Dev Patra

Chemical Engineering –Polymer and Materials Engineering Minor

patradev77@gmail.com 9021119840 Jalgaon, India https://www.linkedin.com/in/dev-patra-78711a223/

https://sites.google.com/view/dev-patra07/home

About Me

Technical Palette	MATLAB, Python, DWSIM, CATIA, R, ChemDraw 3D, Plotdigitizer, Endnote, Windows, Excel, PPT
Languages	Full Professional Proficiency – English; Elementary Proficiency- Hindi, Marathi Native Proficiency – Bengali
Work Domain	Thermodynamic Modelling, Artificial Neural Networks, Optimization & Algorithms, AI/ML
Skills	Critical thinking, communication, problem solving, management, leadership
Interests	Designing & Reading,

Education

Institute of Chemical Technology, Mumbai Marathwada Campus, Jalna (2021 – Present)

- Integrated Master of Technology in Chemical Engineering (Major)
  Polymer and Materials Engineering (Minor): Current CGPA – 9.96/10 (Upto 7th Trimester)

Chhatrapati Shivaji Junior College (2019-2021)

- Physics, Chemistry, Mathematics, Biology (HSC Board): Grade – 89.83 %

St. Teresa Convent School (2006-2019)

- SSC Board: Grade – 86.80 %

Work Experience

Thakurji Solvex Private Limited (TSPL) (Jalna, Maharashtra)
Chemical Engineer Intern *March 2024 – June 2024*

- Gained hands-on experience and worked with processes in preparation, solvent extraction, oil refining, DOC (De-oiled Cake) production, and boiler operations within a cottonseed oil extraction plant.

Defence Institute of Advanced Technology, DRDO (Pune, Maharashtra)
Research Intern *September 2023- October2023*

- Actively involved in developing an Artificial Neural Network- based metaheuristic models for predicting the potential of biochar to remove heavy metal pollutants from industrial waste-water effluent.
- Working with different nature-inspired algorithms, including Particle Swarm Optimization (PSO), Cuckoo Search Algorithm, Teaching Learning-Based Optimization (TLBO), Genetic Algorithms and many more.

Bombay Technologist (Jalna, Maharashtra)
Research Intern *March 2023-April 2023*

- Performed an extensive literature review, established a database of relevant properties, and developed code for various thermodynamic models.
- Completed the manuscript and conducted a comprehensive literature survey, in addition to developing crucial code for the project's success.

Publications

Research Article:

Dev K Patra, Debashis Kundu*, Generalized Pitzer-Debye-Hückel (PDH) framework for the deep eutectic solvent assisted extraction of europium (III), americium (III), and uranium (VI), Taylor and Francis.

Dev K Patra, Debashis Kundu*, Systematic Exploration of COSMO-SAC-PDH and EXT-UNIQUAC-PDH* Models for Rare-Earth Element Leaching in Deep Eutectic Solvents, American Chemical Society (ACS)

Book Chapter Under Review:

Dev K Patra, Debashis Kundu*, Deep eutectic solvent in dissolution of lanthanide, actinide and recovery of value-added materials from electronic waste, Elsevier

Conference

Presented a paper titled *Predictive Models for Removing Heavy Metal Water Pollutants with Biochar: Exploring Neural Networks and Machine Learning* at the **International Conference on Machine Learning and Data Engineering (ICMLDE 2024)** in Dehradun.

PROJECTS

Smart Biochar Modeling: AI and ML Approaches for Heavy Metal Removal from Water

- Developed and tested **12 Metaheuristic-ANN models**, including frameworks like *Cuckoo Search Algorithm-ANN (CSA-ANN), Teaching-Learning-Based Optimization ANN (TLBO-ANN), Particle Swarm Optimization ANN (PSO-ANN), Grey Wolf Optimization ANN (GWO-ANN), Krill Herd Algorithm-ANN (KHA-ANN), Firefly Algorithm, and Harmony Search*
- Explored **22 ML models** featuring traditional techniques like Support Vector Machines (SVM), Gaussian Process Regression (GPR), kernels and advanced *custom ensemble models* with *boosted trees, bagged tress as well as LS Boost* for robust and interpretable predictions.
- Collaborated with Defence Institute of Advanced Technology (DIAT-DRDO) under the guidance of Dr. Amrita Nighojkar, and with Vellore Institute of Technology (VIT), partnering with co-authors Rajdeep Chaudhuri and Jayashree Paul to enhance the scope and impact of this research.

Work Under Review:

Polymer Structure Builder Software

Developed a software tool designed to construct large polymer structures in **1D, 2D, and 3D** through innovative replication and manipulation techniques.

- Features include **replication**, **merging**, **axis swapping**, and **linking** functionalities to create intricate polymeric architectures.
- Integrated a comprehensive **repository of structures**, offering pre-designed and customizable templates for quick access and modification.

ORGANIZATIONS

Science Opp's Connect *May 2023- Present*

- Institute Engagement Ambassador
- As a member of the Institutional Engagement team, we identify and connect with institutions that align with our initiative's goals.
- Our team actively gathers contacts and collaborates to establish meaningful partnerships.
- Our primary objective is to create a robust network of institutional partners that support and advance our mission and vision.

Rotaract Club of Jalna Rainbow (NGO) *October 2022- Present*

- Volunteered as part of project IncrEDIbles.

CERTIFICATIONS

- Quantum chemistry Thermodynamic approach — ZastraInnovations
- National Programme On Technology Enhanced Learning (Python for Data Science) — IIT Madras
- National Intellectual Property Rights — Ministry of Commerce and Industry, Government of India