

Nikhil Navaratna

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EDUCATION

Nanyang Technological University (NTU) Ph.D., Physics ▪ GPA: 4.88/5.0	Aug. 2021 – Aug. 2025 Singapore
Birla Institute of Technology and Science, Pilani M.Sc. (Hons.) Physics, B.E (Hons.) Electronics and Communications ▪ GPA: 8.59/10	Jul. 2015 – Jul. 2020 Hyderabad, India

WORK EXPERIENCE

Nanyang Technological University (NTU) Graduate Researcher. Supervisor: Prof. Ranjan Singh Thesis title: <i>On-chip terahertz topological photonic crystals for 6G communications and sensing.</i> ▪ Engineered on-chip terahertz interconnects and devices to tackle the scaling limits of electronic-only communication systems. <ul style="list-style-type: none">○ Achieved record single-lane 450 Gbps data transmission speed over a 80 GHz bandwidth with minimal loss, setting a new benchmark for silicon-based broadband terahertz interconnects○ Developed integrable components such as a monolithic terahertz Mach-Zehnder interferometers with < 2 dB insertion losses and > 20 dB isolation, for high-fidelity signal routing in integrated terahertz photonic systems. ▪ Developed photonics-enabled 6G testbeds to enable real-time device evaluation. <ul style="list-style-type: none">○ Designed and implemented a versatile testbed supporting both on-chip and over-the-air terahertz communication experiments○ Executed real-time benchmarking of terahertz waveguides and reconfigurable intelligent surfaces for next-generation networks. ▪ Designed low-noise, wideband amplifiers tailored for next-generation terahertz communication links. <ul style="list-style-type: none">○ Architected a low-noise amplifier (LNA) delivering 11 dB gain with < -18 dB input reflection, ensuring high sensitivity and minimal mismatch losses; design completed and ready for fabrication.○ Contributed to the design and layout optimization of a power amplifier, achieving a bandwidth of 51 GHz and a gain of 10.2 dB. Design sent for tapeout.	Aug. 2021 – Present
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Texas Instruments

Intern	Jul. 2019 – Dec. 2019 Bangalore, India
▪ Developed a method to calculate jitter at various stages in digital circuits and oscillators using Cadence Virtuoso, improving circuit optimization and performance.	
▪ Applied jitter analysis to enhance the reliability and timing precision of digital circuit designs, contributing to more stable and efficient circuit operation	

SKILLS

▪ Simulation and modelling: Keysight ADS, CST Studio, COMSOL Multiphysics, and Cadence Virtuoso
▪ Measurement and Characterization: Experienced in characterizing high-frequency devices using Vector Network Analyzers (VNAs), spectrum analyzers, and other high-frequency measurement tools.
▪ Programming Languages: C++, Python, and MATLAB for modeling, simulation automation and data processing. Proficient in automating measurement setups and data acquisition using LabVIEW

SELECTED PUBLICATIONS

- **Navaratna, N.**, Tan, Y. J., Kumar, A., Gupta, M., & Singh, R. (2023). On-chip topological THz biosensors. *Applied Physics Letters*, 123(3), 033705.
- Gupta, M., **Navaratna, N.**, Sriftgiser, P., Ducournau, G., & Singh, R. (2023). 327 Gbps THz silicon photonic interconnect with sub-λ bends. *Applied Physics Letters*, 123(17), 171102.
- Kumar, A., Tan, Y. J., **Navaratna, N.**, Gupta, M., Pitchappa, P., & Singh, R. (2024). Slow light topological photonics with counter-propagating waves and its active control on a chip. *Nature Communications*, 15(1), 926.
- **Navaratna, N.**, Tan, Y. J., Singh, R., Topological Line Defect Waveguide. *Adv. Optical Mater.* 2025, 13, 2403451.
- **Navaratna, N.**, Tan, Y. J., Wang, W., Singh, R., Monolithic Terahertz Topological Mach-Zehnder Interferometer. *Adv. Mater.* 2025, 2505657

LEADERSHIP EXPERIENCE

Graduate Student Council

Aug. 2023 – Aug.2024

President

- Led initiatives to improve student engagement, academic collaboration, and overall professional development.
- Represented the student body in multiple decision-making processes with faculty and administration.

INTERESTS

Reading, programming, astronomy and running