SOMYA DEEP DEY

Bareilly, Uttar Pradesh, (243001) India
+91-9259838049 | ananddey148@gmail.com | linkedin.com/in/somya-deep-dey
Portfolio: https://somyadeep1408.github.io/Somya-Deep-Dey/

RESEARCH INTERESTS

Catalysis and Reaction Engineering, Process Systems Engineering, **Energy Technologies**, **Thermal Energy Storage**, Green Technology, Separation Technologies, **CFD Simulation** and Computational Modeling, Advanced Materials for Energy Applications

EDUCATION

Indian Institute of Technology (IIT) Jodhpur, Rajasthan

Master of Technology (M.Tech) in Chemical Engineering 2023 – 2025
CGPA: 8.04/10.0

Coursework: **Computational Fluid Dynamics**, Transport Phenomena, **Heterogenous Catalysis**, Advanced Reaction Engineering, **Packaging of electronic devices**, Advanced Wastewater Treatments

Thesis: Thermal characterization of inorganic phase change materials for Thermal Energy Storage applications

Advisor: Dr. Krunal Madhukar Gangawane

Uttar Pradesh Textile Technology Institute (UPTTI) Kanpur, Uttar Pradesh

Bachelor of Technology (B.Tech) in Man-Made Fibre Technology 2020 – 2023
CGPA: 7.69/10.0

BTech Project: Observation of acid hydrolyzed cotton cellulose nanocrystals (CNCs)

Advisor: Dr. Pramod Kumar Diwakar

RESEARCH EXPERIENCE

M.Tech Thesis Research, IIT Jodhpur

Advisor: Dr. Krunal Madhukar Gangawane July 2024 – July 2025

- Investigated **thermal energy storage** using inorganic **phase change materials** with metal oxide nanoparticle enhancement for solar thermal applications.
- Synthesized **raw-coconut based biochar** and incorporated iPCM into it for high number of thermal cycles.
- Performed comprehensive **material characterization** using **DSC, TGA, XRD, SEM, FT-IR, and BET** to analyze thermal properties and phase stability.
- Conducted **photothermal conversion** experiments demonstrating enhanced heat storage capacity through nanoparticle dispersion.
- Published research findings in *Powder Technology* (2025) on photothermal conversion characteristics.

B.Tech Final Year Project, UPTTI Kanpur

Advisor: Dr. Pramod Kumar Diwakar 2022 – 2023

- **Produced CNCs via acid hydrolysis** (55-65% HCl) from spinning waste cotton, reducing particle size with higher acid concentration.
- Characterized via **SEM** & **FTIR**; confirmed abundant -OH groups (3760, 3566 cm^{-1}) and nitro functionalization (1541 cm^{-1}).
- Proposed bi-component CNC-PAN filaments for heavy metal (Pb^{2+}, Ni^{2+}) **wastewater treatment** using porous sheath structure.

Research Intern, Defence Research & Development Organisation (DRDO)

ADRDE, Agra July 2022 – August 2022

- Characterized mechanical and thermal properties of **PTFE-coated Kevlar** and glass fabrics for aerospace applications.
- Conducted systematic experimental design and **statistical analysis** achieving 3x strength improvement.
- Collaborated with defense scientists on **high-performance materials** research under stringent quality protocols.

PROFESSIONAL EXPERIENCE

EPP Composites Pvt. Ltd., Rajkot, Gujarat

Engineer July 2025 – Nov 2025

- Led 10+ **pilot-scale trials** with **scale-up analysis**.
- Applied **process simulation** (DWSIM, ASPEN HYSYS) and **CFD** (OpenFOAM, Ansys) for process optimization.
- Developed material/energy balances and **process flow diagrams** for industrial wastewater treatment systems.

Department of Chemical Engineering, IIT Jodhpur

Teaching Assistant July 2023 – July 2025

- Assisted in **Polymer Science, Thermodynamics, Unit Operations**, and **Multi-component Separation Processes**.
- Mentored undergraduate students on laboratory techniques and **research methodology**.
- Developed tutorial materials on **reaction engineering** and **polymer science**.

PUBLICATIONS

- **2nd Author**: Study of photothermal conversion characteristics of metal oxide nanoparticles-based phase change materials, *Powder Technology*, 2025. DOI: 10.1016/j.powtec.2025.121223
- **Manuscript Under Review**: Co-Pyrolysis of Biomass, Plastics, and Waste Tires: Mechanistic Insights, Synergistic Effects, and Optimization Strategies, *Bioresource Technology*, 2025

TECHNICAL SKILLS

Characterization: X-ray Diffraction (XRD), FT-IR Spectroscopy, Scanning Electron Microscopy (SEM), Thermal Analysis (DSC & TGA), BET Surface Area Analysis, Rheometry

Simulation: **CFD** (OpenFOAM, Ansys Fluent), **Process Simulation** (ASPEN HYSYS, DWSIM), MATLAB, Python (NumPy, SciPy, Pandas)

CAD/Modeling: Solidworks, FreeCAD, GMSH (Mesh Generation)

Programming: MATLAB, LaTeX, Linux (Ubuntu/ Kali), Python

Research: Experimental Design, Data Visualization (Origin & Power BI), Statistical Analysis, Literature Review, Technical Writing

CONFERENCE PRESENTATIONS

- Presented research at **18th International Congress on Thermal Analysis & Calorimetry**, IIT Madras, 2024
- Participated in **THRIVE 2025** Innovation Challenge, IIT Jodhpur
- Attended **Industry Day 2024** and **Chem-e-sorption 2023**, IIT Jodhpur

ADDITIONAL TRAINING

- MATLAB Onramp – MathWorks, Dec 2023
- Power BI Desktop – LinkedIn Learning, Sep 2025
- Prompt Engineering – LinkedIn Learning, Sep 2025

REFERENCES

- **Prof. Pradip K. Tewari**
  Jal Jeevan Mission Professor Chair and Head, Department of Chemical Engineering
  Indian Institute of Technology Jodhpur
  Email: pradiptewari@iitj.ac.in
- **Dr. Krunal M. Gangawane**
  Assistant Professor, Department of Chemical Engineering
  Indian Institute of Technology Jodhpur
  Email: krunalg@iitj.ac.in
- **Dr. Sumit Kamal**
  Assistant Professor, Department of Chemical Engineering
  Indian Institute of Technology Jodhpur
  Email: sumitkamal@iitj.ac.in
- **Dr. Santhosh Kumar Varanasi**
  Assistant Professor, Department of Chemical Engineering
  Indian Institute of Technology Jodhpur
  Email: skvaranasi@iitj.ac.in