

# Milind Kumar Vaddiraju

## Curriculum Vitae

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### Interests

Networking, Decentralized Wireless, 5G NR

### Education

2021-Present **PhD: ECE**, *University of Illinois at Urbana-Champaign*

Advisor: Prof. Brighten Godfrey

**MS: ECE**, *University of Illinois at Urbana-Champaign*

CGPA - **4.00/4.00**

Advisor: Prof. Pramod Viswanath

2016-2020 **B.Tech: Electrical Engineering**, *Indian Institute of Technology Madras*

CGPA - **9.82/10.00**

Advisor: Prof. Radhakrishna Ganti

### Publications

HotNets 2023 **Boosting Application Performance using Heterogeneous Virtual Channels: Challenges and Opportunities**, *ACM Workshop on Hot Topics in Networks, 2023*

[[Paper](#)]

Talal Touseef, William Sentosa, **Milind Kumar Vaddiraju**, Debopam Bhattacharjee, Balakrishnan Chandrasekaran, Brighten Godfrey, Shubham Tiwari

HotNets 2022 **Trust-free Service Measurement and Payments for Decentralized Cellular Networks**, *ACM Workshop on Hot Topics in Networks, 2022*

[[Paper](#)]

SVR Anand, Serhat Arslan, Rajat Chopra, Sachin Katti, **Milind Kumar Vaddiraju**, Ranvir Rana, Peiyao Sheng, Himanshu Tyagi, and Pramod Viswanath

### Awards and Scholarships

2023 Awarded a travel grant for SIGCOMM 2023

2022-2026 Awarded the **ECE Distinguished Research Fellowship** at UIUC

2022-2023 Awarded the **James M. Henderson Fellowship** at UIUC

2021-2022 Awarded the **Dilip and Sandhya Sarwate Fellowship** at UIUC

2019 Awarded the **S. N. Bose scholarship** (top 1.5% undergraduates in India)

2019 Selected for the **Caltech LIGO SURF Program**

2017 Awarded the **Sri S Subramanian Prize** and the **Sarasvidya Scholarship** by IITM for the highest CGPA among all first year students

2017,2018 Awarded the **O.P. Jindal Engineering and Management Scholarship** twice

2014 Awarded the **K.V.P.Y.** fellowship

## Scholastic Achievements

2020 Department rank **2 out of 127** students in the Department of Electrical Engineering, IITM at the end of 8 semesters.

- Secured **10/10** GPA in Fall 2016, Spring and Summer 2017, Fall 2018 and Spring 2020 terms at IIT Madras

2016 Ranked **189** out of 1.3 Million examinees in the **JEE Advanced Examination**

2016 Ranked **1** out of about 178,000 examinees in the **Karnataka CET exam**

## Talks

### Proof of Service: Trust-free OCS for Decentralized Cellular Networks

Dec 2022 *IITM*, [[Slides](#)]

Feb 2023 *UIUC*, CSL Student Conference

July 2020 **Receiver design and implementation for the Indigenous 5G Testbed**, *IITM*

July 2019 **Laser beam position tracking for LIGO interferometers**, *Caltech*, [[Slides](#)]

- See full list [here](#)

## Teaching

Jan 2021- **EE6143: Advanced Topics in Communications (5G NR)**, *Instructor: Prof.*

May 2021 *Radhakrishna Ganti*, IIT Madras, [[Content](#)]

## Projects and Internships

### Coordinated Science Laboratory, UIUC

May 2023- **Networking with Heterogeneous Virtual Channels**, *with Prof. Brighten Godfrey*

- Present
- Exploring the use of the throughput, latency and reliability guarantees of virtual channels like eMBB and URLLC in 5G NR, TSN and MLO in Wi-Fi and those in newer WAN architectures to improve performance across broad classes of applications in a deployable manner.

Jan 2022- **Proof of Service**, *with Prof. Pramod Viswanath, Prof. Himanshu Tyagi (IISc)*,

May 2023 Work done in collaboration with Witness Chain

- Designed a smart contract and state channel based trust-free OCS for decentralized cellular networks. Integrated with [Magma](#), an open source network core for system evaluation. Introduced [two-sided measurements](#) for a trust-free design.

### Indigenous 5G Testbed, IITM

Advisor: Prof. Radhakrishna Ganti

Oct 2020- **L1 Controller Design**

- Aug 2021
- Designed and implemented a software interface to translate inputs from L2/L3 to PHY into configurations for hardware modules. Optimized the interface to consume minimum time measured in the number of clock cycles

- Nov 2019- **5G NR Receiver Simulation**
- Aug 2021 [\[Abstract\]](#) ○ Designed and implemented a 5G NR compliant end to end communication system in MATLAB. Evaluated the performance of multiple channel estimation and equalization algorithms in the single user, SISO case for AWGN and multipath fading channel
- Dec 2019- **Half-duplex System Design using USRP N321**
- May 2020 [\[Overview\]](#) [\[Report\]](#) ○ Implemented and designed a user manual for a 5G NR compliant transmitter and receiver on the USRP using GNU Radio. Tested functionality by transmitting and receiving frames of 5G NR data using the USRP and Keysight VSA and VSG
- 40 Meter Prototype Interferometer Laboratory, Caltech
- May 2019- **Laser Beam Position Tracking for LIGO Interferometers, with Prof. Rana**
- Jul 2019 [\[Report\]](#) *Adhikari and Dr. Koji Arai* ○ Assisted in the installation of a Gigabit Ethernet camera at the viewport of the 40m interferometer. Developed software using pypylon to interact with the installed camera
- Collected video and position data of the laser beam spot under varying conditions. Used convolutional and LSTM networks for laser beam tracking and successfully detected motion of amplitude 3mm with maximum error under 20%

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## Academic Service

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

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## Leadership Positions

- May 2018- **Head, Lectures and Demonstrations team, Evolve, Shaastra 2019, IITM**
- Apr 2019 [\[Webpage\]](#) ○ **Headed a team of 15** to organize IIT Madras' annual lecture series and was in charge of a budget of over **7 Lakh INR (9,400 USD)**. Increased organizational efficiency to reduce operational costs by **5 Lakh INR (6,700 USD)**.
- Organized Shaastra's **first blockchain themed TEDx style event** catering to professionals
  - Organized **15 lectures** over four days in extremely diverse areas including those of stalwarts such as **Viswanathan Anand** (Indian Chess grandmaster), **Prof. Venkatraman Ramakrishnan** (Nobel laureate in Chemistry) and **Prof. Juergen Schmidhuber**
  - **Collaborated with an external conference (CCBR)** to co-host speakers and make their talks accessible to a broader, more general audience
  - Catered to and managed a **live audience of around 3000** over a span of four days
- May 2017- **Coordinator, Lectures and Demonstrations team, Evolve, Shaastra 2018, IITM**
- Apr 2018 [\[Webpage\]](#) ○ Organized **13 lectures** on topics as diverse as AI, Art, Ecology, Law, Economics, Neuroscience and Signal Processing in a **team of 10** catering to a **live audience of over 3600** and over **12000 online** over a span of four days
- Conducted Shaastra's **first TEDx style event, ShaastraX**, with five talks catering to over **400 schoolchildren** from all over the city of Chennai
  - Personally set up and managed the first remote lecture in Shaastra's history by [Ron Klein](#)
  - Personally invited, hosted and coordinated the lectures of **Prof. Karlheinz Brandenburg** (inventor of the MP3), **Prof. Geoffrey Hinton**, **Prof. Ada Yonath** (Nobel laureate in chemistry) and **Prof. Vilayanur Ramachandran** (acclaimed neuroscientist). Assisted in the organization of the remaining lectures

May 2020- **Student Mentor, CoEdu India, 2020, IITM**

- Dec 2020 [\[Webpage\]](#)
- Organized and taught classes for over 100 schoolchildren belonging to underprivileged communities from class 8 to class 12 to fill in for lack of in person teaching due to Covid-19 over a span of several weeks
  - Designed accessible content to introduce schoolchildren to Bioengineering, AI and Deep Learning and their applications in order to cultivate a passion for STEM

May 2017- **Coordinator, Inter IIT Sports meet Organizing Team, IITM**

- Dec 2017 [\[Webpage\]](#)
- Worked in a team of 30 to organize the stay of the sports contingents from 23 IITs
  - Personally coordinated and managed the aquatics team of IIT Kanpur for several weeks during their campaign at IIT Madras
  - Prepared a security and awareness manual made available to all participants to ensure their safety at IIT Madras