

Md (Methun) Kamruzzaman, Ph.D.

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Current Position(s)

Assistant Professor of Computer Science and Data Science
School of Applied Computational Sciences
Meharry Medical College
Nashville, Tennessee
Coordinator, Certificate in Data Science

Education

Ph.D. Computer Science, Washington State University, Pullman, WA	2020
B.Sc. Computer Science and Engineering, Bangladesh University of Engineering and Technology (BUET)	2009

Academic Appointments

Assistant Professor of Computer Science and Data Science School of Applied Computational Sciences Meharry Medical College Nashville, Tennessee	2026 – Present
Postdoctoral Researcher Department of Computer Science Biocomplexity institute, University of Virginia Charlottesville, VA	2020 – 2023
Graduate Research Assistant Department of Computer Science Washington State University Pullman, WA	2015 – 2020
Teaching Assistant Department of Computer Science Washington State University Pullman, WA	2015 – 2017

Professional Positions and Experience

Postdoctoral Researcher Sandia National Laboratories Livermore, CA, USA	2023 – 2025
Applied Scientist Intern Amazon Seattle, WA, USA	2019
Research Intern Pacific Northwest National Laboratory Richland, WA, USA	2018
Software Development Engineer KBGroup & NRG Dhaka, Bangladesh	2009 – 2015

Professional Memberships and Activities

SIAM	2025
GRC	2024
TRICON	2024
PSB	2024
ACM-BCB	2016 – 2018

Educational Activities

- Assistant Professor at Meharry Medical College:
 - MSDS 530: Statistical Inference and Modeling Spring
 - MSCS 530: Principles in Programming Languages Spring
 - MSDS 510: Computer Programming Foundations for Data Science Fall
 - MSDS 535: Further Programming Languages for Data Science Fall
 - * Prepared syllabus, lecture content, and delivered lectures
 - * Maintained dedicated office hours, quizzes, and projects
 - * Ensured a collaborative, engaging, and performance-focused classroom
- Teaching Assistant at Washington State University: Fall 2015 – 2017
 - Served as head TA for Verilog in the VLSI lab (EE214, Design of Logic Circuits): helped students complete weekly projects, held office hours to clarify topics, graded exams on time, uploaded grades, and held in-person performance discussions.
 - Suggested curriculum upgrades on VLSI, Theory of Computing, and Algorithms.

Grants and Contract Awards

- Project Title: *AI-Secured, Predictive, Interoperable Rural Excellence (ASPIRE)*
 - Meharry Medical College, Austin Peay State University, regional hospital partners
 - Role: *Co-PI (PI: Dr. Eugene Levin)*
 - Funding Agency: *Tennessee Department of Health, Rural Health Transformation Program*
 - Status: *Selected for funding; contract pending*
- Project Title: *CAREER: Fixed-Dimensional Topological Sketches for Federated Clinical Trajectory Reconstruction*
 - Meharry Medical College
 - Role: *PI*
 - Funding Agency: *National Science Foundation (NSF CAREER)*
 - Status: *Pending*
- Project Title: *FORT-AI: Foundations of Robust and Trusted Artificial Intelligence under Degraded, Adversarial, and Uncertain Information*
 - Meharry Medical College
 - Role: *Senior/Key Personnel*
 - Funding Agency: *Department of War (Army Research Office)*
 - Status: *Pending*
- Project Title: *Excellence in Research: VERITAS – Verified Inference for Topological Adaptive Streaming Digital Twins*
 - Meharry Medical College
 - Role: *PI*
 - Funding Agency: *National Science Foundation (HBCU-EiR, NSF 23-598)*
 - Status: *Pending*

Honors and Awards

Innovation Award, Sandia National Laboratories	2024
CHAI (Community Health Analytics Initiatives) fellowship	2016 – 2017
BigLS (Big Data in Life Science) travel award for ACM-BCB Workshop	2016

Publications

Peer-Reviewed Journals

1. **Kamruzzaman, M.**, Landera, A., Menon, N. C., Allendorf, M. D., & Poorey, K. (2026). *P2MAT: A machine learning (ML) driven software for Property Prediction of MATerial*. Journal of Cheminformatics, 18, 144.
2. Balakrishnan, U., Poorey, K., Radhakrishnan, R., Mishra, U., & **Kamruzzaman, M.** (2026). *Opportunities and Credibility Challenges of Generative AI-Enhanced Digital Twins Across Science and Engineering*. Computing in Science & Engineering (IEEE).
3. Yin, K., Landera, A., Lee, N., Iavarone, A. T., Young, T. D., Deng, K., Chen, Y., Gin, J. W., Benedict, R., Chiu, Y., Ukabiala, E., **Kamruzzaman, M.**, Poorey, K., Northen, T. R., Petzold, C. J., George, A., Cruz-Morales, P., Dan, Q., & Keasling, J. D. (2026). *Polyketide synthase-based controlled synthesis of polycyclopropanated fuel molecules*. Nature Communications.
4. Choudhary, A., Desai, S., **Kamruzzaman, M.**, Landera, A., Ghosh, K., & Poorey, K. (2025). *Predicting the critical micelle concentration of binary surfactant mixtures using machine learning*. Journal of Cheminformatics, 17(1), 170.
5. **Kamruzzaman, M.**, Salinas, J. S., Kolla, H., Sale, K. L., Balakrishnan, U., & Poorey, K. (2025). *GenAI-Based Digital Twins Aided Data Augmentation Increases Accuracy in Real-Time Cokurtosis-Based Anomaly Detection of Wearable Data*. Sensors, 25(17), 5586.
6. Chowdhury, T. A., Izubuchi, T., **Kamruzzaman, M.**, Karthik, N., Khan, T., Liu, T., ... & Sufian, R. S. (2025). *Polarized and unpolarized gluon PDFs: Generative machine learning applications for lattice QCD matrix elements at short distance and large momentum*. Physical Review D, 111(7), 074509.
7. **Kamruzzaman, M.**, Heavey, J., Song, A., Bielskas, M., Bhattacharya, P., Madden, G., ... & Vullikanti, A. (2024). *Improving Risk Prediction of Methicillin-Resistant Staphylococcus aureus Using Machine Learning Methods with Network Features: Retrospective Development Study*. JMIR AI, 3(1), e48067.
8. Cui, J., Cho, S., **Kamruzzaman, M.**, Bielskas, M., Vullikanti, A., & Prakash, B. A. (2023). *Using spectral characterization to identify healthcare-associated infection (HAI) patients for clinical contact precaution*. Scientific Reports, 13(1), 16197.
9. **Kamruzzaman, M.**, Bielskas, M., Krishnamoorthy, B., Marathe, A., Vullikanti, A., & Kalyanaraman, A. (2021). *Navigating the COVID-19 Data Landscape: Automated Hypothesis Generation using Topological Data Analysis*. BMC Medical Informatics and Decision Making.
10. Madden, G., Bielskas, M., **Kamruzzaman, M.**, Bhattacharya, P., Lewis, B., Klein, E., Sifri, C., & Vullikanti, A. (2021). *173. Deciphering COVID-19-Associated Effects on Hospital MRSA Transmission and Social Networks*. Open Forum Infectious Diseases, 8(Suppl. 1), S104–S106.
11. Sadilek, A., Liu, L., Nguyen, D., **Kamruzzaman, M.**, Serghiou, S., Rader, B., Ingerman, A., Mellem, S., Kairouz, P., Nsoesie, E. O., & MacFarlane, J. (2021). *Privacy-first health research with federated learning*. npj Digital Medicine, 4(1), 1–8.
12. **Kamruzzaman, M.**, Kalyanaraman, A., Krishnamoorthy, B., Hey, S., & Schnable, P. S. (2019). *Hypno-X: A Scalable Exploratory Framework for Analyzing Complex Phenomics Data*. IEEE/ACM Transactions on Computational Biology and Bioinformatics, 18(4), 1535–1548.
13. Kalyanaraman, A., **Kamruzzaman, M.**, & Krishnamoorthy, B. (2019). *Interesting paths in the Mapper Complex*. Journal of Computational Geometry, 10(1). DOI: [10.20382/jocg.v10i1a17](https://doi.org/10.20382/jocg.v10i1a17) (author order: alphabetical).

Conference/Workshop Proceedings

1. Datta, R., **Kamruzzaman, M.**, Klein, E. Y., Madden, G. R., Deng, X., Vullikanti, A., & Bhattacharya, P. (2026). *Prediction of Hospital Associated Infections During Continuous Hospital Stays*. Proceedings of the AAAI Conference on Artificial Intelligence, 40(47), 40234–40241.
2. Zhang, X., Nguyen, D., **Kamruzzaman, M.**, Bhattacharya, P., Cadena, J., Deng, X., & Vullikanti, A. (2024). *Classification with Rejection for Data Imbalance and Fairness*. [Under submission]
3. Jang, H., Fu, A., Cui, J., **Kamruzzaman, M.**, Prakash, B. A., Vullikanti, A., ... & Pemmaraju, S. V. (2023). *Detecting sources of healthcare associated infections*. Proceedings of the AAAI Conference on Artificial Intelligence, 37(4), 4347–4355.
4. Zhou, Y., **Kamruzzaman, M.**, Schnable, P., Krishnamoorthy, B., Kalyanaraman, A., & Wang, B. (2021). *Pheno-Mapper: an interactive toolbox for the visual exploration of phenomics data*. Proceedings of the 12th ACM Conference on Bioin-

formatics, Computational Biology, and Health Informatics, 1–10.

5. Madhobi, K. F., **Kamruzzaman, M.**, Kalyanaraman, A., Lofgren, E., Moehring, R., & Krishnamoorthy, B. (2019). *A Visual Analytics Framework for Analysis of Patient Trajectories*. Proceedings of the ACM Conference on Bioinformatics, Computational Biology, and Health Informatics (ACM-BCB'19). DOI: [10.1145/3307339.3342143](https://doi.org/10.1145/3307339.3342143).

6. **Kamruzzaman, M.**, Kalyanaraman, A., & Krishnamoorthy, B. (2018). *Detecting divergent subpopulations in phenomics data using interesting flares*. Proceedings of the ACM Conference on Bioinformatics, Computational Biology, and Health Informatics (ACM-BCB'18), 155–164. DOI: [10.1145/3233547.3233593](https://doi.org/10.1145/3233547.3233593).

Published Abstracts and Presentations

1. **Kamruzzaman, M.**, Kalyanaraman, A., & Krishnamoorthy, B. (2016). *Characterizing the role of environment on phenotypic traits using topological data analysis*. Proceedings of the 7th ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics, 487–488.

Oral Presentations

SIAM	2025
ACM-BCB	2018

Poster Presentations

CBD S&T (Chemical and Biological Defense, Science and Technology Conference)	2024
GRC (Gordon Research Conferences)	2024
BIOIT (Bio-IT World Conference & Expo)	2024
TRICON (Precision Med TRI-CON)	2024
PSB (Pacific Symposium on Biocomputing)	2024
ACM-BCB	2016

Other Creative Products

Hyppo-X (Interactive visualization software)	2017 – 2020
TwinMe4AD (Software tool)	2024
P2MAT (Software tool; DOE CODE release v1.0, doi:10.11578/dc.20260318.3)	2024 – 2026
PARORA (Agentic AI software; in development)	2026

Other Scholarly Products

SHAD (Benchmark analysis during internship)	2018
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