

Meet Dr. Lisa Roy, Thieme Chemistry Journals Awardee 2025!



Dr. Lisa Roy received her PhD in 2015 from the Indian Association for the Cultivation of Science. Subsequently, she pursued postdoctoral studies at the Max Planck Institute for Chemical Energy Conversion, Germany. She worked as an independent scientist at CSIR Central Mechanical Engineering Research Institute from 2017 to 2018 before working as an Assistant Professor at the Institute of Chemical Technology - IOC Bhubaneswar campus between November 2018 and August 2024. She is currently an Assistant Professor Grade I (Chemistry) at the Department of Education at Indian Institute of Technology Kharagpur.

Thieme: Which field of organic chemistry are you interested in the most and why?

Dr. Roy: I am most interested in the concept of chemical reactions and the underlying fundamentals behind the bond-breaking and bond-making phenomena that lead to making novel molecules. Hence, I find the field of physical organic chemistry intriguing because it provides in-depth understanding of the observed chemical phenomena through quantitative estimation of physical properties, such as frontier orbital energies, electrophilicity/nucleophilicity parameters, and non-covalent interactions, and provides a richer perspective towards design and development of new molecules and materials.

Thieme: Following that, what is the focus of your current research activity?

Dr. Roy: I am a curious computational chemist. I am fascinated by chemical phenomena in general, which drives me to interpret how they work in nature and in the laboratory setting. As a computational chemist my work is focused on the investigation and modeling of catalytic activities which include reactivity study of metalloenzyme and model organometallic complexes, organocatalysts, and metal organic frameworks and covalent organic frameworks to design novel catalytic systems for sustainable energy and resources. We primarily use quantum chemistry tools to deliver a reliable picture of the catalyst's active-site binding, aggregation, and reaction mechanism to deliver new ideas to optimize the systems for conclusive experiments. Recently, we have started using machine-learning principles to design novel catalysts and new reaction pathways. We are mainly focused on three different subtopics: bio-inspired C–H activation or C=C hydroxylation; small-molecule activation by 3d transition metals; and non-covalent interactions assisted catalysis (Figure 1).

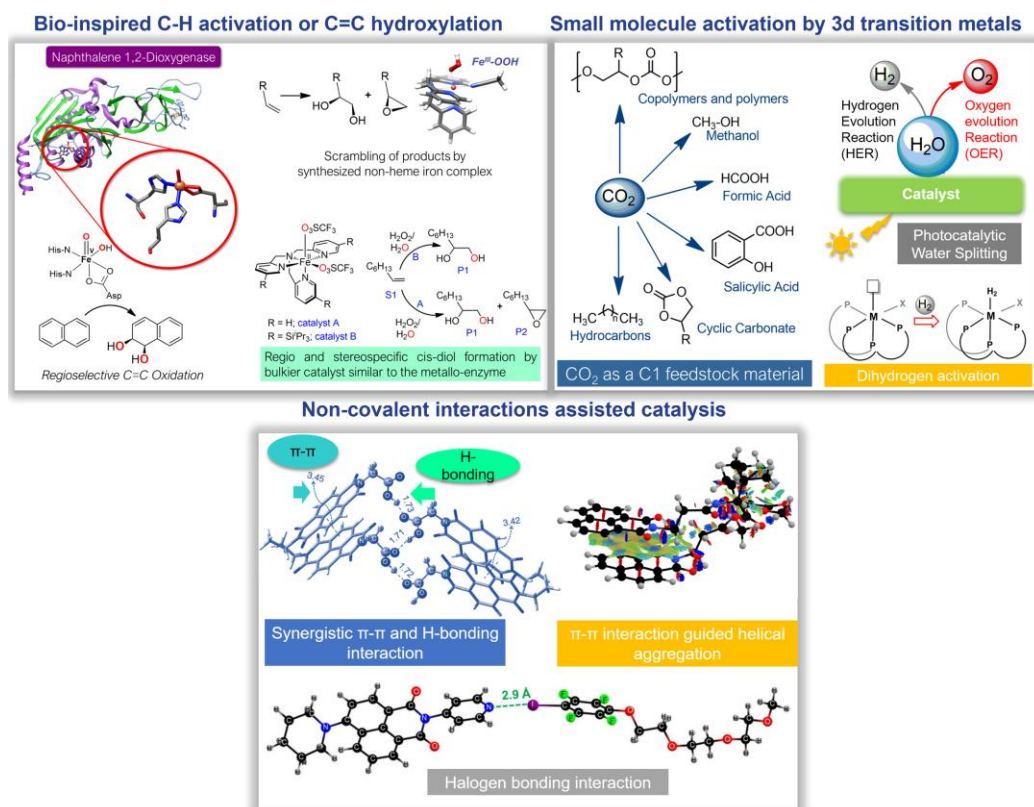


Figure 1 Current research focus

Thieme: What do you think about the modern role and prospects of organic chemistry?

Dr. Roy: Organic chemistry finds its place in day-to-day utilizations. Regio-, enantio-, and chemoselective functionalization of organic compounds lead to synthesis of value-added chiral and complex molecules relevant in the pharmaceutical, food production, and cosmetics industries. However, one of the major drawbacks of organic chemistry lies in the use of expensive and poorly atom-economical reagents. Hence, modern sustainable organic synthesis should focus on green and clean synthetic approaches utilizing photoredox, electrochemical or solvent-free confinement strategies.

Thieme: Which difficulties are there for young upcoming chemists in your field? Do you have any tips?

Dr. Roy: Many young researchers in my field find it difficult to enjoy their work due to constant pressure about outcomes, deadlines, funding,

peer-pressure, among others. They put their success/failure in brackets of the above-mentioned criteria. I believe one should remain composed and focused, and enjoy the scientific journey, and remain optimistic even if the immediate outcomes are undesired.

Thieme: What is your most important scientific achievement to date and why?

Dr. Roy: It is too early in my independent scientific career to label any work as my “most important scientific achievement”. It is still to come.

Thieme: Could you tell us something about yourself outside the lab, such as your hobbies or extra-work interests?

Dr. Roy: Outside the lab, I try to have a balance with my life. I like to travel with my family and spend quality time during weekends.