

PRIYANSHU RANJAN GUPTA

TATA Fellow, IIT Bombay

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EDUCATION

Master of Technology¹

2020-Present

Chemical Engineering, CGPA: 9.51/10 [Class rank 2 of 72]
Indian Institute of Technology, Bombay

Bachelor of Technology, with Honours

2015-2019

Chemical Engineering, CGPA: 8.13/10
Indian Institute of Technology, Gandhinagar

RESEARCH EXPERIENCE

Development of a Rotary Dryer for the Jaggery Industry

Aug 2021-Present

M. Tech. Thesis Project | Dr. Sanjay Mahajani, IIT Bombay
(Sponsored by Tata Centre for Technology and Design)

- Conducted **extensive literature survey** on techniques used to study particle motion in rotating drum
- Developed computational model in **Ansys Fluent** using Eulerian-Eulerian approach to simulate motion of powder in a rotating drum with eight flights; Studying the agglomeration kinetics of powder inside the dryer
- Mentoring 4 undergraduate students to perform an field experiments at our pilot plant in Kolhapur, MH, India

Gas exchange in lungs of COVID-19 infected patients

Apr-Sep 2021

Independent Project | Dr. Sanjay Mahajani and Dr. Santosh Noronha, IIT Bombay

- Utilised the **Finite Difference Approach** to simulate the breathing pattern of **Weibel model** of human lung
- **Confirmed** the presence of diffusion dominated regime by showing **$Pe < 1$** in generations 17-23 of the bronchi
- Awaiting data from clinical trials to investigate the impact of the breathing pattern on the **convection-diffusion barrier** in the lungs

Zero-Liquid Discharge in Textile Dyeing Units

Feb-Aug 2020

Junior Research Fellow | Dr. Jaichander Swaminathan, IIT Gandinagar

- Analyzed past experiment data to quantify the impact of process chemistry on dyeing quality using $\Delta E_{cmc,2:1}$
- Proposed further experiments at industrial partner to study effect of dyebath salinity on shade of dyed fabric
- **First author** in the resulting manuscript (*submitted*)

Entropy Generation Minimization (EGM) in Brine Splitting technologies

Feb-Aug 2020

Junior Research Fellow | Dr. Jaichander Swaminathan, IIT Gandinagar

- Built a **computational model** using Finite Difference method to implement the EGM approach for osmotically assisted reverse osmosis (**OARO**) and Electrodialysis (**ED**) using *fsolve* and *ode45* 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

May-Jul 2018

Visiting Research Scholar | Dr. Lee Wilson, University of Saskatchewan

- Used **in-situ UV-Vis studies** to investigate the performance of the AgNP catalysts supported by a customised polymer backbone
- Tuned the composition of polymer support to **reduce** the reaction time **by 50%** to <7minutes for reduction of methylene blue dye
- Provided 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

PUBLICATIONS

- **Gupta, P.R.**, Shanmukham, S.P., Patel, C., Lienhard, J. H., Swaminathan, J. (2022). *Cheaper effluent desalination through textile dyeing process modifications*. Manuscript submitted for publication (Under Review)
Pre-print available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3998726

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

COMPETITIVE EXAMS

- **Scored 330/340 on the GRE Exam**, *170/170Q + 160/170V + 4/6AWA* 2021
- **Scored 113/120 on the TOEFL Exam**, *R:28, L:30, S:29, W:26* 2020
- **96.2 percentile in JEE Advanced (out of 150,000 students)**, 2015
- **99.25 percentile in JEE Mains (out of 1.3mn students)**, 2015
- **School Rank 1 in Pascal Mathematics Constat (Univ. of Waterloo)**, *Indian School Al Ghubra* 2011
- **'A' grade in Sastra Pratibha Contest (Top 250 students from 4000)**, *Science India Forum* 2010
- **98.3% percentile in Mathematics**, *ACER, International Benchmark Test* 2010

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

VOLUNTARY SERVICE

President, AIChE IIT Gandhinagar Student Chapter

Aug 2018-Jul 2019

- Secured funding of INR56,000 to help 6 students showcase their research projects at AIChE Student Regional Conference, India 2018

Founder Organiser, Drone Racing Amalthea, IIT Gandhinagar

Aug-Oct 2017

- Organized India's first ever professional drone race in collaboration with the Indian Drone Racing League (IDRL)

Instructor, Multiple workshops

- Led student run workshops on Arduino Uno (2016), 'Utilizing AIChE Resources' (2018), and MATLAB Programming (2021).

Volunteer, Amalthea, IIT Gandhinagar

2017

- Participated in extending the ideas learned in 'Introduction to Design' course to design and fabricate library furniture using high-density corrugated sheets for a local government school in Palaj village.

GRADUATE LEVEL ELECTIVES COMPLETED

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

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

REFEREES

Dr. Jaichander Swaminathan

Kanchan and Harilal Doshi Chair
Assistant Professor, Mechanical Engineering
Indian Institute of Technology, Gandhinagar
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Dr. Santosh B Noronha

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Dr. Sanjay M Mahajani

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Dr. Lee Wilson

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