlands, NJ, November 23-25, 2003.

E. Miller[‡] and J.P. Rothstein, “Characterization and control of the sharkskin instability through localized thermal modification.” Presented in the general session of Society of Rheology Annual Meeting, Pittsburgh, PA, October 13-16, 2003.

J.P. Rothstein[‡], “Transient Extensional Rheology of Wormlike Micelle Solutions.” Presented in the general session of Society of Rheology Annual Meeting, Pittsburgh, PA, October 13-16, 2003

J.P. Rothstein[‡] and G.H. McKinley. “A Comparison of the Stress and Conformation Growth of Dilute, Semi-Dilute and Entangled Polymers in Uniaxial Extensional Flows.” Presented in the general session of APS Division of Fluid Dynamics Annual Meeting, Dallas, TX, November 24-26, 2002.

S. Chen and J.P. Rothstein[‡], “Extensional Flow of Wormlike Micelles Past a Sedimenting Sphere.” Presented in the general session of the 74rd Annual Meeting of the Society of Rheology, Minneapolis, MN, October 23-17, 2002.

J.P. Rothstein[‡], G.H. McKinley, Yong L. Joo, Robert C. Armstrong and Robert A. Brown. “Stress and Birefringence Measurements in Non-Homogeneous Transient Uniaxial Extensional Rheometry.” Presented in the general session of the 73rd Annual Meeting of the Society of Rheology, Bethesda, MD, October 21-25, 2001.

J.P. Rothstein[‡] and G.H. McKinley. “The effect of viscous heating on elastic instabilities in torsional flows of polymeric liquids.” Presented in the general session of the 72st Annual Meeting of the Society of Rheology, Hilton Head, SC, February 11-15, 2001.

J.P. Rothstein[‡] and G.H. McKinley. “Thermoelastic instabilities in torsional flows of polymeric fluids.” Presented at the 2000 AIChE Annual Meeting, Los Angeles, CA, November 12-17, 2000.

J.P. Rothstein[‡] and G.H. McKinley. “Axisymmetric flow-induced birefringence measurements for the flow of a polystyrene Boger fluid into an abrupt contraction-expansion.” Presented at the XIIIth International Congress on Rheology, Cambridge, England, August 20-25, 2000.

J.P. Rothstein[‡] and G.H. McKinley. “The influence of the transient extensional viscosity on the Couette pressure correction and the vortex growth dynamics in an axisymmetric abrupt contraction-expansion.” Presented in the general session of the 71st Annual Meeting of the Society of Rheology, Madison, WI, October 17-21, 1999.

J.P. Rothstein[‡] and G.H. McKinley. “Elastic effects on the Couette pressure correction and the stability of converging-diverging flows.” Presented in the general session of the 1998 Annual Meeting of the AIChE, Miami, FL, November 15-20, 1998.

J.P. Rothstein[†] and G.H. McKinley. “Flow of a polystyrene Boger fluid through a 4:1:4 axisymmetric contraction-expansion.” Presented in the conference for Mechanics of Nonlinear Materials, Banff, Alberta, Canada, May 13-16, 1998.

Patents

R. Daniello and J.P. Rothstein, “Design of Superhydrophobic Surfaces for Drag Reduction,” invention disclosure submitted 2009

E. Miller, A. Santamaria and J.P. Rothstein, “A technique for the temporal and spatial control of surface roughness during thermoplastic extrusion,” invention disclosure submitted 2007.

E. Miller, N. DeLong, S. Agrawal, G. Tew, S. Bhatia and J. Rothstein, “Strengthening PLA-PEO-PLA Hydrogels with Nanoparticles,” invention disclosure submitted 2006.