

Darshana Uttam Malusare

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Educational Qualifications

North Carolina State University, Raleigh, NC

Aug 2022 – Present

Pursuing PhD in Chemical and Biomolecular Engineering. Current GPA: 4.0/4.0

Institute of Chemical Technology, Mumbai, India

Aug 2016 – Jul 2020

Completed Bachelor of Chemical Engineering with Cumulative GPA: 9.24/10

Skills

Optical Microscopy, Scanning Electron Microscopy (SEM), X-ray Diffraction (XRD), Fourier-Transform Infrared Spectroscopy (FTIR), Differential Scanning Calorimetry (DSC), Thermogravimetric Analysis (TGA), SolidWorks, MATLAB, Python

Experience

Graduate Research Assistant – North Carolina State University, Raleigh, NC

Jan 2023 – Present

Advisor – Dr. Saad Khan

- Working on bonding metal organic frameworks (MOFs) to nonwovens using solvent free method
- Designed and built a small-scale setup in the lab to fabricate MOF-fiber composites by aerosolizing MOF particles and depositing on nonwoven web
- Characterization and evaluating functionality of MOF-fiber composites using microscopic techniques, TGA and BET surface area tests.
- Designed and built a single fiber extrusion setup for direct deposition of MOF particles on fiber during extrusion process

Process Engineer - Deccan Fine Chemicals Pvt Ltd, Goa, India

Sep 2020 – Jun 2022

- Provided technical support to the plant for commissioning, trouble shooting and debottlenecking for new and modified processes in collaboration with fellow engineers
- Involved in the design and development of Piping & Instrumentation diagram (P&ID), Process and block flow diagram (PFD, BFD) and Logic flow chart (LFC)
- Conducted process risk assessment for new projects in collaboration with the safety assessor and engineers

Undergraduate Student Researcher – Institute of Chemical Technology, Mumbai, India

Sep 2019 - June 2020

Research Supervisor - Dr. MD Yadav

- Prepared a techno-economic feasibility report of a plant designed to manufacture 100 Tons per day (TPD) green Acrylic Acid
- Designed the process route for manufacture of acrylic acid using glucose as raw material along with process flow diagram
- Developed the detailed design, Piping & Instrumentation Diagram (P&ID) and Hazard and Operability Study (HAZOP) of equipment to be used in the manufacturing process.

Summer Intern - Hikal Ltd, Pune, India

May 2019 - July 2019

- Studied and carried out lab experiments to assess the feasibility of different methods for scrubbing of methyl chloride, HCl and sulphur dioxide gases
- Proposed a suitable design scheme for commercial applications of the given system with the help of ASPEN in collaboration with other engineers and chemists

Research Intern – Institute of Chemical Technology, Mumbai, India

May 2018 - June 2018

Research Mentor - Dr. AB Pandit

- Experimental study of synthetic wastewater treatment using a membrane bioreactor
- Studied the effect of pretreatment and biological treatment on various parameters such as Dissolved Oxygen (DO), Total Organic Carbon (TOC) etc. in case of high Chemical Oxygen Demand (COD) synthetic wastewater

Publication

- **Malusare, D. U., Ghumra, D. P., & Yadav, M. D. (2023).** Bioconversion of CO₂ and potential of gas fermentation for mainstream applications: Critical advances and engineering challenges. Canadian Journal of Chemical Engineering, February, 1–18. <https://doi.org/10.1002/cjce.24977>

Academic Achievements and Awards

- Third place winner of Chemical and Biomolecular Engineering Department's Research Image Contest, 2024
- Cleared the Graduate Aptitude Test (GATE 2020) in Chemical Engineering with an All-India Rank of 581
- Secured third place in Industry Defined Problem (IDP) in Azeotropy 2019, IIT Bombay - designed a packed absorber for the absorption of hydrogen sulfide gas from natural gas using solvent monoethanolamine.
- Secured second place in Industry Defined Problem (IDP) in Vortex 2018, ICT Mumbai – designed a suitable process for recovering salt and monoethylene glycol (MEG) from aqueous streams of pigmentation process.