Aisha B. Rahman

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Highlights

• Hands-on experience in building a Machine Learning (ML) pipeline to identify malicious modifications in wirelessly transmitted packets. The developed ML pipeline is a deliverable for the project Goaltender: Cloud-based Defense and Response Tools for Distributed Energy Resources Ecosystem, funded by U. S. Department of Energy. Throughout this project, expertise in ML and Deep Learning (DL) algorithms was developed
• 4 years of experience conducting simulation-based experiments with Python for Ph.D. research, focusing on developing distributed decision-making policies for performance optimization in complex heterogeneous networks using constrained optimization problems and/or Reinforcement Learning (RL)
• 3 years of experience in large-scale data analysis and processing in Python and SQL
• 2 years of experience using High-Performance Computing (HPC) systems
• Consistent and strong publication record throughout the Ph.D. program

Education

• **Arizona State University** **May 2026 (Expected)**
Ph.D., School of Electrical, Computer and Energy Engineering

Research Interest: Applications of optimization tools and/or artificial intelligence including supervised, unsupervised, and reinforcement learning for resource pricing and performance optimization in heterogeneous networks including 5G/6G wireless networks, computing environments, federated learning systems, and distributed energy resources (DER).

Relevant Coursework: Probability and Random Processes, AI-based Decision-making in Dynamic Systems

• **University of New Mexico, USA** **Dec. 2023**
M.Sc, Computer Engineering (with Distinction) *GPA 4.23/ 4.00*

Relevant Coursework: Network Economics, Foundations of Computing, Machine Learning, Reinforcement Learning

Technical Skills

• **Programming Languages**: Experienced: Python, C++, MATLAB, SQL, JavaScript/HTML/CSS, Familiar: R, Java, C#
• **Libraries and Tools:** Experienced: Sklearn, PyTorch, TensorFlow, Pandas, SciPy, Pyomo, GitHub, Docker, HPC, Familiar: SageMaker
• **Operating System**: Windows, Linux
• **Trainings**: Industrial Control System Cybersecurity Training, delivered by U. S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency (CISA)

Professional Experience

Summer Graduate Intern **May 2025 – Present**
Vehicle-Grid Integration, Department of Advanced Transportation *Idaho National Laboratory*

- Explored the possibility to provide black start services through Vehicle-to-Grid (V2G)
- Developed a two-stage decentralized vehicle coordination framework called HIVE (Harmonized Integration of Vehicle Energy for Grid Support) for black start and load support through V2G
- Contributing to developing an end-to-end electric vehicle charging network emulator for testing, validation, and research of standardized V2G protocols, e.g., ISO 15118-20, OCPP 2.0.1 using open source protocol implementation
- **Technical Skills:** Languages– Python, C++, Tools/Framework– EVerest, CitrineOS
- **Related Publication**: A. B. Rahman, B. J. Varghese, C. Quinn, D. Anand, J. G. Smart, "Enhancing Grid Resilience with HIVE: Decentralized V2G Coordination for Black Starts", 2025 Resilience Week (Under review)

Graduate Research Associate **Jan 2025 – Present**
Performance and Resource Optimization Lab (PROTON Lab) *Arizona State University*
U. S. Department of Energy (DOE)-funded projects:

1. ***Goaltender**: Cloud-based Defense and Response Tools for DER Ecosystem;*
   - Developed autoencoder-based malicious user behavior in electric vehicle charging networks with 97.9%, 80.84% and 94% F1 score for detecting stealthy under-billing, over-billing, and spoofing state of charge attacks, respectively
   - Continuing on ML and DL models exploration for detection of different classes of anomalies in EV charging networks including malicious user behavior. Explored models include supervised learning, e.g. Random Forest, XGBoost and unsupervised learning, e.g., Isolation Forest, One-Class SVM, and deep learning, e.g., Autoencoders

- Preprocessing of large-scale dataset and investigation of dimensionality reduction techniques to reduce overfitting risks and enhance model efficiency
- **Technical Skills:** Languages– Python, SQL, Tools/Framework– Supervised and unsupervised machine learning, Deep Learning, Scikit-Learn, Tensorflow, PyTorch, Docker
- **Related Publication**: A. B. Rahman et al., "Autoencoder-based Detection of Stealthy Under-billing and Over-billing Attacks via Manipulation of OCPP 2.0.1 Payloads", IEEE CAMAD 2025 (Accepted)

***2. HELIOCOMM**: A Resilient Wireless Heliostats Communication System;*

- Modeling a resilient wireless communication system for heliostat fields to replace conventional wired networks using next-generation wireless technologies and reinforcement learning
- Simulation and emulation using Python coding and wireless emulators including OMNET++ and/or NS3
- Testing of the developed system in large scale for available direct normal irradiation and heliostats mirror orientation dataset in high-performance computing (HPC) environments
- **Technical Skills:** Languages– Python and C++, Tools/Framework– Reinforcement learning, OMNET++, HPC
- **Related Publication**: A. B. Rahman, M. S. Siraj and E. E. Tsiropoulou, "Wireless Communications for Concentrated Solar Power Fields," in IEEE Transactions on Green Communications and Networking.

Graduate Research Assistant **Jan. 2022 – Dec. 2024**
Department of Electrical and Computer Engineering *University of New Mexico*

- Conducted research under the two DOE-funded projects listed above, i.e., Goaltender: Cloud-based defense and response tools for DER ecosystem, and HELIOCOMM: A resilient wireless heliostats communication system (both projects moved to ASU starting 2025 where I am continuing my research activities)

Research Assistant **May 2019 – Feb. 2021**
Wireless Emerging Technology Lab (WET Lab) *University of Chittagong*

- Conducted research on cutting-edge wireless technologies including cooperative communication, simultaneous wireless information and power transmission, and RF energy harvesting.

Selected Publications (Google Scholar) and Presentations

Technical Papers

- **A. B. Rahman**, P. Charatsaris, E. E. Tsiropoulou, S. Papavassiliou "Symbiotic Resource Pricing in the Computing Continuum Era", in IEEE Transactions on Mobile Computing, vol. 24, no. 7, pp. 6474-6487, July 2025, doi: 10.1109/TMC.2025.3542017
- M. Diamanti, **A. B. Rahman**, P. Charatsaris, E. E. Tsiropoulou, S. Papavassiliou, "Resource Allocation and Pricing for Multi-Server Multi-Model Federated Learning based on Market Equilibrium", Future Generation Computer Systems 2025, Vol. 175
- **A. B. Rahman**, O. Diamatopoulos-Pantaleon, E. E. Tsiropoulou, "NEMESIS: No-Regret E-health User Experience in Multi-Access Edge Computing Systems", IEEE ICC 2025 (To appear)
  More available upon request.

Technical Reports

- E. E. Tsiropoulou, **A. B. Rahman**, and M. S. Siraj, "HELIOCOMM: Wireless Controls State-of-the-Art Report", 2024, Golden, CO: National Renewable Energy Laboratory. NREL/SR-5K00-88431.

Oral Presentations

- Conference presentation for accepted papers at 2022 Global Communications Conference and 2024 International Conference on Communications
- Presentation on progress and updates during biweekly and quarterly meetings with Sandia National Laboratories and National Renewable Energy Laboratory for DOE-funded projects

Volunteering and Leadership Experience

- Chair in IEEE Albuquerque Section Women in Engineering Affinity Group (2023-2024), Vice-chair in IEEE Albuquerque Section Communications Society and Computer Society Joint Chapter (2024)
- Peer reviewer for at IEEE journal and conferences including IEEE Internet of Things Journal, IEEE Transactions on Green Communications and Networking, IEEE WCNC'25, IEEE WiMob'25, IEEE SmartGridComm'24

Honors and Awards

University Graduate Fellowship **2025**
Arizona State University *Tempe, AZ, USA*

IEEE Albuquerque Section Outstanding Graduate Student Award 2024 **2024**
IEEE Albuquerque Section *Albuquerque, NM, USA*

IEEE Albuquerque Section Service Award 2023 **2023**
IEEE Albuquerque Section *Albuquerque, NM, USA*

2022 Women in Technology Scholarship **2022**
Cadence Design Systems *California, USA*