

ARTHI JAYARAMAN

EDUCATION

North Carolina State University, Raleigh NC Ph.D. Chemical and Biomolecular Engineering	05/2006
North Carolina State University, Raleigh NC M.S. Chemical and Biomolecular Engineering	12/2002
Birla Institute of Technology and Science, Pilani India B. E. (Honors) Chemical Engineering	08/2000

PROFESSIONAL EXPERIENCE

Assistant Professor Department of Chemical and Biological Engineering University of Colorado, Boulder	08/2008-
Postdoctoral Research Associate Department of Material Science and Engineering University of Illinois, Urbana-Champaign	06/2006 – 08/2008
Graduate Research Assistant Department of Chemical and Biomolecular Engineering North Carolina State University	05/2001 – 01/2006
Graduate Teaching Assistant Department of Chemical and Biomolecular Engineering North Carolina State University	08/2000 – 05/2001
Undergraduate Practical School Research Assistant Chemical Engineering Division Central Leather Research Institute, Madras, India	01/2000 – 06/2000

RESEARCH EXPERIENCE

Postdoctoral research with Dr. Kenneth Schweizer, Department of Material Science and Engineering, University of Illinois at Urbana-Champaign

- Used Polymer Reference Interaction Site Model (PRISM) theory to study structure and phase behavior of polymer tethered nanoparticles.
- Used theory to predict the spatial organization and packing, statistical conformation, and thermodynamics of polymer-tethered nanoparticle-filled polymer nanocomposites.

Doctoral research with Dr. Carol K. Hall and Dr. Jan Genzer, Department of Chemical and Biomolecular Engineering, North Carolina State University

- Doctoral thesis: 'Computer Simulation Studies of Pattern Recognition in Biomimetic Polymers'

- Overall aim: To understand the underlying molecular phenomena governing recognition in numerous biological processes such as antibody-antigen binding, transmembrane signaling, viral-inhibition, etc. Specifically, I used computer simulation to study the thermodynamics of recognition and selective adsorption of biopolymer sequences.
- Studied the thermodynamics and kinetics of hybridization in DNA microarrays using Monte Carlo simulations and theory
- Developed a novel simulation method to design surfaces that can recognize and preferentially adsorb specific monomer sequences in biomimetic polymers
- Used Monte Carlo simulations to study pattern transfer from heterogeneous surfaces into a di-block copolymer film
- Investigated adsorption of comb polymers on a solid surface using lattice Monte Carlo simulations

Undergraduate practical school research with Dr. A. Sivasamy, Chemical Engineering Division, Central Leather Research Institute, Madras, India

- Title: 'Extraction of amino acids using reverse micelles'
- Investigated the effect of amino acid concentration, surfactant concentration, and pH on the solubilization and extraction of the amino acids.

Undergraduate research with Dr. B. V. Babu, Dept. of Chemical Engineering, Birla Institute of Technology and Science, Pilani India on 'Supercritical Fluid Extraction'

Undergraduate research with Dr. R. K. Gupta, Dept. of Chemical Engineering, Birla Institute of Technology and Science, Pilani India on 'Designing a controller for a double pipe heat exchanger'

AWARDS

- *Edward M. Schoenborn Award* for excellence in graduate research, Department of Chemical Engineering, NC State University, 2006
- *Richard D. Gilbert Award* for Best Poster, ACS Polymer Discussion Group, NC section, 2004
- *Edward M. Schoenborn Award* for Best Poster, Department of Chemical Engineering, NC State University, 2003
- *Monali Dey Award* for outstanding undergraduate student in the Chemical Engineering department, Birla Institute of Technology and Science, Pilani, 2000

PUBLICATIONS

- **A. Jayaraman**, C. K. Hall and J. Genzer, 'Designing pattern-recognition surfaces for selective adsorption of copolymer sequences using lattice Monte Carlo simulation', *Phys. Rev. Lett.*, 94, 078103 (2005)
(Selected to appear in *Virtual Journal of Biological Physics*)
- **A. Jayaraman**, C. K. Hall and J. Genzer, 'Computer simulation study of pattern transfer in AB diblock copolymer film adsorbed on a heterogeneous surface' *J. Chem. Phys.* 123, 124702 (2005)
- A. Striolo, **A. Jayaraman**, C. K. Hall, and J. Genzer, 'Adsorption of comb copolymers on weakly-attractive solid surfaces' *J. Chem. Phys.*, 123, 064710 (2005)
(Selected to appear in *Virtual Journal of Biological Physics*)

- **A. Jayaraman**, C. K. Hall and J. Genzer, 'Computer simulation study of molecular recognition in model DNA microarrays' *Biophys. J.*, 91, 2227 (2006)
- **A. Jayaraman**, E. E. Santiso, C. K. Hall and J. Genzer, 'Theoretical study of zipping phenomena in biomimetic polymers' *Phys. Rev. E.*, 76 (1), 011915 (2007)
(Selected to appear in *Virtual Journal of Biological Physics*)
- **A. Jayaraman**, C. K. Hall and J. Genzer, 'Computer simulation study to understand the effect of surface density on hybridization in model DNA microarrays' *J Chem. Phys.* 127, 144912 (2007)
(Selected to appear in *Virtual Journal of Biological Physics*)
- **A. Jayaraman** and K. S. Schweizer, 'Structure and phase behavior of dense solutions and melts of single polymer tethered nanoparticles' *J. Chem. Phys.* 128, 164904 (2008)
(Selected to appear in *Virtual Journal of Nanoscale Science & Technology*)
- **A. Jayaraman** and K. S. Schweizer, 'Effect of number and placement of polymer tethers on the structure of concentrated solutions and melts of hybrid nanoparticles' *Langmuir* (submitted)
- **A. Jayaraman** and K. S. Schweizer, 'A theoretical study of tethered nanoparticles as novel fillers in polymer nanocomposites', (in preparation)

INVITED PRESENTATIONS

- A. Jayaraman*, 'Computer Simulation Studies of Pattern Recognition in Biomimetic Polymers' at The Center for Engineering in Medicine, Harvard Medical School, February 22, 2006
- A. Jayaraman*, 'Computer Simulation Studies of Pattern Recognition in Biomimetic Polymers' at Dept. of Chemical Engineering, University of California, Berkeley, March 21, 2006
- A. Jayaraman*, 'A Theoretical Study of Structure and Assembly of Dense Solutions and Melts of Polymer Tethered Nanoparticles' departmental seminar at Dept. of Chemical and Biomolecular Engineering, Ohio State University, January 17, 2008
- A. Jayaraman*, 'A theoretical study of structure and assembly of dense solutions and melts of polymer tethered nanoparticles' departmental seminar at Dept. of Chemical and Petroleum Engineering, University of Pittsburgh, January 24, 2008
- A. Jayaraman*, 'A theoretical study of polymer tethered nanoparticles: their assembly in melt and role as novel fillers in polymer nanocomposites' departmental seminar at Dept. of Chemical Engineering, University of South Carolina, February 7, 2008
- A. Jayaraman*, 'A theoretical study of polymer tethered nanoparticles: their assembly in melt and role as novel fillers in polymer nanocomposites' departmental seminar at Dept. of Chemical and Biomolecular Engineering, Clemson University, February 14, 2008
- A. Jayaraman*, 'A theoretical study of polymer tethered nanoparticles: their assembly in melt and role as novel fillers in polymer nanocomposites' departmental seminar at Dept. of Chemical Engineering, Lehigh University, February 20, 2008
- A. Jayaraman*, 'A theoretical study of polymer tethered nanoparticles: their assembly in melt and role as novel fillers in polymer nanocomposites' seminar at Molecular Foundry, Lawrence Berkeley National Laboratories, February 28, 2008
- A. Jayaraman*, 'A theoretical study of polymer tethered nanoparticles: their assembly in melt and role as novel fillers in polymer nanocomposites' departmental seminar at Dept. of Chemical and Biological Engineering, University of Colorado, Boulder, March 20, 2008
- A. Jayaraman*, 'A theoretical study of polymer tethered nanoparticles: their assembly in melt and role as novel fillers in polymer nanocomposites' departmental seminar at Dept.

- of Energy, Environmental and Chemical Engineering, Washington University at St. Louis, March 24, 2008
- A. Jayaraman*, 'A theoretical study of polymer tethered nanoparticles: their assembly in melt and role as novel fillers in polymer nanocomposites' departmental seminar at Dept. of Chemical and Biological Engineering, Rensselaer Polytechnic Institute, April 2, 2008

CONTRIBUTED PRESENTATIONS

- A. Jayaraman* and K. S. Schweizer, 'Structure and phase behavior of melts and dense solutions of polymer tethered nanoparticles and colloids' oral presentation at the APS March Meeting, New Orleans, LA March 2008
- A. Jayaraman*, 'Computational and Theoretical Studies of Soft Materials and Biological Systems' poster presentation at the AIChE Annual Meeting, Salt Lake City, UT November 2007
- A. Jayaraman* and K. S. Schweizer, 'Structure and phase behavior of melts and dense solutions of polymer tethered nanoparticles and colloids' oral presentation at the AIChE Annual Meeting, Salt Lake City, UT November 2007
- A. Jayaraman* and K. S. Schweizer, 'Structure and phase behavior of melts and dense solutions of polymer tethered nanoparticles and colloids' oral presentation at the 81st ACS Colloid and Surface Science Symposium, Newark, DE, June 25, 2007
- A. Jayaraman*, C. K. Hall and J. Genzer, 'A Computer Simulation and Theoretical Study of Molecular Recognition in Model DNA Microarrays' oral presentation at the AIChE Conference, November 14, 2006, San Francisco, CA
- A. Jayaraman*, C. K. Hall and J. Genzer, 'Computer Simulation Studies of Pattern Recognition in Biomimetic Polymers' poster presentation at the Polymer Physics Gordon Conference, June 2006.
- A. Jayaraman*, C. K. Hall and J. Genzer, 'Computer Simulation Studies of Pattern Recognition in Biomimetic Polymers' oral presentation at the Edward M. Schoenborn Competition, Dept. of Chemical and Biomolecular Engineering, NC State University, January 24, 2006
- A. Jayaraman*, C. K. Hall and J. Genzer, 'Molecular Recognition in Model DNA Microarrays: A Computer Simulation Study' oral presentation at the AIChE Conference, October 31, 2005, Cincinnati, OH
- A. Jayaraman*, C. K. Hall and J. Genzer, 'Computer Simulation Studies of Pattern Recognition in Biomimetic Polymers' poster presentation at the AIChE Conference, October 30, 2005, Cincinnati, OH
- A. Jayaraman*, C. K. Hall and J. Genzer, 'Pattern Recognition in Biomimetic Polymers' poster presentation at Thermo 2005, College Park, MD
- A. Jayaraman*, C. K. Hall and J. Genzer, 'Designing pattern recognition surfaces for copolymers using computer simulation' oral presentation at the AIChE Conference, November 10, 2004, Austin, TX
- A. Jayaraman*, C. K. Hall and J. Genzer, 'Designing pattern recognition surfaces using computer simulation' poster presentation at the 10th PPEPPD Conference, May 18, 2004, Snowbird, UT.
- A. Jayaraman*, C. K. Hall and J. Genzer, 'Designing pattern recognition surfaces for copolymers using computer simulation' poster presentation at the Richard D. Gilbert Award Symposium, ACS Polymer Discussion Group, February 12, 2004, Raleigh, NC.
- A. Jayaraman*, C. K. Hall and J. Genzer, 'Designing pattern recognition surfaces for copolymers using computer simulation' oral presentation at the AIChE Conference, November 20, 2003, San Francisco, CA.

TECHNICAL SKILLS

- **Programming Languages:** Extensive experience with FORTRAN, C, Pascal, BASIC, Matlab, HTML, Latex
- **Operating Systems:** Redhat Linux (extensive training as a systems administrator), Microsoft Windows
- **Laboratory and Instrumentation:** Stress Rheometer, UV spectrophotometer, Unit operations equipment
- **Languages:** Fluent in English, Hindi and Tamil

ACTIVITIES

- Professional meetings and conferences
 - Chair for 'Theory and Simulation – I' session at APS March Meeting 2008
 - Co-chair for 'Thermodynamics of Polymers' session at AIChE Annual Meeting 2007
- Reviewer for
 - Journal of Chemical Physics
 - Journal of Computational Chemistry
- Reviewer for
 - American Chemical Society Petroleum Research Fund grants
- Member of
 - American Institute of Chemical Engineers
 - American Physical Society
- Computer Systems Administrator (2003 - 2005), Hall Research Group, NC State University
- Graduate Students Recruiting Captain, (2002), Chemical Engineering Department, NC State University
- Joint Secretary (1998 - 1999), Annual Committee of the Chemical Engineering Dept, Birla Institute of Technology and Science, Pilani.