

PRIYANSHU RANJAN GUPTA

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[Webpage](#) | [Google Scholar](#) | [LinkedIn](#)

EDUCATION

Doctor of Philosophy¹ in Civil Engineering (Environmental and Water Resources Engineering) University of Texas at Austin, USA	2022 - Present CGPA: Ongoing
Master of Technology in Chemical Engineering [Rank 2 in class of 89] Indian Institute of Technology, Bombay	2020-2022 CGPA: 9.56/10
Bachelor of Technology (with Honours) in Chemical Engineering Indian Institute of Technology, Gandhinagar	2015-2019 CGPA: 8.13/10

PUBLICATIONS

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- **Gupta, P.R.**, Shanmukham, S.P., Patel, C., Lienhard, J. H., Swaminathan, J. (2022). *Replacing chloride anions in dyeing enables cheaper effluent concentration and recycling* Desalination, Volume 533, 2022, <https://doi.org/10.1016/j.desal.2022.115761>.
Pre-print Version- [Link](#)

RESEARCH EXPERIENCE

Development of a Rotary Dryer for the Jaggery Industry <i>M. Tech. Thesis Project</i> Dr. Sanjay Mahajani, IIT Bombay (Sponsored by Tata Centre for Technology and Design)	Aug 2021-Jun 2022
<ul style="list-style-type: none">• Conducted extensive literature survey on techniques used to study particle motion in rotating drum• Developed computational model in ANSYS Fluent using Eulerian-Eulerian approach and in LIGGGHTS using Discrete Element Method to study distribution of powder particles between active passive phases in a flighted drum• Mentored 4 undergraduate students to perform field experiments at the pilot plant in Kolhapur, MH, India	
Gas exchange in lungs of COVID-19 infected patients <i>Independent Project</i> Dr. Sanjay Mahajani and Dr. Santosh Noronha, IIT Bombay	Apr-Sep 2021
<ul style="list-style-type: none">• Utilized the Finite Difference Approach to simulate the gas transfer inside a human lung using Weibel geometry• Coded different numerical solvers Euler, RK-4, Adams-Bashforth to solve the convection diffusion equation• Confirmed the presence of diffusion dominated regime by showing Pe < 1 in generations 17-23 of the bronchi	
Zero-Liquid Discharge in Textile Dyeing Units <i>Junior Research Fellow</i> Dr. Jaichander Swaminathan, IIT Gandinagar	Feb-Aug 2020
<ul style="list-style-type: none">• Analyzed past experiment data to quantify the impact of process chemistry on dyeing quality using $\Delta E_{cmc,2:1}$• Designed additional experiments for industrial partner to study effect of dyebath salinity on shade of dyed fabric• First author in the resulting publication in the Desalination journal	
Entropy Generation Minimization (EGM) in Brine Splitting technologies <i>Junior Research Fellow</i> Dr. Jaichander Swaminathan, IIT Gandinagar	Feb-Aug 2020
<ul style="list-style-type: none">• Implemented the EGM approach for osmotically assisted reverse osmosis (OARO) and Electrodialysis (ED) using <i>fsolve</i> and <i>ode45</i> functions in MATLAB• Studied the impact of concentration polarization and membrane properties on specific energy consumption• Co-author in a soon to be published journal article documenting the derivations, methods and results	
Supported Silver Nanoparticles (AgNP) for Catalytic Reduction and Adsorption Processes <i>Visiting Research Scholar</i> Dr. Lee Wilson, University of Saskatchewan	May-Jul 2018
<ul style="list-style-type: none">• Used in-situ UV-Vis studies to investigate the performance of the AgNP catalysts supported by a customized polymer backbone• Tuned the composition of polymer support to reduce the reaction time by 50% to <7minutes for reduction of methylene blue dye• Collected compelling evidence to highlight role of hydrophobicity of support polymer in the performance of catalyst	

¹Ongoing. Expected Graduation: July 2022

SELECT CONFERENCE PRESENTATIONS

- Doltkhah A*, **Gupta PR**, Wilson LD, Adjustable catalytic activity in redox-active polymer for selective organic dyes reduction. Poster Presented at: 103rd **Canadian Chemistry Conference and Exhibition**; 2020 May 28; Winnipeg, MB, Canada
- **Gupta PR***, Doltkhah A, Wilson LD, Supported Silver Nanoparticles (AgNP) for Catalytic Reduction and Adsorption Processes. Poster Presented at: 11th **Bengaluru India Nano 2020**; 2020 March 3; Bangalore, India
- **Gupta PR***, Doltkhah A, Wilson LD, Supported Silver Nanoparticles (AgNP) for Catalytic Reduction and Adsorption Processes. Poster Presented at: **AICHE Student Regional Conference**; 2018 August 11; VIT Vellore, India
- **Gupta PR***, Doltkhah A, Wilson LD, Supported Silver Nanoparticles (AgNP) for Catalytic Reduction and Adsorption Processes. Poster Presented at: **Undergraduate Research Conclave (UGRC)**; 2018 August 25; IIT Gandhinagar

AWARDS AND SCHOLARSHIPS

- **F.L.Y. (Finding the Leader in You) Scholar**, *Competitiveness Mindset Institute, USA* 2021
- **TATA Fellowship (2020-22)**, *TATA Center for Technology and Design (TCTD), IIT Bombay* 2020
- **Dean's List Award for Academic Excellence**, *IIT Gandhinagar* 2019
- **Special Mention for Poster Presentation**, *Undergraduate Research Conclave, IIT Gandhinagar* 2018
- **Dean's List Award for Academic Excellence**, *IIT Gandhinagar* 2017

INDUSTRIAL EXPERIENCE

Management Trainee

Jun 2019 - Jan 2020

Operations Excellence (OE) Team, Aarti Industries Limited

- **Inspected** and **identified gaps** in the existing **P&IDs** of Sulphuric Acid, CSA and DMS plants
- Examined performance metrics for **5 business functions** | Supported **leadership** in managing the division
- Monitored operational productivity for **3 manufacturing plants** | Ensured **>90%** overall equipment efficiency

SELECT TECHNICAL COURSE PROJECTS

Fenton Treatment – Batch to Continuous

Jan-Apr 2021

Industry Defined Problem, SLP | Dr. Sanjay Mahajani, IIT Bombay

Business Model Canvas (BMC) for Automated Jaggery Manufacturing Units

Jan-Apr 2021

Technology Design and Development Laboratory | Dr. Santosh Noronha, IIT Bombay

Design of a seawater desalination plant for producing potable water

Aug-Nov 2019

Process Synthesis and Design | Dr. Babji Srinivasan, IIT Gandhinagar

Feasibility Study for setting up a P.E.T. bottle manufacturing plant

Mar-Apr 2018

Process Plant Design – How to Set Up a Process Industry | Dr. Surya Pratap Mehrotra, IIT Gandhinagar

Synthesis of Curcumin nanoparticles

Jan-Apr 2018

Project Course | Dr. Sameer V Dalvi, IIT Gandhinagar

Enzymatic production of Formaldehyde and Hydrogen Peroxide from methanol

Feb-Apr 2018

Process Analysis and Simulation | Dr. Nitin Padhiyar, IIT Gandhinagar

GRADUATE LEVEL ELECTIVES COMPLETED

At IITB: Advanced Process synthesis, Product Research and Design, Granular Mechanics, Supervized Learning Project

At IITGn: Energy Efficient Design of Separation Processes, Energy Systems, Process Plant Design, Biological Physics

At UT Austin: Physical and Chemical Water Treatment, Water Pollution Chemistry, Mass Transfer in Polymers

VOLUNTARY SERVICE

President, *AICHE IIT Gandhinagar Student Chapter*

Aug 2018-Jul 2019

Founder Organiser, *Drone Racing Amalthea, IIT Gandhinagar*

Aug-Oct 2017

Instructor, *Multiple workshops on Arduino, MATLAB*

Volunteer, *Amalthea, IIT Gandhinagar*

2017

References available on request