

Prathamesh S. Karandikar

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OBJECTIVE:

To achieve excellence in Chemical Engineering research

CURRENT EDUCATION:

PhD Student University of Southern California

M.S. Chemical & Biomolecular Engineering

B.S. Chemical & Biomolecular Engineering with Honors

The Ohio State University, Columbus OH

Graduated: May 2015

Graduated: August 2013

GPA: 3.57/4.0

Viterbi Fellow at the University Of Southern California in Dr. Gupta's Research Group

(August 2015 – Present)

- Performed solvent free, functional nanoparticle synthesis via chemical vapor deposition on low vapor pressure liquids
- Fabricated ionic liquid - polymer gel beads using hydrophobic chromatography paper via sequential deposition
- Characterized polymers using DLS, SEM, FTIR, contact angle Goniometry, and GPC
- Karandikar P., Gupta M. "Fabrication of ionic liquid gel beads via sequential deposition" Thin Solid Films, 2017

Project for completion of M.S. degree in Dr. Zakin's Fluid Mechanics Lab

(May 2014 – May 2015)

- Coauthored 'Heat Transfer Enhancement in Turbulent Drag Reducing Surfactant Solutions by Agitated Heat Exchangers' International Journal of Heat and Mass Transfer (In Press)
- Heat transfer enhancement in concentric tube heat exchangers for drag reducing surfactant solutions via pulsatile flow for closed recirculating systems such as district heating and cooling units.
- Studied : fluid dynamics with focus on pulsatile flow; rheological properties of drag-reducing surfactant solutions; microstructure of micelles and high-polymers under flow induced shear; boundary layer problems in heat exchange
- Conducted experiments on sub-pilot scale 30 meter test loop for efficient heat transfer enhancement of drag reducing solution, via temporary destruction of micelle microstructure and/or enhanced turbulence

Lab rotation in Dr. Nicholas Brunelli's Catalysis Research Lab

(January 2014 - May 2014)

- Studied catalytic material design of immobilized organocatalysts, synthesized MCM-41 type silica materials
- Performed grafting of primary amine functionalized silica materials for catalytic testing in aldol condensation reaction
- Studied urea and thio-urea functional group synthesis and catalytic activity for carbon-carbon coupling reaction

Lab rotation in Dr. Wood's Biotechnology Lab

(June 2013 – August 2013)

- Performed gene cloning, Oligo design, PCR reactions, plasmid extraction, restriction digests and bacterial cultures

First-Year Engineering Graduate Teaching Associate

(August 2013 – May 2015)

- Taught advanced use of Matlab to implement arduino microcontrollers for real time control in small vehicles
- Taught computer aided design using Autodesk 2012 and Solidworks and Microsoft Excel

UNDERGRADUATE RESEARCH EXPERIENCE:

(March 2012 – May 2013)

Student Researcher for Dr. Tomasko, Associate Dean for the College of Engineering

(July 2010 – May 2013)

- Coauthored 'Biocompatible Electrospun Polymer Blends for Biomedical Applications' in the Journal of Biomedical Materials Research: Part B - Applied Biomaterials (2014)
- Completed Honors Thesis: "CO₂ Assisted Impregnation of Electrospun Polymer Blends for Biomedical Applications" Awarded \$5000 scholarship by the Undergraduate Honors Committee in the College of Engineering and received 'Outstanding Undergraduate Award for Research Excellence'

- Received honorable mention at the Denman Undergraduate Research Forum poster presentation
- Goals: Use pressurized CO₂ to infuse Rhodamine-B dye into drug delivery systems (polymers);
- Used blends of biocompatible polymers to prepare drug delivery systems and tissue engineering devices; Optimized blend composition to control structural integrity of delivery system; Studied release profiles of the dye after infusion
- Performed FTIR Spectroscopy analysis, SEM, and XRD on polymer samples; Operated high pressure equipment such as ISCO pump and Supercritical fluid extractor; Performed electrospinning of nano-fibers, compression molding of polymer melts, and structural analysis after high pressure treatment

CAPSTONE SENIOR DESIGN EXPERIENCE

(January 2013 – May 2013)

Fuel Grade Ethanol Production from Cellulosic Biomass (Model for Economic Feasibility Analysis)

- Performed an advanced CHEMCAD simulation for Azeotropic distillation of ethanol using pentane as an entrainer
- Performed SuperPro simulation for batch fermentation of cellulose including cellulase enzyme production
- Scheduled batch processes and performed sizing and pricing of equipment for continuous production of ethanol

Pond Aeration to Combat Algal blooms in Commercial Fisheries

- Studied economic feasibility of bubble aerator and venturi aspirator for pond aeration
- Experimentally studied dissolved oxygen levels in pond water using an oxygen probe
- Calculated biological oxygen demand and estimated the cost to supplement the oxygen levels via bubble aeration and venturi aspirator

Acrylonitrile (AN) Continuous Production Process CHEMCAD Simulation

- AN production through gas phase reaction in a fluidized bed followed by degassing and water capture of AN
- Azeotropic distillation of water-AN mixture by pressure swing to achieve 99.8% pure AN
- Iterative calculation of recycle streams for distillation columns for continuously functioning process simulation

ENGINEERING EXPERIENCE:

Summer Intern at Agni Bio Power, Pune India

(July 2010 – August 2010)

- Participated in an exploratory project to convert rice straw to a cleaner biofuel by carbon densification
- Assisted chemists with experimental procedures such as: ash content determination, gross calorific value, moisture content, proximate analysis; Designed lab templates in excel for data collection in experiments
- Executed material handling and field work on pilot plant; Ensured SCADA (supervisory control and data acquisition) and other instrumentation were fully operational during trials

Undergraduate Teaching Assistant for Fundamental of Engineering (F.E)

(September 2010 – April 2012)

- Teaching Computer Aided Design(Autodesk 2012) , MATLAB, Engineering Drawing, Microsoft Excel
- Assisted with lab on a chip project for engineering; Milled chips with computer numeric control; Corrected designs on FeatureCam design software; Delivered finished Microfluidics chips to Students
- Executed curriculum development by preparing tutorial slides for Inventor 2012; Wrote code for Instructional key to operate microcontrollers via MATLAB for stoplight project
- Produced lab equipment to initiate the F.E. program; Soldered L.E.D's, Photo diodes, microcontroller chips; threaded aluminum rods for lab stands

LEADERSHIP EXPERIENCE:

Core Curriculum and Undergraduate Services Committee

(September 2011 – June 2012)

- Student Representative from Chemical Engineering; Worked under Ethics Sub-Committee to approve courses for engineering ethics requirement in Semesters; Assisted revision of syllabus for general chemistry courses for the Quarter to Semester transition

PROFESSIONAL SAFETY & SKILLS:

- Compressed Gas safety; Chemical spill clean-up; Personal protective equipment
- Proficient in Autodesk Inventor, SOLIDWORKS, Microsoft Office, MATLAB, Mathcad, JMP, ChemCad, Basic Calculus, soldering, milling with Computer Numeric Control, threading; Fluent in English, Hindi, Marathi