Dr. Shailja Rai

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Career Objective

- To pursue a challenging and fulfilling career as an Assistant Professor of Chemistry, specializing in Polymer Chemistry, where I can effectively contribute to undergraduate and postgraduate teaching, develop innovative and application-oriented research in Chemistry and mentor students toward academic and industrial excellence. I aim to actively engage in interdisciplinary research, secure competitive research funding, publish in reputed journals, and support institutional growth through curriculum development, academic administration, and community outreach.

Education

- **Madan Mohan Malaviya University of Technology, Gorakhpur** 2024
  Doctor of Philosophy (Polymer Chemistry)
  Mentor: Prof. Poorn Prakash Pande **Thesis Title**: Synthesis, Characterisation and Application of Polymer-Enzyme Bioconjugates based on Various Vinylic Monomers
- **Lucknow University** 2019
  Master of Science (Chemistry)
  71.4
- **Delhi University** 2016
  Bachelor of Science (Chemistry Hons.)
  71.4

Experience

- Over a three-year tenure as a Research Scholar at Madan Mohan Malaviya University of Technology, Conducted inorganic chemistry laboratory courses for B. Tech. students across four semesters and for Master's students for two semester, while also mentoring eight M. Sc. students and one Ph. D. candidate in their research projects.

Teaching Interest

- Polymer Chemistry, Spectroscopy, water hardness, Organometallic, Atomic and Molecular Orbital Theory, Thermodynamics, Electrochemistry, Chemical Kinetics.

Research Interest

- Polymer Synthesis and Characterization
- Immobilization of Enzymes with polymer
- Biocompatible and Smart Polymer
- Nanomaterial Synthesis, Characterization and Properties

Research And Synthetic Skills

- Experience in polymer synthesis techniques (emulsion, solution polymerization), nanoparticle and nanocomposite synthesis.
- Proficient in schlenk line technique, grafting techniques, RAFT, ATRP and NMP techniques.
- Handled catalysis in organic reactions (acid/base, organometallic, enzymatic) and also purification techniques (chromatography, recrystallization, distillation).
- Experience in software such as Chemdraw, ChemSktech, Origin, Microsoft (Excel, Word, Power Point), Mercury, Matlab and MestReNova.
- Possess strong communication skills, a self-motivated and creative approach to problem-solving, and the ability to work effectively both independently and as a part of a team.
- Hands-on experience in operating UV-Vis., FT-IR, GPC, NMR, SEM and HPLC as well as solving complex

problems related to structure elucidation.

Achievements & Awards

- Qualified for the award of Scholarship for Higher Education (SHE) under Innovation in Science Pursuit for Inspired Research (INSPIRE).
- Best oral presentation in Chemistry in 3rd International Conference on STAEBM-2023, at NIT Shrinagar, Jammu and Kashmir, India.
- Commendable Research Award for excellence in research, 2025 (July and December) at MMMUT, Gorakhpur

Publications

- **Shailja Rai**, Poorn Prakash Pande, Krishna Kumar, Enhancement of urease properties by introducing new interface based on pH responsive Polymer-Enzyme Bioconjugates via grafting through-RAFT polymerization technique, *Material Chemistry and Physics*, 2023, doi: 10.1016/j.matchemphys.2023.128009 (Published).

- **Shailja Rai**, Poorn Prakash Pande, Krishna Kumar, Ameliorating Enzyme Functionality with Temperature and pH Responsive Polymer Interface, *Journal of Polymer Research*, 2024, doi: https://doi.org/10.1007/s10965-024-04227-6 (Published).

- **Shailja Rai**, Poorn Prakash Pande, Krishna Kumar, Emergence of ADM-mediated bioconjugate to enhance longevity and catalytic efficiency of urease, *International Journal of Biological Macromolecules*, 2024, doi:https://doi.org/10.1016/j.ijbiomac.2025.139629 (Published).

- **Shailja Rai**, Poorn Prakash Pande, Krishna Kumar, Reinforcement of Urease through Encapsulation with β-Cyclodextrin-based Bioconjugates: A Comparative Analysis and Kinetic Assessment, *Reactive and Functional Polymers*, 2025, doi: https://doi.org/10.1016/j.reactfunctpolym.2025.106532 (published).

- Vinai Kumar Singh, Krishna Kumar, **Shailja Rai**, Quick Catalytic Responsive Chitosan Flakes@Ag/CuO Nanocomposites in Organic Synthesis and Environmental Remediation" , Journal of Environmental Chemical Engineering (2023) (published).

- Aradhana Chaudhary, Krishna Kumar, **Shailja Rai**, Poly(acrylamide)-co-poly(hydroxyethyl methacrylate)-co-poly(cyclohexyl methacrylate) Hydrogel Platform for Stability, Storage, and Biocatalytic Applications of Urease" , International Journal of Biological Macromolecules (2024) (published).

- Nisha Yadav, Krishna Kumar, **Shailja Rai**, "Newly Designed Acrylamide Derivative-Based pH-Responsive Hydrogel-Urease Bioconjugates: Synthesis and Catalytic Urea Hydrolysis", Soft Matter, (2022) (published).

- Vinai Kumar Singh, Krishna Kumar, **Shailja Rai**, "Fabrication of Cationic Microgels Doped MnO_2/Fe_3O_4 Nanocomposites and Study of Their Photocatalytic Performance and Reusability in Organic Transformations", Polymer Advanced Technologies, (2024) (published).

- Rudramani Tiwari, **Shailja Rai**, Krishna Kumar, "High-Performance Nitrogen-Polymer Fertilizer: Synthesis, Characterization, and Application in Sustainable Agriculture", Chemical Engineering Journal, (2025) (published).

- Aradhana Chaudhary, P. P. Pande, **Shailja Rai**, "Chitosan-Based Core-Shell Microgel Support for Urease: Step-Up of Enzyme Activity, Stability, and Storage" , Next Materials (2025) (published).

- Tarkeshwar Prasad, Poorn Prakash Pande, **Shailja Rai**, "Fabrication of Low-Cost Thermoresponsive Microgel@CuO Catalyst for Rapid Reduction of Methylene Blue Dye", Journal of Polymer Research (2024) (published).

- Utkarsh Rai, Poorn Prakash Pande, **Shailja Rai**, "Facile Synthesis of Cobalt Oxide-Doped Hydrogel Nanocomposite for Efficient Methylene Blue Dye Removal", Chemistry Africa (2025) (published).

- Varsha Yadav, Poorn Prakash Pande, **Shailja Rai**, "Fabrication and analysis of copper oxide–based hydrogel nanocomposite for the extraction of MB dye from wastewater", Colloid and Polymer Science (2025) (published).

- Aradhana Chaudhary, Poorn Prakash Pande, **Shailja Rai**, "Fabrication of Microgel@TiO2 /ZnO NPs for Efficient Degradation of Methylene Blue Under Solar Light, Journal of Applied Polymer Science (2025) (published).

- Tarkeshwar Prasad, Poorn Prakash Pande, **Shailja Rai**, "Smart microgel-encased nanoceria for pH-triggered catalytic efficiency, Iranian Polymer Journal, (2025) (published).

Conferences And Workshops

- International Conclave on "Materials, Energy and Climate" (Enzymatic Activity Enhancement in Polymer-Enzyme Bioconjugates by Grafting through Technique of RAFT Polymerization using pH Responsive Polymers) organized by IGDTU for Women, Delhi, India, 2022.
- International Conference on "Frontiers in Desalination, Energy, Environmental and Material Sciences for Sustainable Development" (FDEEMSSD-2023), (New Dual Interface Polymeric Platform for Urease: Synthesis, Characterization and Application) organized by MMMUT, Gorakhpur, India.
- 3rd International Conference Innovative Research in Sciences, Technology, Agriculture, Environment, Business Management and Humanities" (STAEBM-2023), (Tailoring of Enzyme-Polymer Bioconjugates using Stimuli Responsive Polymers with Preserved Enzymatic Activity) organized by NIT Srinagar, Jammu and Kashmir, India.
- Power Progress: The International Conference on Energy, Functional Materials and Photonics (PPICEFP-2024), (RAFT Grafting through Mode Utilizing Multiple Responsive Polymer Matrix Connectors for Preserved Urease Enzyme Activity) organized by MMMUT, Gorakhpur, India.
- International Conference on Recent Innovation in Biomaterials and Tissue Engineering (ICRIBTE-2024), (Reinforcement of Urease through Encapsulation with Beta-cyclodextrin based Bioconjugates: A Comparative Analysis and Kinetic Assessment) organized by HBTU, Kanpur, India.

Reference

- **Dr. Mritunjay Kumar Shukla - CSIR-Indian Institute of Petroleum, Mohkampur Haridwar Road, Dehradun-248005, India**
  Senior Principal Scientist Head - Engineering Services Division (ESD)
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- **Prof. Poorn Prakash Pande - Madan Mohan Malaviya University of Technology, Gorakhpur**
  Department of Chemistry
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- **Prof. Tushar Jana - School of Chemistry, University of Hyderabad, Gachibowli (P.O.), Hyderabad, Telangana-500046, India**
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Declaration

- I do hereby declare that the information mentioned above is correct to the best of my knowledge. If given a chance, I will prove my efficiency, loyalty, and willingness to work.