Md Sadman Siraj

Performance and Resource Optimization (PROTON) Laboratory, School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ 85281, USA

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Professional Summary

Md Sadman Siraj specializes in developing novel decision-making algorithms using Game Theory, Network Economics and Reinforcement learning for alternative positioning, navigation and timing methods. He is holding a M.Sc. in Computer Engineering, which he obtained with distinction and his skills include wireless communications and networks, resource management in wireless networks, and parallel processing with high performance computing.

Education

Arizona State University, USA **May 2026 (Expected)**
Ph.D., School of Electrical, Computer and Energy Engineering
• **Research Interests**: Machine Learning, Alternative Positioning, Navigation and Timing, Wireless Communication and Networks, Network Economics, Resource Allocation and Management, Distributed Energy Resources (DERs)

University of New Mexico, USA **December 2023**
M.Sc., Computer Engineering

University of Dhaka, Bangladesh **March 2020**
B.Sc., Electrical and Electronic Engineering

Work Experience

Graduate Research Assistant **April 2023 – Present**
HELIOCOMM Project: A Resilient Wireless Heliostats Communication System

- A joint research project by the Department of Energy, National Renewable Energy Laboratory, the Sandia National Laboratories, and Arizona State University.
- Designed primary components including integrated access and backhaul (IAB) technology, AI-based clustering, entropy-based routing, dynamic spectrum management, and interference mitigation.
- Simulated the wireless network for a two-year duration based on real-time energy harvested by PV panel and real-time updates of azimuth and elevation angles of the heliostats.
- Implemented the simulation with parallel processing assisted by the High Performance Computing (HPC) of NREL Computational Science Center and UNM Center for Advanced Research Computing (CARC).

Graduate Research Assistant **January 2024 – Present**
Goaltender Project: Cloud-Based Defense and Response Tools for the DER Ecosystem

- A joint research project by the Department of Energy, the Sandia National Laboratories, and Arizona State University.
- Collected large, labeled dataset of IEEE 2030.5 XML and OCPP 2.0.1 JSON payloads, and parsed and pre-processed the collected dataset to create a training dataset for machine learning-based cyber-attack detection.
- Extracted informative features from the collected payloads to distinguish between malicious and benign data samples.
- Explored and evaluated multiple machine learning models for malware detection, considering supervised and unsupervised learning methods.

Graduate Research Assistant **December 2023 – Present**
CBDC Project: Central Bank Digital Currency

- A joint research project by the Bank of Canada, and Arizona State University.
- Developed an Android application incorporated with Physical Unclonable Function (PUF)-based authentication database.
- Integrated the software-based PUF authentication with PeerTrust protocol.
- Explored reinforcement learning approaches for in-field use.
- Developed a PUF-based authentication incorporated with software-based instances of PeerTrust protocol packaged in an Android application.

Research Assistant **June 2022 – December 2024**

Performance and Resource Optimization Lab (PROTON Lab), University of New Mexico

- Designed alternative positioning, navigation and timing methods for GPS-denial scenarios.
- Investigated novel resource management techniques in wireless communications and networks.
- Applied game theory and network economics for developing new decision-making algorithms.
- Applied reinforcement learning for localization using UAVs through integrated sensing and communication.

Teaching Assistant **January 2022 – May 2022**

Department of Electrical and Computer Engineering, University of New Mexico

- ECE-314L Signals and Systems
- ECE-360 Electromagnetic Fields and Waves
- ECE-381 Introduction to Power Systems

Technical Skills

Programming Languages: Python, MATLAB, C, C++, SQL, PHP
Software/Tools: Reinforcement Learning in Python, Deep Learning with Tensorflow and Scikit-learn, Unix/Linux/ SLURM, Network Simulation in OMNET++ and NS3
Other skills: Research and open data aggregation, Data cleaning and processing, Parallel processing, Excellent visualizations, Collaborative project management, Advanced presentation skills

Technical Reports

- Tsiropoulou, Eirini Eleni, Aisha B. Rahman, and **Md Sadman Siraj**. 2024. HELIOCOMM: Wireless Controls State-of-the-Art Report. Golden, CO: National Renewable Energy Laboratory. NREL/SR-5K00-88431. https://www.nrel.gov/docs/fy24osti/88431.pdf.

Publications — Google Scholar

Notable Journal Publications

- **M. S. Siraj**, J. R. Atencio, and E. E. Tsiropoulou, "PANTHER: A Power-Optimized and Accurate Positioning, Navigation, and Timing with High Efficiency and Reliability," IEEE Open Journal of the Communications Society, 2025.
- **M. S. Siraj**, A. B. Rahman, M. Diamanti, E. E. Tsiropoulou, and S. Papavassiliou, "Alternative Positioning, Navigation, and Timing enabled by Games in Satisfaction Form and Reconfigurable Intelligent Surfaces," IEEE Systems Journal, vol. 17, no. 3, pp. 5035–5046, 2023.

Notable Conference publications

- **M. S. Siraj**, J. R. Atencio, and E. E. Tsiropoulou, "Dead-on-Target: An accurate alternative positioning, navigation, and timing solution," in ICC 2024 - 2024 IEEE International Conference on Communications, pp. 3377-3382, 2024.
- **M. S. Siraj**, E. E. Tsiropoulou, S. Papavassiliou, and J. Plusquellic, "SAFE: Secure symbiotic positioning, navigation, and timing," in GLOBECOM 2023 - 2023 IEEE Global Communications Conference (GLOBECOM), pp. 2832-2837, 2023.
- **M. S. Siraj**, A. B. Rahman, P. Charatsaris, E. E. Tsiropoulou, and S. Papavassiliou, "Positioning, navigation, and timing on the air," in 2023 19th International Conference on Distributed Computing in Smart Systems and the Internet of Things (DCOSS-IoT), pp. 661–668, 2023.
- **M. S. Siraj**, A. B. Rahman, E. E. Tsiropoulou, S. Papavassiliou, and J. Plusquellic, "Symbiotic positioning, navigation, and timing," in 2023 19th International Conference on Distributed Computing in Smart Systems and the Internet of Things (DCOSS-IoT), pp. 261–268, 2023.
- **M. S. Siraj**, A. B. Rahman, M. Diamanti, E. E. Tsiropoulou, S. Papavassiliou, and J. Plusquellic, "Orchestration of reconfigurable intelligent surfaces for positioning, navigation, and timing," in MILCOM 2022 - 2022 IEEE Military Communications Conference (MILCOM), pp. 148–153, 2022.
- **M. S. Siraj**, M. S. Hossain, R. Brown, E. E. Tsiropoulou, and S. Papavassiliou, "Incentives to learn: A location-based federated learning model," in 2022 Global Information Infrastructure and Networking Symposium (GIIS), pp. 40–45, 2022.

Honors and Awards

IEEE Service Award 2024 **2024**
IEEE Albuquerque Section *Albuquerque, NM, USA*
IEEE Outstanding Graduate Engineering Student Award 2023 **2023**
IEEE Albuquerque Section *Albuquerque, NM, USA*
ECE Outstanding Student Teaching Award 2023 **2023**
Department of Electrical and Computer Engineering, University of New Mexico *Albuquerque, NM, USA*