Md Sadman Siraj

Performance and Resource Optimization (PROTON) Laboratory, Dept. of Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM 87106, USA

505-464-5155 mdsadmansiraj96@unm.edu sadman-siraj.github.io sadman-siraj

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. His research endeavors and innovative ideas has led to several publications in flagship conferences and top-tier journals along with an invention disclosure to the US Patent office. His collaborative research work with the Department of Energy, National Renewable Energy Laboratory, Sandia National Laboratories, and Bank of Canada complement his skills as a researcher and is a recognition of contributions in the field of wireless communications, cybersecurity, and software development. He is also acting as the Chapter Chair for IEEE Albuquerque Section Communications Society and Computer Society Joint Chapter which attest to his leadership skills.

Education

University of New Mexico, USA **January 2022 – May 2026 (Expected)**
Ph.D., Department of Electrical and Computer Engineering
• **Research Interests**: Machine Learning, Alternative Positioning, Navigation and Timing, Wireless Communication and Networks, Resource Allocation and Management

University of New Mexico, USA **January 2022 – December 2023**
M.Sc., Computer Engineering

University of Dhaka, Bangladesh **January 2016 – March 2020**
B.Sc., Electrical and Electronic Engineering

Technical Skills

Programming Languages: Python, MATLAB, C, C++, SQL, PHP
Software/Tools: Reinforcement Learning in Python, Deep Learning with Tensorflow and Scikit-learn, Shell Scripting in Linux, Resource Management using SLURM Workload Manager, Network Simulation in OMNET++ and NS3
Other skills: Executing large-scale simulations in High Performance Computing systems, Parallel processing, Research and open data aggregation, Data cleaning and processing, Excellent visualizations, Collaborative project management, Advanced presentation skills

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, Sandia National Laboratories, and University of New Mexico.
- Simulated a wireless network in a heliostat field 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, Sandia National Laboratories, and University of New Mexico.
- Collected large, labeled dataset of IEEE 2030.5 XML and OCPP 2.0.1 JSON payloads, and parsed and preprocessed the collected dataset to create a training dataset for machine learning-based cyber-attack detection.
- 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 University of New Mexico.
- Developed an Android application incorporated with Physical Unclonable Function (PUF)-based authentication database.
- Explored reinforcement learning approaches for in-field use.

Research Assistant **June 2022 – Present**

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 reinforcement learning for developing new decision-making algorithms.

Teaching Assistant **January 2022 – May 2022**

Department of Electrical and Computer Engineering, University of New Mexico

- Courses: ECE-314L – Signals and Systems, ECE-360 – Electromagnetic Fields and Waves, ECE-381 – Introduction to Power Systems

Publications — Google Scholar

Notable Journal Publications

- **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.

Leadership and Volunteering Experience

Chapter Chair **December 2023 – Present**

IEEE Albuquerque Section Communications Society and Computer Society 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.

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*