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

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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.