Dr. Gopinath Gorai

Assistant Professor | Department of Chemistry

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1. Academic Profile

I am an Assistant Professor and Head of the Department of Chemistry at St. Xavier's College (Autonomous), Maharo, Dumka, where I also serve as the Research and Publications Coordinator. I hold a Ph.D. in Chemistry from Sido Kanhu Murmu University and an M.Sc. in Organic Chemistry from VIT University, Vellore. My career brings together over 8 years of collegiate teaching experience and 6 years of industrial R&D experience across multinational pharmaceutical and chemical organizations including Merck Life Science, Syngene International, and AstraZeneca. My research focuses on environmental chemistry, heavy metal toxicity, and bio-geochemical translocation in soil, water, and agricultural ecosystems, alongside core expertise in synthetic organic chemistry and anti-tubercular drug discovery.

2. Educational Qualifications

Degree	Specialization	Institution / University	Year
Ph.D.	Chemistry	Sido Kanhu Murmu University (SKMU), Dumka, Jharkhand	2019 – 2024 (Awarded)
M.Sc.	Organic Chemistry	VIT University, Vellore, Tamil Nadu	2010 – 2012
B.Sc.	Chemistry, Biotechnology, Genetics	Garden City College, Bangalore (Affiliated to Bangalore University)	2007 – 2010

3. Areas of Specialization / Research Interests

- **Area of Specialization:** Organic Chemistry
- **Environmental Metal Toxicity:** Investigation of heavy metals and fluoride contamination, deposition mechanisms, and bioavailability/bioaccessibility in soil, aquatic systems, and agricultural crops.
- **Risk Modeling & Machine Learning:** Human dietary and health risk assessments using Sobol sensitivity analysis and machine learning–driven source attribution.
- **Synthetic Organic & Medicinal Chemistry:** Design, synthesis, route optimization, and characterization of novel bioactive scaffolds and small molecules, with application to anti-tubercular drug discovery.

4. Teaching Experience

Total Teaching Experience: 8+ Years (plus 6 Years of Industrial R&D Experience)

Courses Taught: Organic Chemistry, Inorganic Chemistry, Physical Chemistry (Theory & Laboratory Practicals)

Institution / Organization	Designation	Department / Functional Unit	Period
St. Xavier's College (Autonomous), Maharo, Dumka	Assistant Professor (HOD)	Department of Chemistry	Jan 2018 – Present
Merck Life Science India, Bangalore	Senior Associate	Product Information	Jun 2015 – Jan 2018
Syngene International Pvt. Ltd. (Biocon), Bangalore	Research Associate	Custom Synthesis / R&D Division	May 2014 – May 2015
AstraZeneca India Pvt. Ltd., Bangalore	Research Associate	Medicinal Chemistry / Neglected Diseases (TB/Malaria)	Jun 2013 – Apr 2014
CSIR – Central Electrochemical Research Institute (CECRI), Karaikudi	Project Assistant – III	Electro-Organic Synthesis	Sep 2012 – Mar 2013

5. Research Profile

- **Research interests:** Environmental geochemistry, heavy metal and fluoride accumulation in stone mining and rural ecosystems, dietary health risk modeling, synthetic organic methodology, and medicinal chemistry target development.
- **Research projects & dissertations:**
  Master Dissertation: 'Coupling of small ligands to monolithic support' (Methacrylate monolith & nylon membrane activation via PEG, tosylation, and L-histidine coupling, validated by FT-IR).

  CSIR-CECRI Project: Electrochemical reduction and quantitative concentration determination of indigo dyes (demonstrated to SF Dyes Bangalore).

- **Research supervision:** Undergraduate student project mentoring and research methodology guidance in experimental and analytical chemistry.
- **Ongoing Projects:**
  1. Ethanol generation from the dry leaves and waste papers.
  2. Water analysis in dumka surroundings by using pH meter, Conductometer, Hardness and TDS.
- **Research collaborations & technical expertise:** Hands-on experience with Inductively Coupled Plasma Mass Spectrometry (ICP-MS), NMR, LCMS, FT-IR, preparative TLC, Combiflash/Grace chromatography; chemical informatics tools: SAP, ChemDraw, ACD/ISIS Base, SciFinder, Corpbase, Lotus Notes; SD file generation, structure/substructure search algorithms.

6. Publications

Research Papers / Journal Publications

1. Barman, A., Gorai, G., et al. (2026). Assessing Fluoride Translocation from Soil to Plants in Indian Agroecosystems: Focusing on Bioavailability, Bioaccessibility, and Human Health Risk Assessment Using Sobol Sensitivity Analysis. Exposure and Health, 18(62): 1–17.

2. **Acharya, A., Gorai, G., et al. (2026).** Deciphering stone mining induced hazardous heavy metal contamination in agricultural soils using source attribution, health dietary risk analysis, and machine learning driven insights. Environmental Geochemistry and Health, 48(280): 1–19.
3. **Gorai, G., & Mandal, N. K. (2024).** Analysis of Dense Metals Accumulation in Shikaripara Stone Mines. Makara Journal of Science, 28(4): 370–383.
4. **Gorai, G., & Mandal, N. K. (2024).** Investigation of heavy metals accumulation in Shikaripara stone mines. Pure and Applied Chemistry, 97(1): 121–136.
5. **Gorai, G., & Mandal, N. K. (2023).** Impact of heavy materials accumulation in soil using Inductively Couple Plasma Mass Spectrometry. Tuijin Jishu / Journal of Propulsion Technology, 44(3): 3265–3272.
6. **Gorai, G., & Mandal, N. K. (2023).** Heavy metal accumulation in rural area of Dumka. Tuijin Jishu / Journal of Propulsion Technology, 44(3): 3273–3280.
7. **Naik, M., Gorai, G., et al. (2014).** 4-Aminoquinolone Piperidine Amides: Noncovalent Inhibitors of DprE1 with Long Residence Time and Potent Antimycobacterial Activity. Journal of Medicinal Chemistry, 57(12): 5419–5434.
8. **Naik, M., Ghorpade, S., Jena, L. K., Gorai, G., et al. (2014).** 2-Phenylindole and Arylsulphonamide: Novel Scaffolds Bactericidal against Mycobacterium tuberculosis. ACS Medicinal Chemistry Letters, 5(9): 1005–1009.

7. Conference Proceedings / Papers

1. **Oral Presentation:** 'Heavy metal accumulation in soil in mining area', International Conference on Recent Trends and Future Prospects in Biological Sciences, NIPER, Raebareli, UP (Apr 6, 2023).
2. **Paper Presentation:** 'Investigation of Heavy metal accumulation in soil and its impact on vegetation', National Seminar on Recent Trends in Chemical Sciences, Govt. T.C.L. PG College, Janjgir, Chhattisgarh (Mar 14, 2023).
3. **Oral Presentation:** 'Recent Development in Medicine and Essential Elements through Periodic Table', National Seminar on Relevance of Periodic Table in Innovative Research and Chemical Education, Indian Chemical Society & TMBU Bhagalpur, Bihar (Sep 14, 2019).

8. Conferences, Seminars & Workshops

- **Webinar Convenor:** Convenor for the One-Day National Webinar 'Chemistry a wide area of Research', jointly organized by IQAC and Department of Chemistry, St. Xavier's College, Maharo, Dumka (21st Aug 2020).
- **Paper Presentation (Oral):** 'Heavy metal accumulation in soil in mining area', International Conference on Recent Trends and Future Prospects in Biological Sciences, NIPER, Raebareli, UP (6th Apr 2023).
- **Paper Presentation:** 'Investigation of Heavy metal accumulation in soil and its impact on vegetation', National Seminar on Recent Trends in Chemical Sciences, Govt. T.C.L. PG College, Janjgir, Chhattisgarh (14th Mar 2023).
- **Paper Presentation (Oral):** 'Recent Development in Medicine and Essential Elements through Periodic Table', National Seminar on Relevance of Periodic Table in Innovative Research and Chemical Education, ICS & TMBU Bhagalpur (14th Sep 2019).

- **Conference Participation:** International Conference on Medicinal Chemistry (MedChem2013), IIT Madras, Chennai (25th–26th Oct 2013).
- **Conference Participation:** International Conference on Recent Trends in Advanced Materials, VIT University, Vellore (20th–22nd Feb 2012).
- **Conference Participation:** International Conference on Science, Engineering and Technology (SET), VIT University, Vellore (Nov 2011 & Apr 2011).
- **Conference Participation:** National Conference on Genomics, Proteomics & Systems Biology, IISc Campus, Bangalore (1st–3rd Oct 2008).
- **Webinar Participation:** National Webinar on 'Challenges for Biologists in time of Covid19', St. Xavier's College, Maharo (26th Aug 2020).
- **Webinar Participation:** National Webinar on 'Introduction to Electron Microscopy with Live Imaging Demonstration', St. Aloysius College, Mangaluru (10th Aug 2020).

9. Professional Development & Certifications

- **Faculty Development Programme (FDP):** Completed 3-day Online FDP on 'ICT Tools For Effective Teaching and Blended Learning', Servite Arts and Science College for Women, Karur, Tamil Nadu (4th–6th Aug 2021).
- **UGC PARAMARSH Certification:** Participated in Two-Day Webinar on 'NAAC assessment and accreditation process' under UGC PARAMARSH scheme, St. Xavier's College, Kolkata (30th–31st Jul 2020).
- **Advanced Informatics Proficiency:** Expertise and industrial training in SAP, ChemDraw, ACD/ISIS Base, SciFinder, and Structure/Substructure Loading Databases.

10. Administrative & Institutional Responsibilities

- **Head of the Department (HOD):** Department of Chemistry, St. Xavier's College (Autonomous), Maharo, Dumka. Leading academic governance, timetable management, laboratory upkeep, and student evaluations.
- **Research and Publications Coordinator:** Overseeing faculty research projects, publication dissemination, institutional reporting, and research symposium organization.
- **Event Convener:** Organized collegiate and national scientific Webinar under the Internal Quality Assurance Cell (IQAC).

11. Academic & Professional Profiles

Profile Platform	Identifier / Link
ORCID ID	0000-0003-4887-3292
VIDWAN ID	Faculty ID – St. Xavier's College, Dumka
LinkedIn Profile	www.linkedin.com/in/dr-gopinath-gorai-39077154
Direct Contact / Official Email	gopinathsci@gmail.com | +91 9900274539

12. Other Academic Contributions

- **Curriculum & Practical Laboratory Development:** Realigned undergraduate Chemistry practical sessions, introduced microscale/green chemistry laboratory procedures, and enforced laboratory chemical hygiene standards.
- **Industry-Academia Mentorship:** Leveraged 6 years of industrial R&D background (Merck, Syngene, AstraZeneca) to mentor students on spectroscopic analysis (NMR, LCMS, FT-IR) and industrial pharma careers.
- **Academic References:**
  1) Dr. Niranjan Kumar Mandal, Assistant Professor, PG Dept. of Chemistry, SKM University, Dumka (nkmandal234@gmail.com).
  2) Dr. V. Vijayakumar, Professor & Assistant Director, Centre for Organic and Medicinal Chemistry, VIT University, Vellore (vvijayakumar@vit.ac.in).