



Dr. Sujoy Rana

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Professional Experience:

- **Visiting Researcher at Georg-August-Universität Göttingen**
(in Institut für Organische und Biomolekulare Chemie)
(Host: **Prof. Dr. Lutz Ackermann**) (2022-2023)
- **Assistant Professor in Chemistry, University of North Bengal**
(Since 20th September-2018)
- **SERB-Post Doctoral Fellow, IISER Kolkata, India** (2017-2018)
Catalysis, Bio-inspired C-H Functionalization
(Mentor: **Prof. Sayam Sen Gupta**)

Educational Background:

- **Indian Institute of Technology, Bombay** (2011-2017)
Ph.D., Synthetic Methodology (Catalysis) and Bio-inspired Chemistry
(Supervisor: **Prof. Debabrata Maiti**) (Date of Award: **25/02/2017**)
 - **Indian Institute of Technology, Kanpur** (2009-11)
Master of Science (M.Sc.), Chemistry
(Mentor: **Prof. Sabyasachi Sarkar**)
 - **University of Calcutta** (2006-09)
Bachelor of Science (B.Sc.), Chemistry
(College: **Ramakrishna Mission Vidyamandira**, Belur, Howrah)
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Academic Background:

My basic education in chemistry started with my bachelor's study (B.Sc.) at Ramakrishna Mission Vidyamandira (Belur Math), one of the top 10 colleges in India. Then I moved to Indian Institute of Technology (IIT) Kanpur for my master's study (M.Sc.). IIT Kanpur is regarded as the number one institute for Chemistry in the country. During my Master's thesis, with Professor Sabyasachi Sarkar, I synthesized various metal-isoporphyrin complexes and characterized them by NMR, UV-vis, IR and ESI-MS. Here, I learned the basics about metal-porphyrin-related compounds and their characterization. For my doctoral studies, I went to IIT Bombay in 2011 and joined the laboratory of **Professor Debabrata Maiti** in the Chemistry department. My research project was bio-inspired catalysis as well as synthetic methodology. During my doctoral study, primarily, I worked in non-heme iron chemistry where I synthesized room temperature stable iron(IV)-oxo, iron(IV)-imido species and did their reactivity towards C-H halogenation, oxygenation, and amination chemistry. Additionally, I worked on developing methods of olefin nitration, nitration of boronic acids, and decarbonylation, iron-catalyzed C-H functionalization. After defending my Ph.D. thesis at the end of 2016, I was a research associate at the Department of Chemistry, IIT Bombay with Prof. D. Maiti. Then I received a national post-doctoral fellowship (NPDF) in 2017 and joined the lab of **Prof. Sayam Sen Gupta** at IISER Kolkata-India where I worked on bioinspired C-H functionalization with iron-b-TAML complex and gained knowledge in iron(V)-oxo and imido complexes. My doctoral and postdoctoral training taught me about the necessity of being level-headed during pursuing a challenging and important problem. You must have a hypothesis for your project and continue independent logical thinking and have enough patience to read literature and work until you find success. Thus, I have been able to mitigate the problem of halogenations and achieve the selective formation of halogenation products by suppressing hydroxylation products. It took more than four years during my Ph.D. to find out the condition using iron(IV)-oxo and iron-halide for selective halogenation reaction stoichiometrically with pentadentate nitrogen ligands. It's one of my breakthrough publications during my Ph.D. Also, I have developed an understanding of ligand design that can modulate the reactivity of a complex. A short post-doctoral stint has taught me the importance of fundamental studies with high-valent iron species for the development of synthetic transformation.

Thereafter in 2018, I got a job offer from University of North Bengal, Darjeeling-India, and joined there as an Assistant Professor and started my independent career since then. My present research interests are electrocatalysis with base metals, bio-inspired catalysis, and water oxidation with homogeneous catalysis. So far, I have authored 21 publications including 17 research articles and 4 book chapters. Recently, in August-2022, I went to **Georg-August-Universität Göttingen, Germany** to work with **Prof. Lutz Ackermann** where I pursued my research on Iron-electrocatalyzed C-H functionalization. Here I learned about electrochemical organic synthesis and presently pursued a project on metalla-electrocatalyzed site and chemoselective C-H functionalization. I believe, my previous experience in bio-inspired chemistry and synthetic chemistry and my present experience in electrocatalysis at Prof. Lutz Ackermann's lab will help me to pursue future research work in the electrocatalysis field.

Research Interest:

- Electro and Photocatalysis with 3d transition metals
 - Bio-inspired catalysis
 - Development of homogeneous catalysts for water oxidation
 - Reaction methodology
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Research Grant Received:

- Start-up Grant:
 - i) Merging of Visible Light Photo-redox and Bio-inspired Catalysis for C-H Functionalization (SRG/2019/000310) SERB, India (SRG/2019/000310) (Completed)
 - ii) Merging of Photocatalysis with Organometallic and Bioinspired Catalysis for Synthetic Transformation [No. F. 30-515/2020 (BSR), F.D. Diary No: 9718, Dated: 23.01.2020], UGC-India (Completed)
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Awards/Fellowships:

- 2022: SERB International Research Experience Fellowship (SERB-DST-India)
 - 2017: National Post-Doctoral Fellowship, SERB-DST-India
 - 2015: SRF Qualified
 - 2013: SRF Qualified
 - 2011: CSIR-NET Qualified
 - 2011: GATE Qualified
 - 2010: Recipient of Merit-Cum Means Scholarship during M.Sc.
 - 2009: Joint Admission test for M.Sc. (JAM) Qualified
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Teaching Interest:

- Organometallics Chemistry
 - Bioinorganic Chemistry
 - Molecular Symmetry & Group Theory
 - Solid State: X-ray Crystallography
 - Electrochemistry
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Publications (2011-2022)

1. Recent Advances in First Row Transition Metal Mediated C-H Halogenation of (Hetero)arenes and Alkanes, *Asian Journal of Organic Chemistry*, **2022**, *11*, e202200060. A. Paik[†], Sabarni Paul[†], S. Bhowmick, R. Das, T. Naveen, and **S. Rana*** ([†] Equally Contributed) (**Impact Factor: 3.319**) (DOI: 10.1002/ajoc.202200060R1) (**Corresponding Author**)
2. Sabarni Paul, A. Paik, R. Das, and **S. Rana***: *Pd-Pincer Complexes in C-H Activation* (Edited by **Prof. Debabrata Maiti, Wiley-VCH**) (DOI: 10.1002/9783527834242.chf0016) (**Corresponding Author**) (Book Chapter)
3. M. Deb* and **S. Rana*** : Site-selective C-H functionalizations using Pd-catalysis and Photochemistry (Edited by **Prof. Debabrata Maiti, Wiley-VCH**) (DOI: 10.1002/9783527834242.chf0005) (**Corresponding Author**) (Book Chapter)
4. R. Das, A. Paik, Sabarni Paul, and **S. Rana***: *Ru-Catalyzed Direct C-H Amidation of Arenes* (Edited by **Prof. Debabrata Maiti, Wiley-VCH**) (DOI: 10.1002/9783527834242.chf0043) (**Corresponding Author**) (Book Chapter)
5. Recent Advances in Directed sp^2 C-H Functionalization Towards Synthesis of N-Heterocycles and O-Heterocycles, *Chemical Communications*, **2021**, *57*, 8699-8725. B. Desai, M. Patel, B. Z. Dholakiyaa, **S. Rana*** and T. Naveen*. (**Impact factor: 6.223**) (DOI: 10.1039/D1CC02176A) (**Corresponding Author**)
6. Effect of ligand backbone on the reactivity and mechanistic paradigm of non-heme iron(IV)-oxo during olefin epoxidation, *Angewandte Chemie International Edition*, **2021**, *60* (25), 14030-14039. J. P. Biswas, M. Ansari, A. Paik, S. Sasmal, Sabarni Paul, **S. Rana***, G. Rajaraman* and D. Maiti* (**Impact factor: 15.336**) (DOI:10.1002/anie.202102484) (**Corresponding Author**)
7. Organic synthesis with the most abundant transition metal- Iron: From rust to multitasking catalysts, *Chemical Society Review*, **2021**, *50*, 243-472 **S. Rana***, J. P. Biswas, Sabarni Paul, A. Paik, D. Maiti*. (**Impact factor: 54.564**) (DOI: 10.1039/D0CS00688B) (**Corresponding Author**)
8. Fe-Catalyzed Aziridination Is Governed by the Electron Affinity of the Active Imido-Iron Species, G. Coin, R. Patra, **S. Rana**; J. P. Biswas, P. Dubourdeaux, M. Clémancey, S. P. de Visser, D. Maiti*, P. Maldivi*, and J-Marc Latour* *ACS Catalysis* **2020**, *10*, 17, 10010-10020. (**Impact factor: 13.084**) (DOI: 10.1021/acscatal.0c01427)
9. Selective C–H Halogenation over Hydroxylation by Non-heme Iron(IV)-oxo, **S. Rana**, J. P. Biswas, A. Sen, A. Clémancey, M.; Blondin, G.; Latour, J.; G. Rajaraman.; and D. Maiti*, *Chemical Science*., **2018**, *9*, 7843-7858. DOI: 10.1039/C8SC02053A (**Impact factor: 9.825**) (DOI: 10.1039/C8SC02053A)
10. Manganese-salen catalyzed oxidative benzylic chlorination. S. Sasmal, **S. Rana**, G. K. Lahiri, and D. Maiti, *Journal of Chemical Science*, 2018, *130*, 88, 1-9. (**Impact factor: 1.406**) (DOI: 10.1007/s12039-018-1511-7)

11. Palladium-catalyzed deformylation reaction with detailed experimental and in-silico mechanistic studies. A. Modak, **S. Rana**; A. Phukan, and D. Maiti. *European Journal of Organic Chemistry*, 2017, 4168-4174. (Impact factor: 3.021). (DOI: 10.1002/ejoc.201700451).
12. A Doubly Biomimetic Synthetic Transformation: Catalytic Decarbonylation and Halogenation at RT by Vanadium Pentoxide, **S. Rana**, B. Pandey, A. Dey, R. Haque; G. Rajaraman, D. Maiti, *ChemCatChem*, (2016), 8 (21) 3367–3374. (Impact factor: 5.686) (DOI: 10.1002/cctc.201600843)
13. Mechanistic elucidation of C-H oxidation by electron-rich non-heme iron(IV)–oxo at room temperature, **S. Rana**, A. Dey, and D. Maiti, *Chemical Communications*, (2015), 51, 14469-14472. (Impact factor: 6.223) (DOI: 10.1039/c5cc04803f)
14. Iron catalyzed regioselective direct arylation at C-3 position of N-alkyl-2-pyridone, A. Modak, **S. Rana**; D. Maiti, *Journal of Organic Chemistry*, 2015, 80, 296–303. (Impact factor: 4.354) (DOI: 10.1021/jo502362k)
15. Synthesis of Bis-heteroaryl Ketones via Removal of Benzylic -CHR- and -CO- Groups, A. Maji, **S. Rana**, Akanksha and D. Maiti, *Angewandte Chemie International Edition*, 2014, 53, 2428-2432. (Impact factor: 15.336) (DOI: 10.1002/anie.201308785)
16. Catalytic Electrophilic Halogenations and Halo-alkoxylations by Non-heme Iron-halides, **S. Rana**, S. Bag, T. Patra, D. Maiti. *Advanced Synthesis & Catalysis*, 2014, 356, 2453-2458. (Impact factor: 5.851) (DOI: 10.1002/adsc.201400316)
17. Efficient and Stereoselective Nitration of Mono- and Disubstituted Olefins with AgNO₂ and TEMPO, S. Maity; S. Manna, **S. Rana**, N. Togati, A. Mallick, and D. Maiti. *Journal of American Chemical Society*, 2013, 135, 3355-3358. (Impact factor: 15.419) (DOI: 10.1021/ja311942e)
18. Decarbonylative Halogenation by a Vanadium Complex: **S. Rana**, R. Haque, G. Santosh, and D. Maiti, *Inorganic Chemistry*, (2013), 52, 2927-2932. (Impact factor: 5.165) (DOI: 10.1021/ic302611a)
19. A general and efficient aldehyde decarbonylation reaction by using a palladium catalyst: A. Modak, A. Deb, T. Patra, **S. Rana**, S. Maity, and D. Maiti, *Chemical Communications*, 2012, 48, 4253-4255. (Impact factor: 6.226) (DOI: 10.1039/C2CC31144E)
20. *ipso*-Nitration of Arylboronic Acids with Bismuth Nitrate and Perdisulfate, S. Manna, S. Maity, **S. Rana**, S. Agasti, and D. Maiti, *Organic Letters*, 2012, 14, 1736-1739. (DOI: 10.1021/ol300325t) (Impact factor: 6.005)

Book Chapter(s)

21. **S. Rana**, A. Modak, S. Maity, T. Patra, and D. Maiti : *Iron Catalysis in Synthetic Chemistry in Progress in Inorganic Chemistry*: ISBN: 9781118869994, (2014), Volume 59, DOI:10.1002/9781118869994.ch01 (Edited by **Prof. Kenneth D. Karlin**, John Wiley & Sons, Inc., Hoboken, New Jersey. Print ISBN: 9781118870167, Online ISBN: 9781118869994)
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Details of Patent

Title: PROCESS FOR SYNTHESIZING A NITRO OLEFIN

Inventors: Soham Maity, Srimanta Manna, **Sujoy Rana** and Debabrata Maiti

Patent No. 289568

Award Date: 14/11/2017

Agency/Country: DE PENNING & DE PENNING, INDIA
