Md Sadman Siraj

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Professional Summary

• 3+ years of experience in modeling and simulation using Python for developing distributed decision-making policies using optimization techniques and/or Reinforcement Learning.
• 3+ years of research experience in developing alternative positioning, navigation, and timing solutions, resource management in wireless networks and demand response management in smart grids.
• 2+ years experience using High-Performance Computing (HPC) systems and SLURM workload manager for parallel processing in simulation-based experiments of wireless networks in heliostat fields.
• Hands-on experience in building a Machine Learning (ML) pipeline for malware detection in electric vehicles' charging networks' wireless payload exchange.
• Hands-on experience in developing trust models for hardware oriented security utilizing Physical Unclonable Functions (PUFs).
• Strong and consistent record of publications in IEEE flgaship conferences and journals on communications including IEEE ICC, IEEE GLOBECOM, IEEE MILCOM, IEEE HOST, IEEE Systems, and IEEE OJCOMS.

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 Associate **January 2022 – Present**
Performance and Resource Optimization Lab (PROTON Lab), Arizona State University

- 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.

Research Projects

HELIOCOMM Project: A Resilient Wireless Heliostats Communication System

- A joint and collaborative research project by the Department of Energy, National Renewable Energy Laboratory, 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).

Goaltender Project: Cloud-Based Defense and Response Tools for the DER Ecosystem

- A joint and collaborative research project by the Department of Energy, 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.

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.

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, Federated Learning, Trust Models for Hardware Security
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.

Oral Presentations

• Conference paper presentations at the 2022 Global Information Infrastructure and Networking Symposium (GIIS) and 2024 IEEE International Conference on Communications (ICC).
• Poster presentation on "SAFE: Secure Symbiotic Positioning, Navigation, and Timing" at The LoboBITES Research Poster Presentation 2023, Shared Knowledge Conference, University of New Mexico, Albuquerque, New Mexico, USA.
• Idea presentation on "Alternative Positioning, Navigation, and Timing" at The LoboBITES 2022, Shared Knowledge Conference, University of New Mexico, Albuquerque, New Mexico, USA.

Leadership and Volunteering Experience

Chapter Chair **December 2023 – December 2024**
IEEE Albuquerque Section ComSoc and CS Joint Chapter
- Organizing and conducting monthly public talks, workshops, and webinars.

Chair **August 2019 – August 2021**
IEEE Student Branch University of Dhaka
- Organizing and conducting monthly public talks, workshops, and webinars.

Technical Program Committee (TPC) Member
IEEE Conferences
- IEEE International Conference on High Performance Switching and Routing, 5-7 June 2023, Albuquerque, USA.

Peer Reviews — verified by Web of Science
IEEE Journals, Magazines and Conferences
• 1 Paper - IEEE Vehicular Technology Magazine
• 1 Paper - IEEE Transactions on Mobile Computing
• 4 Papers - IEEE International Conference on Communications, 9-13 June 2024, Denver, USA.
• 3 Papers - IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids, 31 October-3 November 2023, Glasgow, Scotland.
• 1 Paper - IEEE Vehicular Technology Conference, 10-13 October 2023, Hong Kong.
• 1 Poster, 1 Demo - IEEE Symposium on Computers and Communications, 9-12 July 2023, Tunis, Tunisia.
• 1 Paper - IEEE Vehicular Technology Conference, 20-23 June 2023, Florence, Italy.
• 1 Paper - IEEE Global Communications Conference, 4-8 December 2022, Rio de Janeiro, Brazil.
• 3 Posters - IEEE Symposium on Computers and Communications, 30 June-3 July 2022, Rhodes, Greece.

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*