

Syed Irfan Ali Meerza

Ph.D. CANDIDATE @ DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE, UNIVERSITY OF TENNESSEE, KNOXVILLE

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Research Interests

Robust and Trustworthy AI

- Federated Learning
- Machine Unlearning
- Differential Privacy
- Algorithmic Fairness

Responsible Content Governance

- Creative Content Protection
- Generative Model Auditing
- Data Watermarking
- Foundation Model Security

Smart Healthcare and Fitness

- Intelligent Fitness Technologies
- Multimodal Sensing
- Passive Health Tracking
- Early Disease Detection

Education

University of Tennessee, Knoxville

Ph.D. Candidate in Computer Engineering

Advisor: Dr. Jian Liu

Knoxville, TN

Aug 2021–May 2026 (expected)

American International University Bangladesh (AIUB)

M.Sc. in Electrical and Electronics Engineering (**Gold Medalist**)

Dhaka, Bangladesh

Jan 2018–Nov 2019

Khulna University of Engineering and Technology

B.Sc. in Electronics and Communication Engineering

Khulna, Bangladesh

Feb 2011–Jun 2015

Publication

- [1] [IEEE S&P/Oakland, 26] **Syed Irfan Ali Meerza**, Jian Liu, “MusicShield: Protection for Musicians in the Era of Generative AI,” Accepted at the 47th IEEE Symposium on Security and Privacy, (**IEEE S&P**), 2026. (**Acceptance Rate: 13%**)
- [2] [UbiComp, 25] Chandler Jackson Bauder, Tianhao Wu, **Syed Irfan Ali Meerza**, Aly Fathy, Jian Liu, “mm-RunAssist: mmWave-based Respiratory and Running Rhythm Analysis During Treadmill Workouts,” in Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies, (**IMWUT/UbiComp**), 2025.
- [3] [UbiComp, 25] Tianhao Wu, Yi Wu, Bibek Poudel, **Syed Irfan Ali Meerza**, Rajasi Gore Athawale, Weizi Li, Zan Gao, Cagdas Karatas, Jian Liu, “VibRun: Real-time Unobtrusive Gait Analysis for Treadmill Running via Footstep Vibrations,” in Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies, (**IMWUT/UbiComp**), 2025.
- [4] [PPAI @ AAAI, 25] **Syed Irfan Ali Meerza**, Luyang Liu, Jiaxin Zhang, Jian Liu, “GLocalFair: Jointly Improving Global and Local Group Fairness in Federated Learning,” in Proceedings of the 6th AAAI Workshop on Privacy-Preserving Artificial Intelligence, (**PPAI**), 2025.
- [5] [IEEE S&P/Oakland, 25] **Syed Irfan Ali Meerza**, Lichao Sun, Jian Liu, “HarmonyCloak: Making Music Audio Unlearnable for Generative AI,” in Proceedings of the 46th IEEE Symposium on Security and Privacy, (**IEEE S&P**), 2025. (**Acceptance Rate: 14%**)

- [6] [IJCAI, 24] **Syed Irfan Ali Meerza**, Jian Liu, “EAB-FL: Exacerbating Algorithmic Bias Through Model Poisoning Attacks in Federated Learning,” in *Proceedings of the 33rd International Joint Conference on Artificial Intelligence, (IJCAI)*, 2024. (**Acceptance Rate: 14%**)
- [7] [ISVLSI, 24] **Syed Irfan Ali Meerza**, Amir Sadovnik, Jian Liu, “ConFUSE: Confusion-based Federated Unlearning with Salience Exploration,” in *Proceedings of the IEEE Computer Society Annual Symposium on VLSI, (ISVLSI)*, 2024.
- [8] [AsiaCCS, 22] Yue Cui, **Syed Irfan Ali Meerza**, Zhuohang Li, Luyang Liu, Jiaxin Zhang, Jian Liu, “RecUP-FL: Reconciling Utility and Privacy in Federated Learning via User-configurable Privacy Defense,” in *Proceedings of the 18th ACM ASIA Conference on Computer and Communications Security, (AsiaCCS)*, 2022. (**Acceptance Rate: 16%**)
- [9] [WNYISPW, 22] Afsana Ahamed, **Syed Irfan Ali Meerza**, “Iris Recognition Using Curvelet Transform and Accuracy Maximization by Particle Swarm Optimization,” in *Proceedings of the IEEE Western New York Image and Signal Processing Workshop, (WNYISPW)*, 2022.
- [10] [EMBC, 22] **Syed Irfan Ali Meerza**, Zhuohang Li, Luyang Liu, Jiaxin Zhang, Jian Liu, “Fair and Privacy-Preserving Alzheimer’s Disease Diagnosis Based on Spontaneous Speech Analysis via Federated Learning,” in *Proceedings of the 44th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, (EMBC)*, 2022.
- [11] [EMBC, 21] **Syed Irfan Ali Meerza**, Affan Affan, Hossein Mirinejad, Michael E Brier, Jacek M Zurdada, Tamer Inanc, “Precise Warfarin Management Through Personalized Modeling and Control with Limited Clinical Data,” in *Proceedings of the 43rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society, (EMBC)*, 2021.
- [12] [AAEA, 21] Syed Imran Ali Meerza, **Syed Irfan Ali Meerza**, Afsana Ahmed, “Food Insecurity Through Machine Learning Lens: Identifying Vulnerable Households,” in *Proceedings of the Agricultural and Applied Economics Association and Western Agricultural Economics Association Joint Annual Meeting, (AAEA/WAEA)*, 2021.
- [13] [ICASERT, 19] **Syed Irfan Ali Meerza**, Moinul Islam, Md Mohiuddin Uzzal, “Q-Learning Based Particle Swarm Optimization Algorithm for Optimal Path Planning of Swarm of Mobile Robots,” in *Proceedings of the IEEE 1st International Conference on Advances in Science, Engineering and Robotics Technology, (ICASERT)*, 2019.
- [14] [ICREST, 19] **Syed Irfan Ali Meerza**, Moinul Islam, Md Mohiuddin Uzzal, “Performance Evaluation of Different Algorithms for Handwritten Isolated Bangla Character Recognition,” in *Proceedings of the 1st International Conference on Robotics, Electrical and Signal Processing Techniques, (ICREST)*, 2019.
- [15] [ICITISEE, 18] **Syed Irfan Ali Meerza**, Moinul Islam, Md Mohiuddin Uzzal, “Optimal Path Planning Algorithm for Swarm of Robots Using Particle Swarm Optimization Technique,” in *Proceedings of the IEEE 3rd Conference on Information Technology, Information Systems and Electrical Engineering, (ICITISEE)*, 2018.

Manuscripts

- [1] **Syed Irfan Ali Meerza**, Jiawei Yu, Yi Chen Liu, Xi Gua, Jian Liu, “Harmonizing Perception: Human vs. AI Capabilities in Identifying AI-Generated Music”. (**Under review**)
- [2] **Syed Irfan Ali Meerza**, Feiyi Wang, Jian Liu, “FedSpy-LLM: Towards Scalable and Generalizable Data Reconstruction Attacks from Gradients on LLMs”. (**Under review**)

- [3] **Syed Irfan Ali Meerza**, Oktay Ozturk, Amir Sadovnik, Jian Liu, “DiffUE: Enhancing Utility Unlearnability Trade-offs in Unlearnable Examples Against Relearning with Diffusion Autoencoders”. (***Under review***)
- [4] Jiawei Yu, **Syed Irfan Ali Meerza**, Yi Wu, Amir Sadovnik, Jian Liu, “SemPurify: Semantics-Aware Data Purification Against Backdoor Attacks”. (***Under review***)
- [5] **Syed Irfan Ali Meerza**, Jian Liu, “MusicTrace: Certifiably Robust, General Purpose Watermarking for Traceability Through Generative Music Models”. (***In preparation***)

Patents

- [1] Jian Liu, Syed Irfan Ali Meerza, Lichao Sun, “HarmonyCloak: Making Music Audio Unlearnable for Generative AI,” U.S. Provisional Application, April 2025.
- [2] Jian Liu, Syed Irfan Ali Meerza, “MusicShield: Protection for Musicians in the Era of Generative AI,” U.S. Provisional Application, April 2025.

Awards, Grants and Fellowships

Awards

- “Gonzalez Family Outstanding Graduate Research Assistant,” University of Tennessee, Knoxville, 2025
- “Honorable Mention (Team)”, MagNet Challenge, Princeton University, New Jersey, USA, 2023
- Received “Chancellor’s Award” and “Vice-Chancellor’s Award”, AIUB, 2020
- Winner (Team) (Khulna Division), Digital Innovation Fair, Bangladesh, 2015
- Top 20 nomination for “Young Bangla Youth Award”, Bangladesh, 2015

Grants

- NSF Non-Academic Research Internship for Graduate Students (INTERN) Supplemental Funding (\$55,000), 2024
- GSS Travel Grant UTK (\$1550), 2025
- PPAI Workshop Travel Grant, AAAI Workshop on Privacy-Preserving Artificial Intelligence (\$500), 2025
- GSS Travel Grant UTK (\$1,150), 2024
- IJCAI Travel Grant, 33rd International Joint Conference on Artificial Intelligence (IJCAI) (\$350), 2024

Fellowships

- EERE Fellow, Department of Energy Efficiency and Renewable Energy and University of Tennessee, Knoxville (\$10,000), 2022-2023
- Tennessee’s Top 100 Fellow, University of Tennessee, Knoxville (\$40,000), 2021-2025
- Khulna University of Engineering and Technology Merit Scholarship, 2012-2015

Professional Experience

Graduate Research Intern, Oak Ridge National Laboratory
Advisor: Dr. Feiyi Wang

Jan. 2025–May 2025, Oak Ridge, TN
May 2024–Aug. 2024, Oak Ridge, TN

- Develop a scalable and generalizable data reconstruction attack from gradients on LLMs in the FedLLM.
- Develop an LLM training protocol to train a proprietary large language model on clinical notes data.
- Designed a communication-efficient FL framework to train an LLM model on heterogeneous communication restricted clients.

Graduate Research Assistant, University of Tennessee Knoxville

Aug. 2021 – Present, Knoxville, TN

- Developed methods to ensure privacy, fairness, and unlearning capabilities in distributed and federated learning systems, addressing emerging challenges in algorithmic accountability and personalized data protection.
- Designed techniques to safeguard creative digital content from misuse by generative AI models, focusing on robust watermarking, auditing, and content cloaking to uphold creator rights and data ownership.
- Advanced intelligent fitness and healthcare technologies by integrating AI with multimodal sensor data, enabling unobtrusive, real-time analysis of human activity and physiological signals for improved wellness monitoring.

Executive Engineer, Bashundhara Oil and Gas Company Ltd.

Feb 2017–Nov 2019, Dhaka, Bangladesh

- Designed electrical and distributed control systems (DCS) for oil refinery and bitumen plants.
- Reviewed construction and deployment of the substation and 2 MW powerplant.

Assistant Engineer, R&D, Walton Hi-Tech Industries Ltd. Feb 2016–Aug 2016, Dhaka, Bangladesh

- Designed electronic control systems and algorithms for refrigerators and air conditioners.
- Developed PCB designs for refrigeration and air conditioning systems.

Teaching Experience

Lab Instructor, The University of Tennessee, Knoxville

Fall 2025

COSC-102 Introduction to Computer Science

Led weekly labs for **35** students; developed exercises and graded assignments.

Teaching Assistant, The University of Tennessee, Knoxville

Fall 2024

ECE-569 Mobile and Embedded System Security

Assisted course delivery for **50** graduate students; held office hours and graded projects.

Guest Lecture, The University of Tennessee, Knoxville

Spring 2024

COSC-526 Data Mining and Analytics

Delivered a **60-minute** lecture on data privacy and security; received positive feedback from students and instructor.

Teaching Assistant, The University of Tennessee, Knoxville

Spring 2024

COSC-526 Data Mining and Analytics

Supported course for **27** graduate students; assisted with grading, projects, and exam preparation.

Teaching Assistant, The University of Tennessee, Knoxville

Fall 2023

COSC-522 Machine Learning

Assisted with lectures and assignments for **45** graduate students; held weekly office hours.

Mentorship and Academic Supervision

Undergraduate Students

- Minjae Bae UTK EECS, 2024–Current
- Shawn-Patr Barhorst UTK EECS, 2024–2025
- Maximus Nwider UTK EECS, 2023–2025
- Luis Gonzalez UTK EECS, 2021–2023

MS Students

- Xiande Zhang UTK EECS, 2022–2024
- Oktay Ozturk UTK EECS, 2023–2024

PhD Students

- Tianhao Wu UGA SoC, 2023–Current
- Jiawei Yu UGA SoC, 2024–Current
- Yi Chen Liu UGA SoC, 2024–Current

Selected Media Mentions

- Jul 2025 **how to poison AI music scrapers** — killswitch@kaleidoscope (*Apple Podcast*)
- May 2025 **Pitch perfect protection.** *EurekAlert.*
- Apr 2025 **The Art Of Poison-Pilling Music Files.** Benn Jordan (*YouTube, 615k Views*).
- Dec 2024 **You can't hear it, but the University of Tennessee tool 'cloaks' songs to protect music from AI.** *Knox News.*
- Oct 2024 **Liu's New Tool Makes Songs Unlearnable to Generative AI.** *UTK News.*
- Oct 2024 **New Tool Makes Songs Unlearnable to Generative AI.** Featured in *TechXplore, Softonic, Futura, Knowridge, New Atlas, etc.*
- Oct 2024 **HarmonyCloak slips silent poison into music to corrupt AI copies.** *New Atlas.*
- Oct 2024 **Someone has come up with a cloaking device to fight bogus AI music. It's pretty cool.** *Alan Cross' Journal of Musical Things.*
- Oct 2024 **HarmonyCloak: A New Tool to Protect Musicians from AI Copyright Infringement.** *The Outpost.*
- Oct 2024 **Herramienta dificulta a la IA entrenarse con canciones.** *Tecnología.*
- Oct 2024 **New tech makes songs invisible to AI, protecting artists from copycats.** *Knowledge.*

Professional Activities

- Reviewer, IEEE Computer Society Annual Symposium on VLSI (ISVLSI), (2024).
- Reviewer, IEEE Transactions on Network Science and Engineering, (2024).
- Reviewer, ACM SIGKDD Conference on Knowledge Discovery and Data Mining, (2024)
- Mentor, HackUTK student hackathon, University of Tennessee (2022–2023)
- Volunteer, IEEE Computer Society – Bangladesh Chapter (2017–2019)
- Member and Mentor, MEC Robotics Club, Khulna University of Engineering and Technology, Khulna (2012–2015)