

SHUBHI GUPTA

Postal address:

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Research area

Waste biomass valorization to fuels and chemicals, Pyrolysis, Gasification, Catalysis, Bio-oil upgradation, Plastic pyrolysis, Life cycle analysis (LCA), Technoeconomic assessment (TEA), Process simulation.

Experience

Assistant Professor	Department of Fuel, Mineral and Metallurgical Engineering, Indian Institute of Technology (Indian School of Mines) Dhanbad, Dhanbad, Jharkhand, India.	31 st Oct. 2023-Present
Post-doctoral fellow (PDF)	Chemical Engineering Department, Indian Institute of Technology Bombay, Mumbai, Maharashtra, India. Project title: "Multiobjective optimization of biomass conversion techniques" Supervisor: Prof. Yogendra Shastri	02 nd June 2023 - 20 th Oct 2023

Education

PhD	Chemical Engineering Department, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, India. Thesis title: "Valorization of waste biomass through catalytic pyrolysis to produce upgraded bio-oil". Thesis defended on 09 th May, 2023. Supervisor: Prof. Prasenjit Mondal	July 2018-May 2023
M.Tech	Chemical Engineering Department, Indian Institute of Technology Banaras Hindu University, Varanasi, Uttar Pradesh, India CGPA: 9.63 Thesis title: "Fixed bed slow pyrolysis of phosphoric acid pretreated walnut shell" Supervisor: Prof. Manoj Kumar Mondal	2016-2018
B.Tech	Chemical Engineering Department, Moradabad Institute of Technology, Moradabad, Uttar Pradesh, India Percentage: 78.16%	2012-2016

Publications

- 1 **Shubhi Gupta**, Goutam Kishore Gupta, and Monoj Kumar Mondal. "Slow pyrolysis of chemically treated walnut shell for valuable products: Effect of process parameters and in-depth product analysis." Energy 181 (2019): 665-676.
<https://doi.org/10.1016/j.energy.2019.05.214>
- 2 **Shubhi Gupta**, Prasenjit Mondal, Venu Babu Borugadda, and Ajay K. Dalai. "Advances in upgradation of pyrolysis bio-oil and biochar towards improvement in bio-refinery economics: A comprehensive review." Environmental Technology & Innovation 21 (2021): 101276.
<https://doi.org/10.1016/j.eti.2020.101276>
- 3 **Shubhi Gupta**, and Prasenjit Mondal. "Catalytic pyrolysis of pine needles with nickel doped gamma-alumina: Reaction kinetics, mechanism, thermodynamics and products analysis." Journal of Cleaner Production 286 (2021): 124930.
<https://doi.org/10.1016/j.jclepro.2020.124930>

- 4 **Shubhi Gupta**, Pushpraj Patel, and Prasenjit Mondal. "Biofuels production from pine needles via pyrolysis: Process parameters modeling and optimization through combined RSM and ANN based approach." *Fuel* 310 (2022): 122230.
<https://doi.org/10.1016/j.fuel.2021.122230>
- 5 **Shubhi Gupta**, Rahul Lanjewar, and Prasenjit Mondal. "Enhancement of hydrocarbons and phenols in catalytic pyrolysis bio-oil by employing aluminum hydroxide nanoparticle based spent adsorbent derived catalysts." *Chemosphere* 287 (2022): 132220.
<https://doi.org/10.1016/j.chemosphere.2021.132220>
- 6 **Shubhi Gupta**, Pushpraj Patel, and Prasenjit Mondal. "Catalytic Pyrolysis Using a Nickel-Functionalized Chemically Activated Biochar Catalyst: Insight into Process Kinetics, Products, and Mechanism." *ACS Sustainable Chemistry & Engineering* (2022): 5770–5780 .
<https://doi.org/10.1021/acssuschemeng.1c08193>
- 7 **Shubhi Gupta**, Pushpraj Patel, and Prasenjit Mondal. "Life cycle analysis (LCA) and economic evaluation of catalytic fast pyrolysis: implication of coproduct's end-usage, catalyst type, and process parameters." *Sustainable Energy & Fuels* (2022): 2970-2988.
<https://doi.org/10.1039/D2SE00079B>
- 8 **Shubhi Gupta**, Pushpraj Patel, and Prasenjit Mondal. "Life cycle analysis (LCA) and operating cost assessment of carbon negative catalytic pyrolysis technique using spent aluminum hydroxide nanoparticle (AHNP) adsorbent derived catalyst: Insights into co-products utilization and sustainability." *Energy & Fuels* (2023): 2960–2971.
<https://doi.org/10.1021/acs.energyfuels.2c03944>
- 9 **Shubhi Gupta**, Pushpraj Patel, and Prasenjit Mondal. " Environmental footprints of the catalytic pyrolysis of pine needles through integration of nickel decorated chemically modified biochar catalyst." *ACS Sustainable Chemistry & Engineering*.
<https://doi.org/10.1021/acssuschemeng.2c07563>
- 10 Pushpraj Patel, **Shubhi Gupta**, and Prasenjit Mondal. "Modeling of continuous adsorption of greywater pollutants onto sawdust activated carbon bed integrated with sand column." *Journal of Environmental Chemical Engineering* 10.2 (2022): 107155.
<https://doi.org/10.1016/j.jece.2022.107155>
- 11 Pushpraj Patel, **Shubhi Gupta**, and Prasenjit Mondal. "Electrocoagulation process for greywater treatment: Statistical modeling, optimization, cost analysis and sludge management." *Separation and Purification Technology* (2022): 121327.
<https://doi.org/10.1016/j.seppur.2022.121327>
- 12 Pushpraj Patel, **Shubhi Gupta**, and Prasenjit Mondal. "Modeling and optimization of process parameters of MB dye adsorption using waste-derived chemically activated biosorbents." *Biomass Conversion and Biorefinery* (2022): 1-20.
<https://doi.org/10.1007/s13399-022-02693-w>
- 13 Pushpraj Patel, **Shubhi Gupta**, and Prasenjit Mondal. "Life cycle assessment (LCA) of greywater treatment using ZnCl₂ impregnated activated carbon and electrocoagulation process: A comparative study." *"ACS Industrial & Engineering Chemistry Research"* (2023): 2960–2971.
<https://doi.org/10.1021/acs.iecr.2c03353>
- 14 Navneeta Lal, **Shubhi Gupta**, Hemant Goyal, Prasenjit Mondal. "Energy generation from waste packaging plastic via thermo-catalytic pyrolysis using catalysts produced from spent aluminum hydroxide nanoparticles" *Clean Technologies and Environmental Policy* (2023): 1-12. <https://doi.org/10.1007/s10098-023-02644-7>
- 15 **Shubhi Gupta**, Pushpraj Patel, Prasenjit Mondal. " Catalytic pyrolysis of pine needles using metal functionalized spent adsorbent derived catalysts: Kinetics, thermodynamics and prediction modelling using artificial neural network (ANN) approach. " *Industrial Crops and Products* (2024): 118481.
<https://doi.org/10.1016/j.indcrop.2024.118481>
- 16 Pushpraj Patel, Ioanna Dimitriou, Prasenjit Mondal, Omvir Singh, **Shubhi Gupta***. "Process optimisation and enviro-economic assessment of carbon-negative hydrogen production from biomass co-gasification" *Energy Conversion and Management* (2025): 119211 <https://doi.org/10.1016/j.enconman.2024.119211>

Book chapter

- 1 **Shubhi Gupta**, Anil Kumar Varma and Prasenjit Mondal, "Catalytic upgrading of bio-oil and bio-crude oil to synthetic transportation fuels" *Biomass to Bioenergy*, Woodhead Publishing (2024): 155-184.
<https://doi.org/10.1016/B978-0-443-15377-8.00007-2>

Conference Presentation

- 1 **Shubhi Gupta**, Prasenjit Mondal, Nand K. Saini and Chiranjeevi Thota. "Upgradation of pyrolysis bio-oil through hydrodeoxygenation using bimetallic Fe-Co/Al₂O₃ catalyst". "ACS spring 2021, American Chemical Society meeting and events". (April 2021)
- 2 **Shubhi Gupta**, and Prasenjit Mondal. "Enhancement of bio-oil properties from catalytic pyrolysis of pine needles using iron doped gamma alumina catalyst". "Advances in Chemistry and Chemical Engineering 2021 (ACCE 2021)". NIT Surat, India. (April 2021)
- 3 **Shubhi Gupta**, and Prasenjit Mondal. "Enrichment of bio-oil fuel properties via catalytic pyrolysis of pine needles using biochar catalyst". "Advances in Sustainable Research for Energy and Environmental Management (ASREEM-2021)". NIT Surat, India. (August 2021)
- 4 **Shubhi Gupta**, and Prasenjit Mondal. "Phenols and hydrocarbons enhancement in pyrolysis bio-oil using metal doped alumina catalyst". "CHEMCON-2021, 71th Annual Session of Indian Institute of Chemical Engineers". CSIR-IMMT, Bhubaneswar, India. (December 2021)

Teaching experience

- 1 Fine Particle Processing of Coal and Minerals
- 2 Processing of Liquid and Gaseous Fuels
- 3 Elements of Mineral Engineering
- 4 Particle Technology
- 5 Fuel Technology Laboratory
- 6 Processing of Liquid and Gaseous Fuels Laboratory
- 7 Particle Technology Laboratory

New Courses/Lab development

- 1 Developed a new theory-course titled 'Processing of Liquid and Gaseous Fuel' for M.Tech (Fuel & Energy Engineering).
- 2 Developed a new NEP UG course titled 'Fuel to Chemicals'
- 3 Developed a new lab titled 'Processing of Liquid and Gaseous Fuel Lab' for M.Tech (Fuel & Energy Engineering).

Projects

- 1 Development of a closed loop approach for enhanced conversion of agro-residues to liquid hydrocarbons using multifunctional pyrolysis-derived porous graphitic carbon catalyst June 2025
Funding Agency: ANRF (Under Prime Minister Early Career Research Grant)
Amount: 58.03 Lakhs
- 2 Sustainable production of liquid and solid biofuels through catalytic co-pyrolysis of waste biomass and plastic feedstocks June 2024
Funding Agency: IIT ISM Dhanbad (Under Faculty Research Scheme)
Amount: 20 Lakhs

Positions/Responsibilities

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| 1 | Department Purchase Advisory Committee (DPAC) member for financial year 2025-26 | March 2025 – Present |
| 2 | Warden of Emerald Hostel | June 2025 – Present |
| 3 | Department Event Coordinator | Oct. 2024 – Present |
| 4 | Department Advisory Committee (DAC) member | Oct. 2023 – Present |

M.tech. and Ph.D. Supervision

Ph.D. Supervision

1	Vishak G (25DR0016)	Feb. 2025-Present
2	Puranjay Pratap (25DR0034)	March 2025-Present
3	Modhu Sailan Bagani (25DR0043)	March 2025-Present

M.tech. Supervision

1	Aman Kumar Gupta (24MT0043)	July 2024-Present
2	Anshuman Verma (24MT0070)	July 2024-Present
3	Praveen Kumar Soni (24MT0314)	July 2024-Present
4	Rahul Kumar (24MT0332)	July 2024-Present

Achievement and Award

1	Awarded IIT (BHU) Varanasi medal for standing first in Chemical Engineering at the M. Tech. Examination of 2018	2018
2	Received All India Rank (AIR) 125 in GATE Chemical Engineering Examination 2018	2018

Software skills

Life Cycle Analysis (GaBi; OpenLCA); Response Surface Methodology (ANOVA); Artificial Neural Network (MATLAB); Mathematical optimization (GAMS), Process simulation (Aspen Plus)