

# Syed Irfan Ali Meerza

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

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## Research Interests

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### 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

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### 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

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- [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, 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 Saliency 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)*, 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 Zurada, 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”. *47th IEEE Symposium on Security and Privacy, (IEEE S&P)*, 2026. **(In review)**
- [2] **Syed Irfan Ali Meerza**, Feiyi Wang, Jian Liu, “FedSpy-LLM: Towards Scalable and Generalizable Data Reconstruction Attacks from Gradients on LLMs”. *Submitted to the IEEE Conference on Secure*

and Trustworthy Machine Learning, (**SaTML**), 2026. (*In 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”. *Submitted to the IEEE/CVF Conference on Computer Vision and Pattern Recognition, (CVPR), 2026. (In review)*
- [4] Jiawei Yu, **Syed Irfan Ali Meerza**, Yi Wu, Amir Sadovnik, Jian Liu, “SemPurify: Semantics-Aware Data Purification Against Backdoor Attacks”. *Submitted to the IEEE/CVF Conference on Computer Vision and Pattern Recognition, (CVPR), 2026. (In 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**

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### **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 (\$400), 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

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- Graduate Research Intern, Oak Ridge National Laboratory** Jan. 2025–May 2025, Oak Ridge, TN  
*Advisor: Dr. Feiyi Wang* 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

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- 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

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### 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

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

## Professional Activities

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- 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)

## Reference

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### **Dr. Jian Liu**

Associate Professor of Computer Science

University of Georgia, Athens

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### **Dr. Hairong Qi**

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### **Dr. Fnu Suya**

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