

Technical Skills

Networked systems

PTP/NTP, 100G Ethernet, Tofino/P4, Linux networking, TSN

Time synchronization

IEEE 1588 PTP, GNSS synchronization, oscillator characterization, hardware timestamping

Mathematical modeling

Stochastic methods, network latency and uncertainty modeling, performance and stability analysis

Simulation & measurement

SimPy, ns-3, OMNeT++, empirical measurement, experimental evaluation

Programming & scripting

C, C++, Python, Go, Bash, MATLAB

Languages

- English
- German
- Hindi
- Marathi

Yash Deshpande

Networking & Systems Researcher

Network Time Synchronization | Mathematical Modeling

Professional Summary

Networking and systems researcher at the Technical University of Munich specializing in precision network time synchronization and mathematical modeling of network latency. Research combines IEEE 1588 PTP/NTP, GNSS-referenced synchronization, oscillator and clock-drift characterization, hardware timestamping, stochastic network-latency models, simulation, and experimental validation on high-speed programmable networks.

Professional Experience

Jan 2021 – Present | Technical University of Munich

Research Fellow & Doctoral Researcher, Chair of Communication Networks

- Research and experimental development in IEEE 1588 PTP/NTP synchronization, mathematical network-latency modeling, and time-uncertainty characterization.
- Develop analytical and stochastic models and measurement methodologies for packet delay, congestion, and synchronization uncertainty.
- Characterize synchronization using GNSS-referenced clocks, oscillators, SyncE, hardware timestamping, and high-speed Ethernet networking hardware.
- Analyze how queuing, scheduling, congestion, switch processing, timestamping, and oscillator behavior affect synchronization accuracy.
- Validate mathematical models using 100G Ethernet and programmable Tofino/P4 switches in controlled timing and performance experiments.
- Characterize Linux network-endpoint latency across NICs, drivers, interrupts, and packet-processing paths using DPDK and XDP.
- Teach the Wireless Sensor Networks Laboratory, supervising 18 students per semester in protocol design, implementation, and experimental evaluation.

Sep 2019 – Jan 2020 | Technical University of Munich

Research Intern, Chair of Communication Networks

- Built a Python simulator for tree-splitting medium-access algorithms; analyzed throughput, delay, and stability for an approach combining successive interference cancellation and K-multipacket reception. The work and its continuation led to five peer-reviewed publications.

Jan 2019 – Dec 2020 | MegAuto KG

Working Student, Product Engineering

- Designed rotary and linear position sensors with semiconductor-manufacturer partners; developed test and production equipment and trained staff at partner factories in India and China.

2015 – 2016 | Pratham Technologies / Vision Experts

Engineering Internships

- Developed embedded signal-processing electronics linking line-scan cameras and a PLC; contributed to optical design using cameras, illumination, lenses, mirrors, and polarizing filters.

Selected Publications

- **Y. Deshpande**, P. Diederich, W. Kellerer, “Towards a Network Aware Model of the Time Uncertainty Bound in Precision Time Protocol”, IEEE INFOCOM Workshop, 2023.
- **Y. Deshpande**, Q. Vogel, L. Becker, K. Aykurt, W. Kellerer, “Improving Network Clock Synchronization by Marking Congestion”, arXiv preprint, 2026.
- **Y. Deshpande**, Q. Vogel, W. Kellerer, “Strict-Priority Packet Delay in Switches with Transmit-Ring Buffering”, arXiv preprint, 2026.
- **Y. Deshpande**, O. Ayan, W. Kellerer, “Improving AoI via Learning-based Distributed MAC in Wireless Networks”, IEEE INFOCOM Workshop on AoI, 2022.
- **Y. Deshpande**, E. Sulkaj, W. Kellerer, “TwinRAN: Twinning the 5G RAN in Azure Cloud”, IEEE NOMS, 2025.

Education

2018 – 2020 | Technical University of Munich

MSc Communications Engineering | German grade: 1.4 / 1.0

Master’s thesis: Reinforcement-learning-based distributed medium access in Networked Control Systems; published in IEEE INFOCOM Workshops. Project-based laboratories in wireless sensor networks and software-defined networking.

2013 – 2018 | Fergusson College, University of Pune

BSc and MSc Electronic Science | GPA: 9.8/10

Hardware programming in C on ARM, Arduino, and Raspberry Pi; built a 3D printer and a wireless open-field speed gate for athletes.

Awards & Additional

- Best Student, Fergusson College, 2015–16; IEEE INFOCOM Student Travel Grant, 2022; Best Master Project (Imagine Cup), 2018.
- **Tennis:** ITF World Junior Ranking #322 (January 2012); competed internationally in Asia and Europe and captained the varsity team.
- Led approximately 50 students in producing Fergusson College’s annual electronics fair; organized weekly programming and circuit-design workshops.