Ranjana Bisht

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Lucknow, Uttar Pradesh-226014, India

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Professional Experience

Postdoctoral Fellow, Emory University, **12/2023 – present**
Advisor: Prof. Monika Raj

Postdoctoral Research Associate, University of Manchester, **01/2021 – 07/2023**
Advisor: Prof. David J. Procter

Research Associate, Centre of Bio-Medical Research, Lucknow **11/2019 – 11/2020**
Advisor: Prof. Buddhadeb Chattopadhyay

Assistant Professor, National P.G. College, Lucknow **07/2013 – 09/2014**

Education

Centre of Bio-Medical Research, Lucknow, India **09/2014 – 11/2019**
Doctor of Philosophy (Ph.D.), Chemistry
Advisor: Prof. Buddhadeb Chattopadhyay
Thesis title: Iridium-catalyzed ortho- and meta-selective C–H bond borylation and silylation of aromatic molecules

Lucknow University, India **08/2010 – 10/2012**
Master of Science (M.Sc.), Organic Chemistry

Isabella Thoburn College, Lucknow, India **08/2007 – 06/2010**
Bachelor of Science (B.Sc.), Chemistry

Research Experience

Postdoctoral Fellow | Emory University | USA

Currently working on developing chemoselective bioconjugation strategies for non-nucleophilic amino acids.

Postdoctoral Research Associate | University of Manchester | UK

Pioneered a cross-coupling strategy for metal-free, regioselective C–H functionalization of the benzo[b]thiophene core. Advanced the field by exploiting BTP-sulfonium salts to **achieve** unprecedented C4 C–H functionalization, introducing new site-selectivity.

Doctoral Researcher | Centre of Bio-Medical Research Lucknow | India

Designed and developed several C-H borylation of arenes. Achieved selective transformation of aryl C-H bonds to C-C, C-O, C-N, and C-X bonds, and alkyl C-H bonds to C-C, C=C, and C-O bonds using transition metal-catalyzed C-H bond functionalization.

Publications (‡ = These authors contributed equally).

13. **Bisht, R.;** Popescu, M. V.; He, Z.; Ibrahim, A. M.; Crisenza, G. E. M.; Paton, R. S.; Procter, D. J. "Metal-Free Arylation of Benzothiophenes at C4 by Activation as their Benzothiophene S-Oxides" *Angew. Chem. Int. Ed.* **2023**, *61*, e202302418.

12. **Bisht, R.;** Haldar, C.; Hassan, M. M. M.; Hoque, E. M.; Chaturvedi, J.; Chattopadhyay, B. "Metal-Catalysed C–H Bond Activation and Borylation" *Chem. Soc. Rev.* **2022**, *51*, 5042.

11. Hoque, E.;‡ **Bisht, R.;**‡ Unnikrishnan, A.; Dey, S.; Hassan, M. M. M.; Guria, S.; Rai, R. N.; Sunoj, R. B.; Chattopadhyay, B. "Iridium-Catalyzed Ligand-Controlled Remote *para*-Selective C–H Activation and Borylation of Twisted Aromatic Amides" *Angew. Chem. Int. Ed.* **2022**, *61*, e202203539.

10. **Bisht, R**.; Chaturvedi, J.; Pandey, G.; Chattopadhyay, B. "Double-Fold *Ortho*- and Remote C–H Bond Activation/Borylation of BINOL: A Unified Strategy for Arylation of BINOL" *Org. Lett.* **2019**, *21*, 6476.

9. **Bisht, R**.;‡ Hoque, E.;‡ Chattopadhyay, B. "Amide Effect in C–H Activation: Noncovalent Interactions with L-Shaped Ligand for *Meta*-Borylation of Aromatic Amides" *Angew. Chem. Int. Ed.* **2018**, *57*, 15762.

8. Hoque, E.;‡ **Bisht, R.;**‡ Haldar, C.; Chattopadhyay, B. "Noncovalent Interactions in Ir-Catalyzed C– H Activation: L-Shaped Ligand for *Para*-Selective Borylation of Aromatic Esters" *J. Am. Chem. Soc.* **2017**, *139*, 7745.

7. **Bisht, R**.; Chattopadhyay, B. "*Ortho*- and *Meta*-Selective C–H Activation and Borylation of Aromatic Aldehydes via in situ Generated Imines" *Synlett*, **2016**, *27*, 2043**.**

6. **Bisht, R**.; Chattopadhyay, B. "Formal Ir-Catalyzed Ligand-Enabled *Ortho*- and *Meta*-Borylation of Aromatic Aldehydes via in Situ Generated Imines" *J. Am. Chem. Soc.* **2016**, *138*, 84.

5. Haldar, C.; **Bisht, R**.; Chaturvedi, J.; Guria, S.; Hassan, M. M. M.; Ram, B.; Chattopadhyay, B. "Ligand- and Substrate-Controlled para C–H Borylation of Anilines at Room Temperature" *Org. Lett.* **2022**, *24*, 8147**.**

4. Smith, M. R.; **Bisht, R**.; Haldar, C.; Pandey, G.; Dannatt, J. E.; Ghaffari, B.; Maleczka, R. E.; Chattopadhyay, B. "Achieving High *Ortho*-Selectivity in Aniline C-H Borylations by Modifying Boron Substituents" *ACS Catal*. **2018**, *8*, 6216.

3. Hassan, M. M. M.; Mondal, B.; Singh, S.; Haldar, C.; Chaturvedi, J.; **Bisht, R.**; Sunoj, R. B.; Chattopadhyay, B. "Ir-Catalyzed Ligand-Free Directed C–H Borylation of Arenes and Pharmaceuticals: Detailed Mechanistic Understanding**"** *J. Org. Chem.* **2022**, *87*, 4360.

2. Chaturvedi, J.; Haldar, C.; **Bisht, R.**; Pandey, G; Chattopadhyay, B. "Meta Selective C–H Borylation of Sterically Biased and Unbiased Substrates Directed by Electrostatic Interaction" *J. Am. Chem. Soc.* **2021**, *143*, 7604.

1. Haldar, C.; Hoque, E.; **Bisht, R**.; Chattopadhyay, B. "Concept of Ir-catalyzed C–H bond activation/borylation by noncovalent interaction" *Tetrahedron Lett.* **2018**, *59*, 1269.

Patents

1. Haldar, C.; **Bisht, R.**; Chaturvedi, J.; Guria, S.; Chattopadhyay, B. "A New Ligand Framework for *para*-Borylation of Arenes" **2022**. Patent Application No. 202211001312.
2. Chaturvedi, J.; Haldar, C.; **Bisht, R.**; Chattopadhyay, B. "Method of *meta*-Selective Borylation of Aromatic Molecules" **2020**. Patent Application No. 202011035905.

Skills

- *Organic Synthesis:* Methodology Development, Small-Molecule Functionalization, Asymmetric Catalysis, Catalyst and Ligand Design, Multi-Step Synthesis, Organometallic Chemistry, Solid-Phase Peptide Synthesis, Peptide functionalization.
- *Instrumental Skills & Software:* NMR (1D/2D) HPLC/UHPLC, LC-MS/MS, LC-MS/Q-TOF, GC-MS, FTIR, MestReNova, SciFinder^n, Chem-Draw, Agilent MassHunter WorkStation.

Awards & Fellowships

JNOST Sai-Life Best Thesis Award	2019
Senior Research Fellowship, Council of Scientific & Industrial Research India	2018
Qualified **Graduate Aptitude Test in Engineering** (GATE)	2012
Qualified **National Eligibility Test** (NET-LS)	2012
Qualified **State Level Entrance Test for Ph.D.** (SLET)	2012

Conference Presentations

"Formal Ir-Catalyzed Ligand-Enabled *Ortho*- and *Meta*-Borylation of Aromatic Aldehydes via in Situ Generated Imines", National seminar on "Role Of Analytical Techniques In Advanced Scientific Research" National PG College Lucknow, India. (*Oral presentation*, **Awarded Best Oral presentation**)	2014
12th National Organic Synthesis Trust Conference for Research Scholars (XII J-NOST - 2016), CDRI-Lucknow, India. (*Oral presentation*)	2016
National Chemistry Scholars' Colloquium, IISER Kolkata, India. (*Oral presentation*)	2019
14th National Organic Synthesis Trust Conference for Research Scholars (XIV J-NOST - 2019), University of Delhi, India. (*Poster presentation*, **Awarded Best Poster**)	2019
"Transition metal catalysis to metal-free C-H functionalization", *invited talk*, IIT Kanpur	2023
Invited talk, IIT Roorkee	2024

Teaching

Assistant Professor, National Post Graduate College, Lucknow.	01/2013-09/2014
Supervised summer-project student and 4 graduate students (2015- 2020).	2015-2020
Supervision of a M.Phil. student.	2021-2022

References

1. Dr. Buddhadeb Chattopadhyay, FNASc.
   Associate Professor
   Centre of Bio-Medical Research (CBMR)
   SGPGIMS Campus, Raebareli Road
   Lucknow 226014, Uttar Pradesh, India.
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2. Prof. David J. Procter
   Professor
   Chemistry Building, 4.1
   Department of Chemistry, The University of Manchester
   Oxford Road, Manchester, M13 9PL
   United Kingdom.
   Email: david.j.procter@manchester.ac.uk

3. Prof. Dr. Ganesh Pandey FNA, FNASc.
   Department of Chemistry
   Institute of Science,
   Banaras Hindu University, Varanasi-221005
   India.
   Email: gp8577@gmail.com