Curriculum Vitae for Robert S. Hoy

Contact Info

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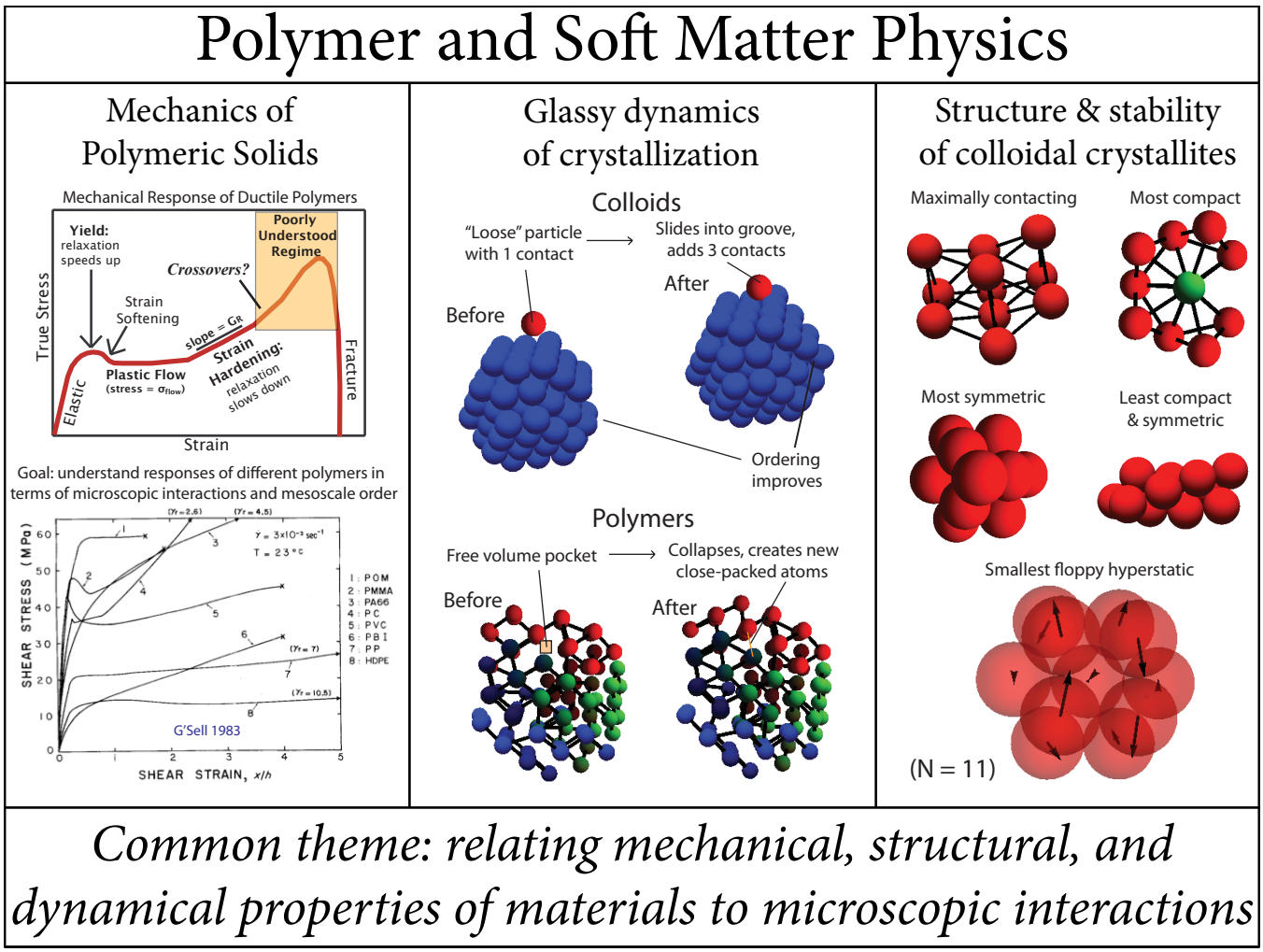
Primary Research Interest: computational soft matter physics / materials science

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

"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

Co-organizer, "Coarse-grained modeling of soft matter" symposium at the 2012 International Workshop on Computational Mechanics (Baltimore, MD).

Organizer,"Common Features of Soft Materials: Polymers, Colloids, and Granular Media" Focus Session at the 2012 APS March Meeting

Referee for numerous journals including *Physical Review Letters*, *Physical Review E*, *Macromolecules*, *Journal of Physical Chemistry Letters*, and *Journal of Polymer Science: Part B - Polymer Physics*.

Peer Reviewed Publications

Total citations: 242 h-index: 10 Source: ISI (Thompson) Web of Science, 8/20/2012

16. Structure of finite sphere packings via exact enumeration: Implications for colloidal crystal nucleation
R. S. Hoy, Jared 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)

Selected Recent and Upcoming Presentations

Nonlinear mechanics of thermoreversibly associating polymer networks
Deformation, Yield and Fracture of Polymers: April 2012, Eindhoven, Holland

Structure of finite sphere packings via exact enumeration: implications for crystal nucleation
2012 March Meeting of the American Physical Society, Boston, MA

How can coarse-grained modeling inform constitutive models of glassy polymer mechanics?
U. S. National Congress on Computational Mechanics, July 2011, Minneapolis, MN

Direct Comparison of Crystallization Transitions and Glassy Dynamics in Polymers and Colloids
2011 March Meeting of the American Physical Society, Dallas, TX

Effect of Thermodynamics, Chemical Kinetics, and Chemical Heterogeneity on Thermoreversible Polymer Networks
Society of Rheology Annual Meeting, October 2010, Santa Fe, NM

Molecular plasticity; the crossover from perfect-plastic flow to polymeric strain hardening
Glasses '10 Workshop, Kavli Institute for Theoretical Physics, Santa Barbara, CA

Minimal Energy Polymer Packings (invited)
2010 March Meeting of the American Physical Society, Portland, OR