Aisha B. Rahman

Graduate Research Associate, Performance and Resource Optimization in Networks Lab, Arizona State University

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Highlights

• 4+ years of experience in AI-driven distributed decision-making, developing scalable and efficient resource allocation policies for heterogeneous and dynamic networks
• Demonstrated expertise in trust modeling and AI-based anomaly detection, through the DOE–sponsored project *Goaltender: Cloud-based Defense and Response Tools for Distributed Energy Resources Ecosystem*
• Extensive experience in large-scale data processing, data cleaning, and statistical analysis using Python and SQL, including use of high-performance computing (HPC) environments
• Consistent publication record spanning distributed AI, optimized edge computing, and secure networks

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

Technical Skills

• **Programming Languages**: Experienced: Python, C++, MATLAB, SQL, JavaScript/HTML/CSS, Familiar: R, Java, C#
• **Libraries and Tools:** NumPy, Pandas, Sklearn, PyTorch, TensorFlow, SciPy, Pyomo, GitHub, Docker, HPC, Simulink
• **Communication Protocols:** MQTT, Wi-Fi (IEEE 802.11), Bluetooth, ZigBee, OCPP 2.0.1, ISO 15118
• **Operating System**: Windows, Linux
• **Trainings**: Industrial Control System Cybersecurity Training, delivered by U. S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency (CISA)

Research Experience and Projects

Summer Graduate Intern **May 2025 – Aug. 2025**
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
- Contributed 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 (RWS).

Graduate Research Associate **Jan. 2025 – Present**
School of Electrical, Computer and Energy Engineering *Arizona State University*

Conducting research in the following DOE-funded projects:

1. ***Goaltender**: Cloud-based Defense and Response Tools for DER Ecosystem;*
   - Large-scale data processing, ML/DL models for the detection of diverse anomaly classes in electric vehicle charging networks, including malicious user behavior, complemented by LLM-driven human-readable root-cause analysis.
   - Developed autoencoder-based malicious user behavior in electric vehicle charging networks with 97.9% and 80.84% F1 score for detecting stealthy under-billing and over-billing attacks, respectively

- Developed OCSVM model for detecting EV State-of-Charge (SOC) spoofing to manipulate scheduling priority and bypass charging cutoff after reaching SOC threshold, achieving an F1 score of 89.6%
- **Technical Skills:** Languages– Python, SQL, Tools/Framework– Scikit-Learn, Tensorflow, PyTorch, Docker
- **Related Publication**: A. B. Rahman, et. al., "Unsupervised Detection of SOC Spoofing in OCPP 2.0.1 EV Charging Communication Protocol Using One-Class SVM", Future Internet 2026, 18, 60.

***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
- Monte Carlo simulations to evaluate the developed wireless system using large-scale direct normal irradiation and heliostat mirror orientation datasets in high-performance computing (HPC) environments
- Prototyping of the wireless communication protocol using Software Defined Radios (SDRs)
- **Technical Skills:** Languages– Python and C++, Tools/Framework– Simulink, 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 on distributed decision-making policies using network economics and game-theoretic frameworks and reinforcement learning for optimal resource allocation and performance optimization of complex heterogeneous networks including 5G/6G wireless communication networks, federated learning systems, etc.

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 and Presentations

Technical Papers

- **A. B. Rahman**, et al. "Autoencoder-based Detection of Stealthy Under-billing and Over-billing Attacks via Manipulation of OCPP 2.0. 1 Payloads." 2025 IEEE 30th International Workshop on Computer Aided Modeling and Design of Communication Links and Networks (CAMAD) 2025.
- **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*