Md Abrar Jahin, CSCA™

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Citizenship: Bangladesh

GitHub
LinkedIn
Personal Website

Google Scholar
ResearchGate
ORCiD

Education

University of Southern California — Los Angeles, CA, USA
Ph.D. in Computer Science — *Aug 2025 – Present*
- USC Graduate Fellowship for 2025-2026
- Co-advised by Prof. Craig Knoblock and Prof. Jay Pujara

Khulna University of Engineering & Technology — Khulna, Bangladesh
B.Sc. Eng. in Industrial & Production Engineering — *Nov 2018 – Mar 2024*
CGPA: 3.83/4.00 (Top 5% of class)
- Dean's award: 2018-2019, 2019-2020, 2020-2021
- Thesis title: Supply Chain Backorder Prediction Using Interpretable Hybrid Quantum–Classical Neural Network [Thesis Presentation] [*Supervisor*: Dr. Md. Saiful Islam]
- Developed the first-ever LaTeX template for B.Sc. Undergrad Thesis of KUET [Template]
- Google Knowledge Panel of Md Abrar Jahin

Research Interests

† Efficient Deep Learning (DL)
- *Geometric & Spiking Neural Networks, Kolmogorov-Arnold Networks (KAN), Physics-informed Neural Networks (PINN)*

† Quantum Computing
- *Quantum Machine Learning (QML)*

† Trustworthy AI
- *Explainable AI (XAI)*
- *Uncertainty Quantification*
  - ◇ *Conformal Prediction*

† Self-Supervised Learning (SSL)
- *Contrastive Learning*

† Reinforcement Learning (RL)
- *Inverse RL, Imitation Learning*

† Natural Language Processing (NLP)
- *Sentiment Analysis*

Research Experiences

❖ **Lead Researcher** — *Mar 2023 – Present*
Advanced Machine Intelligence Research Lab (AMIRL), American International University-Bangladesh (AIUB)
Roles: Research Assistant (Mar 2023 - Dec 2023), Researcher (Dec 2023 - Feb 2024), Lead Researcher (May 2024 - Present)
Research Affiliations:
◆ Department of Natural Language Processing and Computational Linguistics
Supervisor: Prof. M. F. Mridha (Professor, Dept. of CS, AIUB)
◆ Collaborators: Prof. R. Simon Sherratt (IEEE Fellow), Prof. Nilanjan Dey, Prof. Jungpil Shin, Prof. Yuichi Okuyama, Prof. Zeyar Aung, Prof. Yutaka Watanobe, Prof. Md. Rashedul Islam
■ Published **6 WoS Q1** journal articles and **1 CORE ranked** conference article, and 14 are under review in Q1 journals (concentration: DL, QML, GNN, XAI, conformal prediction, human-in-the-loop, NLP, and operations research).

❖ **Visiting Researcher (VR)** — *Mar 2024 – Mar 2025*
Physics and Biology Unit, Okinawa Institute of Science and Technology Graduate University (OIST), Japan
Supervisor: Prof. Jonathan Miller [BS (Yale); PhD Biology (Cambridge); PhD Physics (Caltech)]
Research project: Evolution of Strongly Conserved Sequence [Code Repository]
■ [FY2023 Annual Report] [OIST Affiliation]

❖ **Visiting Research Student (VRS)** — *Feb 2023 – Feb 2024*
Physics and Biology Unit, OIST, Japan
Supervisor: Prof. Jonathan Miller [BS (Yale); PhD Biology (Cambridge); PhD Physics (Caltech)]
Research project: Evolution of Strongly Conserved Sequence [Certificate]
Collaborators: Dr. Lucia Žifčáková, Dr. Priscila Do Nascimento Biller, Dr. Zdenek Lajbner, and Dr. Reuven Pnini

■ Critically analyzed and visually represented all potential combinations of inter-gap segments (IGS), ancestral repeats (ARs), and contiguous mismatched ARs in human/mouse and human/gorilla genome alignments, focusing on both DNAs and repetitive sequences.
■ Successfully replicated the findings of the neutral indel model proposed by Lunter, Pointing, and Hein (2006).

❖ Research Lead *May 2022 – Mar 2023*
Research Camp 02, Scholarship School BD, Bangladesh
Supervisor: Dr. Mohammad Arafat Hussain (Post-doctoral Research Fellow at Image, Informatics & Intelligence Research Lab, Harvard Medical School; PhD in Biomedical Eng., UBC Canada; MASc in Biomedical Eng., UBC)

■ Led the research team of 17 fellow researchers as a co-first author on a project titled "Ultrasound-Based AI for COVID-19 Detection: A Comprehensive Review of Public and Private Lung Ultrasound Datasets and Studies".
■ Contributed to writing the original manuscript, software implementation, and data curation and served as a corresponding author for the entire communication with the journal.

❖ Research Intern (RI) *Oct 2021 – Mar 2022*
Physics and Biology Unit, OIST, Japan
Supervisor: Prof. Jonathan Miller [BS (Yale); PhD Biology (Cambridge); PhD Physics (Caltech)]

■ Awarded a full-funded scholarship with a daily allowance of JPY 2400 per working day (taxable) [Offer Letter] [RI Agreement] [Internship Certificate] (acceptance rate: **14%**)
■ Tracked erroneous out-of-bound PCS coordinates generated by Nash and Lenhard (2018), utilizing R and Bedtool, and resolved complexity issues using Python 3.10.
■ Demonstrated shell scripting and parallel computing proficiency on the HPC Deigo cluster.
■ Conducted research on perfectly conserved sequence (PCS) length distributions of UCSC 44 pairwise genome sequences.
■ Analyzed quantile kurtosis of PCS lengths proposed by Nash and Lenhard (2018) and identified a 'knee' in the PCS distributions of the heavy-tailed region.
■ Optimized Nash and Lenhard's 3 R scripts for PCS generation, quantile kurtosis analysis, and genomic regulatory blocks (GRBs), reducing time and memory complexity. Successfully reproduced PCS coordinates following UCSC format and fixed genome coordinate-related errors in R's Bioconductor package.

❖ Research Intern *May 2021*
UiT - The Arctic University of Norway
Supervisors: Prof. Aleksander Pedersen, Prof. Rune Dalmo, Ghada Bouzidi
Internship Mentor: Prof. Per Arne Sundsbø

■ Conducted comprehensive data and statistical analysis on the Narvik road dataset as part of the DIT4BEARs Smart Road project. [Internship Report] [Project Source Code] [Certificate]
■ Designed, implemented, and evaluated ML models that successfully identified six road states, addressing the challenges of winter weather conditions in the Barren Euro-Arctic region.
■ Proposed a novel safety metric and utilized Ridge, Lasso, Elastic Net, Linear Regression, and XGBRegressor to forecast its values.

Publications

I have 90 citations according to Google Scholar as of April 6, 2025 (h-index = 6, i10-index = 4)
* *Denotes co-first authorship.*

Journal Articles

[J-1] **Jahin, M. A.**, Shovon, M. S. H., Islam, M. S., Shin, J., Mridha, M. F., & Okuyama, Y. (2023). QAmplifyNet: Pushing the boundaries of supply chain backorder prediction using interpretable hybrid quantum-classical neural network. ***Scientific Reports***, *13*(1), 18246. [Code]
[J-2] **Jahin, M. A.**, & Talapatra, S. (2024). A Natural Language Processing-Based Classification and Mode-Based Ranking of Musculoskeletal Disorder Risk Factors. ***Decision Analytics Journal***, *11*, 100464. [Code]
[J-3] **Jahin, M. A.**, Shovon, M. S. H., Shin, J., Ridoy, I. A., & Mridha, M. F. (2024). Big Data - Supply Chain Management Framework for Forecasting: Data Preprocessing and Machine Learning Techniques. ***Archives of Computational Methods in Engineering***, *31*(6), 3619–3645.
[J-4] Ahmad, K.*, Islam, M. S., **Jahin, M. A.***, & Mridha, M. F. (2024). Analysis of Internet of things implementation barriers in the cold supply chain: An integrated ISM-MICMAC and DEMATEL approach. ***PLoS ONE***, *19*(7), e0304118.
[J-5] Saha, A. K.*, **Jahin, M. A.***, Rafiquzzaman, M., & Mridha, M. F. (2024). Ergonomic Design of Computer Laboratory Furniture: Mismatch Analysis Utilizing Anthropometric Data of University Students. ***Heliyon***, *10*(14).

[J-6] Shahriar, H.*, Islam, M. S., **Jahin, M. A.***, Ridoy, I. A., Prottoy, R. R., Abid, A., & Mridha, M. F. (2024). Exploring Internet of Things Adoption Challenges in Manufacturing Firms: A Delphi Fuzzy Analytical Hierarchy Process Approach. ***PLoS ONE***, *19*(11), e0311643.
[J-7] **Jahin, M. A.**, Shovon, M. S. H., Mridha, M. F., Islam, M. R., & Watanobe, Y. (2024). A hybrid transformer and attention based recurrent neural network for robust and interpretable sentiment analysis of tweets. ***Scientific Reports***, *14*(1), 24882. [Code]
[J-8] **Jahin, M. A.**, Masud, M. A., Suva, M. W., Mridha, M. F., & Dey, N. (2025). Lorentz-Equivariant Quantum Graph Neural Network for High-Energy Physics. ***IEEE Transactions on Artificial Intelligence***, 1–11. [Code]
[J-9] Morshed, A., Shihab, A. A., **Jahin, M. A.***, Nahian, M. J. A., Sarker, M. M. H., Wadud, M. S. I.*, Uddin, M. I., Siraji, M. I., Anjum, N., Shristy, S. R., Rahman, T., Khatun, M., Dewan, M. R., Hossain, M., Sultana, R., Chakma, R., Emon, S. B., Islam, T., & Hussain, M. A.* (2025). Ultrasound-Based AI for COVID-19 Detection: A Comprehensive Review of Public and Private Lung Ultrasound Datasets and Studies. ***Multimedia Tools and Applications***.

Under-Review Journal Articles

[U-1] **Jahin, M. A.**, Naife, S. A., Saha, A. K., & Mridha, M. F. (2024). AI in Supply Chain Risk Assessment: A Systematic Literature Review and Bibliometric Analysis. Under review at ***Supply Chain Analytics***.
[U-2] **Jahin, M. A.**, Naife, S. A., Lima, F. T. J., Mridha, M. F., & Shin, J. (2024). Analyzing Male Domestic Violence through Exploratory Data Analysis and Explainable Machine Learning Insights. Under review at ***Scientific Reports***. [Code]
[U-3] Rahman, M. M.*, **Jahin, M. A.***, Islam, M. S., & Mridha, M. F. (2024). Optimizing Container Loading and Unloading through Dual-Cycling and Dockyard Rehandle Reduction Using a Hybrid Genetic Algorithm. Under review at ***European Journal of Operational Research***. [Code]
[U-4] **Jahin, M. A.***, Shahriar, A.*, & Amin, M. A. (2024). MCDFN: Supply Chain Demand Forecasting via an Explainable Multi-Channel Data Fusion Network Model. Under review at ***Evolutionary Intelligence***. [Code]
[U-5] **Jahin, M. A.**, Mridha, M. F., Aung, Z., Dey, N., & Sherratt, R. S. (2024). TriQXNet: Forecasting Dst Index from Solar Wind Data Using an Interpretable Parallel Classical–Quantum Framework with Uncertainty Quantification. Under review at ***npj Artificial Intelligence***. [Code]
[U-6] **Jahin, M. A.**, Masud, M. A., Mridha, M. F., Aung, Z., & Dey, N. (2024). KACQ-DCNN: Uncertainty-Aware Interpretable Kolmogorov-Arnold Classical-Quantum Dual-Channel Neural Network for Heart Disease Detection. Under review at ***Computers in Biology and Medicine***. [Code]
[U-7] Uddin, M. K., Islam, M. S., **Jahin, M. A.**, Seam, M. S. I., & Mridha, M. F. (2024). Solving Generalized Grouping Problems in Cellular Manufacturing Systems Using a Network Flow Model. Under review at ***OPSEARCH***.
[U-8] Uddin, M. K., Islam, M. S., **Jahin, M. A.**, Irfan, M. T. H., Seam, M. S. I., & Mridha, M. F. (2024). Designing Cellular Manufacturing System in Presence of Alternative Process Plans. Under review at ***OPSEARCH***.
[U-9] Soudeep, S.*, Mridha, M. F., **Jahin, M. A.***, & Dey, N. (2024). DGNN-YOLO: Interpretable Dynamic Graph Neural Networks with YOLO11 for Small Object Detection and Tracking in Traffic Surveillance. Under review at ***Pattern Recognition***.
[U-10] Islam, M. A., Mridha, M. F., **Jahin, M. A.**, & Dey, N. (2024). A Unified Framework for Evaluating the Effectiveness and Enhancing the Transparency of Explainable AI Methods in Real-world Applications. Under review at ***Information Fusion***.
[U-11] **Jahin, M. A.**, Masud, M. A., Mridha, M. F., & Dey, N. (2024). Quantum Rationale-Aware Graph Contrastive Learning for Jet Discrimination. Under review at ***IEEE Transactions on Neural Networks and Learning Systems***. [Code]
[U-12] **Jahin, M. A.**, Mridha, M. F., & Dey, N. (2024). Human-in-the-Loop Feature Selection Using Interpretable Kolmogorov-Arnold Network-based Double Deep Q-Network. Under review at ***IEEE Transactions on Automation Science and Engineering***. [Code]
[U-13] **Jahin, M. A.***, Soudeep, S.*, Mridha, M. F., & Dey, N. (2025). Soybean Disease Detection via Interpretable Hybrid CNN-GNN: Integrating MobileNetV2 and GraphSAGE with Cross-Modal Attention. Under review at ***IEEE Transactions on AgriFood Electronics***. [Code]

Conferences

[C-1] Žifčáková, L., & **Jahin, M. A.** (2023, July 23-27). *Perfectly conserved sequences (PCS) between human and mouse are significantly enriched for small-protein coding sequence* [Poster presentation]. **Society for Molecular Biology and Evolution (SMBE)**, Ferrara, Emilia-Romagna, Italy. [Poster]
[C-2] Žifčáková, L., **Jahin, M. A.**, & Miller, J. (2022, December 13-15). *Perfectly conserved sequences (PCS) between human and mouse are significantly enriched for exonic small proteins* [Poster presentation]. **Bioinformatics and Computational Biology Conference (BBCC)**, Virtual. [Poster]

[C-3] **Jahin, M. A.**[*], Soudeep, S.[*], Mridha, M. F., Kabir, R., Islam, M. R., & Watanobe, Y. (2025, July 1-4). *CAGN-GAT Fusion: A Hybrid Contrastive Attentive Graph Neural Network for Network Intrusion Detection* [Conference session]. **38th International Conference on Industrial, Engineering & Other Applications of Applied Intelligent Systems (IEA/AIE 2025)**, Kitakyushu, Japan. [Code]

Research Internship Report

[R-1] **Jahin, M. A.**, & Krutsylo, A. (2021). DIT4BEARs Smart Roads Internship (arXiv:2107.06755). arXiv.

Grant/Funding

Competitive Research Funding — AI

[1] University of Aizu (Japan) (×2) for [J-1] & [U-3] — *Research Sponsor:* Prof. Jungpil Shin *2023 – 2024*
[2] Khalifa University (UAE) (×2) for [U-6] & [U-7] — *Research Sponsor:* Prof. Zeyar Aung *2024 – Present*
[3] OIST (Japan) (×1) for [U-5] — *Role:* Visiting Researcher *2024 – Present*
[4] University of Aizu (Japan) (×1) for [J-7]— *Research Sponsor:* Prof. Yutaka Watanobe *2024*

Honors and Scholarships

Student Researcher of the Year Award 2024 — KUET Research Society 2024
Published the highest number of high-impact research articles (Oct 2023 – Nov 2024) in KUET [Award]

MIT Solve — 2024 Global Health Equity Challenge 2024
Founded SpecX, an XAI-powered web app, for sentiment-driven disease profiling & specialist allocation [Solution]

Champion — CS50x Puzzle Day — Harvard University — Meta 2024
Led a 5-person international team by fostering diversity & inclusion (Bangladesh, USA, Morocco, and Pakistan) and solved advanced 9/9 puzzles (including Metapuzzle) [Certificate]

Dean's Award (x3) — KUET 2023
Received 3 Dean's awards in recognition of achieving annual GPAs ≥ 3.75 out of 4.00 in three consecutive years of undergraduate classes [Certificate]

NASA Space Apps Challenge — Global Nominee 2023
Led a 5-person team and forecast geomagnetic storms using hybrid deep neural networks from satellite data — [Project] [30 seconds of glory video]

Finalist — HONDA Y-E-S (Young Engineer and Scientist's) Award 2022 2023
Awarded for being among the top 15 Bangladeshi young engineering undergrad student scientists [Award & certificate]

Junior Research Fellowship — Bangladesh Space Research and Remote Sensing Organization 2022
Nominated as the junior-most research fellow by SPARRSO among the other excellent 55 undergraduate researchers for the project titled "Disaster Damage Mitigation by Multispectral Remote Sensing Satellite Image Data Analysis: A Deep Learning Approach" [Project nomination] [Presentation video]

Qiskit Gold Level Translator — English to Bengali 2021
Translated 22101 and proofread 25375 words of IBM Qiskit's first-ever textbook, collaborating with West Bengal and Bangladeshi Qiskit translator team of 36 members [Certificate]

Top 6 among 385 teams — Entrepret Season-2: Crafting Visions 2021
Developed a feasible and sustainable business canvas model for our Git and Jenkins integrated freelancing startup [Case solution] [Finalist]

Top 500 — Google Android App Developer Challenge 2021
Engineered a countdown timer app on *Android Studio* with *Jetpack Compose Beta* using Kotlin language [Source Code] [Google swags]

Global Champion — Smart Roads Hackathon 2021
Executed a 2-person team and devised an ML model to forecast winter road friction and was offered a 1-month research internship at *UiT - The Arctic University of Norway* [Project Page]

Winner — ISCEA Ptak Prize Global SCM Case Competition 2020
Led a 4-person team and achieved 70% scholarship for completing the course for the professional certification titled *Certified Supply Chain Analyst (CSCA)* [Case solution] [Certificate]

Champion — CS50x Puzzle Day (Fall) — Harvard University 2020
Spearheaded a 4-person international team (Bangladesh, UK, Pakistan, and Mexico) and solved advanced 8/8 puzzles [Certificate]

Gold Honor — Ranked top 3% — IAAC 2020
International Astronomy & Astrophysics Competition [Solution][Final round certificate]

Champion — CS50x Puzzle Day (Spring) — Harvard University 2020
Led a 3-person international team by fostering diversity & inclusion (Bangladesh, Brazil, and India) and solved advanced 8/8 puzzles [Certificate]

International Asteroid Search Collaboration — NASA 2020
Administered a 4-person team and discovered 2 main belt asteroids by analyzing Pan-STARRS images using *Astrometrica* software [Certificate]

Gold Honor — Ranked top 5% — IYMC 2019
International Youth Math Challenge [Solution][Final round certificate]

Government Board Merit-based Scholarship (x4) 2010 – 2018

PSC (2010; 17th in Rajshahi Board; awarded for 2 years), JSC (2013; awarded for 2 years), SSC (2016; awarded for 2 years), HSC (2018; **awarded throughout 4-year B.Sc.**) Govt. Board Exams

Teaching Experience

Intro to Programming with Python Jan 2022
Mini-Course Teacher, OIST, Japan
◇ Topics covered: Intro, Anaconda, variables, lists, strings, control structures [Course materials & details]
◇ Fellow Teachers: Dr. Nicholas Wardhana and Dr. Jeremie Gillet

Tutorials

Operations Research Jan 2023
- Developed and presented first-ever comprehensive Bengali online tutorials on Operations Research topics, facilitating 3rd-year IPE students.
- Topics covered: Simplex Method, Two-Phase, Big M, Graphical Sensitivity Analysis, TORA. [YouTube Playlist]
- Reference book: "Operations Research – An Introduction" by Professor Hamdy A. Taha.

Leadership & Advisory Roles

KUET Research Society *Oct 2023 – May 2024*
Co-founder & President
• Served as an Executive Committee Member and President of the Industrial Engineering and Management Unit
• Supervising (as an alumnus) 6 groups of research students concentrating on ML-DL and computational fuzzy logic, fostering cross-departmental research collaboration
• Teaching (as an alumnus) scientific research methodology, research ethics, and journal article formatting meeting publication criteria and acquiring funding for publications

Professional Service

Peer Reviewer *Jul 2023 – Present*
Reviewed 18 journal articles verified by Web of Science as of April 6, 2025. [WoS ResearcherID]
□ Scientific Reports (Nature Portfolio) (1)
□ ACM Transactions on Intelligent Systems and Technology (1)
□ Expert Systems with Applications (Elsevier) (1)
□ IEEE Access (5)
□ Neural Networks (Elsevier) (1)
□ Computers & Industrial Engineering (Elsevier) (1)
□ Multimedia Tools and Applications (Springer Nature) (2)
□ Engineering Applications of Artificial Intelligence (Elsevier) (2)
□ The Journal of Supercomputing (Springer Nature) (1)
□ Cluster Computing (Springer Nature) (1)
□ Journal of Contemporary African Studies (Taylor & Francis) (1)
□ Journal of Multidisciplinary Healthcare (Taylor & Francis) (1)
□ 7th European Conference on Industrial Engineering and Operations Management (Augsburg, Germany, July 2024) (5)

Skills

Programming
Advanced and Proficient in: Python, C/C++, R, SQL, SAS, Data Structure and Algorithm, Object Oriented Programming
Familiar with: Kotlin
Machine Learning: Classical Deep Learning, Quantum Machine Learning (Qiskit, Pennylane, TorchQuantum), XAI, NLP, DASK: Parallel Computing, Tensorflow, Keras, PyTorch, IBM Watson
Data Analysis and Optimization: Microsoft Excel, IBM SPSS, Minitab, TORA, Gurobi, Beautiful Soup, Biopython, Bioconductor, NetworkX, OpenCV
High-Performance Scientific Computing: Deigo & Saion Cluster (OIST)
Operating System: Linux, Unix, Windows
Version Control: Git Bash, Github, GitLab
Product Design: AutoCAD 2021, SolidWorks 2022, Unity 2D
Referencing Software: Zotero, Mendeley
Reviewing & Bibliometric Analysis: Publish or Perish 8.0, Gephi, VOSviewer
Writing tools: LaTeX, Microsoft Word
Languages: Bengali (Native), Hindi, English (IELTS Overall Score: 7.0, R: 7.5, W: 7.0, L: 6.5, S: 6.5)

Certifications

MITx: CTL.SC4x: Supply Chain Technology and Systems (Grade: 75%)
MITx: 6.431x: Probability - The Science of Uncertainty and Data (Grade: 91%)
MITx: CTL.SC0x: Supply Chain Analytics (Grade: 83%)
MITx: 2.961.2x: Management in Engineering: Strategy and Leadership (Grade: 77%)
HarvardX: PH125.1x: Data Science: R Basics (Grade: 83%)
Delftx: UnixTx: Unix Tools: Data, Software and Production Engineering
TAUx, IsraelX: Unlocking Information Security: Part 1
ISCEA: Certified Supply Chain Analyst (Grade: 88%)
Google: IT Technical Support Fundamentals

Google: Crash Course on Python
Google: The Bits and Bytes of Computer Networking
UCSanDiegoX: DSE200x: Python for Data Science (Grade: 89%)
Georgia Tech: Speak English Professionally: In Person, Online & On the Phone
IBM: AI Chatbots without Programming
IBM: PY0101EN: Python 101 for Data Science
Microsoft: Introduction to Artificial Intelligence (AI)