Rajeev Kumar

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Professional Experience

- **Soft Nanomaterials Theory and Simulation Research Scientist** December 2012 -
  Center for Nanophase Materials Sciences (CNMS),
  Computational Sciences and Engineering Division (CSED),
  Oak Ridge National Laboratory, Oak Ridge, TN
- **Adjunct Assistant Professor** October 2014 -
  Department of Mathematics,
  University of Tennessee, Knoxville, TN
- **American Recovery and Reinvestment Act Fellow** July 2010-December 2012
  Advisors: Bobby G. Sumpter and Ricky Kendall
  National Center for Computational Sciences (NCCS),
  Oak Ridge National Laboratory, Oak Ridge, TN
- **Post-doctoral Research Associate** September 2008-June 2010
  Advisor: Prof. Glenn H. Fredrickson
  Materials Research Laboratory (MRL),
  University of California, Santa Barbara, CA

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

Academic Honors/Activities

- Reviewer for research grant proposal submitted to the National Science Foundation (NSF) and the US-Israel Binational Science Foundation (BSF) 2014-Present
- Member of American Physical Society 2006-Present
- Reviewer for The Journal of Chemical Physics, New Journal of Physics, Macromolecules, European Polymer Journal E, Materials Chemistry and Physics, Advanced Energy Materials, Soft Matter, Langmuir 2006-Present
- Jawahar Gajree Memorial Scholarship 2000-2001
- Award for social services from the National Service Scheme 1999-2000
- State Merit Scholarship from the Haryana Board of School Education 1994-1995

Publications : Refereed Articles

1. J.P. Mahalik, J.W. Dugger, S.W. Sides, B.G. Sumpter, V. Lauter, and **R. Kumar**, "Interpreting neutron reflectivity profiles of diblock copolymer nanocomposite thin films using hybrid particle-field simulations," *Macromolecules* DOI: 10.1021/acs.macromol.8b00180 (2018).
2. J. Cummings, J.S. Lowengrub, B.G. Sumpter, S.M. Wise, and **R. Kumar**, "Modeling solvent evaporation during thin film formation in phase separating polymer mixtures," *Soft Matter* **14**, 1833 (2018).
3. S. Chernyy, J.J.K. Kirkensgaard, J.P. Mahalik, H. Kim, M.M.L. Arras, **R. Kumar**, B.G. Sumpter, G.S. Smith, K. Mortensen, T.P. Russell, and K. Almdal, "Bulk and surface morphologies of ABC miktoarm star terpolymers composed of PDMS, PI, and PMMA arms," *Macromolecules* **51**, 1041 (2018).
4. V. Bocharova, Z. Wojnarowska, P-F. Cao, Y. Fu, **R. Kumar**, B. Li, V.N. Novikov, S. Zhao, A.M. Kisliuk, T. Saito, J.W. Mays, B.G. Sumpter, and A.P. Sokolov, "The influence of chain rigidity and dielectric constant on the glass transition temperature in polymerized ionic liquids," *J. Phys. Chem. B* **121**, 11511 (2017).
5. Y. Fu, V. Bocharova, M. Ma, A.P. Sokolov, B.G. Sumpter, and **R. Kumar**, "Effects of counterion size and backbone rigidity on the dynamics of ionic polymer melts and glasses," *Phys. Chem. Chem. Phys.* **19**, 27442 (2017).
6. Z. Wojnarowska, H. Feng, Y. Fu, S. Cheng, B. Carroll, **R. Kumar**, V.N. Novikov, A.M. Kisliuk, T. Saito, N-G. Kang, J.W. Mays, A.P. Sokolov, and V. Bocharova, "Effect of chain rigidity on the decoupling of ion motion from segmental relaxation in polymerized ionic liquids: ambient and elevated pressure studies," *Macromolecules* **50**, 6710 (2017).
7. J.P. Mahalik, B.G. Sumpter, and **R. Kumar**, "Attraction between opposing planar dipolar polymer brushes," *Langmuir* **33**, 9231 (2017).
8. E.S. Muckley, C.B. Jacobs, K. Vidal, J.P. Mahalik, **R. Kumar**, B.G. Sumpter, and I. Ivanov, "New insights on electro-optical response of poly (3, 4-ethylenedioxythiophene): poly (styrenesulfonate) film to humidity," *ACS Appl. Mater. Interfaces* **9**, 15880 (2017).
9. S.M. Yang, A.N. Morozovska, **R. Kumar**, E.A. Eliseev, Y. Cao, L. Mazet, N. Balke, S. Jesse, R.K. Vasudevan, C. Dubourdieu, and S.V. Kalinin, "Mixed electrochemical-ferroelectric states in nanoscale ferroelectrics," *Nature Physics* **13**, 812 (2017).
10. K. Misichronis, J. Chen, A. Imel, **R. Kumar**, J. Thostenson, K. Hong, M. Dadmun, B. G. Sumpter, J. G. Kennemur, N. Hadjichristidis, J. W. Mays, and A. Avgeropoulos, "Investigation on the phase diagram and interaction parameter of poly(styrene-b-1,3-cyclohexadiene) diblock copolymers," *Macromolecules* **50**, 2354 (2017).
11. **R. Kumar**, J.P. Mahalik, V. Bocharova, E.W. Stacy, C. Gainary, T. Saito, M. P. Gobet, S. Greenbaum, B.G. Sumpter, and A.P. Sokolov, "A Rayleighian approach for modeling kinetics of ionic transport in polymeric media," *J. Chem. Phys.* **146**, 064902 (2017).
12. J.P. Mahalik, B.G. Sumpter, and **R. Kumar**, "Vertical phase segregation induced by dipolar interactions in planar brushes," *Macromolecules* **49**, 7096 (2016).
13. N. Herath, S. Das, J. Zhu, **R. Kumar**, J. Chen, K. Xiao, G. Gu, J.F. Browning, B.G. Sumpter, I.N. Ivanov, and V. Lauter, "Unraveling the fundamental mechanisms of solvent-additive-induced optimization of power conversion efficiencies in organic photovoltaic devices," *ACS Appl. Mater. Interfaces* **8**, 20220 (2016).

14. J.Y. Carrillo, Z. Seibers, **R. Kumar**, M.A. Matheson, J.F. Ankner, M. Goswami, K. Bhaskaran-Nair, W.A. Shelton, B.G. Sumpter, and S.M. Kilbey, "Petascale simulations of the morphology and the molecular interface of bulk heterojunctions," *ACS Nano* **10**, 7008 (2016).
15. A.P. Holt, V. Bocharova, S. Cheng, A.M. Kisliuk, B.T. White, T. Saito, D. Uhrig, J.P. Mahalik, **R. Kumar**, A.E. Imel, T. Etampawala, H. Martin, N. Sikes, B.G. Sumpter, M.D. Dadmun, and A.P. Sokolov, "Controlling interfacial dynamics: covalent bonding versus physical adsorption in polymer nanocomposites," *ACS Nano* **10**, 6843 (2016).
16. E. Muckley, J. Lynch, **R. Kumar**, B.G. Sumpter, and I.N. Ivanov, "PEDOT:PSS/QCM-based multimodal humidity and pressure sensor," *Sensors and Actuators B: Chemical* **236**, 91 (2016).
17. J. P. Mahalik, Y. Yang, C. Deodhar, J. F. Ankner, B. S. Lokitz, S. M. Kilbey, B. G. Sumpter, and **R. Kumar**, "Monomer volume fraction profiles in pH responsive planar polyelectrolyte brushes," *Journal of Polymer Science Part B: Polymer Physics* **54**, 956 (2016).
18. J.Y. Carrillo, S. Cheng, **R. Kumar**, M. Goswami, A.P. Sokolov, and B.G. Sumpter, "Untangling the effects of chain rigidity on the structure and dynamics of strongly adsorbed polymer melts," *Macromolecules* **48**, 4207 (2015).
19. N. Herath, S. Das, J. K. Keum, J. Zhu, **R. Kumar**, I. N. Ivanov, B. G. Sumpter, J. F. Browning, K. Xiao, G. Gu, P. Joshi, and V. Lauter, "Peculiarity of two thermodynamically-stable morphologies and their impact on the efficiency of small molecule bulk heterojunction solar cells," *Scientific Reports* **5**, 13407 (2015).
20. J. Zhu, Y. Han, **R. Kumar**, Y. He, K. Hong, B. G. Sumpter, S. Smith, I. Ivanov and C. Do, "Controlling assembly of a water-soluble conjugated polymer ," *Nanoscale* **7**, 15134 (2015).
21. **R. Kumar**, B. S. Lokitz, S. W. Sides, J. Chen, W. Heller, J. F. Ankner, J. Browning, S. M. Kilbey II, and B. G. Sumpter, "Microphase separation in thin films of lamellar forming polydisperse di-block copolymers," *RSC Advances* **5**, 21336 (2015).
22. E. Strelcov, **R. Kumar**, V. Bocharova, B. G. Sumpter, A. Tselev, and S. V. Kalinin, "Nanoscale lubrication of ionic surfaces controlled via strong electric field," *Scientific Reports* **5**, 8049 (2015).
23. V. Bocharova, A. L. Agapov, A. Tselev, L. Collins, **R. Kumar**, S. Berdzinski, V. Strehmel, A. Kisliuk, I. I. Kravchenko, B. G. Sumpter, A. P. Sokolov, S. V. Kalinin, and E. Strelcov, "Controlled nanopatterning of a polymerized ionic liquid in a strong electric field," *Adv. Func. Mat.* **25**, 805 (2015).
24. **R. Kumar**, V. Bocharova, E. Strelcov, A. Tselev, I. I. Kravchenko, S. Berdzinski, V. Strehmel, O. S. Ovchinnikova, J. A. Minutolo, J. R. Sangoro, A. L. Agapov, A. P. Sokolov, S. V. Kalinin, and B. G. Sumpter, "Ion transport and softening in a polymerized ionic liquid," *Nanoscale* **7**, 947 (2015).
25. **R. Kumar**, B. G. Sumpter, and M. Muthukumar, "Enhanced phase segregation induced by dipolar interactions in polymer blends," *Macromolecules* **47**, 6491 (2014).
26. M. Shao, J. K. Keum, **R. Kumar**, J. Chen, J. F. Browning, S. Das, W. Chen, J. Hou, C. Do, K. C. Littrell, A. Rondinone, D. B. Geohegan, B. G. Sumpter, and K. Xiao, "Understanding how processing additives tune the nanoscale morphology of high efficiency organic photovoltaic blends: From casting solution to spun-cast thin film," *Adv. Func. Mat.* **24**, 6647 (2014).
27. J.Y. Carrillo, **R. Kumar**, M. Goswami, B.G. Sumpter, and W.M. Brown, "New insights into dynamics and morphology of P3HT:PCBM active layers in bulk heterojunctions," *Phys.*

Chem. Chem. Phys. **15**, 17873 (2013).

28. C. Dyer, P. Driva, S.W. Sides, B.G. Sumpter, J. W. Mays, J. Chen, **R. Kumar**, M. Goswami, and M. Dadmun, "Effect of macromolecular architecture on the morphology of polystyrene - polyisoprene block copolymers," *Macromolecules* **46**, 2023 (2013).
29. **R. Kumar**, M. Goswami, B.G. Sumpter, V. Novikov, and A.P. Sokolov, "Effects of backbone rigidity on the local structure and dynamics in polymer melts and glasses," *Phys. Chem. Chem. Phys.* **15**, 4604 (2013).
30. K. Misichronis, S. Rangou, E. Ashcraft, **R. Kumar**, M. Dadmun, B.G. Sumpter, N.E. Zafeiropoulos, J.W. Mays, and A.T. Avgeropoulos, "Synthesis, characterization (molecular-morphological) and theoretical morphology predictions of linear triblock terpolymers containing poly(cyclohexadiene)," *Polymer* **54**, 1480 (2013).
31. **R. Kumar**, S.W. Sides, M. Goswami, B.G. Sumpter, K. Hong, X. Wu, T.P. Russell, S.P. Gido, K. Misichronis, S. Rangou, A.T. Avgeropoulos, T. Tsoukatos, N. Hadjichristidis, F. Beyer, and J.W. Mays, "Morphologies of ABC triblock terpolymer melts containing poly(cyclohexadiene) : effects of conformational asymmetry," *Langmuir* **29**, 1995 (2013).
32. **R. Kumar**, Y. Li, S.W. Sides, J.W. Mays, and B.G. Sumpter, "Morphology diagrams for A_2B copolymer melts: real-space self-consistent field theory," *J. Phys.: Conf. Ser.* **402**, 012042 (2012).
33. J.W. Mays, **R. Kumar**, S.W. Sides, M. Goswami, B.G. Sumpter, K. Hong, X. Wu, T. P Russell, S.P. Gido, A. Avgeropoulos, T. Tsoukatos, N. Hadjichristidis, and F. L. Beyer, "Morphologies of poly(cyclohexadiene) diblock copolymers: effect of conformational asymmetry," *Polymer* **53**, 5155 (2012).
34. **R. Kumar**, B.G. Sumpter, and S.M. Kilbey, "Charge regulation and local dielectric function in planar polyelectrolyte brushes," *J. Chem. Phys.* **136**, 234901 (2012).
35. X. Wang, M. Goswami, **R. Kumar**, B.G. Sumpter, and J.W. Mays, "Morphologies of block copolymers composed of charged and neutral blocks," *Soft Matter* **8**, 3036 (2012) (cover page).
36. R.A. Riggleman, **R. Kumar**, and G.H. Fredrickson, "Investigation of the interfacial tension of complex coacervates using field-theoretic simulations," *J. Chem. Phys.* **136**, 024903 (2012).
37. M. Goswami, **R. Kumar**, B.G. Sumpter, and J.W. Mays, "Breakdown of inverse morphologies incharged diblock copolymers," *J. Phys. Chem. B.* **115**, 3330 (2011).
38. **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).
39. **R. Kumar** and M. Muthukumar, "Origin of translocation barriers for polyelectrolyte chains," *J. Chem. Phys.* **131**, 194903 (2009).
40. **R. Kumar** and G.H. Fredrickson, "Theory of polyzwitterion conformations," *J. Chem. Phys.* **131**, 104901 (2009).
41. **R. Kumar**, A. Kundagrami, and M. Muthukumar, "Counterion adsorption on flexible polyelectrolytes : comparison of theories," *Macromolecules* **42**, 1370 (2009).
42. **R. Kumar** and M. Muthukumar, "Confinement free energy of flexible polyelectrolytes in spherical cavities," *J. Chem. Phys.* **128**, 184902 (2008).

43. **R. Kumar** and M. Muthukumar, "Microphase separation in polyelectrolytic diblock copolymer melt : Weak segregation limit," *J. Chem. Phys.* **126**, 214902 (2007).

Conference Proceedings

44. **R. Kumar** and B.G. Sumpter, "Quantitative analysis of chain packing in polymer melts using large scale molecular dynamics simulations," in Proc. SciDAC 2011, Denver, CO, July 10-14, 2011, http://press.mcs.anl.gov/scidac2011/
45. 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 Chapters : Invited Contributions

46. **R. Kumar**, J. Carrillo, M. Goswami, and B. G. Sumpter, "Insights obtained from modeling of organic photovoltaics: morphology, interfaces and coupling with charge transport," in "Organic Solar Cells: Materials, Devices, Interfaces, and Modeling," edited by Q. Qiao, CRC Press, Taylor and Francis Group, 2015.
47. 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

1. **R. Kumar**, "A Rayleighian approach for modeling kinetics of ionic transport in polymeric media," *American Chemical Society Meeting*, San Francisco, CA, April 2017 (talk).
2. **R. Kumar**, "Effects of dipolar interactions in polymer brushes," *American Physical Society Meeting*, Baltimore, MD, March 2016 (talk).
3. **R. Kumar**, "Polymerized ionic liquid films in strong electric fields: ion transport and nanopatterning," *TechConnect World Innovation Conference*, Washington, DC, June 2015 (talk).
4. **R. Kumar**, B.G. Sumpter, and M. Muthukumar, "Effects of dipolar interactions in polymeric media," *Energy Materials Nanotechnology (EMN) Meeting on Polymer*, Orlando, FL, Jan 2015 (talk).
5. **R. Kumar**, J. Carrillo, M. Goswami, and B.G. Sumpter, "Insights obtained from coarse-grained modeling of P3HT:PCBM active layers," *Energy Materials Nanotechnology (EMN) Summer Meeting*, Cancun, Mexico, June 2014 (talk).
6. **R. Kumar**, J. Carrillo, M. Goswami, and B.G. Sumpter, "Structure and dynamics of polymeric materials in complex solutions and thin films," *Physical Sciences Directorate (PSD) Advisory Committee Meeting*, Oak Ridge, TN, May 2014 (poster).
7. **R. Kumar**, B.G. Sumpter and S.M. Kilbey, "Local dielectric function in inhomogeneous polymeric media," *American Chemical Society Meeting*, Indianapolis, IN, September 2013 (talk).
8. **R. Kumar**, "Polymers near interfaces: field theory and neutron reflectivity experiments," *SNS-HIFR-CNMS User Workshop, Oak Ridge National Laboratory*, Oak Ridge, TN, August 2013 (talk).

9. S.W. Sides and **R. Kumar**, "Simulation of polymers in complex formulations: progress on developing numerical self-consistent field theory (SCFT)," *Proctor & Gamble/ORNL/TechX Corp. Reconnect, Oak Ridge National Laboratory*, Oak Ridge, TN, May 2012 (talk).
10. **R. Kumar**, "Theory and simulations of neutral and charged polymers," *Physics Department, University of Tennessee*, Knoxville, TN, April 2012 (talk).
11. **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).
12. **R. Kumar**, "Local dielectric function and its effects on planar polyelectrolyte brushes: field theoretical study," *Proctor & Gamble /ORNL /TechX Corp. Reconnect, Oak Ridge National Laboratory*, Oak Ridge, TN, June 2011 (talk).
13. **R. Kumar**, "Theory and simulations of neutral and charged polymers," *Department of Chemistry, University of Tennessee*, Knoxville, TN, March 2011 (talk).
14. **R. Kumar** and B.G. Sumpter, "Insights obtained from coarse-grained modeling of charged polymers," *66^{th} Southwest and 62^{nd} Southeastern Regional Meeting of the American Chemical Society*, New Orleans, LA, December 2010 (talk).
15. **R. Kumar**, "Modeling charged polymers using field-theoretic methods," *Center for Functional Nanomaterials, Brookhaven National Lab*, NY, March 2010 (talk).

Other Presentations

16. J. Cummings, S. Wise, and **R. Kumar**," Modeling and simulation of microstructural evolution in organic photovoltaic thin films," *41st SIAM Southeastern Atlantic Section Conference (SIAM-SEAS)* , Florida State University, FL, March 2017 (talk).
17. Y. Fu, M. Chen, T.E. Long, J. Dugger, J.F. Browning, B.G. Sumpter, B.S. Lokitz, and **R. Kumar**,"Probing electromechanical responses of ionic polymers in nanoscale thin films using molecular dynamics simulations," *CNMS User Meeting*, Oak Ridge, TN, August 2016 (poster).
18. J. P. Mahalik, B.G. Sumpter, and **R. Kumar**,"Modeling helical polymer brushes using self-consistent field theory (SCFT)," *American Physical Society Meeting*, Baltimore, MD, March 2016 (talk).
19. B. Philip and **R. Kumar**,"Iterative methods for nonlinear systems arising in diblock copolymer systems," *American Mathematical Society Meeting*, Huntsville, AL, March 2015 (talk).
20. J. P. Mahalik, **R. Kumar**, and B.G. Sumpter,"Planar dipolar polymerr brush: field theoretical investigations, " *American Physical Society Meeting*, San Antonio, TX, March 2015 (talk).
21. **R. Kumar**, V. Bocharova, E. Strelcov, V. Strehmel, J. R. Sangoro, A. P. Sokolov, S. V. Kalinin, and B. G. Sumpter, "Ion transport and softening in a polymerized ionic liquid," *American Physical Society Meeting*, San Antonio, TX, March 2015 (talk).
22. S. W. Sides, **R. Kumar**, L. Hall, J. Brown,"Self-consistent field theory simulations of block copolymer systems: Recent results using the PolySwift++ framework,", San Francisco, CA, August 2014 (talk).
23. J. Carrillo , **R. Kumar**, M. Goswami , S. M. Kilbey II , B. G. Sumpter, and W. M. Brown, "Petascale molecular dynamics simulations of thermal annealing of P3HT:PCBM active layers in bulk heterojunctions", *American Physical Society*, Denver, CO, March 2014 (talk).

24. **R. Kumar**, M. Muthukumar, and B. G. Sumpter, "Effects of dipolar interactions on thermodynamic stabilities of polymer blends and diblock copolymer melts", *American Physical Society*, Denver, CO, March 2014 (talk).
25. J.Y. Carrillo, **R. Kumar**, M. Goswami, B.G. Sumpter and W.M. Brown, "Coarse-grained molecular dynamics simulations of thermal annealing of P3HT:PCBM bulk heterojunctions for organic photovoltaic applications," *American Institute of Chemical Engineers Annual Meeting*, San Francisco, CA, November 2013 (talk).
26. **R. Kumar**, B.G. Sumpter and S.M. Kilbey, "Charge regulation and local dielectric function in planar polyelectrolyte brushes," *American Physical Society*, Baltimore, MD, March 2013 (talk).
27. S.W. Sides, **R. Kumar**, B. Jamroz, R. Crockett and A. Pletzer, "Using adaptive-mesh refinement in SCFT simulations of surfactant adsorption," *American Physical Society*, Baltimore, MD, March 2013 (talk).
28. A.P. Sokolov, J.W. Mays, T. Zawodzinski, A. Kisliuk, K. Hong and **R. Kumar**, "Fundamentals of ionic conductivity in polymeric materials for energy storage applications," *Laboratory Directed Research and Development (LDRD) renewal, Oak Ridge National Laboratory*, Oak Ridge, TN, June 2011 (talk).
29. **R. Kumar**, S.W. 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 (talk).
30. **R. Kumar**, B.G. Sumpter and S.M. Kilbey, "Charge regulation and local dielectric function in planar polyelectrolyte brushes," *Center for Nanophase Materials Sciences User Meeting, Oak Ridge National Laboratory*, Oak Ridge, TN, September 2012 (poster).
31. A.P. Sokolov, J.W. Mays, T. Zawodzinski, A. Kisliuk, K. Hong and **R. Kumar**, "Fundamentals of ionic conductivity in polymeric materials for energy storage applications," *Laboratory Directed Research and Development (LDRD) renewal, Oak Ridge National Laboratory*, Oak Ridge, TN, June 2011 (talk).
32. **R. Kumar**, S.W. 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 (talk).
33. A. Sokolov, J.W. Mays, T. Zawodzinski, A. Kisliuk, K. Hong and **R. Kumar**, "Fundamentals of ionic conductivity in polymeric materials for energy storage applications," *Laboratory Directed Research and Development (LDRD) proposal, Oak Ridge National Laboratory*, Oak Ridge, TN, August 2010 (talk).
34. **R. Kumar** and G.H. Fredrickson, "Coacervation in symmetric mixtures of oppositely charged rodlike polyelectrolytes," *American Physical Society*, Portland, OR, March 2010 (talk).
35. **R. Kumar** and M. Muthukumar, "Origin of translocation barriers for polyelectrolyte chains," *American Physical Society*, Portland, OR, March 2010 (poster).
36. **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).
37. **R. Kumar** and G.H. Fredrickson, "Coacervation in symmetric mixtures of oppositely charged rodlike polyelectrolytes," *Complex Fluids Design Consortium*, Santa Barbara, CA, February 2010 (talk).

38. **R. Kumar** and G.H. Fredrickson, "Theory of polyzwitterionic solutions," *American Physical Society*, Pittsburgh, PA, March 2009 (talk).
39. 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).
40. **R. Kumar** and G.H. Fredrickson, "Conformational characteristics of a single polyzwitterionic chain: effect of salt," *Complex Fluids Design Consortium*, Santa Barbara, CA, Feb. 2009 (talk).
41. **R. Kumar** and M. Muthukumar, "Confinement free energy of flexible polyelectrolytes in spherical cavities," *American Physical Society* , New Orleans, LA, March 2008 (talk).
42. **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 (poster).
43. **R. Kumar** and M. Muthukumar, "Morphology diagrams for polyelectrolytic diblock copolymers," *American Physical Society* , Baltimore, MD, March 2006 (talk).
44. **R. Kumar** and M. Muthukumar, "Morphology diagrams for polyelectrolytic diblock copolymers," *6^{th} National Graduate Research Conference, University of Massachusetts*, Amherst, MA, June 2005 (talk).