Rajeev Kumar

American Recovery and Reinvestment Act Fellow
National Center for Computational Sciences (NCCS)
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Education

The Indian Institute of Technology , Delhi, India	Textile Technology	B.Tech., 2002
The University of Massachusetts, Amherst, MA	Polymer Sci. & Engg.	M.S., 2004
The University of Massachusetts, Amherst, MA	Polymer Sci. & Engg.	Ph.D., 2008

Professional Experience (ORNL = Oak Ridge National Laboratory)

2010/7 – present	American Recovery and Reinvestment Act (ARRA) Fellow, NCCS, ORNL
2008/8 – 2010/6	Post-doctoral research associate, Materials Research Laboratory, University of California, Santa Barbara, CA
2002-2003	Lecturer (Mathematics), Career Point Inc., Kota, India

Professional and Synergistic Activities

2006–present   Reviewer, Journal of Chemical Physics, Macromolecules, European Polymer Journal E

Honors and Awards

2010–present   American Recovery and Reinvestment Act (ARRA) Fellowship, NCCS, ORNL
2000–2001   Jawahar Gajree Memorial Scholarship, The Indian Institute of Technology, Delhi
1999–2000   Award for social services from the National Service Scheme (NSS)
1994-1995   State merit scholarship from the Board of School Education, Haryana, India

Research Synopsis

- *Microphase separation in charged and neutral block copolymers:* We use mesocale modeling techniques to develop a macromolecular understanding of microphase separation in block copolymers of different architectures containing charged and neutral blocks. Predictions of the models are compared with the experiments.

- *Charged and neutral polymers near interfaces:* We have developed field theoretic methods to describe the behavior of polymers near interfaces and surfaces. Furthermore, analysis tools are being developed to compute the neutron reflectivity profiles from the simulated density profiles for a direct comparison with the experiments.

- *Dielectric function for polymers:* Rigorous quantitative description of the dielectric function of inhomogeneous polymers (neutral or charged) is lacking and is a long-standing problem. We have developed mesoscopic methods to compute the dielectric function of polymers in inhomogeneous media in a self-consistent manner.

- *Dynamics of polymers in the melts:* We use molecular dynamics simulations to understand the chain packing and dynamics of polymers in the melts. In particular, the effect of polymer backbone flexibility on the chain packing and the dynamics has been the focus of our research.