Curriculum Vitae

Sanghati Bhattacharya, Ph. D

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SUMMARY

Trained Analytical Researcher | FDA/IPDF Postdoc 3+ Yrs & University Scholar | Experience in Complex Biotherapeutics 5+ Yrs | Advanced Separation Techniques & Mass Spectrometry 6+ Yrs | Proven Industry-Academia Collaboration for Time- & Cost-Effective Biologics Development | Proficient with Computer Software | Award-Winner | International Conference Speaker | Guest Lecturer with Student Mentorship & Teaching Experience | Strong Communicator & Team Leader | Fluent in English.

KEYWORDS AND KEYPHRASES

Multi-Attribute Monitoring (MAM) | Post-Translational Modifications (PTMs) | Critical Quality Attributes (CQA) | Analytical Method Development for Biotherapeutics | Characterization of Highly Heterogeneous Complex Human Papilloma Virus-Like Particles (HPV-VLPs) | Multidisciplinary Expertise in Protein Characterization | N-glycan Modification/Analysis | Formulation | Aggregation | Stability | 2D-LC-MS | HILIC-FLD/MS | Intact/Reduced Mass & Disulfide Linkage | Peptide Mapping | Structure-function Relationships | Protein-protein Interactions | Cross-functional Research Teams | ORIGIN | GraphPad Prism | In-silico Structure Modelling | Molecular Dynamics- Gromacs | Microsoft Office | Illustrator | Bio Render | Journal article reviewer | Member of Scientific Societies and Non-profit Organizations | Peer-reviewed First- and Co-author Publications

PROFESSIONAL EXPERIENCE

Nov 2023–till date

Postdoctoral Research Scholar, Guest Lecturer, College of Pharmacy, University of Iowa, Iowa City, IA, USA

- Enhanced biotherapeutic stability by enzymatic modification and chemical derivatization of N-glycans in biotherapeutics to comprehensively assess and systematically measure glycan heterogeneity, site occupancy, and structural-functional alterations and established their impact on self-association using SE-HPLC, HILIC-FLD-MS-QTOF, MALDI & DLS techniques.
- Worked in FDA-funded project to evaluate the impact of formulation excipients on the stability of active pharmaceutical ingredients (APIs), enabled early formulation risk identification and development of stable formulations. Implemented forced degradation studies and advanced separation methodologies to identify potential excipient-induced modifications that could affect drug efficacy and safety.
- Developed and optimized 3+ analytical methods for monoclonal antibodies (mAbs) and conjugated proteins using LC-MS, enhancing characterization speed and accuracy.
- Established advanced separation workflows using RP, SEC, and HILIC coupling MS improving resolution and reducing analysis time by 30%.
- Supervised and mentored graduate students, providing hands-on training in analytical method development, instrument operation, and data interpretation with 100% successfully publishing their research
- Contributed to curriculum design for graduate-level analytical biochemistry and protein stability training sessions, integrating practical LC-MS workflows and data interpretation modules.
- Coordinating instrument maintenance, scheduling, and training, supporting >6 graduate and PDF researchers.
- Presented research findings at international conferences (ACS, AAPS, Colorado Protein stability conference, AbbVie AARS), for next-generation biologics.
- Published 2 peer-reviewed research articles (co-author) with a cumulative impact factor of 12.4; 2 additional co-author articles under submission and 4 manuscripts (2 first-author, 2 co-author) in preparation.

Mar 2021–Sep 2023

Institute Postdoctoral Fellow, Analytical Consumable Coordinator, Indian Institute of Technology (IIT) Delhi, India

- Developed method for large molecule biotherapeutic development using multi-attribute monitoring (MAM) workflow by in-series coupling of rProA-SEC-UV-WCX-MS (QTOF) that could systematically characterize the multiple Critical Quality Attributes (CQA) and Post-Translational Modifications (PTMs), i.e., size, charge, mAb titer, and glycoform heterogeneities in cell culture supernatant in its native state in real time, which effectively reduces the time and cost by up to 40% from the traditional approach and has been implemented as a Process Analytical Technology (PAT) enabler.
- Developed a novel bottom-up proteomics method for enzymatic protein digestion & confirmed using RP-LC-MS/MS (Q-TOF), and the outcome has significant implications for several areas of the biopharmaceutical/biotherapeutic domains with 30 % more peptide yield, 8.9% more fully digested peptides, and 14% higher sequence coverage than the conventional method.
- Developed an analytical method for characterization of highly heterogeneous complex Human Papilloma Virus-Like Particles (HPV-VLPs) at the capsomere and monomer level in a single workflow by integrating SEC-UV-RP hyphenated MS (QTOF) workflow.
- Developed and validated 6+ LCMS methods (RP, SEC, IEX, HIC, HILIC), resulting in 30% faster protein purity and stability assessments. Manuscript submitted.
- Mentored graduate students and interns, a total of 6, with 100% successfully published their research.
- Served as consumable coordinator for the analytical division, ensuring timely procurement and efficient resource utilization.
- Hands-on training given in HPLC, MS-QTOF–based workflows for intact protein, enzymatic digestion, peptide mapping, and disulfide linkage analysis.
- Worked in academic-industry collaboration to implement advanced analytical methods for next-generation affordable biosimilars and biotherapeutics development.
- Presented research work at national and international scientific conferences.
- Published 10 research articles (3 first-author, 5 co-author, 2 in science magazines) with a cumulative impact factor of 45+; 1 first-author article and 2 co-first-author manuscripts under submission.

Dec 2020– Jan 2021 **Research Scientist, Team lead, DNA Xperts Private Limited, India**

- Developed and optimized LC-MS methods for untargeted proteomics and metabolomics using Q Exactive Plus, resulting in a 35% increase in detection sensitivity and broader molecular coverage for complex biological sample mixtures.
- Designed and validated sample preparation workflows—including protein extraction, enzymatic digestion, and metabolite derivatization—achieving a significant improvement in reproducibility and consistency across high-throughput platforms.
- Led experimental design and implemented quality control protocols across 3 distinct biological sample types (plant, milk, and bile fluids), increasing analytical reliability and data consistency in multi-omics pipelines.
- Collaborated with interdisciplinary teams to integrate proteomic and metabolomic data, enabling systems-level insights into biomolecular mechanisms and metabolic pathway dynamics.
- Co-authored 1 international publication contributing strategies of the essence of vitamin K deficiency and its inherent nutrition and food-omics driven research.

Aug 2018 – Jun 2020 **Senior Technology Officer, Regional Centre for Biotechnology, Faridabad, India**

- Developed Conducted iTRAQ-based proteomics analysis using LC-MS-SCIEX 6500 to identify plasma protein carbonyl modifications associated with preterm birth.
- Identified and enriched 100+ carbonylated plasma proteins using a selective biotin-hydrazine streptavidin assay, enhancing detection sensitivity for oxidative stress markers.
- Quantified cortisol levels in 50+ plasma samples via ELISA, revealing strong correlations between physiological stress and proteomic alterations in high-risk pregnancies.
- Collaborated with clinical and research teams across disciplines, integrating proteomics data with patient metadata to drive comprehensive biomarker insights.

2012 – 2018 **PhD Researcher in Biotechnology, University of North Bengal, India (December 2012 – September 2017)**

- Characterized actinorhizal hemoglobin genes and proteins, uncovering evolutionary patterns in Alnus–Frankia symbiosis and contributing to plant-microbe interaction research.
- Conducted genetic analysis using RAPD, RFLP, and RT-PCR across 50+ plant samples, revealing significant genetic diversity among nitrogen-fixing actinorhizal populations.
- Analyzed gene expression patterns of actinorhizal hemoglobin genes, exploring their roles in plant symbiosis and adaptation to environmental stresses.
- Performed protein isolation and characterization using techniques such as SDS-PAGE and gel electrophoresis.
- Developed a protein structure-function model using molecular dynamics simulations, predicting host-symbiont interaction pathways with >85% accuracy in computational validation.
- Developed MycoSec-A, a web-based secretome database for Mycobacterium species, providing an accessible platform for host-pathogen interaction studies (https://bif.nbu.ac.in/mycosec/index.html).
- Investigated functional divergence in Mycobacterium proteins and their role in ecological adaptation through transfection and soil simulation experiments.
- Published 4 research articles (2 first-author, 2 co-corresponding) with significantly advancing knowledge in symbiosis and microbial proteomics.
- Presented research at 3 international conferences, earning a national travel grant award from the Government of India.

TEACHING EXPERIENCE

2025 **Guest Lecturer,** Graduate (Ph.D.) Courses – (1) Analytical Biochemistry and (2) Drug Stability; Department of Pharmaceutical Sciences and Experimental Therapeutics, **University of Iowa,** Iowa City, USA.

2017 – 2018 **Assistant Professor,** Master of Science Courses – (1) Biotechnology (2) Biochemistry and (3) Bioinformatics; Department of Biotechnology, **ICL College**, Vashi, Navi Mumbai, India.

FORMAL EDUCATION AND TRAINING

2023 – till date **Postdoctoral Research Scholar,** University of Iowa, USA – Analytical Biochemistry, Biopharmaceuticals, Biotechnology
2021 – 2023 **Institute Postdoctoral Fellow,** Indian Institute of Technology, Delhi, India – Analytical Biochemistry, Biopharmaceuticals
2012 – 2018 **Doctoral Degree**, University of North Bengal, India – Biotechnology, Molecular Cytogenetics, Bioinformatics
2009 – 2011 **Master's degree,** Bangalore University, India – Chemistry, Biotechnology, Zoology

PUBLICATIONS

International Journal Articles

2025 Sarsarshahi S, **Bhattacharya S**, Zacharias ZR, Kamel ES, Houtman JC. and Nejadnik R., 2025. *Journal of Pharmaceutical Sciences*, p.103771. https://doi.org/10.1016/j.xphs.2025.103771.

2025 Ahmad A, Refaat H, **Bhattacharya S**, Gurvich VJ, Rathore AS, Nejadnik R, Suryanarayanan R. *International Journal of Pharmaceutics*. 2025, 25:125275. https://doi.org/10.1016/j.ijpharm.2025.125275.

2024 Rathore AS, Sarin D, **Bhattacharya S**, Kumar S. *Journal of Chromatography Open.* 2024, 26:100166. https://doi.org/10.1016/j.jcoa.2024.100166.

2024 Nikita S, **Bhattacharya S**, Manocha K, Rathore AS. *Journal of Separation Science*. 2024, 47(11):2400051. https://doi.org/10.1002/jssc.202400051.

2023 Peruri V, **Bhattacharya S**, Rathore AS. *Journal of Chromatography Open*. 2023, 30:100107. https://doi.org/10.1016/j.jcoa.2023.100107.

2023 Shukla E, Choudhury L, Rastogi S, Chawla A, **Bhattacharya S**, Kaushik U, Mittal M, Rathore AS, Pandey G. *Biomolecules.* 2023, 13(10):1524. https://doi.org/10.3390/biom13101524.

2023 **Bhattacharya S**, Rathore AS. *Journal of Pharmaceutical and Biomedical Analysis.* 2023, 15:115527. https://doi.org/10.1016/j.jchromb.2023.123896.

2023 **Bhattacharya S**, Rathore AS. *Journal of Chromatography B*. 2023, 1229:123896. https://doi.org/10.1016/j.jpba.2023.115527.

2023 **Bhattacharya S**, Joshi S, Rathore AS. *Journal of Chromatography A*. 2023, 1696:463983. https://doi.org/10.1016/j.chroma.2023.463983.

2023 Rathore AS, Joshi S, Nupur N, Saxena N, **Bhattacharya S**, Roy S. *International Journal of Biological Macromolecules.* 2023, 227:124-33. https://doi.org/10.1016/j.ijbiomac.2022.12.011.

2022 Rajagopal S, Gupta A, Parveen R, Shukla N**, Bhattacharya S**, Naravula J, Kumar A, Mathur P, Simlot A, Mehta S, Bihari C. *Trends in Food Science & Technology*. 2022, 119:412-27. https://doi.org/10.1016/j.tifs.2021.12.012.

2020 **Bhattacharya S**, Sen A and Bhattacharya M. *International journal of leading research publication*. 2020, 1(2): 2582-8010. https://www.ijlrp.com/papers/2020/3/12.pdf.

2015 Pal S, **Bhattacharya S**, Sen A, Pati BR, Mondal KC and DasMohapatra PK. *Journal of Advanced Microbiology*. 2015, 2(1),32-53. https://doi.org/10.5530/jam.2.1.4.

2013 **Bhattacharya S**, Sen A, Thakur S, Tisa LS. *Journal of Biosciences.* 2013, 38:777-87. https://doi.org/10.1007/s12038-013-9357-0.

2013 Roy A, **Bhattacharya S**, Bothra AK, Sen A. *OMICS: A Journal of Integrative Biology*. 2013, 17(10):502-9. https://doi.org/10.1089/omi.2013.0015.

International Science Magazine

2023 Auclair J, Rathore A, **Bhattacharya S**. *LCGC North America*. 2023, 41(7):268-73. https://doi.org/10.56530/lcgc.na.mc8166h1.

2022 Rathore A, Auclair J, **Bhattacharya S**, Sarin D. *LCGC North America*. 2022, 40(1):27-31.https://doi.org/10.56530/lcgc.na.cz9881a2.

SCIENTIFIC CONFERENCES

Invited Speaker

2024 Challenges and Lessons Learned in Commercializing Novel Modalities at AAPS PharmSci 360, USA, October 2024.

2024 Current modalities in analytical characterization for large molecule biotherapeutics. Bose Institute, India, November 2024.

2024 Native multidimensional multiple attribute monitoring method development, Sister Nivedita University, India, November 2024

2024 Biosimilar characterization and essential quality features, Presidency University, India, October 2024.

2021 Evolutionary trend through structural divergent analysis, Centurion University, India, June 2021.

Oral & Poster

2025 ACS Spring, San Diego, CA, USA, March 2025.

2024 Colorado Protein Stability Conference, Breckenridge, Colorado, USA, August 2024.

2024 AbbVie Analytical Research Symposium (AARS), North Chicago, USA, July 2024.

2022 CBT, Indian institute of technology, Delhi, India, December 2022.

2015 22nd West Bengal State Council and Technology Congress, Darjeeling, India, February 2015.

2015 18th International Conference of Frankia and Actinorhizal Plants, Montpellier, France, August 2015.

2013 17th International Conference on Frankineae and Actinorhizal Plants, Shillong, India, April 2013.

AWARDS AND HONORS

2025 Selected for SCI-MIX (most exceptional submissions accepted by divisions) ACS Spring San Diego, CA, USA, March, 2025

2024 Invited for Rapid Fire Talk at AAPS PharmSci 360, USA, October 2024.

2024 Represent the University of Iowa, USA at the AbbVie Analytical Research Symposium (AARS), July 2024.

2024 Judge for Poster Presentation at SURC, Iowa Science Academy, USA July 2024.

2023 First Author Interview by Biopatrika for Novel Bottom-up Proteomics Method Development, 2023 (https://lnkd.in/guZ7tYpY)

2021 Institute Post-Doctoral Fellow (IPDF) award: IIT Delhi, India, 2021.

2015 Travel award: DBT-CTEP for international conference, India, 2015.

2011 Distinction Award: Master of Science (M.Sc.) Bangalore University, India, 2011.

2009 Highest Scorer Award in Zoology: Bachelor of Science (B.Sc.) Bangalore University, India, 2009.

LEADERSHIP, MENTORING & TRAINING

Leadership

2025 – till date International postdoc committee member, University of Iowa, USA.

2021 – 2023 Served as consumable coordinator for the analytical division (30+ members), ensuring timely procurement and efficient resource utilization Indian Institute of Technology, Delhi, India.

2021 – 2023 Organizing Committee Member: CBT Conference, Indian Institute of Technology, Delhi, India.

2022 Event management coordinator: Agilent-IIT Delhi Interaction, IIT Delhi, India 3rd October 2022.

Mentoring

2023 – till date Mentored graduate students & PDF (a total of 4), providing hands-on training in analytical method development, instrument operation, and data interpretation with 100% successfully publishing their research, University of Iowa, USA.

2021 – 2023 Mentored graduate students and interns, a total of 6, contributing three co-authored publications, Indian Institute of Technology, Delhi, India.

Training

2023 – till date	Contributed to curriculum design for graduate-level training sessions, integrating practical LC-MS workflows, Analytical method development, SE-HPLC, HILIC-FLD, MS, data interpretation and data interpretation modules, University of Iowa, USA.
2023 – till date	Coordinator for instrument maintenance, scheduling, and training, supporting >6 graduate and PDF researchers., University of Iowa, USA.
2021 – 2023	Hands-on training given in HPLC, MS-QTOF–based workflows for intact protein, enzymatic digestion, peptide mapping, and disulfide linkage analysis Indian Institute of Technology, Delhi, India.
2015 – 2017	Conducted hands-on training in protein modeling (homology modeling, evolutionary study) for undergraduate students, University of North Bengal, India.

REVIEWER FOR JOURNAL ARTICLES

2025	**European journal of pharmaceutical sciences:** Elsevier, Online ISSN: 0928-0987
2025	**Assay and drug development technologies:** Clarivate PLC, Online ID: oeG5x0zb
2024	**AAPS open:** Springer Nature, Online ISSN: 2364-9534
2024	**AAPS open:** Springer Nature, Online ISSN: 2364-9534
2024	**Pharmaceutical research:** Springer Nature, Online ISSN: 0724-8741
2024	**Plant biology:** Clarivate PLC, Online -ID: tfTyxG9Y
2024	**Plant biology:** Clarivate PLC, Online -ID: LYGwJGi4

PROFESSIONAL MEMBERSHIPS & VOLUNTEER

2024 – till date	**Member**, American Chemical Society (ACS)
2024 – till date	**Member**, American Association of Pharmaceutical Scientists (AAPS)
2021 – till date	**Member**, CBT Indian Institute of Technology, Delhi, India
2024 – till date	**Volunteer**, Abstract Screening AAPS PharmSci 360
2024 – till date	**Volunteer**, Abstract Screening AAPS National Biotechnology Conference (NBC)

REFERENCES

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