Nadia Tasnim Ahmed

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PROFESSIONAL SUMMARY

Analytical Scientist with a Ph.D. in Pharmaceutical Engineering and 5+ years of experience in LC-MS/MS and high-resolution mass spectrometry for the characterization of small molecules, peptides, proteins, and oligonucleotides. Skilled in bioanalytical method development, quantitative analysis, impurity profiling, and structural characterization to support drug discovery and development in regulated environments. Experienced in working with cross-functional teams to generate analytical data that supports pharmacokinetic and safety assessments. Strong foundation in analytical method validation in compliance with regulatory guidelines and industry standards.

SELECTED SKILLS AND COMPETENCIES

Laboratory Techniques:

Bioanalytical & Mass Spectrometry Techniques

- LC-MS/MS (Orbitrap, QTOF, QQQ) for small molecules, peptides, proteins, and oligonucleotides
- Extensive experience with high-resolution instruments: Orbitrap Fusion Lumos, Q Exactive HF-X, Waters Cyclic IMS-ACQUITY UPLC/QTOF, MOBILion-Agilent 6545XT, SCIEX Triple Quad 6500+
- Method development, validation, and troubleshooting for quantitative assays, impurity characterization, and structural elucidation
- Expertise in sample extraction workflows: protein precipitation (PPT), solid-phase extraction (SPE), liquid–liquid extraction (LLE), and affinity capture
- Automated 96-well sample preparation using Hamilton Nimbus, Microlab STAR, and KingFisher platforms to increase throughput, reproducibility, and process efficiency
- HPLC–UV, electrophoresis (SDS-PAGE, Western blot), and spectroscopic methods (UV–Vis, IR)

Regulatory, Method Validation & Technical Writing

- Method qualification, transfer to GMP, and preparation of technical reports, SOPs, and validation protocols
- Compliance with FDA bioanalytical method validation guidelines
- Data management: SciNote ELN, STARLIMS, Watson LIMS, MS Office (advanced Excel analytics)

Proteomics & Bioinformatics

- Quantitative & structural proteomics: Label-free, SILAC, and TMT-based workflows
- Peptide mapping, PTM analysis, and glycan profiling
- Bioinformatics for pathway and genetic analysis: Cytoscape, GSEA, gProfiler

Computational & Statistical Analysis

- Software: Proteome Discoverer, Skyline, XCalibur, BioPharma Finder, MassHunter, MassLynx, Byonic, Analyst, Chromeleon
- Programming: R, Python, JMP for experimental design and statistical analysis
- Expertise in DOE and PBPK modeling (Berkeley Madonna, GastroPlus)

Language:

- Fluent in English
- Native in Bengali

EXPERIENCE

June 2025 – Present, **Research Scientist I, Method Development**, Charles River Laboratories, Ashland, Ohio

- Lead bioanalytical method development and validation using LC-MS/MS for small and large molecules across various biological matrices (plasma, serum, tissues, and whole blood),

successfully delivering analytical support for over 10 client projects.

- Collaborate with study directors and project teams to design fit-for-purpose LC-MS/MS methods for new chemical entities, ensuring quantitative performance in complex matrices.
- Evaluate and optimize sample extraction techniques (protein precipitation, SPE, LLE, affinity capture) to maximize recovery and precision.
- Perform quantitative analysis of drugs and metabolites using high-sensitivity LC-MS/MS platforms in compliance with regulatory standards.
- Author method development reports and support method transfer to validation and study teams.
- Apply data processing and visualization tools (Analyst, Chromeleon) to interpret chromatographic and mass spectrometric data.
- Ensure bioanalytical workflows and documentation align with FDA, EMA, and ICH regulatory expectations for method development and validation.
- Support troubleshooting, robustness testing, and documentation for assay qualification and post-validation phases.

November 2024 – May 2025, **ORISE Fellow**, Food and Drug Administration (FDA), St. Louis, Missouri

- Developed high-resolution LC-MS/MS and ion mobility (HRIM-MS, Cyclic IMS-MS) methods for diastereomeric separation and characterization of synthetic oligonucleotides, ensuring analytical precision and confident structural assignment.
- Conducted impurity profiling, structural elucidation, and degradation product assessment of oligonucleotide drug substances and products.
- Designed and optimized chromatographic and mass spectrometric parameters to enhance resolution of closely related isomers.
- Authored method development reports and technical documentation following FDA quality and data integrity standards.
- Collaborated with regulatory scientists to translate research outcomes into practical analytical workflows supporting generic drug product characterization and regulatory submissions.
- Delivered oral presentations summarizing technical outcomes and recommendations for method standardization across the FDA's analytical laboratories.

August 2020 - November 2024, **Graduate Assistant**, Department of Pharmaceutics, School of Pharmacy, Virginia Commonwealth University

Teaching Assistant Responsibilities:

- Designed the "PESC 709: Pharmaceutical Engineering Lab II" course and established a new teaching lab for a class of 12 graduate students.
- Developed syllabus, graded papers, and delivered 4 lectures.

Research Assistant Responsibilities:

- Led LC-MS/MS-based quantitative proteomic analysis of macrophages, identifying key protein markers linked to polarization states in lung inflammation.
- Conducted peptide mapping, post-translational modification analysis, and quantitative proteomics using Orbitrap Fusion Lumos and Q Exactive HFX.
- Applied bioinformatics and statistical approaches to integrate proteomic data with genetic and pathway analyses.
- Led projects on radioimmunotherapy for glioblastoma and RNAi based ADAR gene modulation for cancer immunotherapy, contributing to an NIH R35 grant proposal on nucleic acid modulators and theranostics.
- Presented findings at research symposiums and published in peer-reviewed journals.

May 2024 - September 2024, **Summer ORISE Fellow**, Food and Drug Administration (FDA), St. Louis, Missouri

- Developed and validated a microchip-based CE–MS (ZipChip) method for high-throughput quantitative impurity analysis of synthetic oligonucleotides.
- Improved analytical accuracy, reproducibility, and throughput while maintaining compliance with FDA bioanalytical method validation guidelines.
- Conducted characterization and impurity profiling of oligonucleotide drug products using chip-based CE–MS and high-resolution MS.
- Authored SOPs and validation summaries to document method parameters, accuracy, precision, and robustness.

- Presented findings to the FDA research and regulatory teams, emphasizing the applicability of ZipChip CE–MS for routine quality control and lot-release testing of complex oligonucleotides.

December 2019 - May 2020, **Research Assistant**, Department of Internal Medicine, University of South Florida

- Developed and optimized lipid-based nanocarriers for targeted intranasal drug delivery of lapatinib and ketoconazole.
- Characterized nanoparticles by assessing encapsulation efficiency, particle size, and stability.
- Conducted in vitro drug release studies to evaluate formulation performance.
- Performed cell uptake and cytotoxicity studies in monolayer and 3D cell cultures.
- Developed preclinical pharmacokinetic (PK) and biodistribution models to evaluate drug delivery efficacy.
- Contributed to "Preclinical efficacy of TN-1008," conducting anticancer drug screening, PCR, and flow cytometry assays to assess gene expression, cell viability, and stemness markers (including ALDH activity).
- Designed and executed experiments, performed statistical analyses, and presented findings at conferences.

October 2017 - December 2018, **Research Assistant**, Department of Pharmaceutical Chemistry, University of Dhaka

- Synthesized and characterized silver nanoparticles and nanosilver-conjugated antibiotics to enhance antimicrobial efficacy.
- Evaluated antimicrobial properties against clinical bacterial isolates.
- Prepared comprehensive reports based on the research outcomes.

July 2017 - August 2018, **Development Pharmacist**, Product Development Department, Radiant Pharmaceuticals Ltd, Tongi, Bangladesh

- Led formulation development and analytical method development for tablets and oral liquid dosage forms following USP, BP, and ICH guidelines.
- Conducted stability studies and method validation under cGMP and ISO standards.
- Collaborated across departments to oversee scale-up, pilot, and stability batches for new product development.

May 2016 - October 2016, **Hospital Pharmacy Intern**, Dhaka Medical College Hospital, Dhaka, Bangladesh

- Gained exposure to clinical pharmacology, antibiotic stewardship, and toxicity management.

March 2015, **Industrial Pharmacy Intern**, Square Pharmaceuticals Ltd, Gazipur, Bangladesh

- Assisted in pharmaceutical manufacturing, quality control, and regulatory compliance under GMP standards.

EDUCATION

- **PhD in Pharmaceutical Engineering, October 2024**
  GPA 3.88
  Center for Pharmaceutical Engineering and Science, Department of Pharmaceutics,
  School of Pharmacy, Virginia Commonwealth University (VCU), Richmond, Virginia
  (Advisor: Dr. Adam Hawkridge)
  (Featured in VCU News as the first individual in the nation to earn a Ph.D. in Pharmaceutical Engineering)
- **Master of Science in Pharmaceutical Nanotechnology, August 2020**
  GPA 4
  Pharmacy Graduate Program, Taneja College of Pharmacy, University of South Florida (USF), Tampa, Florida
  (Advisors: Dr. Subhra Mohapatra and Dr. Shyam Mohapatra)
- **Master of Pharmacy (M.Pharm) in Pharmaceutical Chemistry, April 2019**
  GPA 3.69
  Department of Pharmaceutical Chemistry, University of Dhaka, Bangladesh
- **Bachelor of Pharmacy Professional (B.Pharm 5 years) in Pharmacy, July 2017**
  GPA 3.68 (WES 3.8)
  Department of Pharmacy, University of Dhaka, Bangladesh

PROFESSIONAL ACTIVITIES

PRESENTATIONS

- ASMS 2025, Baltimore, MD & FDA Generic Drug Science Day (GDSD) 2025, Silver Spring, MD: Analytical Procedure Development and Validation of High-throughput ZipChip CZE-MS Method for Quantitative Oligonucleotide Analysis.
- ASMS 2025, Baltimore, MD & FDA Generic Drug Science Day (GDSD) 2025, Silver Spring, MD: Characterization of Phosphorothioate Diastereomers in Synthetic Oligonucleotides Using High-Resolution Ion Mobility-Mass Spectrometry (HRIM-MS).
- Pediatric Academic Societies Meeting 2025: "Neutrophil elastase targets select proteins on human blood monocyte derived macrophage cell surfaces."
- NanoFlorida 2019: "Lapatinib and Ketoconazole Combination Therapy using Lipid Micelle Nanoparticles for Treatment of Lung Cancer."
- IUBMB Seoul 2018: "Endophytic Fungal Metabolites Arrest Cell Cycle of Acute Leukemia Cells."
- AFOB Bangladesh 2018: "Synthesis and Functional Evaluation of Nanoparticle Conjugated Antibiotics."
- ISE SFEC National Conference 2017: "A Review on Cytotoxic and Antimicrobial Compounds Derived from Marine Endophytic Fungi."

SHORT COURSES

- Physiologically-Based Pharmacokinetic (PBPK) Modeling Workshop (2024), FDA (Instructor: Dr. Raymond Yang).
- Advanced Mass Spectrometry and Proteomics Techniques, VCU.

CONTINUING EDUCATION

- FDA 101 Training Course (2024).
- Regulatory Guidelines for Bioanalytical Method Validation, FDA.

SELECTED COURSEWORK

- Data Science I & II, Statistical Data Science, Basic Scripting Language, Design and Analysis of Experiment, VCU.

THESIS

1. Ahmed, N. T. (2024). Proteomic Analysis of Neutrophil Elastase-Induced Macrophage Extracellular Traps and Their Role in Lung Inflammation. https://scholarscompass.vcu.edu/etd/7885/

2. Ahmed, N. T. (2020). Hyaluronic Acid Coated Targeted Lipid Micellar Nanoparticle as a Delivery Vehicle for Lapatinib and Ketoconazole in EGFR mutated Lung Cancer. https://digitalcommons.usf.edu/etd/8909/

3. Ahmed, N. T. (2018). Synthesis of silver nanoparticle and nanosilver conjugated ampicillin to increase sensitivity against clinical bacterial isolates.

PUBLICATIONS

1. **Ahmed, N. T.**, Kummarapurugu, A. B., Zheng, S., Bulut, G., Kang, L., Batheja, A., Hawkridge, A., & Voynow, J. A. (2024). Neutrophil elastase targets select proteins on human blood monocyte-derived macrophage cell surfaces. *International Journal of Molecular Sciences*. https://doi.org/10.3390/ijms252313038

2. Islam, M.R., **Ahmed, N.T.**, Yoon, L., Afon, N.D., Zhang, D., Liang, L., Sommers, C., Rodriguez, J.D., Wang, Y., Chia, E-S., Yang, K.* Decoding Oligonucleotide Stereochemistry: Unexpected Disconnect Between Individual Phosphorothioate Configuration Ratios and Intact Sequence Diastereomeric Composition. *Analytical Chemistry*, manuscript submitted.

3. Ayubee, M. S., Akter, F., **Ahmed, N. T.**, Kabir, A. K. L., Alam, L., Hossain, M. M., Kazi, M., & Mazid, Md. A. (2025). Synergistic antibacterial action of AgNP-ampicillin conjugates: Evading β-lactamase degradation in ampicillin-resistant clinical isolates. *PLoS One* 20(9): e0331669 https://doi.org/10.1371/journal.pone.0331669

4. Ayubee, M. S., Akter, F., **Ahmed, N. T.**, Alam, L., Shanto, R. H., Kabir, A. K. L., Hossain, M. M.,

& Mazid, M. A. (2024). Chemical synthesis of silver nanoparticles: A comparative study of antibacterial properties. Preprints. https://www.preprints.org/manuscript/202407.1289

5. Su, T., **Ahmed, N. T.**, Zhou, S., Liu, X., & Zhu, G. (2022). Chapter Eleven—STING pathway and modulation for cancer immunotherapy. In M. M. Amiji & L. S. Milane (Eds.), *Cancer Immunology and Immunotherapy* (pp. 353–373). Academic Press. https://doi.org/10.1016/B978-0-12-823397-9.00011-9

6. **Ahmed, N. T.**, Noor, S., Rahman, M. M., & Mazid, M. A. (2021). Cytotoxic Compounds Derived from Marine Algicolous and Spongicolous Endophytic Fungi: A Review. *Dhaka University Journal of Pharmaceutical Sciences*, 20(2), 247–265. https://doi.org/10.3329/dujps.v20i2.57175

7. Mohapatra, S. S., Frisina, R. D., Mohapatra, S., Sneed, K. B., Markoutsa, E., Wang, T., Dutta, R., Damnjanovic, R., Phan, M.-H., Denmark, D. J., Biswal, M. R., McGill, A. R., Green, R., Howell, M., Ghosh, P., Gonzalez, A., **Ahmed, N. T.**, Borresen, B., Farmer, M., … Martin, D. K. (2020). Advances in Translational Nanotechnology: Challenges and Opportunities. *Applied Sciences*, 10(14), 4881. https://doi.org/10.3390/app10144881

8. **Ahmed, N. T.**, & Mazid, M. A. (2018). Synthesis and functional evaluation of nanoparticle conjugated antibiotics. *New Biotechnology*, 44, S95–S96. https://doi.org/10.1016/J.NBT.2018.05.960

HONORS

- **Excellence in Pharmaceutical Engineering Award in 2023; Issuer - School of Pharmacy, Virginia Commonwealth University**
- **Excellence in student research on the project titled: "Preclinical efficacy of TN-1008" - Apr 2020; Issuer - The Florida High Tech Corridor Council's Matching Grants Research Program**
- **National Science and Technology Fellowship for Master's Research in 2018; Issuer - The Ministry of Science and Technology, Bangladesh**
- **Travel Grant Awardee, IUBMB Conference, Seoul, South Korea, 2018**
- **Best Poster Award (1st), North South University Pharma Fest, 2018**
- **Best Poster Award (2nd), ISE SFEC National Conference, Dhaka, Bangladesh**

PROFESSIONAL CERTIFICATION

- Registered as an A-grade pharmacist in Bangladesh.
- Member, American Society for Mass Spectrometry (ASMS).

LEADERSHIP AND ADVISORY EXPERIENCE

- Judge, Virginia Junior Academy of Science (VJAS) 2025 Research Symposium
- Reviewer, 2025 National Biotechnology Conference Poster Abstracts, American Association of Pharmaceutical Scientists (AAPS)
- Founding President, Pharmaceutical Engineering Graduate Student Association, Virginia Commonwealth University, 2021-2023
- Judge, Virginia Junior Academy of Science (VJAS) 2023 Research Symposium
- Treasurer, Pharmaceutics Graduate Student Association, Virginia Commonwealth University, 2020-2021
- Student Advisor, 2021-2022, VCU Health Science Library Student Advisory Committee
- Secretary, New Advancements in Nanotechnology Organization (NANO), USF, 2019-2020
- Member & Surgent at Arms, Toastmaster International, USF, 2019-2020