

Summary

Expertise in Protein Mass Spectrometry and Analytical Techniques

- Led a 4-year biosensor development program for Air Force pilots.
- Specialized in Hydrogen-Deuterium Exchange MS, Hydroxyl Radical Protein Footprinting, Benchtop Covalent Labeling, and Native MS.
- Successfully executed 25 projects, including 19 on protein footprinting mass spectrometry and pioneering high resolution multiplex chemistry labeling.
- Extensive experience in LC-MS, HPLC/UHPLC, and high-throughput automation
- Proficient in X-ray scattering, Circular Dichroism, and Fluorescence Spectroscopy.

Cross-Functional Collaboration and Research Contributions

- Expertise in integrating Protein Mass Spectrometry with high-resolution techniques Biomolecular NMR, X-ray crystallography, and Cryo-Electron Microscopy.
- Deep structural biology expertise in 20 biomedically important proteins.
- Applied expertise in Protein Design, Drug Discovery, Protein Folding, Protein Interactions Antibody structure characterization and DIA-based cellular screening.
- 13 successful publications, including 1 first-author paper in PNAS and 2 first-author papers in Analytical Chemistry. **(See on Page 3)**

Problem-Solving, Communication, and Leadership

- Mentored 12 professionals, supervising 3 of them and contributed to 5 organizations.
- Thrives in both independent and collaborative team environments.
- Strong problem-solving, oral, and written communication skills.
- Delivered 30 presentations, including 2 Oral Talks at the Conference on Mass Spectrometry (ASMS).

Work Experience

Principal Scientist, Structural and Biophysical Analytics, Protein Mass Spectrometry, and Problem-Solving, Organization, Supervision Skills

Gained as Senior Research Associate at Case Western Reserve University, Cleveland, OH.

- Led a 4-year cross-site biosensor development program for Air Force pilot fatigue monitoring, pioneering high-resolution protein footprinting, securing a patent, license, SBIR grant, and 4 awards, including the NIH-ICORPS Translational Fellows Award.
- Strong leadership and mentorship with expertise in biophysical and analytical techniques, mentoring 12 professionals in protein footprinting mass spectrometry.
- Exceptional written and oral communication skills, securing funding through research proposals, conducting market research, delivering business pitches, and contributing to 5 professional organizations.

Structural Biology, Hydroxyl Radical Protein Footprinting, and Covalent Labeling Skills

Gained as Post-Doctoral Associate at Case Western Reserve University, Cleveland, OH, USA

- Successfully managed 10 global research projects, integrating protein mass spectrometry with high-resolution techniques to achieve 5 discoveries in protein design and drug discovery.
- Validated a benchtop hydroxyl radical labeling platform for faster biosensor development and drug discovery.
- Optimized automated hydroxyl radical labeling and three LC-MS/HPLC/UPLC methods for multiplex chemical labeling.

Protein Chemistry and Hydrogen-deuterium Exchange MS Expertise

Gained as Post-Doctoral Associate at UMass Chan Medical School, Worcester, MA, USA

- Advanced knowledge in protein folding pathways through protein mass spectrometry, biophysical techniques and bioinformatics.
- Prepare HDX-MS samples as well as record and analyze intact and peptide deuterium labeling data of proteins
- Developing efficient and effective methodologies for Recombinant Protein Expression and Protein Purification for biophysics studies.

Biophysics, Protein folding, and Scientific Publishing Skills

Gained as PhD at Max Planck Institute for Multidisciplinary Sciences

- Expertise in equilibrium and time-resolved X-ray scattering for protein folding and protein interaction with small molecules as evidenced by 4 publications including 1 review article.

Recombinant Protein Expression and Protein Purification Skills

Gained as Research Assistant at Heinrich-Heine University, Dusseldorf, Germany

- Circular Dichroism Spectroscopy studies of biomedically important proteins
- Recombinant protein expression and protein purification for Biomolecular NMR experiments.
- Design and generate protein constructs for structural biology studies.

Education

PhD in Protein folding and Biophysics

Max Planck Institute for Biophysical Chemistry

MSc in Life Sciences

Jawaharlal Nehru University

BSc in Biomedical Sciences

University of Delhi

Skills List

Protein Mass Spectrometry

Native MS

Hydrogen-deuterium

Exchange MS

Hydroxyl Radical

Protein Footprinting

LC-MS Experience	Peptide Mapping	HPLC/UHPLC Experience
Structural Biology	X-ray Scattering	Principal Scientist, Structural and Biophysical Analytics
Protein Footprinting	Biophysics	Protein Chemistry
Market Research	Tandem Mass Spectrometry	Protein Expression and Protein Purification
Presentation Skills	Scientific Publishing	Proposal Writing

Affiliations, Awards & Hobbies

- Guest Editor, MDPI Biomolecules journal
- Peer-reviewed 76 reviews for 19 scientific journals
- Research Poster Award, Annual CCMSB Symposium Poster Award
- Finalist in the Morgenthaler-Pavey Startup competition
- 1-year NIH-ICORPS Translational Fellows Award to pursue entrepreneurship
- Protein Society Annual Symposium Travel Award sponsored by Wiley
- Research Poster Award in the 71st American Crystallographic Association meeting
- 4 years scholarship for PhD Research from the German Research Foundation (DFG)
- Travel grant from the Federation of European Biochemical Societies (FEBS)
- Research fellowship from German Academic Exchange (DAAD-IAESTE)
- Graduate Aptitude Test in Engineering. All India Rank 45 (13,505 candidates)
- Research fellowship for postgrads. Top 100 in All India rankings (30,000 candidates)
- Swimming, Table tennis

Publications

- **Jain R, Farquhar E, Dhillon NS, Jeon N, Chance MR, Kiselar J. Multiplex Trifluoromethyl and Hydroxyl Radical Chemistry Enables High Resolution Protein Footprinting. *ACS Analytical Chemistry*, 2024, 97, 1, 482-491.**
- **Jain R, Dhillon NS, Vijayalakshmi K, Lodowski DT, Farquhar E, Kiselar J, Chance MR. Evaluating mass spectrometry-based hydroxyl radical protein footprinting of a benchtop flash oxidation system against a synchrotron X-ray beamline. *Journal of the American Society for Mass Spectrometry*, 2024, 35(3), 476-486.**

- He Q[#], Wang C[#], **Jain R[#]**, Byrnes J, Farquhar E, Reed E, Berezovsky E, Chance MR, Lodowski DT, An R. An engineered lactate oxidase based electrochemical sensor for continuous detection of biomarker lactic acid in human sweat and serum. **Heliyon**, **2024**, **10(14)**, e34301. (# sharing first authorship).
- Farquhar E, Vijayalakshmi K, **Jain R**, Wang B, Kiselar J, Chance MR. Intact mass spectrometry screening to optimize hydroxyl radical dose for protein footprinting. **Biochemical and Biophysics Research Communications**, **2023**, **671**, 343-349.
- **Jain R**, Dhillon N, Farquhar E, Wang B, Li X, Kiselar J, Chance MR. Multiplex chemical labeling of amino acids for protein footprinting structure assessment. **ACS Analytical Chemistry**, **2022**, **94**, **27**, 9819–9825.
- Rosi M, Russell B, Kristensen LG, Farquhar ER, **Jain R**, Gupta S, Ralston CY. An automated liquid jet for fluorescence dosimetry and microsecond radiolytic labeling of proteins. **Nature Communications Biology**, **2022**, **5**, 866.
- Jian-Hua Wang, Yu-Lian Tang, Zhou Gong, **Rohit Jain**, Meng-Qiu Dong, Xiaoguang Lei. Characterization of progressive denaturation and unfolding intermediates of proteins by fast cross-linking using di-*ortho*-phthalaldehyde. **Nature Communications** **2022** **13** (1), 1-16.
- **Jain R***, Muneeruddin K, Shaffer S, Matthews C. R*. A conserved folding nucleus sculpts the free energy landscape of bacterial and archaeal orthologs from a divergent TIM barrel family. **PNAS** 2021, 118 (17); DOI: 10.1073/pnas.2019571118. (* sharing corresponding authorship).
- **Jain R**, Abel D, Rakitin M, Sullivan M, Lodowski D T, Chance M R, Farquhar E R. New high-throughput endstation to accelerate the experimental optimization pipeline for synchrotron X-ray footprinting. **RD11 special issue of the Journal of Synchrotron Radiation**, 2021.
- **Jain R**, Khan N, Konrad M, Techert S. Insights into open/closed conformations of the catalytically active human guanylate kinase as investigated by small-angle X-ray scattering. **European Biophysical Journal** 2016 Jan; 45(1):81-9.
- **Jain R** and Techert S. Time-resolved and in-situ X-ray scattering methods beyond photoactivation: Utilizing high-flux X-ray sources for the study of ubiquitous non photon active proteins. Review Article, **Protein and Peptide Letters** 2016; 23(3):242-54.
- Yin Z, Rajkovic I, **Jain R**, Techert S et al. Ionic solutions probed by resonant inelastic X-ray scattering. **Zeitschrift for physikalische Chemie** 2015, 229(10).
- **Jain R**, Burg T, Techert S. X-ray scattering experiments with high flux X-ray source coupled rapid mixing microchannel device and their potential for high flux neutron scattering investigations. **European Physical Journal E** 2013, Sep;36(9):109.