Scott A. Roberts, Ph.D.

Thermal/Fluid Component Sciences Dept.
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Education

2004 - 2009 **Doctor of Philosophy in Chemical Engineering**
University of Minnesota
Advisor: Prof. Satish Kumar
Thesis: Stability of microscale fluid interfaces: A study of fluid flows near soft substrates and pattern formation under electrostatic fields

2000 - 2004 **Bachelor of Science in Chemical Engineering**, *Highest Distinction*
University of Kansas
Awarded with University and Departmental Honors

Professional Experience

Sandia National Laboratories

2016 - Present Principal Research and Development Chemical Engineer,
Thermal/Fluid Component Sciences Department (1513)

2015 Manager (acting), Computational Thermal and Fluid Mechanics Department (1541)

2011 - 2015 Senior Research and Development Chemical Engineer,
Thermal and Fluid Processes Department (1514) (2011-2013)
Fluid Sciences and Engineering Department (1513) (2013-2014)
Thermal/Fluid Component Sciences Department (1513) (2015)

2010 - 2011 Postdoctoral Appointee, Thermal and Fluid Processes Department (1514)
Mentors: Prof. P. Randall Schunk and Dr. Rekha R. Rao

University of Minnesota - Twin Cities

2004 - 2009 Graduate Research Assistant,
Department of Chemical Engineering and Materials Science
Advisor: Prof. Satish Kumar

ExxonMobil

Summer 2004 Research Intern, ExxonMobil Process Research

Summer 2003 Process Engineering Intern, ExxonMobil Chemicals

University of Kansas

2002 - 2003 Research Associate, Department of Chemical and Petroleum Engineering
Advisor: Prof. Kyle Camarda

Awards / Honors

Sandia National Laboratories

2014 R&D 100 Award - Goma 6.0

2013 Employee Recognition Award - Thermal Battery Code Integration Team

2012 Employee Recognition Award - Novel Railgun Design Team

University of Minnesota - Twin Cities

2009 National Research Council Postdoctoral Fellowship (declined) - NIST

2008 Doctoral Dissertation Fellowship - University of Minnesota

2005 NSF Graduate Fellowship - Honorable Mention

2004 NSF Graduate Fellowship - Honorable Mention

2004 National Tau Beta Pi Fellowship - King Fellow

University of Kansas

2004 AIChE National Student Design Competition A. E. Marshall Award (2nd Place)

2004 Ted Ventrone Inherent Safety Award - AIChE Safety & Health Division

2004 Carl & Sammie Locke Outstanding Senior in the School of Engineering

2004 Outstanding Senior in Chemical Engineering

2004 Outstanding Service to the C&PE Department Award

2003 National Tau Beta Pi Scholarship

2003 Outstanding Junior in Chemical Engineering

2002 Outstanding Sophomore in Chemical Engineering

2002 Tau Beta Pi Engineering Honor Society

Other

2001 Founders' Award, Order of the Arrow, Boy Scouts of America

1997 Eagle Scout Award, Boy Scouts of America

Professional Activities

Professional / External

2015 Co-organizer - Minisymposium on Computational Fluid Mechanics for Free and Moving Boundaries, 13th US National Congress on Computational Mechanics

2014 Co-organizer - Minisymposium on Computational Fluid Mechanics for Free and Moving Boundaries, 11th World Congress on Computational Mechanics

2013 Co-organizer - Minisymposium on Computational Fluid Mechanics for Free and Moving Boundaries, 12th US National Congress on Computational Mechanics

2012 Guest editor - Computers and Fluids, special issue on Computational Fluid Mechanics for Free and Moving Boundaries

2011 Co-organizer - Minisymposium on Computational Fluid Mechanics for Free and Moving Boundaries, 11th US National Congress on Computational Mechanics

2009 Session volunteer - 62nd Annual Meeting of the American Physical Society Division of Fluid Dynamics

2004 Intern Engineer - Kansas State Board of Technical Professions

Ongoing Thesis committee: Abishek Venkatakrishnan (UNM, MS ChE, 2012), Brad Trembacki (UT, PhD ME, 2015), Emilee Reinholz (UNM, MS ChE, 2016)

Ongoing	Reviewer: DOE SBIR/STTR FY16 Proposals, Netherlands Organization for Scientific Research
Ongoing	Referee: *Journal of Fluid Mechanics, Journal of the Electrochemical Society, Journal of Rheology, Journal of Non-Newtonian Fluid Mechanics, International Journal for Numerical Methods in Fluids, Computers and Fluids, Tribology International, Journal of Coatings Technology and Research, IEEE Transactions on Plasma Science*
Ongoing	Member: American Institute of Chemical Engineers, American Physical Society, Society of Rheology, International Society of Coating Science and Technology, United States Association for Computational Mechanics

Sandia National Laboratories

2012 - Present	President (2014-Present), Vice-President (2014), Treasurer (2013), Sandia Labs Softball Association
2011 - Present	DOE Q (Top Secret) Security Clearance

University of Minnesota

2007 - 2009	Sport Clubs Advisory Council
2006 - 2009	University of Minnesota Cycling Team (Officer 2007-2009)
2005 - 2009	CEMS Council of Graduate Students (Communication Chair 2006-2009)

University of Kansas

2005 - 2014	School of Engineering Recent Graduate Advisory Board (Chair 2006-2009)
2003 - 2004	Vice-President, Tau Beta Pi Engineering Honor Society, KU Student Chapter
2003	Chemical Engineering TORP Faculty Search Committee
2002 - 2004	President, American Institute of Chemical Engineers, KU Student Chapter
2002 - 2004	Department of Chemical & Petroleum Engineering Advisory Board
2001 - 2004	KU Student Ambassador

Personal

2013 - 2015	Assistant Scoutmaster, Boy Scouts of America
2006 - 2007	Sunday School Teacher - Centennial United Methodist Church
2001	Lodge Chief, Order of the Arrow
2000 - 2004	Assistant Scoutmaster, Boy Scouts of America

Computer Skills

Finite element methods, ALE and level-set free interface methods, multiphysics coupling

Fortran 77/90, C/C++, Perl, PHP, IDL, and HTML computer languages

OpenMP and MPI parallel computing libraries

MATLAB, Mathematica, and COMSOL numerical software packages

SolidWorks CAD

Publications

Refereed Articles:

12. S. A. Roberts, H. Mendoza, V. E. Brunini, B. L. Trembacki, D. R. Noble, and A. M. Grillet, "Insights into lithium-ion battery degradation and safety mechanisms from mesoscale simulations using experimentally-reconstructed mesostructures," J. Electrochem. En. Conv. Stor, *submitted*

11. A. M. Grillet, T. Humplik, E. K. Stirrup, S. A. Roberts, D. A. Barringer, C. M. Snyder, M. R. Janvrin, C. A. Apblett, "Conductivity degradation of polyvinylidene fluoride binder during cycling: Measurements and simulations for lithium-ion batteries," J. Electrochem. Soc., 163(9) (2016) A1859-A1871. DOI: 10.1149/2.0341609jes

10. E. L. Reinholz, S. A. Roberts, C. A. Apblett, J. B. Lechman, "Composition and Manufacturing Effects on Electrical Conductivity of Li/FeS_2 Thermal Battery Cathodes," J. Electrochem. Soc., 163(8) (2016) A1723-A1729. DOI: 10.1149/2.1191608jes

9. H. Mendoza, S. A. Roberts, V. E. Brunini, and A. M. Grillet, "Mechanical and Electrochemical Response of a $LiCoO_2$ Cathode using Reconstructed Microstructures," Electrochim. Acta, 190 (2016) 1-15. DOI: 10.1016/j.electacta.2015.12.224

8. S. A. Roberts, V. E. Brunini, K. N. Long, and A. M. Grillet, "A Framework for Three-Dimensional Mesoscale Modeling of Anisotropic Swelling and Mechanical Deformation in Lithium-Ion Electrodes," J. Electrochem. Soc., 161 (2014) F3052-F3059. DOI: 10.1149/2.0081411jes

7. S. A. Roberts and P. R. Schunk, "A reduced-order model for porous flow through thin, structured materials," Int. J. Multiphase Flow, 67 (2014) 25-36. DOI: 10.1016/j.ijmultiphaseflow.2014.07.013

6. C. C. Roberts, S. A. Roberts, M. B. Nemer, and R. R. Rao, "Circulation within confined droplets in Hele-Shaw channels," Phys. Fluids 26 (2014) 032105-11. DOI: 10.1063/1.4867695

5. S. A. Roberts, D. R. Noble, and E. M. Benner, P. R. Schunk, "Multiphase hydrodynamic lubrication flow using a three-dimensional shell finite element method," Comput. Fluids, 87 (2013) 12–25. DOI: 10.1016/j.compfluid.2012.08.009

4. S. A. Roberts and R. R. Rao, "Numerical simulations of mounding and submerging flows of shear-thinning jets impinging in a container," J. Non-Newtonian Fluid Mech. 166 (2011) 1100–1115. DOI: 10.1016/j.jnnfm.2011.06.006

3. S. A. Roberts and S. Kumar, "AC electrohydrodynamic instabilities in trilayer liquid films," Phys. Fluids 22 (2010) 122102–15. DOI: 10.1063/1.3520134

2. S. A. Roberts and S. Kumar, "AC electrohydrodynamic instabilities in thin liquid films," J. Fluid Mech. 631 (2009) 255–279. DOI: 10.1017/S0022112009006843

1. S. A. Roberts and S. Kumar, "Stability of creeping Couette flow of a power-law fluid past a deformable solid," J. Non-Newtonian Fluid Mech. 139 (2006) 93–102. DOI: 10.1016/j.jnnfm.2006.07.006

Technical Reports:

6. T. R. Watkins, P. R. Schunk, and S. A. Roberts, "Technique for the Estimation of Surface Temperatures from Embedded Temperature Sensing for Rapid, High Energy Surface Deposition." Sandia Report, SAND2014-15497 (2014). DOI: 10.2172/1148576

5. K. N. Long, C. C. Roberts, S. A. Roberts, and A. M. Grillet, "The Mechanics of Pressed-Pellet Separators in Molten Salt Batteries." Sandia Report, SAND2014-3606 (2014). DOI: 10.2172/1177059.

4. S. A. Roberts and P. R. Schunk, "A non-linear elastic constitutive framework for replicating plastic deformation in solids." Sandia Report, SAND2014-0241 (2014). DOI: 10.2172/1148928

3. P. R. Schunk, P. A. Sackinger, R. R. Rao, K. S. Chen, T. A. Baer, D. A. Labreche, A. C. Sun, M. M. Hopkins, S. R. Subia, H. K. Moffat, R. B. Secor, R. A. Roach, E. D. Wilkes, D. R. Noble, P. L. Hopkins, P. K. Notz, S. A. Roberts, "GOMA 6.0 - A Full-Newton Finite Element Program for Free and Moving Boundary Problems with Coupled Fluid/Solid Momentum, Energy, Mass, and Chemical Species Transport: User's Guide." Sandia Report, SAND2013-1844 (2013). DOI: 10.2172/1089869

2. R. Rao, B. Shelden, C. Brotherton, S. Domino, L. Erickson, A. Grillet, L. Hughes, C. Jove-Colon, J. Lechman, M. Loewenberg, H. Moffat, M. Nemer, D. Noble, T. O'Hern, C. Roberts, S. Roberts, G. Wagner, N. Wyatt, "Multiscale Models of Nuclear Waste Reprocessing: From the Mesoscale to the Plant-Scale." Sandia Report, SAND2012-9145 (2012). DOI: 10.2172/1055918

1. P. R. Schunk, S. A. Roberts, M. E. Chandross, G. S. Grest, H. Fan, E. D. Reedy, J. V. Cox, K. Tjiptowidjojo, S. Cheng, "Nanomanufacturing: Nano-Structured Materials Made Layer-by-Layer." Sandia Report, SAND2011-8080 (2011). DOI: 10.2172/1038208

Other Publications:

15. T. G. Voskuilen, J. C. Hewson, H. K. Moffat, and S. A. Roberts, "Multi-Physics, Multi-Plateau Reaction Model for LiSi/FeS2 Batteries." Proceedings of the 47th Power Sources Conference (2016).

14. B. L. Trembacki, S. R. Harris, E. S. Piekos, and S. A. Roberts, "Uncertainty Quantification, Verification, and Validation of a Thermal Simulation Tool for Molten Salt Batteries." Proceedings of the 47th Power Sources Conference (2016).

13. S. L. Hodson, E. S. Piekos, R. A. Sayer, S. A. Roberts, C. C. Roberts, "Thermal Characterization of Molten Salt Battery Materials." Proceedings of the 47th Power Sources Conference (2016).

12. E. L. Reinholz, S. A. Roberts, P. R. Schunk, and C. A. Apblett, "Mesoscale Modeling and Simulation of Composition, Manufacturing, and Microstructure Effects on Electrical Conduction in Thermal Battery Cathodes." ECS Transactions, 69(1) (2015) 37-43. DOI: 10.1149/06901.0037ecst

11. M. Young, R. J. Kaye, S. A. Roberts, and J. Mejeur, "A Qualification Methodology for Hypervelocity Projectiles in an Electromagnetic Launch Environment." Proceedings of the 6th DoD Innovative Science & Technology EM Railgun Workshop (2014). (peer reviewed)

10. S. A. Roberts and R. C. Givler, "Expanding our Understanding of Interface Physics: Extensions and Improvements to the Railgun Interface Physics Model." Proceedings of the 6th DoD Innovative Science & Technology EM Railgun Workshop (2014). (peer reviewed)

9. S. A. Roberts, R. C. Givler, and P. R. Schunk, "RIPM: A physics-based model of the armature-rail interface." Proceedings of the 5th DoD Innovative Science & Technology EM Railgun Workshop (2014). (peer reviewed)

8. S. A. Roberts, R. C. Givler, and P. R. Schunk, "Verification and sensitivity analysis of the Railgun Interface Physics Model." Proceedings of the 5th DoD Innovative Science & Technology EM Railgun Workshop (2014). (peer reviewed)

7. S. A. Roberts, T. R. Watkins, and P. R. Schunk, "An inverse modeling approach to enabling embedded temperature sensors." Proceedings of the 5th DoD Innovative Science & Technology EM Railgun Workshop (2014). (peer reviewed)

6. S. M. Davison, S. A. Roberts, and P. R. Schunk, "The Sandia Rail Wear Model: Predicting bore life in railguns." Proceedings of the 5th DoD Innovative Science & Technology EM Railgun Workshop (2014). (peer reviewed)

5. K. B. Lewis, J. M. Solberg, M. I. Barham, S. A. Roberts, C. Siefert, J. G. Michopoulos, M. M. Young, and J. P. Barber, "Verification and Code Comparison for Sliding Electromagnetic Contact." Proceedings of the 5th DoD Innovative Science & Technology EM Railgun Workshop (2014). (peer reviewed)

4. S. A. Roberts, K. N. Long, J. R. Clausen, M. J. Martinez, E. S. Piekos, A. M. Grillet, "Towards a Coupled Multiphysics Model of Molten Salt Battery Mechanics." Proceedings of the 46th Power Sources Conference (2014).

3. A. M. Grillet, D. E. Wesolowski, A. N. Allen, C. C. Roberts, L. A. Mondy, B. McKenzie, R. P. Grant, S. A. Roberts, M. J. Martinez, J. R. Clausen, "Electrolyte Mobility within Molten Salt Batteries." Proceedings of the 46th Power Sources Conference (2014).

2. R. R. Rao, L. A. Mondy, M. C. Celina, D. R. Noble, S. A. Roberts, K. Thompson, J. Tinsley, "A Conformal Decomposition Finite Element Method for Polyurethane Foam Expansion." Proceedings of the Polymer Processing Society 29th Annual Meeting (2013).

1. S. A. Roberts, K. N. Long, J. S. Rath, L. A. Mondy, A. M. Grillet, "Modeling separator deformation and electrolyte flow in thermally-activated batteries." Proceedings of the 45th Power Sources Conference (2012).

Conference Presentations

48. **A. M. Grillet**, T. Humplik, E. K. Stirrup, D. A. Barringer, S. A. Roberts, C. Snyder, M. Janvrin and C. A. Apblett, "Conductivity degradation of polyvinylidene fluoride binder during cycling: Measurements and simulations for lithium-ion batteries." 2016 Annual Meeting of the American Institute of Chemical Engineers, San Francisco, CA, November 2016.

47. **T. G. Voskuilen**, J. C. Hewson, H. K. Moffat, and S. A. Roberts, "Multi-Physics, Multi-Plateau Reaction Model for LiSi/FeS2 Batteries." 47th Power Sources Conference, Orlando, FL, June 2016.

46. **B. L. Trembacki**, S. R. Harris, E. S. Piekos, and S. A. Roberts, "Uncertainty Quantification, Verification, and Validation of a Thermal Simulation Tool for Molten Salt Batteries." 47th Power Sources Conference, Orlando, FL, June 2016.

45. **S. L. Hodson**, E. S. Piekos, R. A. Sayer, S. A. Roberts, C. C. Roberts, "Thermal Characterization of Molten Salt Battery Materials." 47th Power Sources Conference, Orlando, FL, June 2016.

44. S. A. Roberts, **B. L. Trembacki**, H. Mendoza, K. N. Long, V. E. Brunini, A. M. Grillet, "Mesoscale Modeling of Lithium-Ion Battery Electrodes: Computational Requirements and the Role of Polymeric Binders." 229th Electrochemical Society Meeting, San Diego, CA, May 2016.

43. **A. M. Grillet**, T. Humplik, E. K. Stirrup, D. Barringer, H. Mendoza, S. A. Roberts, C. M. Snyder, C. A. Apblett, K. R. Fenton, K. N. Long, "The Role of Composite Binder on Mechanics and Performance of Lithium Ion Battery Electrodes." 229th Electrochemical Society Meeting, San Diego, CA, May 2016.

42. T. Humplik, **A. M. Grillet**, D. A. Barringer, E. K. Stirrup, K. N. Long, H. Mendoza, S. A. Roberts, C. Snyder, C. A. Apblett, K. R. Fenton, "The Role of Polymer Composite Binder on Mechanics and Performance of Lithium Ion Battery Electrodes." 2015 Annual Meeting of the American Institute of Chemical Engineers, Salt Lake City, UT, November 2015.

41. **E. L. Reinholz**, S. A. Roberts, P. R. Schunk, and C. A. Apblett, "Mesoscale Modeling and Simulation of Composition, Manufacturing, and Microstructure Effects on Electrical Conduction in Thermal Battery Cathodes." 228th Electrochemical Society Meeting, Phoenix, AZ, October 2015.

40. T. Humplik, **A. M. Grillet**, D. A. Barringer, E. K. Stirrup, K. N. Long, H. Mendoza, S. A. Roberts, C. Snyder, C. A. Apblett, K. R. Fenton, "The Role of Polymer Composite Binder on Mechanics and Performance of Lithium Ion Battery Electrodes." 87th Annual Meeting of the Society of Rheology, Baltimore, MD, October 2015.

39. **S. A. Roberts**, C. C. Roberts, M. B. Nemer, R. R. Rao, "Drop Circulation in Hele Shaw Flow." 13th US National Congress on Computational Mechanics, San Diego, CA, July 2015.

38. **R. R. Rao**, D. R. Noble, J. T. Tinsley, L. A. Mondy, C. C. Roberts, "A Hybrid ALE-CDFEM Approach to Modeling Foaming in Punch Molds." 13th US National Congress on Computational Mechanics, San Diego, CA, July 2015.

37. **H. Mendoza**, S. A. Roberts, V. E. Brunini, K. N. Long, A. M. Grillet, "Anisotropic Mechanical Deformation of Lithium-Ion Electrode Networks using Reconstructed Microstructures." 227th Electrochemical Society Meeting, Chicago, IL, May 2015.

36. **T. Humplik**, E. K. Stirrup, D. E. Wesolowski, A. N. Allen, R. P. Grant, B. McKenzie, C. C. Roberts, S. A. Roberts, L. A. Mondy, A. M. Grillet, " Ionic Permeability within Thermally-Activated Batteries." 227th Electrochemical Society Meeting, Chicago, IL, May 2015.

35. **A. M. Grillet**, C. C. Roberts, S. A. Roberts, D. E. Wesolowski, A. N. Allen, L. A. Mondy, B. McKenzie, R. P. Grant, B. Shelden, M. J. Martinez, J. R. Clausen, "Ion transport in porous battery electrodes." 86th Annual Meeting of the Society of Rheology, Philadelphia, PA, October 2014.

34. **S. A. Roberts**, D. R. Noble, and R. R. Rao, "Improving mass conservation in a stabilized level-set approach for high-density-ratio flows." 11th World Congress on Computational Mechanics, Barcelona, Spain, July 2014.

33. **J. R. Clausen**, S. A. Roberts, M. J. Martinez, K. N. Long, "Developing a Coupled Thermal-Mechanical-Porous Model for Electrolyte Flow in a Molten Salt Battery." 11th World Congress on Computational Mechanics, Barcelona, Spain, July 2014.

32. **S. A. Roberts**, K. N. Long, J. R. Clausen, and M. J. Martinez, "Towards a Coupled Multiphysics Model of Molten Salt Battery Mechanics." 46th Power Sources Conference, Orlando, FL, June 2014.

31. **S. A. Roberts**, K. N. Long, V. E. Brunini, A. M. Grillet, "Three-Dimensional Mesoscale Modeling of Anisotropic Mechanical Deformation in Lithium-Ion Electrodes" 225th Electrochemical Society Meeting, Orlando, FL, May 12, 2014.

30. **K. N. Long**, S. A. Roberts, C. C. Roberts, A. M. Grillet, "The Mechanics of a Molten Electrolyte Battery Separator Material." ASME 2013 International Mechanical Engineering Congress and Exposition, Houston, TX, November 2013.

29. **S. A. Roberts**, D. R. Noble, R. R. Rao, "Improved Level-Set Algorithm for High Density-Ratio and Variable Density Flows." 12th US National Congress on Computational Mechanics, Raleigh, NC, July 24, 2013.

28. **R. R. Rao**, D. R. Noble, C. C. Roberts, S. A. Roberts, C. Brotherton, M. B. Nemer, "A comparison of the conformal decomposition finite element method to the level set method for microfluidic flows." 12th US National Congress on Computational Mechanics, Raleigh, NC, July 23, 2013.

27. **D. R. Noble**, W. W. Erikson, S. A. Roberts, "A Conformal Decomposition Finite Element Method for Burning Deformable Solids." 12th US National Congress on Computational Mechanics, Raleigh, NC, July 23, 2013.

26. **F. van Swol**, S. A. Roberts, M. E. Chandross, "Reactive Wetting at Planar Interfaces." 87th Colloid and Surface Sicence Symposium, Riverside, CA, June 23, 2013.

25. **C. C. Roberts**, S. A. Roberts, R. R. Rao, M. B. Nemer, "Drop Circulation and Liquid-Liquid Extraction in Hele-Shaw Flow." 84th Annual Meeting of the Society of Rheology, Pasadena, CA, February 12, 2013.

24. **R. R. Rao**, D. R. Noble, C. Brotherton, C. .C Roberts, S. A. Roberts, "Using the conformal decomposition finite element method to model microfluidic flows and droplet formation." 84th Annual Meeting of the Society of Rheology, Pasadena, CA, February 12, 2013.

23. **J. R. Clausen**, S. A. Roberts, "Artificial Compressibility with Entropic Damping." 2012 Annual Meeting of the American Physical Society Division of Fluid Dynamics, San Diego, CA, November 2012.

22. **C. C. Roberts**, S. A. Roberts, L. M. Gloe, R. R. Rao, M. B. Nemer, "Drop Circulation and Liquid-Liquid Extraction in Hele Shaw Flow" (poster). 2012 Annual Meeting of the American Institute of Chemical Engineers, Pittsburgh, PA, October 29, 2012.

21. **S. A. Roberts**, K. Tjiptowidjojo, P. R. Schunk, "Reduced-order Modeling Techniques for Understanding Printing and Coating Processes." 16th International Coating Science and Technology Symposium, Atlanta, GA, September 11, 2012.

20. **R. R. Rao**, D. R. Noble, C. C. Roberts, S. A. Roberts, M. B. Nemer, "Application of the Conformal Decomposition Finite Element Method to Problems with Capillary Free Surfaces." 10th World Congress on Computational Mechanics, São Paulo, Brazil, July 2012.

19. **S. A. Roberts**, K. N. Long, J. S. Rath, L. A. Mondy, A. M. Grillet, "Modeling separator deformation and electrolyte flow in thermally-activated batteries." 45th Power Sources Conference, Las Vegas, NV, June 13, 2012.

18. **P. R. Schunk** and S. A. Roberts, "Coupled Thin-Film Reynolds Equation and Poroelastic Media: Theoretical and Computational Approach using Finite Element Shells." 4th International Conference on Porous Media, West Layfayette, IN, May 14, 2012.

17. **S. A. Roberts**, D. R. Noble, and J. B. Lechman, "Spreading and wetting of impacting drops: Three-dimensional simulations using Conformal Decomposition Finite Elements." 2011 Annual Meeting of the American Physical Society Division of Fluid Dynamics, Baltimore, MD, November 22, 2011.

16. **S. A. Roberts** and P. R. Schunk, "Reduced-order model development for multiphase flow through patterned, orthotropic, and structured porous materials." 2011 Annual Meeting of the American Institute of Chemical Engineers, Minneapolis, MN, October 17, 2011.

15. S. A. Roberts, **S. Kumar**, "Formation of Topographical Patterns on Liquid Film Multilayer Coatings using Electric Fields." 2011 U. S. Department of Energy Synthesis and Processing Science Principal Investigators Meeting, Arlington, VA, September 2011.

14. **S. A. Roberts**, K. Tjiptowidjojo, P. R. Schunk, and D. R. Noble, "Multiphase Hydrodynamics of Free and Confined Lubricating Films with Fluid-Structural Interactions." 11th US National Congress on Computational Mechanics, Minneapolis, MN, July 25, 2011.

13. S. A. Roberts and **S. Kumar**, "Formation of Topographical Patterns on Liquid Film Multilayer Coatings using Electric Fields." European Coating Symposium, Turku, Finland, June 8, 2011.

12. R. R. Rao, D. R. Noble, **L. A. Mondy**, S. A. Roberts, M. M. Hopkins and T. A. Baer, "Numerical Simulation of Filling Processes with Newtonian and Shear-thinning Fluids." 27th World Congress of the Polymer Processing Society, Marrakesh, Morocco, May 12, 2011.

11. S. A. Roberts, K. Tjiptowidjojo, P. R. Schunk, **D. R. Noble**, "Multiphase hydrodynamics of free and confined thin films with fluid-structural interactions." 16th International Conference on Finite Elements in Flow Problems, Munich, Germany, March 25, 2011.

10. **S. A. Roberts** and S. Kumar, "Electrohydrodynamic Instabilities in Thin Trilayer Liquid Films." 2010 Annual Meeting of the American Institute of Chemical Engineers, Salt Lake City, UT, November 10, 2010.

9. **S. A. Roberts** and P. R. Schunk, "Multiscale Model Development of Pattern Nano-Imprinting Processes." 2010 Annual Meeting of the American Institute of Chemical Engineers, Salt Lake City, UT, November 9, 2010.

8. **S. A. Roberts** and R. R. Rao, "Submerging flows of non-Newtonian impinging jets." 2010 Annual Meeting of the Society of Rheology, Santa Fe, NM, October 25, 2010.

7. **S. A. Roberts** and S. Kumar, "Formation of Topographical Patterns on Liquid Film Coatings using Electric Fields." 15th International Coating Science and Technology Symposium, Saint Paul, MN, September 15, 2010.

6. **S. A. Roberts** and P. R. Schunk, "Multiscale model development of pattern nano-imprinting processes." 15th International Coating Science and Technology Symposium, Saint Paul, MN, September 13, 2010.

5. **S. A. Roberts**, A. M. Grillet, P. R. Schunk, T. A. Baer, and R. R. Rao, "Mounding of a non-Newtonian jet impinging on a solid substrate." XVIth International Workshop on Numerical Methods for Non-Newtonian Flows, Northampton, MA, June 14, 2010.

4. **S. A. Roberts** and S. Kumar, "AC electrohydrodynamic instabilities in bilayer films." 2009 Annual Meeting of the American Physical Society Division of Fluid Dynamics, Minneapolis, MN, November 22, 2009.

3. S. A. Roberts and **S. Kumar**, "AC Electrohydrodynamic Instabilities in Thin Liquid Films." 2009 Annual Meeting of the American Institute of Chemical Engineers, Nashville, TN, November 9, 2009.

2. **S. A. Roberts** and S. Kumar, "AC electrohydrodynamic instabilities in thin liquid films." 2008 Annual Meeting of the American Physical Society Division of Fluid Dynamics, San Antonio, TX, November 23, 2008.

1. **S. A. Roberts** and S. Kumar, "Stability of Creeping Couette Flow of a Power-law Fluid past a Deformable Solid." 2006 Annual Meeting of the American Physical Society Division of Fluid Dynamics, Tampa, FL, November 19, 2006.

Invited Seminars

5. University of Texas (Austin, TX), Mechanical Engineering Department, "Performance, degradation, and safety modeling for battery systems," November 21, 2014.

4. Northeast High School (Arma, KS), Commencement Address, May 18, 2014.

3. Sandia National Laboratories (Albuquerque, NM), Engineering Sciences Center, "Fluid modeling in industrial manufacturing processes: From shampoos to nano-lithography," March 10, 2011.

2. Sandia National Laboratories (Albuquerque, NM), Engineering Sciences Center, "Fluid Film Interfaces: Understanding and Controlling Stability," August 3, 2009.

1. Lawrence Livermore National Laboratory (Livermore, CA), Atmospheric, Earth, & Energy Division, "Fluid Film Interfaces: Understanding and Controlling Stability," May 13, 2009.

Other Presentations

9. **M. Young**, R. J. Kaye, S. A. Roberts, and J. Mejeur, "A Qualification Methodology for Hypervelocity Projectiles in an Electromagnetic Launch Environment." 6th DoD Innovative Science & Technology EM Railgun Workshop, Laurel, MD, September 15, 2014.

8. **S. A. Roberts** and R. C. Givler, "Expanding our Understanding of Interface Physics: Extensions and Improvements to the Railgun Interface Physics Model." 6th DoD Innovative Science & Technology EM Railgun Workshop, Laurel, MD, September 15, 2014.

7. **S. A. Roberts**, R. C. Givler, P. R. Schunk, "RIPM: A Physics-Based Model of the Armature-Rail Interface." 5th DoD Innovative Science & Technology Electromagnetic Railgun Workshop, Laurel, MD, October 8, 2014.

6. **S. A. Roberts**, T. R. Watkins, P. R. Schunk, "An Inverse Modeling Approach to Enabling Embedded Temperature Sensors" (poster). 5th DoD Innovative Science & Technology Electromagnetic Railgun Workshop, Laurel, MD, October 8, 2014.

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