Ravisubhash Tangirala

6012 Martin Luther King Jr Way
Oakland CA 94609
Cell: 413-687-3442
rtangirala@lbl.gov

CAREER OBJECTIVE

To contribute in a challenging research and development position in the alternative energy sector, requiring multidisciplinary skills in synthesis and characterization of nanomaterials, polymers and composites.

EDUCATION

Ph.D. *Polymer Science and Engineering,* University of Massachusetts, Amherst, MA *2009*
Thesis: Assembly, crosslinking and encapsulation using functionalized nanoparticles at liquid interfaces
Advisors: Professor Thomas P. Russell and Professor Todd Emrick

M.S. *Macromolecular Science and Engineering,* Case Western Reserve University, Cleveland, OH *2003*
Thesis: Design and application of photopatternable nanomaterials
Advisors: Professor Eric Baer and Professor Christoph Weder

B.Tech. *Chemical Technology*, Nagpur University, Nagpur, India *2001*
Senior thesis: Crystallization behavior of nanoparticle-filled polypropylene composites

TECHNICAL SKILLS

- Polymer and nanoparticle syntheses including CdE, AgE, CuE, PbE, SnE (E = S, Se, Te), Ag, Au, Co; inorganic and organic ligand functionalization of nanoparticles for directed assembly and composite formation.
- Expertise in relevant polymer/nanoparticle characterization techniques, specifically, small angle x-ray/ neutron scattering (SAXS, SANS), electron microscopy and fluorescence confocal microscopy.

RESEARCH EXPERIENCE

Postdoctoral Fellow, Lawrence Berkeley National Laboratory, Berkeley, CA *Oct 2008-present*

- Developed techniques for preparation of all-inorganic solution-processed nanocomposites, starting from nanocrystal superlattices. Separate synthesis and processing of the nanoparticle and matrix phases allow complete compositional modularity and retention of original superlattice morphology.
- Currently characterizing size-dependent material properties (conductivity, ionic/ electronic transport, etc) of inorganic nanocomposites for potential electronic applications, including battery electrodes, thermoelectrics, phase change memory, electronic switching and photovoltaics.

Graduate Research Assistant, University of Massachusetts, Amherst *Sep 2003-Sep 2008*

- Devised chemistries for ligand crosslinking upon assembly of nanoparticles at an oil-water interface, resulting in crosslinked capsules and ultra-thin sheets that display size-selective encapsulation and membrane-like properties respectively. Employed both irreversible crosslinking (ring opening metathesis polymerization), and pH-sensitive reversible crosslinking (aldehyde-amine chemistry) to prepare capsules composed of inorganic- and bio-nanoparticles.
- Developed extrusion technique to generate submicron-sized crosslinked nanoparticle-stabilized capsules with a narrow size distribution, crucial for applications involving encapsulation and release.
- Demonstrated the importance of nanoparticle ligand chemistry and coverage in overcoming the size dependence during interfacial assembly at a liquid interface, as evidenced by the displacement of 9 nm Co nanoparticles from a toluene-water interface upon addition of 2.5 nm CdSe nanoparticles.
- Grew poly(phenylene vinylene) (PPV) from CdSe quantum dot surfaces to create composites that display energy transfer from PPV to CdSe and reduced blinking compared to CdSe and CdSe/ZnS quantum dots.
- Served as Lab Safety Officer; trained users on and maintained lab facilities and instruments including solvent stills, glovebox, fluorescence spectrometer and confocal microscope.

Graduate Research Assistant, Case Western Reserve University *Sep 2001-Jul 2003*
- Prepared co-extruded multilayer films with alternating layers containing materials with tunable refractive index, useful for photopatterning applications.

Undergraduate intern, National Chemical Laboratory, Pune, India *Oct-Dec 2000*
- Studied the effect of particle size of wollastonite filler on the crystallization behavior and kinetics of polypropylene composites, using polarized optical microscopy.

INDUSTRIAL EXPERIENCE

Bhansali Engineering Polymers Ltd, Bhansali Nagar, M.P., India *Apr-May 2000*
- Summer internship, studying the manufacturing process, including chemistry, process control, quality control and product development of acrylonitrile-butadiene-styrene (ABS) resins.

TEACHING EXPERIENCE

X-ray scattering and diffraction laboratory, University of Massachusetts Amherst *Fall 2006*
- Assisted first year graduate students in studying polymer crystallinity and block copolymer morphologies using x-ray scattering and diffraction, while explaining the underlying concepts.

Polymer synthesis laboratory, Case Western Reserve University, Cleveland, OH *Fall 2002*
- Assisted graduate students in carrying out free radical polymerization of various monomers.

AWARDS AND CO-CURRICULAR ACTIVITIES
- Bausch & Lomb Student Innovation Award *Aug 2008*
- National School on Neutron and X-ray Scattering at Argonne National Laboratory *Aug 2005*
- X-ray diffraction training at PANalytical Inc., Natick, MA *Dec 2004*

LEADERSHIP AND VOLUNTEER ACTIVITIES
- Served as President of the Indian Students Association, UMass Amherst. *2004-2005*
- Member, Volunteers in Service to Education in India (VSEI), a non-profit organization working to help education projects in India. *2005-present*
- Organized and participated in polymer education outreach activities for high school students at UMass Amherst and Case Western Reserve University. *2002, 2005*

CONFERENCE PRESENTATIONS
- MRS National Meeting, San Francisco, CA (Oral) *Apr 2010*
- ACS National Meeting, San Francisco, CA (Oral) *Mar 2010*
- APS National Meeting, New Orleans, LA (Oral) *Mar 2008*
- ACS National Meeting, Chicago, IL (Poster) *Feb 2007*

PATENTS
- R. Tangirala, D. J. Milliron, "Inorganic nanocomposites with modular composition," *Application filed*.

SELECTED PUBLICATIONS
- R. Tangirala, J. L. Baker, A. P. Alivisatos, D. J. Milliron, "Modular inorganic nanocomposites by conversion of nanocrystal superlattices," *Angewandte Chemie - International Edition* **2010***, 49,* 2878.
- R. Tangirala, Y. Hu, Q. Zhang, J. He, T. P. Russell, T. Emrick, "Connecting quantum dots and bionanoparticles in hybrid nanoscale ultra-thin films," *Soft Matter* **2009***, 5,* 1048.
- R. Tangirala, R. Revanur, T. P. Russell, T. Emrick, "Sizing nanoparticle-covered droplets by extrusion through track-etch membranes," *Langmuir* **2007**, *23*, 965.
- J. He, R. Tangirala, T. Emrick, T. P. Russell, A. Boker, X. Li, J. Wang, "Self-Assembly of Nanoparticle–Copolymer Mixtures: A Kinetic Point of View," *Advanced Materials* **2007**, *19*, 381.
- E. Glogowski. R. Tangirala, T. P. Russell, T. Emrick, "Functionalization of nanoparticles for dispersion in polymers and assembly in fluids," *Journal of Polymer Science-A* **2006**, *44*, 5076.
- H. Skaff, Y. Lin, R. Tangirala, K. Breitenkamp, A. Boker, T. P. Russell, T. Emrick, "Crosslinked capsules of quantum dots by interfacial assembly and ligand crosslinking," *Advanced Materials* **2005**, *44*, 2082.