

Curriculum Vitae for Robert S. Hoy

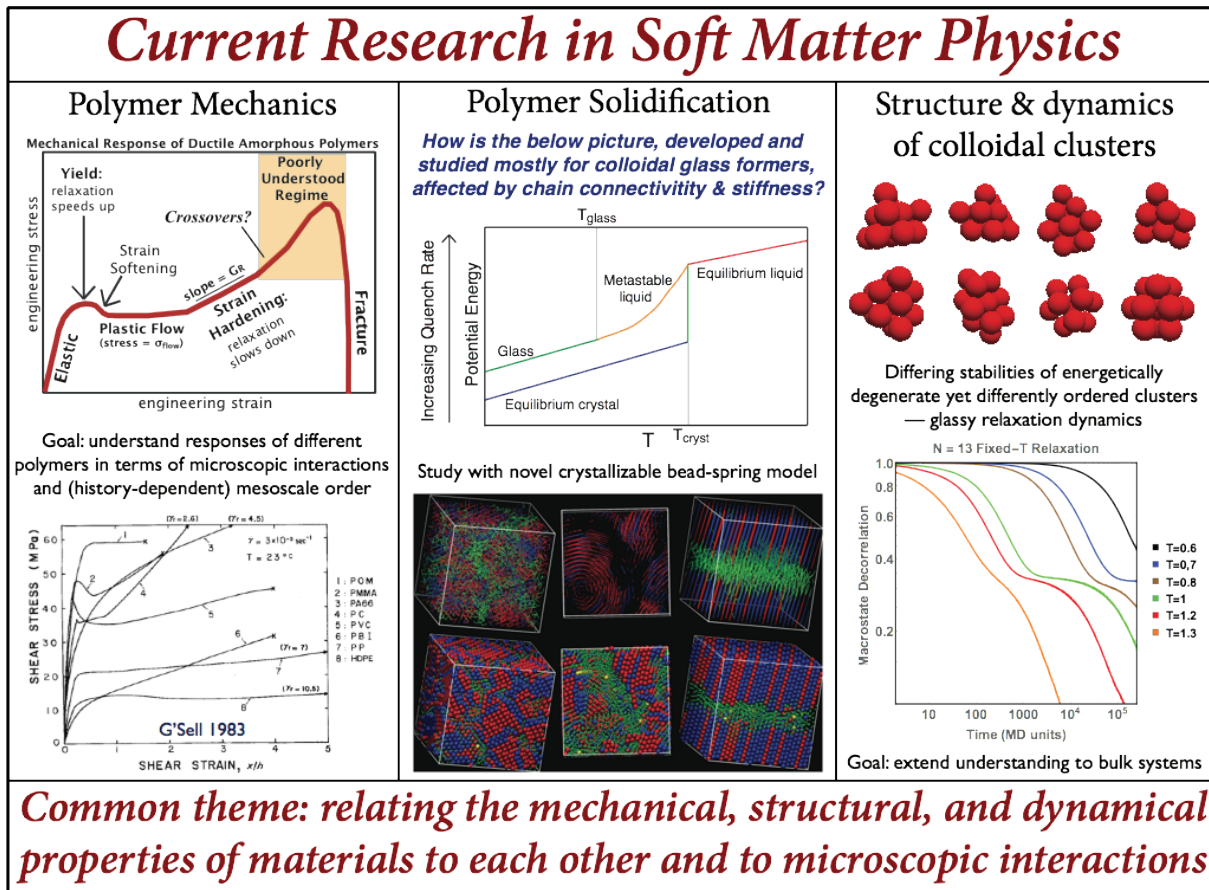
Contact Info

University of South Florida
Dept. of Physics, ISA 4209
Tampa, FL 33620-5700

Phone: 813-399-2976
Fax: 813-974-5813
Email: rshoy@usf.edu

Computational soft matter physics / materials science

Many mechanical, dynamical and structural properties of materials remain poorly understood for reasons fundamentally independent of system-specific chemistry. Great advances in understanding these properties can be achieved through coarse-grained and multiscale simulations that are computationally efficient enough to access experimentally relevant spatiotemporal scales yet “chemically” realistic enough to capture the essential physics underlying the properties under study. I have and will continue to concentrate on explaining poorly-understood behaviors of polymeric, colloidal, and nanocomposite systems through coarse-grained modeling and concomitant development of analytic theories. The general theme is to do basic research on topics that are of high practical interest.



Grants Awarded

CAREER: Fundamental Studies of Glassy Polymer Mechanics (NSF Division of Materials Research, 4/1/2016-3/31/2021; total award \$490,000.)

“Modeling the Mechanochemistry of Amorphous and Semicrystalline Polymers” (Army Research Office, Contract TCN-14028; 8/1/2014-8/31/2015; total award \$28,270.)

“Mesoscale Modeling of Mechanical Properties for Amorphous Polymers” (Army Research Office, Contract TCN-11042; 8/30/2011-2/27/2013; total award \$101,695.)

Research and Teaching Appointments

Assistant Professor, August 2012-present
Department of Physics, University of South Florida

Associate Research Scientist, 9/2010-7/2012
Anderson Postdoctoral Fellow, 9/2009-8/2010
Departments of Mechanical Engineering & Materials Science, and Physics, Yale University

Postdoctoral Fellow, 9/2007-8/2009
Materials Research Laboratory, University of California, Santa Barbara

Education

Ph. D. in Physics, 2008
Johns Hopkins University

B. A. in Physics, 1999
Johns Hopkins University

Professional Society Memberships and Service

Member, American Physical Society, American Chemical Society, and the Society of Rheology

APS March Meeting session organizer for: “Nonlinear Mechanics of Polymer Glasses” (2013)
“Common Features of Soft Materials: Polymers, Colloids, and Granular Media” (2012)

Referee for NSF proposals (ENG-CMMI and DMR-CMMT) and numerous journals including *Physical Review Letters*, *Physical Review E*, *Soft Matter*, *Macromolecules*, *ACS Macro Letters*, and *Journal of Chemical Physics*

Peer Reviewed Publications

Total citations: 643 (870) h-index: 15 (16) Source: Web of Science (Google Scholar), 3/6/2017

29. Jamming of Semiflexible Polymers
R. S. Hoy: *Physical Review Letters*, **118**, 069002 (2017)
28. Entanglements in Glassy Polymer Crazing: Cross-Links or Tubes?
T. Ge, C. Tzoumanekas, S. Anogiannakis, R. S. Hoy and M. O. Robbins: *Macromolecules*, **50**, 459 (2017)
27. Effect of chain stiffness and temperature on the dynamics and microstructure of crystallizable bead-spring polymer melts
H. T. Nguyen and R. S. Hoy: *Physical Review E*, **94**, 052502 (2016)
26. Controlled fragmentation of multimaterial fibres and films via polymer cold-drawing
S. Shabahang, G. Tao, J. J. Kaufman, Y. Qiao, L. Wei, T. Bouchenot, A. P. Gordon, Y. Fink, Y. Bai, R. S. Hoy, and A. F. Abouraddy: *Nature*, **534**, 529 (2016)
25. Effect of chain stiffness on the competition between crystallization and glass-formation in model unentangled polymers
H. T. Nguyen, T. B. Smith, R. S. Hoy, and N. C. Karayiannis: *Journal of Chemical Physics*, **143**, 144901 (2015)
24. Effect of temperature, strain rate and particle size on the yield stresses and post-yield strain softening of PMMA and its composites
J. Jancar, R. S. Hoy, E. Jancarova, and J. Zidek: *Polymer*, **63**, 196 (2015)
23. Structure and dynamics of model colloidal clusters with short-range attractions

- R. S. Hoy: *Physical Review E*, **91**, 012303 (2015)
22. Role of entanglements and bond scission in high strain-rate Deformation of Polymer Gels
Y. R. Sliozberg, R. S. Hoy, R. A. Mrozek, J. L. Lenhardt and J. W. Andzelm: *Polymer*, **55**, 2543 (2014)
 21. Effect of particle size, temperature, and deformation rate on the plastic flow and strain hardening response of PMMA composites
J. Jancar, R. S. Hoy, A. J. Lesser, E. Jancarova and J. Zidek: *Macromolecules*, **46**, 9409 (2013)
 20. Particle-scale reversibility in athermal particulate media below jamming
C. F. Schreck, R. S. Hoy, M. D. Shattuck and C. S. O'Hern: *Physical Review E*, **88**, 052205 (2013)
 19. Nonlinear mechanics of thermoreversibly associating dendrimer glasses
A. Srikanth, R. S. Hoy, B. C. Rinderspacher and J. W. Andzelm: *Physical Review E*, **88**, 042607 (2013)
 18. Simple model for chain packing and crystallization of soft colloidal polymers
R. S. Hoy and N. C. Karayiannis: *Physical Review E*, **88**, 012601 (2013)
 17. Minimal energy packings of nearly flexible polymers
R. S. Hoy, J. Harwayne-Gidansky and C. S. O'Hern: *Journal of Chemical Physics*, **138**, 054905 (2013).
 16. Structure of finite sphere packings via exact enumeration: Implications for colloidal crystal nucleation
R. S. Hoy, J. Harwayne-Gidansky and C. S. O'Hern: *Physical Review E*, **85**, 051403 (2012)
 15. Glassy dynamics of crystallite formation: The role of covalent bonds
R. S. Hoy and C. S. O'Hern: *Soft Matter*, **8**, 1215 (2012)
 14. Why is understanding glassy polymer mechanics so difficult?
R. S. Hoy: *J. Polym. Sci. Part B: Polym. Phys.*, **49**, 979 (2011)
 13. End grafted polymer nanoparticles in a polymeric matrix: Effect of coverage and curvature
J. Kalb, D. Dukes, S. K. Kumar, R. S. Hoy and G. S. Grest: *Soft Matter*, **7**, 1418 (2011)
 12. Viscoplasticity and large-scale chain relaxation in glassy-polymeric strain hardening
R. S. Hoy and C. S. O'Hern: *Physical Review E*, **82**, 041803 (2010)
 11. Minimal energy packings and collapse of sticky tangent hard-sphere polymers
R. S. Hoy and C. S. O'Hern: *Physical Review Letters*, **105**, 068001 (2010)
 10. Strain hardening in bidisperse polymer glasses: Separating the roles of chain orientation and interchain entanglement
R. S. Hoy and M. O. Robbins: *Journal of Chemical Physics*, **131**, 244901 (2009)
 9. Thermoreversible associating polymer networks: I. Interplay of thermodynamics, chemical kinetics, and polymer physics
R. S. Hoy and G. H. Fredrickson: *Journal of Chemical Physics*, **131**, 224902 (2009)
 8. Topological analysis of polymeric melts: Chain length effects and fast-converging estimators for entanglement length
R. S. Hoy, K. Foteinopoulou and M. Kröger: *Physical Review E*, **80**, 031803 (2009)
 7. Scaling of the strain hardening modulus of glassy polymers with the flow stress
M. O. Robbins and R. S. Hoy: *J. Polym. Sci. Part B: Polym. Phys.*, **47**, 1406 (2009)
 6. Strain hardening of polymer glasses: Entanglements, energetics and plasticity
R. S. Hoy and M. O. Robbins: *Physical Review E*, **77**, 031801 (2008)
 5. Entanglements of an end-grafted polymer brush in a polymeric matrix

- R. S. Hoy and G. S. Grest: *Macromolecules*, **40**, 8389 (2007)
4. Strain hardening in polymer glasses: Limitations of network models
R. S. Hoy and M. O. Robbins: *Phys. Rev. Lett.*, **99**, 117801 (2007)
 3. Strain hardening of polymer glasses: Effect of entanglement density, temperature and rate
R. S. Hoy and M. O. Robbins: *J. Polym. Sci. Part B: Polym. Phys.*, **44**, 3487 (2006)
 2. Effect of equilibration on primitive path analyses of entangled polymers
R. S. Hoy and M. O. Robbins: *Physical Review E*, **72**, 061802 (2005)
 1. Fcc-bcc transition for Yukawa interactions determined by applied strain deformation
R. S. Hoy and M. O. Robbins: *Physical Review E*, **69**, 056103 (2004)

Book Chapter

“Modeling strain hardening in polymer glasses using molecular simulations”, in *Polymer Glasses* (edited by Connie B. Roth): CRC Press, 2016.