Jonathan P. Rothstein

Professor
University of Massachusetts
Dept. of Mechanical and Industrial Engineering
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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 (2012-) **Amherst, MA**
Professor in the Department of Mechanical and Industrial Engineering

University of Massachusetts (2007- 2012) **Amherst, MA**
Associate Professor in the Department of Mechanical and Industrial Engineering

University of Massachusetts (2009-) **Amherst, MA**
Adjunct Professor in the Department of Chemical Engineering

Katholieke Universiteit Leuven (2007-2008, 2015) **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, 2009, 2012, 2016, 2018, 2020-21)
MIE 354 Introduction to Heat Transfer (2003-4, 2008, 2011, 2019-20)
MIE 402 Mechanical Engineering Labs II (2005-2008, 2016-17)
MIE 440 Aerospace Fluid Dynamics (2002, 2004, 2016)
MIE 441 Internal Combustion Engines (2017-21)
MIE 497s Automotive Engineering – Supermileage Vehicle (2010-13)
MIE 606 Advanced Heat Transfer (2002, 2005, 2018)
MIE 607 Advanced Fluid Dynamics (2013-15, 2020)
MIE 707 Viscous (and Viscoelastic) Fluids (2004, 2006, 2010, 2017,

2019)

Research Grants

UMASS Faculty Research Grant, “Suppression of Elastic Instabilities in Polymer Processing through Modification of the Thermal Boundary Conditions,” $12,500 (2002, 1 year) **PI**.

3M Nontenured Faculty Award, “The Stability of Non-Isothermal and Extensional Flows of Complex Fluids,” $60,000 (2003, 4 years) **PI**.

Healey Endowment Grant, “Enhanced Mixing in Laminar Flows through Microchannels,” $10,000 (2004, 1 year) **PI**

NSF, “Collaborative Proposal: Theoretical and Experimental Analysis of Wormlike Micellar Solutions and Polymeric Fluids,” $329,312 ($114,000 to my lab) (2004, 3 years) **PI** with Cook, McKinley and Rossi

NSF Major Research Instrumentation (MRI), “Development of a Filament Stretching Rheometer and Shear Micro-Rheometer with Optical Access for Measurements of Complex Fluids,” NSF MRI, $400,000 ($192,000 to my lab) (2004, 2 years) **co-PI** with Henning Winter

NSF Integrative Graduate Education and Research Training (IGERT) “Research and Innovation in Nanoscale Device Development,” NSF, $3,100,000 (about $95,000 to my lab) (2005, 5 years).

NSF, “CAREER: Stability of Viscoelastic Wormlike Micelle Solutions in Extensional Flows,” $400,000 (2006, 5 years) **PI**

Office of Naval Research (ONR), “YIP: Turbulent Drag Reduction Using Micro and Nanotextured Ultrahydrophobic Surfaces,” $300,000, 3 years, **PI**.

NSF Nanoscale Science and Engineering Center (NSEC) “Center for Hierarchical Assembly,” $16,000,000 (about $175,000 to my lab) (2005, 5years).

Kodak, “Continuous Flow Inkjet Printing,” $100,000 (2007, 1 year) **PI** with David Schmidt.

NSF, “Enhanced Polymer Crystallization through Strong Shear and Extensional Flows,” $360,000 (2007, 3 years) **co-PI** with Henning Winter (about $180,000 to my lab).

NSF, Materials Research Science and Engineering Center (MRSEC) in Polymers, co-coordinator of “IRG II: Polymer Surface Instabilities,” $13,200,000 (2008, 6 years) (about $200,000 to my lab).

NSF, “Turbulent Drag Reduction using Superhydrophobic Surfaces,” $280,000 (2010, 3 years).

NSF Nanoscale Science and Engineering Center (NSEC) “Center for Hierarchical Assembly,” co-coordinator of the “Test Beds”, $16,000,000 (about $250,000 to my lab) (2011, 5 years).

BASF, “Rheology Effects on Multiphase Flows in Porous Media,” $105,000 (2011, 2 years).

TWIA, “Microfluidic Flow Rate and Temperature Sensors,” $30,000 (2010, 3 year)

NSF, “Role of Interface Shape on Drag Reduction and Filtration using Superhydrophobic,” $275,000 (2013, 3 years).

Army, “Exploration of Novel Cold Spray Applications,” $350,000 co-PI with David Schmidt (2013, 5 years).

ARL, “Cold spray of nano-particle biocidal coatings and modeling of graphene polymer composites,” $200,000 co-PI with David Schmidt (2014, 2 years).

Sabic, “High Temperature Extensional Viscosity of Polycarbonates,” $120,000 (2015, 2 years).

Markem-Imaje, “Extensional Rheology Characterization of Formulations used in Inkjet Printing,” $128,000 (2016, 1 year).

AIP Venture Funds, “ Panta Rei – The Development of Rheology-Focused K12 Outreach Events,” $24,050 (2016, 2 years)

NSF, “Viscoelastic Fluid Structure Instabilities,” $462,000 co-PI with Yahya Modarres-Sadeghi (2017, 3 years).

NSF, “Collaborative Research: Individual and Collective Dynamics of Marangoni Surface Tension Effects between Particles,” $179,138 PI with Hassan Masoud (2017, 3 years).

ARL, “High Rate Additive Manufacturing for Functional Films and Devices,” $70,000 a year co-PI with Jim Watkins (2019, 4 years).

NSF, “RAPID: Collaborative Proposal of a Low-Cost, Non-invasive, Fast Sample Collection System for COVID-19 Viral Load Level Diagnosis,” $150,000 PI (2020, 1 year).

NIH RadX, “BlowFISH: A Non-invasive Collection System for Fast COVID-19 Detection,” $200,000 co-PI (2020, 1 year).

NSF, “Suppression of Flow-Induced Oscillations through the Addition of Viscoelasticity to the Fluid Flow,” $460,733 PI (2020, 3 years).

DARPA, “BlowFISH-Sentinel: Inexpensive, massively-deployable, sentinel system for collecting airborne viral and bacterial threats”, $250,000 co-PI (2021, 1 year).

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”

Manojkumar Chellamuthu, Ph.D. (2006-2010) “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, Ph.D. (2006-2011) “Self-Assembly of Nanoparticles at Fluid Interfaces.”

Jackson Feng, Ph.D. (2007-2012) “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. (2009-2013) “Dynamics of Drops on Superhydrophobic Surfaces”

Ashwin Sankaran, M.S. (2009-2011) “Flow of Surfactant Solutions through Idealized Porous Media.”

Pranesh Muralidhar, M.S. (2009-2011) “Vortex Dynamics of Flows Past Superhydrophobic Cylinders.”

Erica Bischoff White, M.S. (2010-2011) “Extensional Flow Induced Crystallization of Polypropylene.”

Theo Kassuga, M.S. (2011-2014) “Buckling and Folding of Particle Laden Fluid-Fluid Interfaces.”

SunilKumar Khandavalli, Ph.D (2012-2017) “Effect of Rheology on Gravure and Slot Die Coating.”

Jeong-Hyun Kim, Ph.D. (2012-2017) “Dynamic Contact Angles on Superhydrophobic Surfaces”

Trenton Bush, M.S. (2013-2017) “Cold Spraying of Polymers”

Anita Anup Dey, M.S./Ph.D. (2014-2020) “Viscoelastic Fluid Structure Interactions”

Samrat Sur, Ph.D. (2015-2019) “Extensional Rheology of Flame Resistant Polymers”

Zahra Khalkhali, Ph.D. (2015-2019) “Cold spray deposition of polymer powders”

Kashyap Rajan, M.S. (2017-2020) “Ink-jet printing of viscoelastic fluids”

Kashyap Rajan, M.S. (2020 -) “Cold Spray Deposition of Polymeric Powders”

Madhukar Prasad, M.S. (2019-2021) “Aerodynamically Augmented Air Hockey Pucks – Lateral and Rotational Motion”

Pieter Boersma, Ph.D. (2019-), “Suppression of Fluid Structure Interactions through the Addition of Viscoelasticity”

Umang Patel, Ph.D. (2019-), “Numerical Simulations of Non-Newtonian Fluid Structure Interactions.”

Guinevere Tillinghast (2021-), “Rheological Characterization of Recycled Polymer Films.”

Undergraduate Joshua Lampe (2002-2003)

Independent Study Advisees

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 (2007-2008)
Eric Arndt (2008)
Justin DeBlois (2008)
Michael McKinley (2008-2009)
Erica Bischoff-White (2009)
John Gabour (2009)
Stephen McKinley (2009-2010)
Tom Dacey (2009-2010)
Juan Moliere (2009)
Jonathan Sullivan (2010)
Mark Leonard (2010)
Travis Hopkins (2010)
Ruta Kulkarni (2010-2011)
Nangelie Ferrer (2010-2011)
Mark Greene (2011)
Colin Pespisa (2011)
Eduardo Manta (2011)
Lauren Gerberich (2011) – High School Senior
Andrew Costain (2011-2012)
Rohit Singh (2012)
Nicolas Carron (2011-2012)
Kierstin Del Valle (2012)
John Mandell (2012)
Ahmad Krayem (2012)
Daniel Buckminster (2013)
Michael Donnell (2013)

Elizabeth Baumhoff (2013-2015)
Sean Stine (2013)
Joseph Tilley (2013)
Michael Donnell (2014)
Ryan Kowalski (2016)
James Lefebvre (2016)
Yang Shi (2016-7)
Craig O'Connell (2016-7)
Zareb Noel (2017-2018)
Patrick Rogers (2017)
Nick Uvanovic (2017-2018)
Eddie Esquivel (2017)
Charles Watkins (2017-2018)
Samantha Bonica (2017-2018)
Cameron Callahan (2018)
Samantha Lavalley (2018)
Ha Lee (2018)
Sakshi Kumar (2018-2019)
Benjamin Farrell (2019)
Grace Komah-Saydee (2019)
Jordan Doucet (2019-2020)
Sameer Kamath (2020)

UMASS Service

Member Laboratory Committee (2001- 4, 2011-13)
Faculty Advisor Pi Tau Sigma (2001-11)
Faculty Advisor Tau Beta Pi (2011-17)
Member Machine Shop Committee (2002-3)
Member Department Personnel Committee (2003-4, 2008-10, 2021)
Chair Department Personnel Committee (2008-9, 2018-20)
Member Undergraduate Committee (2004-6)
Member Community Diversity and Social Justice Committee (2004-8)
Member Graduate Committee (2005-6)
Member Undergraduate Committee (2006-2007)
Member Graduate Committee (2007-8)
Member of Dean's Awards Committee (2009-11)
Member of Dean Search Committee (2010-11)
Faculty Advisor for Society of Automotive Engineering (2010-13)
Faculty Advisor for the SAE Supermileage Vehicle Team (2010-13)
College of Engineering Representative on Research Council (2012-2018)
Chair of Search Committee for Materials Faculty (2013)
Graduate Program Director in MIE (2013-2017)
Chair of the MIE Strategic Planning Committee (2019-2020)

Other Activities

Developed short course with Henning Winter entitled "Rheology Practice" taught annually at either the University of Massachusetts or the Technical University of Berlin since 2004.

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

Taught yearly week-long STEM Nanotechnology Summer Institute for middle and high school teachers with Mort Sternheim and Mark Tuominen (2008-2015)

Taught middle and high school students about wetting phenomena including superhydrophobicity and capillary origami at the annual Science Quest and Women in Engineering events (2013-Present).

Developed a K12 Outreach Event entitled "Panta Rei – Everything Flows" held annually since 2014 at the Society of Rheology Annual Meeting. The event includes a dozen interactive demonstrations and activities run by more than 30 volunteers and serving more than 300 young students per year.

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

Marvel Diagnostics (2020-Present) **Los Angeles, CA**
Co-Founder of Marvel Diagnostics with Pirouz Kavehpour and Jeffery Ruberti. Invented, designed, developed and commercialized an exhaled breath condensate collection system for obtaining non-invasive COVID-19 viral samples directly from the lungs.

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

2020 Received Outstanding Senior Faculty Award from the College of Engineering at the University of Massachusetts - Amherst

2019 Received Outstanding Service Award from the Society of Rheology for the development of the Society of Rheology's K12 Outreach Program

2015 Received the Outstanding Teacher Award from the College of Engineering at the University of Massachusetts - Amherst

2012 Received Professor of the Year Award from the Mechanical Engineering Department at the University of Massachusetts.

2011 Received Professor of the Year Award from the Mechanical Engineering Department at the University of Massachusetts.

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^{TM} 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

Timm, M., Rothstein, J. P., and Masoud, H., ''*A bio-inspired Marangoni surfer,*'' submitted Bioinspiration and Biomimetics (2021).

Alshehri, A., Rothstein, J. P., and Kavehpour, H. P., ''*A Novel Continuous Drop-Wise Condensation Technology for Improved Heat and Mass Transfer Efficiencies,*'' submitted Scientific Reports submitted (2021).

Boersma, P. R., Zhao, J., Rothstein, J. P., and Modarres-Sadeghi, Y., ‘‘*Experimental evidence of vortex-induced vibrations at subcritical Reynolds numbers,*’’ J. Fluid Mech. in press (2021).

Khandavalli, S., Sharma-Nene, N., Kabir, S., Sur, S., Rothstein, J., Neyerlin, K., Mauger, S., and Ulsh, M., ‘‘*Towards Optimizing Electrospun Nanofiber Fuel Cell Catalyst Layers: Polymer-Particle Interactions and Spinnability,*’’ ACS Applied Polymer Materials in press (2021).

Naik, A., Zhou, Y., Arellano, D. L., Okoroanyanwu , U., Secor, E., Hersam, M., Dey, A. A., Rothstein, J. P., Carter, K. R., Morse, J., and Watkins, J. J., ‘‘*Printed Microfluidic Sweat Sensing Platform for Cortisol and Glucose Detection,*’’ submitted to Lab on a Chip (2021).

Patel, U., Rothstein, J. P., and Modarres-Sadeghi, Y., ‘‘*Vortex-induced vibration of a cylinder in inelastic shear-thinning and shear-thickening fluids,*’’ submitted to J. Fluid Mech. (2021).

Sur, S., Uvanovic, N., Masoud, H., and Rothstein, J. P., ‘‘*The effect of shape on the motion and stability of Marangoni surfers,*’’ J. Fluids Eng. 143, 011301 (2021).

Rothstein, J. P., and Mohammadigoushki, H., ‘‘*Complex Flows of Viscoelastic Wormlike Micelle Solutions,*’’ J. Non-Newtonian Fluid Mech. 285, 104382 (2020).

Dey, A., Modarres-Sadeghi, Y., and Rothstein, J. P., ‘‘*Viscoelastic flow-induced oscillations of a cantilevered beam in the crossflow of a wormlike micelle solution*’’ J. Non-Newtonian Fluid Mech. 286, 104433 (2020).

Alizadeh-Birjandi, E., Tavakoli-Dastjerdi, F., Leger, J. S., Davis, S. H., Rothstein, J. P., and Kavehpour, H. P., ‘‘*Ice Formation Delay on Penguin Feathers*’’ Eur. Phys. J. 229, 1881–1896 (2020).

Dey, A., Lindner, A., Modarres-Sadeghi, Y., and Rothstein, J. P., “*Oscillations of a cantilevered micro beam driven by a viscoelastic flow instability,*” Soft Matter 16 (2020) 1227-1235

Dey, A., Modarres-Sadeghi, Y., and Rothstein, J. P., “*Observation of lock-in for viscoelastic fluid-structure interactions,*” J. Fluids and Structures 96 (2020) 103025.

Kang, S. J., Sur, S., Rothstein, J. P., and Masoud, H., “*Forward, reverse, and no motion of Marangoni surfers under confinement,*” Phys. Rev. Fluids 5 (2020) 08004.

Khalkhali, Z., and Rothstein, J. P., “*Characterization of the Cold Spray Deposition of a Wide Variety of Polymeric Powders,*” Surf. Coat. Technol. 383 (2020) 125251.

Khalkhali, Z., Sundara Rajan, K., and Rothstein, J. P., “*Peening Effect of Glass Beads in the Cold Spray Deposition of Polymeric Powders,*” J. Therm. Spray Technol. 29 (2020) 657–669.

Sur, S., Chellamuthu, M., and Rothstein, J. P., “*High temperature extension rheology of commercially available polycarbonate mixed with flame retardant salts,*” Korea-Australia Rheol. J. 32 (2020) 47-59.

Khalkhali, Z., Xie, W., Lee, J. H., and Rothstein, J. P., “*Cold Spray Deposition and Laser-Induced Single Particle Impact Experiments for Low Glass Transition Temperature Polymer Particles,*” submitted Advanced Manufacturing Technology (2019).

Lang, C., Hendricks, J., Zhang, Z., Reddy, N. K., Rothstein, J. P., Lettinga, M. P., Vermant, J., and Clasen, C., “*Effects of particle stiffness on the extensional behavior of model rod-like particle suspensions,*” Soft Matter **15** (2019) 833-841.

Rosello, M., Sur, S., Barbet, B., and Rothstein, J. P., “*Dripping-onto-substrate capillary breakup extensional rheometry of low viscosity printing inks,*” J. Non-Newt. Fluid Mech. **266** (2019) 160-170.

Sur, S., Chellamuthu, M., and Rothstein, J. P., "*High temperature extensional rheology of linear, branched and hyper-branched polycarbonates*," Rheol. Acta **58** (2019) 557-572.

Sur, S., Masoud, H., and Rothstein, J. P., "*Translational and Rotational Motion of Disk-Shaped Marangoni Surfers*," Phys. Fluids **31** (2019) 102101.

Inguva, V., J.P. Rothstein, O. Bilsel, J.B. Perot, "*High-speed velocimetry in microfluidic protein mixers using confocal fluorescence decay microscopy*," Exp. Fluids, **59** (2018) 177.

Song, D., B. Song, H. Hu, X. Du, P. Du, C.-H. Choi and J.P. Rothstein, "*The effect of surface tension gradient on the slip flow along a superhydrophobic air-water interface*," Phys. Rev. Fluids **3** (2018) 033303

Khandavalli, S., P. Rodgers, and J. P. Rothstein, "*Roll-to-roll fabrication of hierarchical superhydrophobic surfaces*," App. Phys. Lett. **113** (2018) 041601

Khalkhali, Z., W. Xie, V. K. Champagne, J. H. Lee, and J. P. Rothstein, "*A comparison of cold spray technique to single particle micro-ballistic impacts for the deposition of polymer particles on polymer substrates*," Surface and Coatings Technology **351** (2018) 99-107

Kim, J.-H., J. P. Rothstein, and J. K. Shang, "*Dynamics of a flexible superhydrophobic surface during a drop impact*," Phys. Fluids **30** (2018) 072102

Lang, C., J. Hendricks, Z. Zhang, N.K. Reddy, J.P. Rothstein, M.P. Lettinga, J. Vermant, C. Clasen, "*Effects of particle stiffness on the extensional behavior of model rod-like particle suspensions*," in press in Soft Matter, 15 (2019) 833-841

Dey, A.A., Modarres-Sadeghi, Y., Rothstein, J.P., "*Viscoelastic fluid-structure interactions between a flexible cylinder and a wormlike micelle solution*," Phys. Rev. Fluids **3** (2018) 063301

Sur, S., and J. P. Rothstein, "*Drop breakup dynamics of dilute polymer solutions: Effect of molecular weight, concentration and viscosity*," J. Rheol. **62** (2018) 1-15

Xu, H., Clarke, A., Rothstein, J.P., Poole, R.J., "*Viscoelastic drops moving on hydrophilic and superhydrophobic surfaces*," J. Colloid and Interface Sci. **513** (2018) 53-61

Alizadeh-Birjandi, E., Tavakoli-Dastjerdi, F., Leger, J.S., Davis, S.H., Rothstein, J.P., Kavehpour, H.P., "*Ice Formation Delay on Penguin Feathers,"* submitted to Langmuir, (2018).

Karim, A.M., Rothstein, J.P., Kavehpour, H.P., "*Partial wetting on rough surfaces*," J. Colloid and Interface Sci. **513** (2018) 658-665

Bush, T.B., Khalkhali, Z., Champagne, V., Schmidt, D.P., Rothstein, J.P., "*Optimization of cold spray deposition of high density polyethylene powders*," J. Therm. Spray Technol., **26** (2017) 1548-1564.

Dey, A.A., Modarres-Sadeghi, Y., Rothstein, J.P., "*Experimental Observation of Viscoelastic Fluid-Structure Interactions*," J. Fluid Dynamics Rapids, **813** (2017) R5.

Kim, J.-H., Rothstein, J.P., "*Role of interface shape on the laminar flow through an array of superhydrophobic pillars*," **21** Microfluid Nanofluid, (2017) 78.

Khandavalli, S., Rothstein, J.P., "*Ink Transfer of Non-Newtonian Fluids in Gravure Printing: The Effect of Shear and Extensional Deformation*," J. Non-Newtonian Fluid Mech., **243** (2017) 16-26.

Kassuga, T.D., Rothstein, J.P., "*The Effect of Shear and Confinement on the Buckling of Particle-Laden Interfaces*," J. Phys.: Condens. Matter, **28** (2016) 025101.

Khandavalli, S., Hendricks, J., Clasen, C.J.H., Rothstein, J.P., "*A Comparison of Linear and Branched Wormlike Micelles using Large Amplitude Oscillatory Shear and Orthogonal Superposition Rheology*," J. Rheol., **60** (2016) 1331-1345.

Khandavalli, S., Rothstein, J.P., "*The effect of shear-thickening on slot-die coating*," AIChE J., **62** (2016) 4536-4547.

Kim, J.-H., Rothstein, J.P., "*Delayed Lubricant Depletion on Liquid-Infused Randomly Rough Surfaces*," Experiments in Fluids, **57** (2016) 81.

Kim, J.-H., Rothstein, J.P., "*Droplet Impact Dynamics on Lubricant-Infused Superhydrophobic Surfaces: The Role of Viscosity Ratio*," Langmuir, **32** (2016) 10166-10176.

Paten, J.A., Siadat, S.M., Susilo, M., Ismail, E., Stoner, J., Rothstein, J.P., Ruberti, J.W., *Flow-Induced Crystallization of Collagen: A Potentially Critical Mechanism in Early Tissue Formation*, ACS Nano, 10 (2016) 5027-5040.

Shah, S., Lee, J., Rothstein, J.P., *Numerical Simulations of the High Velocity Impact of a Single Polymer Particle during Cold Spray Deposition*, accepted J. Therm. Spray Technol., (2017).

Xu, H., Clarke, A., Rothstein, J.P., Poole, R.J., *Sliding viscoelastic drops on slippery surfaces*, App. Phys. Lett., 108 (2016) 241602.

Kassuga, T. D., and Rothstein, J. P., "*Cascades of wrinkles on particle laden interfaces*," J. Colloid Int. Sci. 448, 287-296 (2015).

Khandavalli, S., Lee, J. A., Pasquali, M., and Rothstein, J. P., "*The Effect of Shear Thickening on Liquid Transfer during Gravure Printing*," J. Non-Newtonian Fluid Mech. 221, 55-65 (2015).

Khandavalli, S., and Rothstein, J. P., "*Large amplitude oscillatory shear rheology of three different shear-thickening particle dispersions*," Rheologica Acta 54, 601-618 (2015).

Kim, J.-H., and Rothstein, J. P., "*Dynamic Contact Angle Measurements of Superhydrophobic Surfaces*," Phys. Fluids 27, 032107 (2015).

Kim, J.-H., and Rothstein, J. P., "*Dynamic Contact Angle Measurements of Viscoelastic Fluids*," J. Non-Newtonian Fluid Mech. 225, 54-61 (2015).

Nilsson, M. A., and Rothstein, J. P., "*Effect of Sandstone Permeability and Fluid Rheology on Enhanced Oil Recovery in a Microfluidic Sandstone Device*," App. Rheol. 25, 25189 (2015).

Teixeira, A. R., Krumm, C., Vinter, K., Paulsen, A. D., Zhu, C., Maduskar, S., Joseph, K., Greco, K., Stelatto, M., Davis, E., Vincent, B., Hermann, R., Suszynski, W., Schmidt, L. D., Fan, W., Rothstein, J., and Dauenhauer, P. J., "*Reactive Liftoff of Crystalline Cellulose Particles*," Scientific Reports 5, 11238 (2015).

T.D. Kassuga, J.P. Rothstein, *Buckling of particle-laden interfaces*, J. Colloid Int. Sci., 448 (2015) 287-296.

S. Khandavalli, J.A. Lee, M. Pasquali, J.P. Rothstein, *The Effect of Shear Thickening on Liquid Transfer during Gravure Printing*, J. Non-Newtonian Fluid Mech., **221** (2015) 55-65.

S. Khandavalli, J.P. Rothstein, *Large amplitude oscillatory shear rheology of three different shear-thickening particle dispersions*, Rheol. Acta, **54** (2015) 601-608.

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Invited Lectures

J.P. Rothstein. "Viscoelastic Fluid Structure Interactions or How Elastic Flow Instabilities can Induce Motion in Flexible Solid Structures," University of Massachusetts, Physics Department, February 2019

J.P. Rothstein. "Viscoelastic Fluid Structure Interactions or How Elastic Flow Instabilities can Induce Motion in Flexible Solid Structures," Brown University, November 2018

J.P. Rothstein. "Viscoelastic Fluid Structure Interactions or How Elastic Flow Instabilities can Induce Motion in Flexible Solid Structures," Syracuse University, April 2016

J.P. Rothstein. "Orthogonal Superposition and Large Amplitude Oscillatory Shear Rheology of Linear and Branched Wormlike Micelle Solutions," KU Leuven, August 2015

J.P. Rothstein. "The Orientation, Assembly and Stability of Cubes and Spheres Floating on a Liquid Interface," ETH Zurich, July 2015

J.P. Rothstein. "Effect of Fluid Rheology on Printing with a Focus on Gravure Printing and Slot Die Coating," Eindhoven University, June 2015

J.P. Rothstein. "The Orientation, Assembly and Stability of Cubes and Spheres Floating on a Liquid Interface," University of Liege, June 2015

J.P. Rothstein. "Viscoelastic Fluid Structure Interactions or How Elastic Flow Instabilities can Induce Motion in Flexible Solid Structures," ESPCI Paris, June 2015

J.P. Rothstein. "Superhydrophobic Surfaces: From Droplet Motion to Drag Reduction," University of Liverpool, May 2015

J.P. Rothstein. "Effect of Fluid Rheology on Printing with a Focus on Gravure Printing and Slot Die Coating," DSM, March 2015

J.P. Rothstein. "Dynamic Contact Angles: Newtonian vs. Viscoelastic Fluids Hydrophobic vs. Superhydrophobic Surfaces," KU Leuven, January 2015

J.P. Rothstein. "Superhydrophobic Surfaces: From Droplet Motion to Drag Reduction," University of Michigan, October 2014

J.P. Rothstein. "Shear and extensional rheology of shear-thickening suspensions," TA Users Conference, New Orleans, LA, May 2012.

J.P. Rothstein. “Superhydrophobic Surfaces: From Droplet Motion to Drag Reduction,” MIT, Cambridge, MA, April 2012.

J.P. Rothstein. “The Flow of Micelle Solutions through Idealized Porous Media,” BASF, Ludwigshafen, Germany, May 2011.

J.P. Rothstein. “Drag Reduction in Laminar and Turbulent Flows Past Superhydrophobic Surfaces,” BASF, Ludwigshafen, Germany, May 2011.

J.P. Rothstein. “Droplet Dynamics and Flow Along Superhydrophobic Surfaces,” Technical University of Darmstadt, Germany, May 2011.

J.P. Rothstein. “Dynamics and Stability of Viscoelastic Wormlike Micelle Solutions in Strong Shear and Extensional Flows,” Ohio State, April 2010.

J.P. Rothstein. “Drag Reduction in Laminar and Turbulent Flows Past Superhydrophobic Surfaces,” City College of New York, February 2010.

J.P. Rothstein. “Drag Reduction in Laminar and Turbulent Flows Past Superhydrophobic Surfaces,” APS Division of Fluid Dynamics Annual Meeting November 2009.

J.P. Rothstein. “Dynamics and Stability of Viscoelastic Wormlike Micelle Solutions in Strong Shear and Extensional Flows,” IMA, Minneapolis, MN, October 2009.

J.P. Rothstein. “Drag Reduction in Laminar and Turbulent Flows Past Superhydrophobic Surfaces,” UCLA, May 2009.

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

Over 300. List available upon request.

Patents

M. Prasad, H.P. Kavehpour, J.P. Rothstein, “An inexpensive, massively-deployable, sentinel system for collecting airborne viral and bacterial threats,” Patent application submitted 2021

H.P. Kavehpour, J. Ruberti, J.P. Rothstein, “63/030,767 Non-invasive exhaled breath collection apparatus,” Patent pending as of 2020.

M. Nilsson and J.P. Rothstein, “Enhanced Oil Recovery,” patent submitted 2012

R. Daniello and J.P. Rothstein, “Design of Superhydrophobic Surfaces for Drag Reduction,” patent submitted 2010

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.

Student Awards

2010 Robert Daniello won the $50,000 grand prize in the University of Massachusetts Amherst Innovation Challenge Final Business Plan Competition for the business plan for our company Precision Slip.

2005 Erik Miller won the University of Massachusetts Technology Innovation Challenge Executive Summary and Elevator Pitch Competition.

2005 Erik Miller was awarded an NSF Integrative Graduate Education and Research Training (IGERT) Fellowship in nanotechnology innovation.

2004 Erik Miller received the Young Scientists Award within the Rheofutures^{TM} Initiative 2004 for "outstanding and innovative contribution in the area of material characterization."

2003 Joshua Lampe received a University of Massachusetts Engineering Alumni Association scholarship for excellence in undergraduate student-faculty research projects

External Service

Member at Large of the Society of Rheology, 2019-2021.

Member of the Society of Rheology Education Committee since 2011 – Chair 2013-2019.

Developed a K12 Outreach Event entitled "Panta Rei – Everything Flows" held since 2014 at the Society of Rheology Annual Meeting. The event includes a dozen interactive demonstrations and activities run by more than 30 volunteers and serving more than 300 young students per year.

Member of Editorial Board for Journal of Non-Newtonian Fluid Mechanics since 2009.

Technical Program Co-Coordinator for the 2011 Society of Rheology Annual Meeting to be held in Cleveland, OH in October of 2011.

Guest Editor of Journal of Non-Newtonian Fluid Mechanics Special Issue: "XVIth International Workshop on Numerical Methods for Non-Newtonian Flows, Northhampton, MA, June 13-16, 2010"

Co-organized "International Workshop on Numerical Methods in Non-Newtonian Fluid Mechanics" with Mike Graham of UWisc. The workshop was held in June of 2010 in Northampton, MA and attended by more than 60 international researchers/scientists.

Scientific program organizer for the "Viscoelastic Flows and Instabilities" session of the 2007 Society of Rheology Annual Meeting in Salt Lake City, UT.

Scientific program organizer for the Poster Session of the 2005 Society of Rheology Annual Meeting in Vancouver, BC. Judged the student poster competition.

Scientific program organizer for the "Viscoelastic Flows and Instabilities" session of the 2003 Society of Rheology Annual Meeting in Pittsburgh, PA.

Served on many NSF Review Panels.

Reviewed a number of proposals for DOE, ACS PRF and others.

Reviewed papers a wide range of journals.