Astha Garg

Department of Chemical Engineering

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**Profile**

* I have 4+ years of experience in material processing and characterization including RCA and piranha cleaning, confocal, optical and electron microscopy, image processing, light scattering and spectroscopy.
* I have invented a device to measure zeta potential at high salt conditions, by manipulating particles with electric fields and and in-situ high speed optical imaging. In this project I automated the acquisition of over 200 videos and the analysis of data from over 2 million images.
* My most recent work was a collaboration with and funded by Halliburton to create, visualized and measure porosity in calcite minerals. As part of it, I led our biweekly phone conference calls, and delivered on the predetermined goals in a short time-frame of 1 year.

**EDUCATION**

**Doctor of Philosophy (PhD)**, Chemical Engineering, expected January 2017

Pennsylvania State University, University Park, PA

Advisor: Prof. Darrell Velegol

GPA: 3.96/4

**Bachelor of Technology**, Chemical Engineering; May 2011

Minor: Energy Science and Engineering

Indian Institute of Technology, Bombay (India)

GPA: 7.33/10

**PUBLICATIONS**

**A. Garg**, C. Cartier, K. Bishop, D. Velegol, *Particle Zeta Potentials Remain Finite in Saturated Salt Solutions.* Langmuir (2016)

S. Das, **A. Garg**, A. I. Campbell, J. Howse, A. Sen, D. Velegol, R. Golestanian and S. J. Ebbens, *Boundaries can Steer Active Janus Spheres*. Nature Communications, 6:8999 (2015).

D. Velegol, **A. Garg**, R. Guha, A. Kar, M. Kumar, *Origins of* *Concentration Gradients for Diffusiophoresis.* Soft Matter, 12, 4686 (2016).

**A. Garg**, C. Gorski, D. Velegol, Dye Penetration Reveals Deep Channels in *Replaced Calcite Crystals* (In Preparation).

**A. Garg**, I. Al’Abri, C. Gorski, D. Velegol, *Controlling Pseudomorphic Mineral Replacement through Transport* (In Preparation).

**Research Experience**

**Graduate Assistant, Penn State University** Aug 2012 – Oct 2016 (Present)

* I characterized the stability (zeta potential) of polymer latex particles at high ionic strength by inventing a new device based on high speed microscopy and electrophoresis.
* I experimentally measured the zeta potential non uniformity of particles of a composite material in order to estimate the adhesive or repulsive interaction between the particle and a glass wall.
* In my current project with Halliburton, I have engineered porosity using in-situ reactions of calcite minerals for enhanced oil recovery.

**Research Intern**, BASF SE, Ludwigshafen, Germany Oct 2011 – Apr 2012

Advisor: Dr. Alexey Shilkin

I increased the efficiency of distillation columns by modeling the fluid flows in columns with sheet structured packings.

**Leadership**

**Laboratory Safety Chief, Velegol lab** Aug 2013 – Dec 2014

* I brought the Colloidal Assemblies lab to full compliance of safety guidelines by slashing storage of unused flammables by 80%, proper waste segregation and hazard labeling.
* My efforts made safety an important consideration for all lab members in planning out new experiments, training undergraduate students and conducting routine experimental work.

**Overall Project Coordinator, Association for India’s Development (AID)** Apr 2014 – Apr 2015

* I worked on publicity and volunteer co-ordination to raise funds in excess of $20,000 in 1 year for AID Penn State.
* I served as a liason between grassroots NGO’s and Penn State to ensure the funds were disbursed timely, properly utilized and that the projects connected with individuals in our chapter.

**Hostel Cultural Councilor, IIT Bombay** Jan 2009 – Jan 2010

* I led hostel teams for inter-hostel championships to victories in Dance, Dramatics, Fine Arts and Literary Arts categories.
* My council’s focus on increased participation, efficient scheduling of group practices, collaboration and conducting workshops drastically improved my hostel’s performance in these championships.

**AWARDS**

Gordon Research Seminar Travel Award (2016)

Prevention of Accidents with Safety (PAWS) Award by Chemical Engineering, Penn State (2013)

Hostel Organizational and Cultural Citation by IIT Bombay (2011)

**PresentationS**

**A. Garg**, C. Cartier, K. Bishop, D. Velegol, Finite *Zeta Potential at High Ionic Strength*. ACS *Colloid and Surface Science Symposium*, 2016 (Talk).

**A. Garg**, C. Cartier, K. Bishop, D. Velegol, *Zeta Potential at High Ionic Strength*. *Colloidal, Macromolecular & Polyelectrolyte Solutions.* Gordon Research Conference (GRC), 2016 (Poster).

**A. Garg**, A. K. Van Dyk, D. Velegol, *Particle-surface adhesion in presence of electrosteric repulsion*. Colloidal, Macromolecular & Polyelectrolyte Solutions. Gordon Research Conference (GRC), 2014 (Poster).

**Hobbies**

I enjoy fiddling with colloid chemistry in the kitchen (cooking), dancing and hiking in my free time.