

Rajeev Kumar

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Professional Experience

- **American Recovery and Reinvestment Act (ARRA) Fellow** July 2010-Present
Advisors: Bobby G. Sumpter and Ricky Kendall
National Center for Computational Sciences
Oak Ridge National Laboratory, Oak Ridge, TN
- **Post-doctoral Research Associate** Sep. 2008-June 2010
Advisor: Prof. Glenn H. Fredrickson
University of California, Santa Barbara, CA
- **Lecturer (Mathematics) - Career Point Inc., Kota, India** 2002-2003
- **Intern - Jagatjeet Cotton Textile (JCT) Ltd., India** May- July 2001

Education

- **Ph.D. in Polymer Science & Engineering** 2004 - 2008
Dissertation Title: Self-consistent field theory for polyelectrolytes and its applications.
Advisor: Prof. M. Muthukumar
University of Massachusetts, Amherst, MA
- **M.S. in Polymer Science & Engineering** 2003-2004
University of Massachusetts, Amherst, MA
- **B.Tech. in Textile Technology** 1998-2002
Indian Institute of Technology, Delhi, India

Publications

- *R. Kumar* and B.G. Sumpter, "Quantitative analysis of chain packing in polymer melts using large scale molecular dynamics simulations", *Proceedings of the Scientific Discovery through Advanced Computing (SciDAC) Conference, Denver, CO* (2011).
- M. Goswami, *R. Kumar*, B.G. Sumpter and J.W Mays, "Breakdown of inverse morphologies in charged diblock copolymers", *J. Phys. Chem. B.* **115**, 3330 (2011).
- *R. Kumar*, D. Audus and G.H. Fredrickson, "Phase separation in symmetric mixtures of oppositely charged rodlike polyelectrolytes", *J. Phys. Chem. B.* **114**, 9956 (2010).
- *R. Kumar* and M. Muthukumar, "Origin of translocation barriers for polyelectrolyte chains", *J. Chem. Phys.* **131**, 194903 (2009).
- *R. Kumar* and G.H. Fredrickson, "Theory of polyzwitterion conformations", *J. Chem. Phys.* **131**, 104901 (2009).
- *R. Kumar*, A. Kundagrami, and M. Muthukumar, "Counterion adsorption on flexible polyelectrolytes : comparison of theories", *Macromolecules* **42**, 1370 (2009).
- *R. Kumar* and M. Muthukumar, "Confinement free energy of flexible polyelectrolytes in spherical cavities", *J. Chem. Phys.* **128**, 184902 (2008).
- *R. Kumar* and M. Muthukumar, "Microphase separation in polyelectrolytic diblock copolymer melt : Weak segregation limit", *J. Chem. Phys.* **126**, 214902 (2007).

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- M. Jassal, V. Raj, R. Kumar, N.S. Save, and A.K. Agrawal, "Synthesis of stimuli-sensitive polymers based on N-substituted acrylamides", *Proceedings of International Seminar on Frontiers of Polymer Science and Engineering*, MACRO , IIT Kharagpur, December 2002, 09.4.

Book Chapter : Invited Contribution

- A. Kundagrami, R. Kumar, and M. Muthukumar. "Simulations and Theories of Single Polyelectrolyte Chains" in "Modeling and Simulation in Polymers", edited by P.D. Gujrati and A.I. Leonov, WILEY-VCH Verlag, Weinheim, Germany, 2010.

Conference Presentations

Invited Presentations

- R. Kumar and B.G. Sumpter, "Quantitative analysis of chain packing in polymer melts using large scale molecular dynamics simulations", Scientific Discovery through Advanced Computing (SciDAC) Conference, Denver, CO, July 2011 (poster).
- R. Kumar, "Theory and simulations of neutral and charged polymers," *Department of Chemistry, University of Tennessee*, Knoxville, TN, March 2011 (talk).
- R. Kumar and B.G. Sumpter, "Insights obtained from coarse-grained modeling of charged polymers," *66th Southwest and 62nd Southeastern Regional Meeting of the American Chemical Society*, New Orleans, LA, December 2010 (talk).
- R. Kumar, "Modeling charged polymers using field-theoretic methods," *Center for Functional Nanomaterials*, Brookhaven National Lab, NY, March 2010 (talk).

Other Presentations

- R. Kumar, S. Sides and B.G. Sumpter, "Local dielectric constant and its effects on the microphase separation in charged-neutral diblock copolymer melts," *American Physical Society*, Dallas, TX, March 2011.
- R. Kumar and G.H. Fredrickson, "Coacervation in symmetric mixtures of oppositely charged rodlike polyelectrolytes," *American Physical Society*, Portland, OR, March 2010.
- R. Kumar and M. Muthukumar, "Origin of translocation barriers for polyelectrolyte chains," *American Physical Society*, Portland, OR, March 2010 (poster).
- R. Kumar, D. Audus, and G.H. Fredrickson "Theoretical investigations of complex coacervates for biosensor technology," *Institute for Collaborative Biotechnologies Army-Industry Collaboration Conference*, Santa Barbara, CA, March 2010 (poster).
- R. Kumar and G.H. Fredrickson, "Coacervation in symmetric mixtures of oppositely charged rodlike polyelectrolytes", *Complex Fluids Design Consortium*, Santa Barbara, CA, Feb. 2010.
- R. Kumar and G.H. Fredrickson, "Theory of polyelectrolyte solutions", *American Physical Society*, Pittsburgh, PA, March 2009.
- D. Audus, R. Kumar, and G.H. Fredrickson, "Theoretical investigations of polyelectrolyte complexes for biosensors", *Institute for Collaborative Biotechnologies Army-Industry Collaboration Conference*, Santa Barbara, CA, March 2009 (poster).
- R. Kumar and G.H. Fredrickson, "Conformational characteristics of a single polyelectrolyte chain: effect of salt", *Complex Fluids Design Consortium*, Santa Barbara, CA, Feb. 2009.
- R. Kumar and M. Muthukumar, "Confinement free energy of flexible polyelectrolytes in spherical cavities", *American Physical Society*, New Orleans, LA, March 2008.
- R. Kumar and M. Muthukumar, "Confinement effects on flexible polyelectrolytic systems", *Modeling and Computation in Physics, Mathematics and Biology*, University of Massachusetts, Amherst / University of Heidelberg Workshop, Amherst, MA, May 2007.

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- *R. Kumar* and M. Muthukumar, “Morphology diagrams for polyelectrolytic diblock copolymers”, *American Physical Society*, Baltimore, MD, March 2006.
- *R. Kumar* and M. Muthukumar, “Morphology diagrams for polyelectrolytic diblock copolymers”, *6th National Graduate Research Conference*, University of Massachusetts, Amherst, MA, June 2005.

Academic Honors/Activities

- Member of American Physical Society. 2006-Present
- Reviewer for The Journal of Chemical Physics (JCP) and European Polymer Journal E (EPJE). 2006-Present
- Jawahar Gajree Memorial Scholarship for outstanding academic performance from the Indian Institute of Technology, Delhi. 2000-2001
- Award for social services from the National Service Scheme at the Indian Institute of Technology, Delhi. 1999-2000
- State Merit Scholarship from the Haryana Board of School Education. 1994-1995

Skills

- *Programming Languages*: C/C++, L^AT_EX, HTML.
- *Softwares/Libraries*: Mathematica, Matlab, CLAPACK, FFTW, f2c, MS Office.

References

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