

Aditya Guhagarkar

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EDUCATION

University of Michigan

Master of Science, Electrical and Computer Engineering | GPA: 4.09/4.00

Aug. 2025 – May 2027

Ann Arbor, MI

Coursework: Digital Communications and Codes, VLSI for ML and Communications, AI-enabled Mixed Reality

Indian Institute of Technology, Indore

Bachelor of Technology, Electrical Engineering | GPA: 9.05/10

Nov. 2021 – May 2025

Indore, India

Coursework: Signals and Systems, Probability and Random Processes, Digital Signal Processing, Digital Communications, Information Coding Theory, Communication Systems, IoT Communication Systems (LTE, WiFi, 5G, M2M, Aloha, CDMA, TCP/IP), Vehicular Communication Systems, VLSI Systems and Technology, Microprocessors and Digital Systems Design.

Honors: Institute Gold Medal – Best All-Round Graduate (2025)

TECHNICAL SKILLS

Programming: C, C++, Python, MATLAB/Simulink, Simscape, GNU Radio, Verilog

Hardware & Tools: SDR (ADALM-PLUTO, USRP B210), Vivado, Proteus, PLECS, Arduino, CC3220SF LaunchPad

Certifications: 5G Introductory-Level Certification (Qualcomm), Mastering 5G PHY (Udemy) – 3GPP L1, OFDM, MIMO, SSB, PDSCH, PUSCH, CSI-RS, DMRS, HARQ, and physical layer procedures

RESEARCH EXPERIENCE

University of Michigan

Research Assistant under Prof. Lei Ying

Aug. 2025 – Present

Ann Arbor, MI

- Built a streaming RL framework in Jelly Bean World to evaluate continuous decision-making, demonstrating improved stability and performance over multiple DQN variants.
- Implemented a contrastive RL approach that augments RRT-based planning, enabling robust trajectory generation for high-DOF robots.

6G Flagship | University of Oulu

Research Intern under Prof. Nandana Rajatheva

Apr. 2025 – Present

Oulu, Finland

- Designed a Graph Attention Network (GAT) for downlink power allocation in multi-cell Massive MIMO systems under spatially correlated Rician fading, targeting maximization of sum-rate while mitigating intra-cell interference.
- Benchmarked the model against a novel dual-constraint WMMSE baseline across supervised, unsupervised, and hybrid training paradigms.

University of British Columbia

Research Intern under Prof. David Michelson

May 2023 – Jul. 2023

Vancouver, Canada

- Developed a channel sounder and Doppler shifter using ADALM-PLUTO SDRs to measure channel impulse response, path loss, and Doppler shifts, with applications in satellite and wireless communications.
- Executed LTE-based signal processing and real-time Doppler correction in MATLAB, achieving near 100% BER reduction under test conditions through dynamic feedback-based digital mitigation of RF distortion.

PROJECT EXPERIENCE

MFCC Audio Feature Extraction Accelerator | ECE 598: VLSI For ML and Comms, Final Project

Fall 2025

- Designed a fixed-point DSP hardware accelerator for MFCC extraction, implementing pre-emphasis, framing/windowing, 512-point FFT, Mel filterbanks, log scaling, DCT, and liftering in Verilog.
- Achieved <1% numerical error vs. MATLAB reference with $\sim 7.7\mu\text{s}$ latency per frame, enabling real-time speech processing for low-power IoT devices.

RL for SWIPT and RIS-Aided Scheduling | Under Dr. Sumit Gautam

Sept. 2024 – Mar. 2025

- Investigated scheduling strategies for RIS-assisted SWIPT systems with nonlinear energy harvesting, comparing TDMA, random selection, constraint programming (CP), and DQN.
- Developed a DQN-based scheduler achieving $\sim 90\%$ of CP throughput with over $1000\times$ lower decision latency.

UAV-Aided Two-Way Relaying for mmWave Vehicular Networks | Under Prof. Vimal Bhatia

Apr. 2024 – Dec. 2024

- Proposed a UAV-assisted two-way relaying architecture to enhance mmWave vehicular connectivity.
- Solved joint relay selection and transmission scheduling using CP, DQN, and PPO across static and dynamic scenarios.
- Achieved 18% reduction in transmission time and 22% increase in throughput compared to the baseline JRDS model.
- In dynamic environments, PPO achieved 13% lower transmission time and 14.5% higher throughput over JRDS.
- Demonstrated PPO's superiority over CP with 100% optimality and minimal inference time.

ASER Estimation of HQAM Signals | Under Prof. Vimal Bhatia

Apr. 2024 – Jul. 2024

- Implemented ASER formulations from literature in MATLAB and validated them against improved in-house estimators for high-order Hexagonal QAM.
- Performed AWGN and Rayleigh fading simulations, confirming accuracy of the enhanced ASER models.

Ground Penetrating Radar using SDRs | Under Prof. Vimal Bhatia

May 2022 – Dec. 2023

- Operated the Ettus USRP B210 SDR to perform distance estimation and study signal penetration across materials including glass, cloth, rubber, and wood.
- Built a narrowband radar prototype by integrating MFCW radar algorithms on GNU Radio.
- Used the TI AWR1642 radar to validate subsurface detection, successfully identifying metallic plates beneath the surface.

LEADERSHIP EXPERIENCE**Tinkerers' Lab IIT Indore | Manager, Head of Public Relations**

Oct. 2023 – Apr. 2024

- Handled lab setup, maintenance, onboarding 100+ students, and acted as PoC for collaborations and events.

Intelligent Vehicle Design and Control Club | President

Apr. 2023 – Apr. 2024

- Led 20+ members across hardware, software, and autonomy to build an intelligent rover and in-house EV.

EECS 301: Probabilistic Methods for Engineering, UMich | Grader, Fall'25

Aug. 2025 - Dec. 2025

- Graded weekly assignments for over 100 students across the course of the fall semester.

SELECTED PUBLICATIONS

1. **A. Guhagarkar**, T. Sivalingam, V. Bhatia, N. Rajatheva, and M. Latva-aho, “RL-Based Optimization of Relay Selection and Transmission Scheduling for UAV-Aided mmWave Vehicular Networks,” in *Proc. WPMC*, 2024. [\[Paper\] ↗](#)
2. **A. Guhagarkar**, V. Bhatia, and S. Gautam, “Towards Efficient Scheduling in RIS-Aided Wireless Networks with Non-Linear Energy Harvesting,” in *Proc. ICCCNT*, 2025. [\[Paper\] ↗](#)
3. A. Navarkar, R. Prajapati, **A. Guhagarkar**, and V. Bhatia, “Efficient Relay Selection and Transmission Scheduling in Non-Terrestrial Assisted Vehicular Networks,” in *Proc. IEEE ANTS*, 2025 (Delhi). [\[Accepted\]](#)
4. R. Rana, **A. Guhagarkar**, and V. Khare, “Enhancing Brain MRI Super-Resolution: A Comparative Study of DCNN, GAN, and Vision Transformer Models,” in *Proc. IEEE INDICON*, 2025. [\[Paper\] ↗](#)

AWARDS & HONORS**MITACS Globalink Fellow** (2023) – Awarded a fully funded research internship at the University of British Columbia.**IEEE PES India Scholarship** (2022–24) – One of 3 students selected nationally for academic excellence and leadership.**Chess** – Internationally rated chess player (FIDE 2046); 2-time SGFI U-14 National Champion; State Champion U-9.