

# Milind Kumar Vaddiraju

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## Education

### University of Illinois at Urbana-Champaign

2021-2027

PhD: Electrical and Computer Engineering

GPA: 4.00 / 4.00

Advisor: Prof. Brighten Godfrey

MS: Electrical and Computer Engineering

GPA: 4.00 / 4.00

Advisor: Prof. Pramod Viswanath

### Indian Institute of Technology Madras

2016-2020

B.Tech: Electrical Engineering

GPA: 9.82/10.00

## Research Interests

Broadly, I am interested in protocol and algorithm design across the network stack for various applications, including for AI workloads. I am currently working on enabling low latency networking for interactive applications like extended reality (AR/VR/XR) via a multipath transport protocol.

## Research Experience

### Graduate Research Assistant

2023 - Present

University of Illinois at Urbana-Champaign

#### Low Latency Multipath Transport for AR/VR applications

- Industry Collaborators: Microsoft Research, Qualcomm, T-Mobile, Peraton Labs, Cisco
- Designed a priority based scheduling algorithm for a 2.26x improvement in P95 latency for real-time video streaming
- Implementing a multipath QUIC (C/C++/Rust) solution exploiting heterogeneous 5G/Wi-Fi paths for AR/VR
- Integrating with open-source XR stack ILLIXR and open-source 5G RAN and core solutions for end-to-end testing

#### Low Latency Wi-Fi for interactive, real-time applications

- Industry Collaborators: Intel
- Designed a secondary ultra-reliable, low-latency channel with novel WTSN and OFDMA based scheduling to provide <5ms P99 latency for time sensitive traffic in simulated Wi-Fi 6 networks

## Professional Experience

### Banyan Intelligence

Aug-Dec 2022

Graduate Intern

Bangalore, India

- Deployed Magma (open-source LTE/5G core) with srsRAN on Linux VMs using Docker; wrote Ansible playbooks for reproducible end-to-end setups (UE-RAN-core)
- Implemented two-sided measurement components in Python/C++; integrated with cluster orchestration

### Indigenous 5G Testbed, IIT Madras

Aug 2020-Aug 2021

Research Engineer

Chennai, India

- Built a 5G NR bits-to-bits simulator (MATLAB); implemented channel estimation/equalization (DMRS-based), analyzed performance under multipath fading
- Developed a L1 controller interface (C/C++) translating L2/L3 configs to PHY configs for hardware modules; optimized control latency on the Indigenous 5G Testbed

### LIGO Laboratory, Caltech

May-July 2019

Undergraduate Intern

Pasadena, California

- Automated optical cavity locking (Python) to improve completion time by 18x to under 10s; prototyped CNN/LSTM beam-tracking pipeline on gigabit camera streams to successfully track 4mm laser beam motion for the first time

## Publications

Is WTSN the missing piece for low latency in general-purpose Wi-Fi?, *HotMobile* 2025

[\[Paper\]](#)

- Industry Collaborators: Intel Corporation

Boosting Application Performance using Heterogeneous Virtual Channels: Challenges and Opportunities, *HotNets* 2023

[\[Paper\]](#)

- Industry Collaborators: Microsoft Research

Trust-free Service Measurement and Payments for Decentralized Cellular Networks, *HotNets* 2022

[\[Paper\]](#)

- Industry Collaborators: Kaleidoscope Blockchain Inc.

## Technical Skills

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**Programming languages:** C, C++, Python, Rust, MATLAB, Verilog, Bash/Zsh

**Systems & Networking:** QUIC (transport protocol), Magma (LTE/5G core), srsRAN, Linux networking, ns-3, Mininet, GNU Radio, USRP, Wireshark, tcpdump, netem

**Optimization & Analysis:** Gurobi, NumPy, Pandas, Matplotlib, FFmpeg/ffprobe, valgrind

**Virtualization & Infrastructure:** Linux, Docker, Docker Compose, VirtualBox, Ansible, SSH/tmux, Git, CMake, Make, gdb

**Communication standards:** 3GPP 5G NR, Wi-Fi 802.11ax

## Awards and Scholarships

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- **Qualcomm Innovation Fellowship** finalist 2025
- Awarded a travel grant for SIGCOMM 2023 2023
- Awarded the **ECE Distinguished Research Fellowship** at UIUC 2022–2026
- Awarded the **James M. Henderson Fellowship** at UIUC 2022–2023
- Awarded the **Dilip and Sandhya Sarwate Fellowship** at UIUC 2021–2022
- Awarded the **S. N. Bose scholarship** (top 1.5% undergraduates in India) 2019
- Selected for the **Caltech LIGO SURF Program** (4 students from India) 2019
- Awarded the **Sri S Subramanian Prize** and the **Sarasvidya Scholarship** by IITM for the highest CGPA among all first year students 2017
- Awarded the **O.P. Jindal Engineering and Management Scholarship** ( $\approx 100$  undergraduates across India) twice 2017, 2018
- Awarded the **K.V.P.Y.** fellowship by Dept. of Science & Technology, Govt. of India 2014

## Scholastic Achievements

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- Department rank **2 out of 127** students in the Department of Electrical Engineering, IIT Madras 2020
- Secured **10/10** GPA in Fall 2016, Spring and Summer 2017, Fall 2018 and Spring 2020 terms at IIT Madras
- Ranked **189** out of 1.3 million examinees in the **JEE Advanced Examination** 2016
- Ranked **129** out of 1.3 million examinees in the **JEE Main Examination** 2016
- Ranked **1** out of about 178,000 examinees in the **Karnataka CET exam** 2016

## Relevant Coursework

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[Modern Cloud Infrastructure](#) , [Advanced Computer Networks](#) , [Advanced Wireless Networks and IoT](#) , [Pattern Recognition](#) , [Deep Learning](#) , Fault Tolerant Distributed Algorithms, Random Processes, See full list [here](#)

## Academic Service

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- Shadow Technical Program Committee (TPC), **ACM IMC 2025**
- Technical Program Committee (TPC), **ACM MobiCom S3 Workshop 2023**
- Artifact Evaluation Committee, **MobiCom 2023**