Dr. ABHISHEK SHARMA

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RESEARCH INTERESTS

Environmental Nano-chemistry | Nanomaterials | Advanced Oxidation/Reduction Processes | Emerging Pollutants | Catalysis | Adsorption | Environmental Monitoring & Profiling | Environmental Remediation | Water and Wastewater Management | Scientific Writing | Research & Development |

EDUCATION

- **Ph.D. in Environmental Nano-chemistry** — **First class, (2025)**
  University: Academy of Scientific & Innovative Research (AcSIR), CSIR-NEERI, Nagpur, India
  Title: "Diversified Catalytic Nano-structures for Remediation of Emerging Pollutants"
- **M.Sc. in Environmental Sciences** — **First class, (2018)**
  University: Central University of South Bihar, Gaya, India.
- **B.Sc. in Chemistry (Honors)** — **First class, (2016)**
  College: RD and DJ College, Munger, India
  University: Tilka Manjhi Bhagalpur University, Bhagalpur, India

RESEARCH EXPERIENCES

Ph.D. (Junior/Senior Research Fellow), CSIR-NEERI — Awarded

Title: *"Diversified Catalytic Nano-structures for Remediation of Emerging Pollutants"*

- Engineered multifunctional nanomaterials and heterostructures for water and wastewater remediation.
- Investigated catalytic, redox, and AOP/ARP processes targeting POPs, PPCPs, ARBs, and ARGs.
- Conducted and interpreted advanced physicochemical characterization (SEM, TEM, XRD, XPS, EIS, BET, FTIR, DRS, DLS).
- Operated and maintained analytical instruments (UFLC, GC-MS/TQ, AAS, IC, ICP-OES) for pollutant profiling.
- Modelled degradation kinetics and mechanistic pathways using experimental, chemometric.
- Density Functional Theory and computational approaches.
- Collaborated on interdisciplinary R&D and consultancy projects with strict time-bound deliverables.
- Authored and co-authored multiple high-impact peer-reviewed publications.

Master's Research, CUSB, Gaya — Jul 2016 – May 2018

M.Sc. Dissertation: "Physio-chemical Properties of Water, Surface Sediments, and Core Sediments in the Vicinity of Tobacco Industry, Munger, Bihar"

- Collected, analyzed, and interpreted water and sediment quality data.
- Evaluated industrial impact on surface and core sediment contamination profiles.

Master's Summer Internship, JNU, New Delhi — Jul 2016 – May 2018

M.Sc. Internship: "Comparative Study on the Occurrence and Distribution of Heavy Metals in Core Sediments of Ganga and Ghagra Floodplains, Ballia, India"

- Surveyed and sampled floodplain sediments from two major river systems.
- Assessed and compared heavy metal distribution patterns using advanced analytical techniques.

FELLOWSHIP & AWARDS

1. University Grants Commission-Junior/Senior Research Fellowship: **Awarded, Dec 2018**
2. University Grants Commission-National eligibility test: **Awarded, Dec 2019**
3. Poster Presentation, IISF- 2020 **Third Prize (2020)**
4. Oral presentation, PANI-WATER Workshop- 2024 **Jury Award (2024)**

PUBLICATIONS & FEATURED COVER ART

1. ACS Applied Nano Materials, **Cover Art, Vol. 8, Issue 28, July 2025**; Acoustic Cavitation-Assisted Ag/Fe Bimetallic Nanoparticle-Based Integrated Heterocatalytic System Synergistically Promotes Rapid Degradation of Polybrominated Diphenyl Ethers" https://pubs.acs.org/toc/aanmf6/8/28 **(Cover Art)**

2. **Sharma, A.,** Panchal, D., Jiang, S., Mushrif, S. H., & Pal, S. (2025). Acoustic Cavitation-Assisted Ag/Fe Bimetallic Nanoparticle-Based Integrated Heterocatalytic System Synergistically Promotes Rapid Degradation of Polybrominated Diphenyl Ethers. ACS Applied Nano Materials, 8, 28, 14170–14192. https://doi.org/10.1021/acsanm.5c02189 **(I.F.: 5.5)**

3. **Sharma, A.,** Juneja, C., & Pal, S. (2025) Boron nitride nanomaterials for environmental remediation, energy, and sensing: a review. Environmental Chemistry Letters, 1-65. https://doi.org/10.1007/s10311-025-01852-5 **(I.F.: 20.4)**

4. Singh, A. V., **Sharma, A.**, Kumar, M. S., Naoghare, P. K., & Pal, S. (2025). Biointerface Behavior of Layered Double Hydroxides: Dispersibility and Toxicity Assessment Using Experimental and Computational Models. Langmuir. https://doi.org/10.1021/acs.langmuir.5c04928 **(I.F.: 3.9)**

5. **Sharma, A.,** & Pal, S. (2025) Heterogeneous Coupled System Catalyzed Fe-redox Cycle for Enhanced Debromination of Decabromodiphenyl ether: Presenting A Degradation Model and Optimization Using Response Surface Methodology. **(Chemical Engineering Journal, Under review)**

6. Juneja, C., **Sharma, A.,** & Pal, S. (2025). Tapping the solar spectrum through vacancy engineering: Application in environmental remediation and energy production. Materials Today Chemistry, 47, 102866. https://doi.org/10.1016/j.mtchem.2025.102866 **(I.F.: 6.7)**

7. Panchal, D., **Sharma, A.**, Mondal, P., Prakash, O., & Pal, S. (2021). Heterolayered TiO_2@ layered double hydroxide-MoS_2 nanostructure for simultaneous adsorption-photocatalysis of co-existing water contaminants. Applied Surface Science, 553, 149577. https://doi.org/10.1016/j.apsusc.2021.149577 **(I.F.: 6.9)**

8. Panchal, D., **Sharma, A.**, & Pal, S. (2023). Engineered MoS_2 nanostructures for improved photocatalytic applications in water treatment. Materials Today Sustainability, 21, 100264. https://doi.org/10.1016/j.mtsust.2022.100264 **(I.F.: 7.9)**

9. Tripathy, P., Prakash, O., **Sharma, A.**, Juneja, C., Hiwrale, I., Shukla, V., & Pal, S. (2024). Facets of cost-benefit analysis of greywater recycling system in the framework of sustainable water security. Journal of Cleaner Production, 451, 142048. https://doi.org/10.1016/j.jclepro.2024.142048 **(I.F.: 10.0)**

10. Prakash, O., Tripathy, P., Zade, A., **Sharma, A.**, Juneja, C., Hiwrale, I., Shukla, V., Kannan, K., & Pal, S. (2024). Multifaceted dimensions of greywater recycling in advancing sustainable development goals: a comprehensive review. Environment, Development and Sustainability, 1-30. https://doi.org/10.1007/s10668-024-05668-1 **(I.F.: 4.2)**

11. Bobde, P., Patel, R. K., Panchal, D., **Sharma, A.**, Sharma, A. K., Dhodapkar, R. S., & Pal, S. (2021). Utilization of layered double hydroxides (LDHs) and their derivatives as photocatalysts for degradation of organic pollutants. Environmental Science and Pollution Research, 28(42), 59551-59569. https://doi.org/10.1007/s11356-021-16296-x

12. Panchal, D., Tripathy, P., Prakash, O., **Sharma, A.**, & Pal, S. (2021). SARS-CoV-2: fate in water environments and sewage surveillance as an early warning system. Water Science and Technology, 84(1), 1-15. https://doi.org/10.2166/wst.2021.146 **(I.F.: 2.6)**

13. Bobde, P., Sharma, A. K., Panchal, D., **Sharma, A.**, Patel, R. K., Dhodapkar, R. S., & Pal, S. (2023). Layered double hydroxides (LDHs)-based photocatalysts for dye degradation: A review. International Journal of Environmental Science and Technology, 20(5), 5733-5752. https://doi.org/10.1007/s13762-022-04007-z **(I.F.: 3.4)**

14. Singh, A. V., Panchal, D., **Sharma, A.**, Nandanwar, C., Kumar, M. S., Pal, S., & Naoghare, P. K. (2024). Dispersion behaviour of molybdenum disulfide (MoS_2) nanosheets in different exposure media and determination of its toxicity using in-vitro and in-silico approaches. Applied Materials Today, 36, 102023. https://doi.org/10.1016/j.apmt.2023.102023 **(I.F.: 6.9)**

BOOK CHAPTERS (Authored & Co-authored in 14+ book chapters)

Scholar google: /com/abhishek-sharma

TEACHING EXPERIENCES

M.Sc. Mentoring / Demonstrator, CSIR-NEERI

- Supervised 5 M.Sc. dissertation students on nanomaterials and water remediation.
- Provided training on analytical instrumentation, statistical analysis, and scientific writing.

TECHNICAL STRENGTHS

- **Nanomaterials:** Synthesis, Functionalization, Catalysis, Adsorption, Field Mapping of Emerging Contaminants.
- **Computational & Data Analysis:** Material Studio (DFT), OriginPro, Minitab, Past, MS Office, Design-Expert.
- **Analytical Techniques:** UFLC, GC, IC, ICP-OES, FTIR, AAS, Fluorometer, BET analyzer, DLS, SEM, XRD.
- **Scientific Software:** MDI Jade, CASA, ASiQwin, ChemDraw, OpenChrom, ImageJ, GATAN, NIST, Photoshop.
- **Experimental Expertise:** POPs/PPCPs Degradation, Water Quality Analysis, Pollutants Monitoring and Profiling.

CONFERENCES, WORKSHOPS & PRESENTATIONS

1. **A, Sharma.**, D, Panchal, & S. Pal* Functionalized Layered-Nanosheets for simultaneous removal of Organic Dyes, International Conference on Photo-irradiation and Adsorption based Novel Innovations for Water-treatment, PANI-WATER, Bits Pilani, Goa, India, 3rd-4th, March 2020. **(Conference, Poster).**

2. A, Sharma., P, Tripathy, & S. Pal*, Covid-19 Biomedical Waste Problems and Challenges, IISF-2020, Nagpur, India. 21-24th December, 2020. **(Conference, Poster, Third Prize).**

3. **A, Sharma**., D, Panchal., P, Tripathy., O, Prakash, & S. Pal*, Functionalized Layered-Nanosheets for simultaneous removal of Organic Dyes, IISF-2021, Goa, India. 10-13th December, 2021 **(Conference, Poster).**
4. **A, Sharma**., D, Panchal, & S. Pal* Modulating Morphology of Iron-Silver Bimetallic Nanostructure Through Photo-oscillation of Ferroso-Ferric System and Their Environmental Application, International Online Conference on Nano Materials (ICN-2022), Mahatma Gandhi University, Kerala, India. 12th-14th August 2022. **(Conference, Poster).**
5. Participation in the workshop on Water Treatment Technologies for Water Challenged Sites in India: Opportunities for Research based Solutions, IIT Roorkee, India. 15th-16th, 2023 **(Workshop).**
6. **A, Sharma**., D, Panchal., C, Juneja, & S. Pal* Heterolayered Nanocomposites for Adsorption-Photocatalysis Dual Modality Remediation of Diversified Contaminants, Indo-US workshop, CSIR-NEERI, Nagpur, India, 3rd-5th January, 2024. **(Workshop, Poster).**
7. Oral presentation on India-EU: PANI-WATER Workshop "Development of Hetero-Catalytic Nanomaterial for Rapid Degradation of Decabromodiphenyl Ether", CSIR-NEERI, Nagpur, India. 22nd-24th, 2024. **(Workshop, Oral presentation, Jury award).**

TRAININGS & CERTIFICATIONS

1. **Hazardous Chemical Assessment** (Stockholm University, 2024).
2. **DFT Training via Quantum Espresso** (Udemy, 2024).
3. **XRD Application Training** (Malvern, 2024).
4. **CETP/ETP Training** (CSIR-NEERI, 2019).
5. **Nanomaterial & Nanodevice Modeling Simulation Using NANODCAL & RESCU SOFTWARE (Density Functional Theory)** (Impulse Technology, Nanoacademic Technologies, 2025).

PROFESSIONALS SKILLS & LANGUAGES

- Independent research execution, Team leadership, Critical thinking, Strategic adaptability, Visionary planning, problem solving
- Languages: English (IELTS), Hindi & Angika (native)

I hereby declare that the information furnished above is true to the best of my knowledge.

ABHISHEK SHARMA