

# SHUBHAM BANSAL

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## EDUCATION

- Doctor of Philosophy (Ph.D.), Organic Chemistry** June 2022 – May 2026  
College of Arts & Sciences, Georgia State University, Atlanta, GA, USA (Advisor: **Dr. Binghe Wang**)
- Master of Science (M.S.), Chemistry** Jan 2021 – May 2022  
College of Arts & Sciences, Georgia State University, Atlanta, GA, USA (Advisor: **Dr. Binghe Wang**)
- Master of Science (M.S.), Pharmaceutical Chemistry** Aug 2016 – Nov 2018  
M.M. Modi College, Punjabi University, Patiala, Punjab, India (Advisor: **Dr. Sanjay Kumar**)
- Bachelor of Science (B.S.)** Aug 2013 – May 2016  
M.M. Modi College, Punjabi University, Patiala, Punjab, India

## EXPERIENCE

- Yale University**, New Haven, CT, USA  
**Department of Radiology & Biomedical Imaging**  
**Postdoctoral Associate** (Advisor: **Dr. Sheryl Roberts**) June 2026 – Present
- Georgia State University**, Atlanta, GA, USA  
**Doctoral Researcher** Jan 2021 – May 2026
- Drove 9+ peer-reviewed publications in top-tier journals (Chem. Sci., J. Med. Chem., Anal. Chem., Org. Lett.) including 3- journal covers, 1 top-read article (**2024**), and a pending U.S. patent (No. 63/805,452) on a novel ROS-sensitive drug delivery platform.
  - Identified critical experimental artifacts in ROS research - a methodological breakthrough that redefined assay best practices and produced high-impact publications, demonstrating strong scientific rigor and attention to detail.
  - Collaborated cross-functionally with biologists, enzymologists, and virologists on target identification and compound evaluation; presented findings at 20+ national/international conferences including Pacifichem **2025**, SERMACS **2025**, and ACS Spring **2025-2026**.
  - Earned Outstanding Talk Award + \$1,000 travel prize (CGSA Symposium **2025**); mentored 5+ junior researchers; served as peer reviewer for ACS Omega (5+ manuscripts).
- Graduate Teaching & Research Assistant** Jan 2021 – Dec 2023
- Instructed Organic Chemistry I & II and General Chemistry labs for 20+ students per section; designed targeted problem-solving sessions that measurably improved student comprehension and lab report quality.
  - Mentored students through experimental failures using structured troubleshooting exercises, building capacity for independent scientific reasoning and reproducible data collection.
- M.M. Modi College, Punjabi University**, Punjab, India  
**Researcher - Synthetic Methodology** Aug 2016 – Aug 2021
- Designed multicomponent, one-pot heterocyclic syntheses using ionic liquid catalysis; optimized reaction conditions and delivered high-yield, scalable compounds. Recognized with Best Poster Presentation Award (RACES-**2019**).

## PATENTS

Wang, B.; **Bansal, S.**; Kondengadan, S. M. Redox-sensitive prodrugs and methods of use thereof, USA, *Patent Pending*, application number: 63/805,452, **2025**.

## PUBLICATIONS | GOOGLE SCHOLAR

### Peer-Reviewed Publications (9)

- 1) **Bansal, S.**; Wang, B. Reactive Oxygen Species (ROS) Research in Drug Discovery and Drug Delivery: Can the Medium Be a Trojan Horse Disguised as Something Benign? *J Enzyme Inhib Med Chem* **2026**, 41(1), 2631215.

- 2) Kondengadan, S. M.;\* **Bansal, S.**;\* Lu, W., Chaudhary, M. R.; Wang, B. A Novel Reactive Oxygen Species (ROS)-Sensitive Prodrug Approach: Leveraging the Oxidation of a Stable "Non-cleavable" Thioether Group to Create a Cleavable Mechanism. *J Med Chem* **2026**, 69(8), 9196-9214.
  - *\*Co-first Author*
  - **Highlighted on the Journal's front cover page.**
- 3) **Bansal, S.**; Gori, M.; Quaye, J.A.; Gadda, G.; Wang, B. Detection and Analysis of Reactive Oxygen Species (ROS): Buffer Components Are Not Bystanders. *Anal Chem* **2025**, 97 (28), 14931-14942.
  - **Highlighted on the Journal's front cover page.**
- 4) Lyles, K. V.; Stone, S.; Singh, P.; Patterson, L. D.; Natekar, J.; Pathak, H.; Varshnaya, R. K.; Elsharkawy, A.; Liu, D.; **Bansal, S.**; et al. Entry Inhibitors of SARS-CoV-2 Targeting the Transmembrane Domain of the Spike Protein. *Viruses* **2025**, 17 (7), 989.
- 5) Abdelfattah, A.G.;;\* **Bansal, S.**;\* Joanna, A.K.; Kondengadan, S. M.; Gadda, G.; Wang, B. Thioether Oxidation Chemistry in Reactive Oxygen Species (ROS)-sensitive Trigger Design: A Kinetic Analysis. *Org Lett* **2025**, 27 (12), 3071-3076.
  - *\*Co-first Author*
- 6) **Bansal, S.**; Wang, B. A critical factor in reactive oxygen species (ROS) studies: the need to understand the chemistry of the solvent used: the case of DMSO. *Chem Sci* **2024**, 15 (43), 17843-17851.
  - **Highlighted on the Journal's cover page.**
  - **Among the most popular analytical chemistry articles from the journal in 2024.**
- 7) **Bansal, S.**;\* Liu, D.;;\* Mao, Q.;;\* Bauer, N.; Wang, B. Carbon Monoxide as a Potential Therapeutic Agent: A Molecular Analysis of Its Safety Profiles. *J Med Chem* **2024**, 67 (12), 9789-9815.
  - *\*Co-first Author*
- 8) Kondengadan, S. M.; **Bansal, S.**; Yang, X.; Wang, B. Folate-conjugated organic CO prodrugs: Synthesis and CO release kinetic studies. *Med Chem Res* **2024**, 33 (8), 1410-1422.
- 9) Kondengadan, S. M.; **Bansal, S.**; Yang, C.; Liu, D.; Fultz, Z.; Wang, B. Click chemistry and drug delivery: A bird's-eye view. *Acta Pharm Sin B* **2023**, 13 (5), 1990-2016.

#### Submitted (2)

- 10) **Bansal, S.**; Wang, B. Ensuring Rigor in Reactive Oxygen Species (ROS) Research: The SKACS Guardrails. *Chem* **2026**, in peer review.
- 11) **Bansal, S.**; Gori, M.; Wang, B. One Stone Two Birds: Novel Fluorescent Probe Chemistry that Detects Redox Stress in Both Directions in Cell Culture. *Anal Chem* **2026**, in peer review.

#### DISSERTATION AND THESIS

- 1) **Ph.D. Dissertation:** Bansal, Shubham. **2026**. "Reactive Oxygen Species (ROS) Research: From Fundamental Insights to Practical Applicable Tools." Dissertation, Georgia State University. <http://doi.org/10.57709/67>
- 2) **M.S. Thesis:** Bansal, Shubham. "Bioreversible Derivatization of Drug Molecules with a Pyridine Ring for Improved Water Solubility: Model Studies." Thesis, Georgia State University, **2022**. <https://doi.org/10.57709/29000717>

#### BOOK CHAPTERS

- 1) Liu, D.; **Bansal, S.**; Gori, M.; Wang, B. Click Chemistry in Delivering Gaseous Signaling Molecules. Topics in Heterocyclic Chemistry; Springer Nature; **2026**, DOI: [10.1007/7081\\_2025\\_104](https://doi.org/10.1007/7081_2025_104)
- 2) **Bansal, S.**; Singh, P.; Liu, D.; Wang, B. Reactive Oxygen Species (ROS)-sensitive Drug Delivery: Current State and Future Needs. Drug Delivery: Principles and Applications; Wang, B., Ed.; Wiley; **2025**, *accepted*.
- 3) **Bansal, S.**; Challa, S.; Wang, B. Mitochondrion-targeted Drug Delivery. Drug Delivery: Principles and Applications; Wang, B., Ed.; Wiley; **2025**, *accepted*.

#### PROFESSIONAL SERVICE

##### Reviewer for research article

- |                                |                        |
|--------------------------------|------------------------|
| 1) ACS Omega, ACS Publications | March, <b>2026</b>     |
| 2) ACS Omega, ACS Publications | November, <b>2025</b>  |
| 3) ACS Omega, ACS Publications | October, <b>2025</b>   |
| 4) ACS Omega, ACS Publications | September, <b>2025</b> |
| 5) ACS Omega, ACS Publications | August, <b>2025</b>    |

##### Judge

- 6) Georgia State Undergraduate Research Conference (GSURC), at Georgia State University
- 7) **2022 MBD & NSF-REU Undergraduate Research at Georgia State University**

April 11, **2024**

July 29, **2023**

## JOURNAL COVERS



## AWARDS | FELLOWSHIPS | MEMBERSHIPS

- |                                                                                                                                                                                       |                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 1) Center for Diagnostics and Therapeutics (CDT) “Fellow of the year” award                                                                                                           | May 05, <b>2026</b>   |
| 2) Dean's Graduate Research Grants award ( <b>\$500</b> )                                                                                                                             | April 14, <b>2026</b> |
| 3) <b>David W. Boykin Graduate Fellowship in Medicinal Chemistry (\$4000)</b>                                                                                                         | March 20, <b>2026</b> |
| 4) <b>Panther innovator awards</b> , Georgia State University, Atlanta, Georgia, USA                                                                                                  | Feb 10, <b>2026</b>   |
| 5) Georgia State University Graduate Scholar Travel Award ( <b>\$500</b> )                                                                                                            | Aug 29, <b>2025</b>   |
| 6) <b>Invited Full Member of Sigma Xi, The Scientific Research Honor Society.</b>                                                                                                     | Aug 12, <b>2025</b>   |
| 7) Awarded “Outstanding Talk Award” and <b>\$1000 travel award</b> at Chemistry Graduate Student Association (CGSA) Spring Symposium, Georgia State University, Atlanta, Georgia, USA | May 23, <b>2025</b>   |
| 8) <b>David W. Boykin Graduate Fellowship in Medicinal Chemistry (\$4000)</b>                                                                                                         | Feb 28, <b>2025</b>   |
| 9) <b>Center for Diagnostics and Therapeutics (CDT) Fellowship, Georgia State University, Atlanta, Georgia, USA</b>                                                                   | (2022 – present)      |
| 10) Awarded <b>prize</b> in poster presentation in CDT's poster session, Georgia State University, Atlanta, Georgia, USA                                                              | Dec 12, <b>2022</b>   |
| 11) Awarded <b>prize</b> in poster presentation in RACES-2019 conference                                                                                                              | April <b>2019</b>     |
| 12) Awarded “College Color” <b>prize</b> for securing fourth position in MS program in Punjabi University, Patiala, Punjab, India                                                     | March <b>2019</b>     |
| 13) Awarded 3rd prize in quiz competition at National Science Day Celebration- 2017 at Thapar University, Patiala, India.                                                             | Feb <b>2017</b>       |
| 14) Awarded 2nd prize in quiz competition at National Science Day Celebration- 2016 at Thapar University, Patiala, India.                                                             | Feb <b>2016</b>       |

## CONFERENCES | SCIENTIFIC MEETINGS

### Oral talk

- 1) “Reactive Oxygen Species (ROS)-Sensitive Drug Delivery: A Novel Prodrug Approach with On-Demand Release and Tunable Release Kinetics” at ACS Spring 2026 on March 25, **2026**.
- 2) “Oxidative Stress Research: Critical Factors Causing Experimental Errors” at ACS Spring 2026 on March 22, **2026**.
- 3) “Pitfalls in Reactive Oxygen Species (ROS) Detection: Solvent and Buffer Components Are Not Bystanders” at Pacifichem 2025, Honolulu, Hawaii, December 19, **2025**.
- 4) “ROS-Activated Novel Linker System That Releases Drug via a Bioorthogonal Reaction” at Pacifichem 2025, Honolulu, Hawaii, December 18, **2025**.
- 5) “Critical Factors in Reactive Oxygen Species (ROS) Detection: The Need to Understand the Chemistry of the Solvent Used: Case of DMSO” at Pacifichem 2025, Honolulu, Hawaii, December 17, **2025**.
- 6) “Oxidative Stress Research: Critical Factors Causing Experimental Errors” at 2025 International Forum on Research Excellence, organized by Sigma Xi, virtual meeting, October 30 – November 1, **2025**.
- 7) “Reactive Oxygen Species (ROS)-Sensitive Drug Delivery: Back to the Fundamentals” at Joint Meeting of SERMACS/SWRM 2025, Orlando, Florida, USA on October 26, **2025**.

- 8) "Pitfalls in Reactive Oxygen Species (ROS) Research: Solvent and Buffer Components Are Not Bystanders" at Chemistry Graduate Student Association (CGSA) Spring Symposium, Georgia State University, Atlanta, Georgia, USA on May 23, **2025**.
  - *Awarded "Outstanding Talk Award"*
  - *Awarded \$1000 travel award.*

#### Poster

- 9) "Reactive Oxygen Species (ROS) Research: Lacking Attention to Fundamental Chemistry Issues Can Lead to mis-leading Results" (Poster) at the Society for Redox Biology and Medicine's (SfRBM) 32<sup>nd</sup> Annual Conference, Washington DC, USA on November 19-22, **2025**.
  - *Abstract published: Free Radical Biology and Medicine 2025, 240, S15. <https://doi.org/10.1016/j.freeradbiomed.2025.10.048>*
- 10) "Pitfalls in Reactive Oxygen Species (ROS) Research: Solvent and Buffer Components Are Not Bystanders" (Poster) at 44th Annual Meeting of the Biological Stain Commission at Georgia State University, Atlanta, Georgia, USA on October 31, **2025**.
- 11) "Detection and Analysis of Reactive Oxygen Species (ROS): Solvent and Buffer Components Cause Experimental Errors" (Poster) at 76th Midwestern Universities Analytical Chemistry Conference, University of North Carolina at Chapel Hill, North Carolina, USA on October 16-17, **2025**.
- 12) "Pitfalls in Reactive Oxygen Species (ROS) Research: Solvent and Buffer Components Are Not Bystanders" (Poster) at Southeastern Chemical Biology and Drug Discovery Symposium (SCBDDS), University of Georgia, Athens, Georgia, USA on May 21, **2025**.
- 13) "Critical factors in reactive oxygen species (ROS) detection: solvents are not bystanders: case of DMSO" (Poster) at the 2025 Brains & Behavior Annual Retreat, Georgia State University, Atlanta, Georgia, USA on May 9, **2025**.
- 14) "Detection and Analysis of Reactive Oxygen Species (ROS): Buffer Components Are Not Bystanders" (Poster) at 15th Annual Southeast Enzyme Conference, Georgia State University, Atlanta, Georgia, USA on April 26, **2025**.
- 15) "Critical factor in reactive oxygen species (ROS) studies: the need to understand the chemistry of the solvent used" (Poster) at the ACS Spring 2025, San Diego, California, USA on March 23, **2025**.
  - *Research work selected for the digital poster presentation as well.*
- 16) 75<sup>th</sup> Southeastern Regional Meeting of the American Chemical Society (SERMACS), American Chemical Society (ACS), Atlanta, Georgia, USA on Oct 23-24, **2024**. (Attendance)
- 17) "Folate-conjugated organic CO prodrugs: Synthesis and CO-release kinetic studies" (Poster) at the Southeastern Chemical Biology and Drug Discovery Symposium (SCBDDS), University of Georgia, Athens, Georgia, USA on May 14, **2024**.
- 18) "Folate-conjugated organic CO prodrugs: Synthesis and CO-release kinetic studies" (Poster) at the Spring Research Symposium, Georgia State University, Atlanta, Georgia, USA on May 3, **2024**.
- 19) Midwest Antiviral Drug Discovery (AViDD) Center Annual Conference, UF Scripps Institute for Biomedical Innovation & Technology, Jupiter, Florida, March 30<sup>th</sup>-31<sup>st</sup>, **2023**. (Attendance)
- 20) "Development of A Novel ROS Triggered Drug Delivery System" (Poster) at the Center for Diagnostics and Therapeutics (CDT) poster session, Georgia State University, Atlanta, Georgia, USA on Dec 12, **2022**.
  - *Awarded best poster presentation award.*
- 21) Midwest Antiviral Drug Discovery (AViDD) Center Annual Conference, University of Minnesota, Minneapolis, October 27, **2022**. (Attendance)

#### During MS

- 22) "SuccinimidiniumN-sulfonic acid hydrogen sulfate an efficient Ionic liquid catalyst for the synthesis of pyrano[3,2-c]coumarins under solvent-free conditions" (Poster) at Recent Advances in Chemical and Environmental Sciences (RACES-2019), Multani Mal Modi College, Patiala in April **2019**.
  - *Awarded best poster presentation award.*
- 23) "Ionic liquid catalyzed synthesis of tetrahydropyrimidine-2[1H]-one" (Oral presentation) at Emerging Scenario in Basic and Applied Science for Sustainable Development, DAV College, Bathinda, Punjab in April **2018**.
- 24) "Multicomponent, one pot synthesis of 2-amino-5,7-dihydroxy-4-phenyl-1,4-dihydroquinoline-3-carbonitrile derivatives" (Poster) at Chemical and Environmental Sciences: Innovation and Advances-2018, Punjabi university, Patiala in Feb **2018**.
- 25) "Ionic liquid mediated fast and efficient synthesis of tetrahydropyrimidine-2[1H]-one" (Poster) at Recent Advances in Chemical, Biological and Environmental Sciences (RACES-2018), Multani Mal Modi College, Patiala in Feb **2018**.

- **Medicinal & Organic Chemistry:** Chemical synthesis, Medicinal chemistry, small-molecule drug discovery, hit identification, lead optimization; Structure-activity relationship (SAR) analysis and hypothesis-driven molecular design; multi-step organic synthesis, reaction optimization, scale-up synthesis; Synthetic methodology development, bioorthogonal chemistry, click chemistry; Prodrug design, redox-responsive chemistry, chemical probe development.
- **Analytical & Characterization:** NMR spectroscopy ( $^1\text{H}$ ,  $^{13}\text{C}$ ), FTIR, HPLC, LC-MS, MS.; RP-HPLC (analytical and preparative), flash chromatography (Biotage, CombiFlash, puriFlash); Gas chromatography (GC), UV-Vis spectroscopy, fluorescence spectroscopy; Compound purification, structural characterization, purity assessment.
- **Chemical Biology & Translational Research:** Cell culture (mammalian), cell-based assays, intracellular compound quantification; Cell imaging, fluorescence microscopy, flow cytometry; Mitochondrial isolation, biological sample preparation; Data interpretation linking chemical structure to biological activity.
- **Data Analysis & Scientific Rigor:** Experimental design, hypothesis testing, SAR-driven decision-making; Scientific literature analysis, competitive landscape assessment; Reproducibility, troubleshooting, root-cause analysis.
- **Project & Program Skills:** Research project management, milestone planning, prioritization; Cross-functional collaboration with biologists, enzymologists, and virologists; Documentation, technical reporting, data presentation to diverse audiences.
- **Leadership & Communication:** Scientific writing (manuscripts, patents, reports); Oral presentations (internal reviews and conferences); Mentoring and training junior researchers; Effective communication across multidisciplinary teams.
- **Professional:** Strategic thinking, adaptability, initiative, attention to detail; Time management, ownership of projects, independent problem-solving; Trilingual: English, Hindi, Punjabi.