

Minhaj Uddin Ahmad

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 [Minhaj Uddin Ahmad](#) |  [Minhaj6](#) |  [Minhaj Ahmad](#)

Tuscaloosa, Alabama - 35404

EDUCATION

- **University of Alabama** January 2024 - Present
Ph.D. Civil Engineering Tuscaloosa, USA
- **University of Alabama** January 2024 - December 2025
MSc. Civil Engineering Tuscaloosa, USA
 - GPA: 4.00/4.00
- **Islamic University of Technology** May 2023
Bsc. Electrical Engineering Dhaka, Bangladesh
 - Grade: 3.78/4.00

EXPERIENCE

- **University of Alabama**  January 2024 - Present
Graduate Research Assistant Tuscaloosa, AL
 - Developed **OpenCAMS**, a co-simulation platform integrating traffic simulation, sensor simulation and C-V2X communications simulation by combining SUMO, CARLA and OMNeT++ simulators.
 - Implemented late-fusion of roadside LiDAR, Radar, Camera for proactive safety warning system.
 - Worked on implementation of GNSS spoofing detection and mitigation techniques, demonstrated on TraCR Annual Conference 2024 and USDOT FoT Summit 2024.
- **Cybernetics Hi Tech Solutions (Pvt) Ltd.**  May 2023 - December 2023
Research Engineer (Embedded Systems) Dhaka, Bangladesh
 - Developed live multi-camera low-latency video streaming over radio transceivers from deployed robotic platforms.
 - Designed CAN-BUS data streaming module over Ethernet interface on STM32-H7 microcontroller for controlling robotic platforms.
- **ANTS Aerial Systems Ltd.**  2022 - 2023
Engineering Intern Dhaka, Bangladesh
 - Worked on drone swarm flight firmware, based on Ardupilot flight controller firmware.
 - Worked on software-in-the-loop (SITL) simulation of automated mission-planning software, over an implementation of MAVLink protocol.

PRESENTATIONS AND PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, B=BOOK CHAPTER

Journal Papers

- [J.2] **Ahmad, M.U., Dasgupta, S., Rahman, M., Khan, S., Haque, M.W., Saba, S.R., Bodoh, D., Huynh, N., Zhao, L. and Ozguven, E.E., (2026). Lessons Learned from the Real-World Deployment of Multi-Sensor Fusion for Proactive Work Zone Safety Application.** *Transportation Research Record*. DOI: 10.1177/03611981261441281
- [J.1] **Ahmad, M.U., Rahman, M., Sevim, A., Bodoh, D., Khan, S., Zhao, L., Huynh, N. and Ozguven, E.E., (2026). Historical Prediction Attention Mechanism based Trajectory Forecasting for Proactive Work Zone Safety in a Digital Twin Environment.** *IEEE Internet of Things Journal*, Vol. 13, Issue 11, pp. 22846-22861. DOI: 10.1109/JIOT.2026.3669235

Book Chapters

- [B.2] Ahmad, M.U., Abrar, A., Dasgupta, S. and Rahman, M., (2025). **End-to-End Co-Simulation Testbed for Cybersecurity Research and Development in Intelligent Transportation Systems**. Submitted for publication in book *Advances in Transportation Cybersecurity and Resilience*
- [B.1] Rahman, M., Ahmad, M.U., Chowdhury, M. and McClendon, J., (2025). **Data analytics for prediction of real-time traffic flow parameters**. In *Data Analytics for Intelligent Transportation Systems*, pp. 289-315, Elsevier. DOI: 10.1016/B978-0-443-13878-2.00011-4

Peer-reviewed Conference Proceedings and Presentations

- [C.9] Ahmad, M.U., Irfan, MS., Dasgupta, S., Rahman, M., (2026). **gr-pocketsdr: Bringing PocketSDR Front-Ends to GNU Radio and GNSS-SDR Ecosystem**. In *GNU Radio Conference 2026, 'Hardware for GNU Radio' track, Raleigh, North Carolina, USA, Sep 21 – 25, 2026*. Accepted for technical proceedings and talk.
- [C.8] Ahmad, M.U., Irfan, MS., Dasgupta, S., Rahman, M., (2026). **Beyond Legacy L1 C/A: Characterizing Advanced Multi-Frequency Spoofing Against Multi-Frequency GPS Receivers for Autonomous Navigation**. In *The 39th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2026), C1: Navigation Resilience to Interference and Cyber-Attacks 1 Technical Session, Orlando, Florida, USA, September 14 - 16, 2026*. Accepted as an alternate presentation.
- [C.7] Dasgupta, S., Ahmad, M.U., Irfan, MS., Rahman, M., Larson, JD., (2026). **Resilient Urban Vehicle Navigation in GNSS-Denied Environments via Tightly Integrated Inertial Propagation, Deep Motion Inference, GIS Route Constraints, and Opportunistic Visual Landmark Corrections**. In *The 39th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2026), C1: Navigation Resilience to Interference and Cyber-Attacks 1 Technical Session, Orlando, Florida, USA, September 14 - 16, 2026*. Accepted.
- [C.6] Irfan, MS., Ahmad, M.U., Zaman, Z., Dasgupta, S., Rahman, M., (2026). **A Synchronous GNSS Spoofing Attack Model by Exploiting Basic Safety Message Transmissions for Connected and Automated Vehicles**. In *The 39th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2026), F3: Resilient and Secure PNT Against Interference and Emerging Threats 2 Technical Session, Orlando, Florida, USA, September 14 - 16, 2026*. Accepted as an alternate presentation.
- [C.5] Ahmad, M.U., Dasgupta, S., Rahman, M., Khan, S., Haque, M.W., Saba, S.R., Bodoh, D., Huynh, N., Zhao, L. and Ozguven, E.E., (2025). **Lessons Learned from the Real-World Deployment of Multi-Sensor Fusion for Proactive Work Zone Safety Application**. In *Transportation Research Board Annual Meeting*. DOI: 10.48550/arXiv.2508.01599
- [C.4] Ahmad, M.U., Rahman, M., Sevim, A., Bodoh, D., Khan, S., Zhao, L., Huynh, N. and Ozguven, E.E., (2025). **Historical Prediction Attention Mechanism based Trajectory Forecasting for Proactive Work Zone Safety in a Digital Twin Environment**. In *Transportation Research Board Annual Meeting*. DOI: 10.48550/arXiv.2508.06544
- [C.3] Saba, S.R., Khan, S., Ahmad, M.U., Cao, J., Rahman, M., Zhao, L., Huynh, N. and Ozguven, E.E., (2025). **Infrastructure Sensor-enabled Vehicle Data Generation using Multi-Sensor Fusion for Proactive Safety Applications at Work Zone**. In *Transportation Research Board Annual Meeting*. DOI: 10.48550/arXiv.2509.25452
- [C.2] Ibrahim, M.S., Rahman, S., Hasan, M.S., Ahmad, M.U. and Abrar, A., (2022). **Flow-Based Path Planning for Multiple Homogenous UAVs for Outdoor Formation-Flying**. In *2022 7th International Conference on Mechanical Engineering and Robotics Research (ICMERR)*, pp. 18-26, IEEE. DOI: 10.1109/ICMERR56497.2022.10097797
- [C.1] Ahmad, M.U., Akib, A.A.R., Raihan, M.M.S. and Shams, A.B., (2022). **ABO3 Perovskites' Formability Prediction and Crystal Structure Classification using Machine Learning**. In *International Conference on Innovations in Science, Engineering and Technology (ICISSET)*, pp. 480-485, IEEE. DOI: 10.1109/ICISSET54810.2022.9775906

OPEN-SOURCE CONTRIBUTIONS

- **GNSS-SDR**  2026-
Software GNSS Receiver
 - Added a new PocketSDR signal source to GNSS-SDR source code.
 - Contributed to multiple data analysis tools of GNSS-SDR.
- **gr-pocketsdr**  2026-
GNU Radio OOT Module
 - Implemented a GNU Radio Out-of-Tree (OOT) block which enables interfacing PocketSDR front-ends to GNU Radio ecosystem.
- **OpenCAMS**  2025
SUMO-CARLA-OMNeT++ Co-Simulator
 - Developed a co-simulation environment that combines three major aspects of Intelligent Transportation System (ITS) - traffic simulation (SUMO), 3D sensor simulation (CARLA), and communications simulator (OMNeT++).
 - All source code is publicly available on GitHub.

TECHNOLOGY DEMONSTRATION

- **USDOT Future of Transportation Summit**

US DOT Headquarters

2024
Washington DC

- Demonstration of secure GNSS-based Autonomous Vehicle Navigation [🌐].

- **TraCR Annual Conference**

National Center for Transportation Cybersecurity and Resiliency

2024
Greenville, SC

- Demonstration of secure GNSS-based Autonomous Vehicle Navigation [🌐].

TEACHING AND MENTORSHIP

- **Research Experiences for Undergraduates (REU)**

Mentored undergraduate students under REU program

2026
University of Alabama

- Craig Kudson
- Rais Tefiku

SKILLS

- **Programming Languages:** Python, C, C++, MATLAB, Verilog
- **Database Systems:** SQLite, MongoDB, Redis
- **Data Science & Machine Learning:** Machine Learning, Deep Learning, Computer Vision, Spatiotemporal Modeling
- **Development Technologies:** Linux, Git, GitHub/GitLab, Docker/Podman, Kubernetes
- **Specialized Simulation:** SUMO, CARLA, OMNeT++

LEADERSHIP EXPERIENCE

- **University of Alabama Student Chapter of the Institute of Transportation Engineers**

Vice President

2025 - 2026
[🌐]

- Organizing invited talks and programs with collaboration with Alabama Transportation Institute and student organizations.

ADDITIONAL INFORMATION

Languages: English (Fluent), Bengali (Native)

Interests: Embedded and Linux systems, home server and self-hosting services, amateur radio.

REFERENCES

1. **Dr. Mizanur Rahman**

Assistant Professor,

University of Alabama

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Relationship: PhD supervisor