

Thariq Shanavas

✉ thariq.shanavas@colorado.edu

in thariq-shanavas

🌐 thariqshanavas.com

📞 720-935-9886

Summary

Prospective Physics PhD. graduate (Expected July 2025) from the University of Colorado Boulder with two pending patents and 6 years of experience in laser systems, photonic integrated circuits, and optical sensors.

Education

Expected July 2025 📖 **Ph.D. Physics, University of Colorado, Boulder**
Spring 2019 📖 **B.S. Electrical Engineering, Indian Institute of Technology, Mumbai**

Skills

Simulation and Design: Comsol, Lumerical, Custom Physics Modeling (Nonlinear Optics, Monte Carlo, etc.), PIC Design and Dispersion Engineering, Numerical Methods (ODE Solving, Fourier Analysis)

Experimental: Lithography, Free-Space and Fiber Optical Circuit Design, Electronics (Circuit and PCB Design, Soldering, Troubleshooting), Instrument Control, FPGA and Microcontroller Programming

Programming: Python, C, Matlab, Linux Shell scripting, VHDL, Verilog

Employment History

University of Colorado, Boulder (Advisor: Prof. Juliet Gopinath) Aug 2019 – Present
PhD Candidate, Physics

- **(Patent Pending)** Demonstrated the smallest (200 μm) optical gyroscope to date, with size-normalized performance metrics matching or exceeding the best reported figures. [1]
- **(Patent Pending)** Developed a finite difference solver for Maxwell's equations in highly scattering media, with $O(n^{2.37})$ complexity vs. $O(n^3)$ for existing methods. [3]
- Prototyped the first cascaded forward Brillouin laser in a microresonator platform, with a record low pump power of 1 mW.

Tyndall National Institute, Ireland (Advisor: Prof. Paul Townsend) May – July 2018
Internship

- Demonstrated 20 Gbps data rates over a fiber-optic network designed for 10 Gbps using machine learning to reduce error rate.

High Energy Accelerator Research Organization, Japan (Advisor: Prof. Manobu Tanaka) Nov – Dec 2017
Internship

- Wrote an FPGA framework for processing and digitizing data from a fast semiconductor-based subatomic particle detector.

University of Alberta, Canada (Advisor: Prof. Karthik Shankar) May – July 2017
Internship

- Developed a theoretical framework for surface plasmon resonances in metamaterial surfaces. [6]

Publications and Patents

Journal Articles

- 1 **T. Shanavas**, G. Kreuper, J. Zhu, W. Park, and J. T. Gopinath, “Nonlinear symmetry breaking to enhance the sagnac effect in a microresonator gyroscope,” *In preparation*, 2025, U.S. Provisional Patent Application No. 63/784,713, filed April 7, 2025.
- 2 **T. Shanavas**, W. Park, and J. T. Gopinath, “A new mechanism for optical frequency combs: Phase-locking a cascaded brillouin laser,” *In preparation*, 2025.
- 3 **T. Shanavas**, R. R. McLeod, M. E. Siemens, and J. T. Gopinath, “Fast finite difference solver for optical microscopy in deep biological tissue,” *Optics Letters*, vol. 49, no. 15, pp. 4417–4420, 2024, U.S. Patent Application No. 19/210,929, filed May 16, 2025.
- 4 M. Grayson, B. Xu, **T. Shanavas**, *et al.*, “Fabrication and characterization of high quality gesbse reflowed and etched ring resonators,” *Optics Express*, vol. 30, no. 17, pp. 31 107–31 121, 2022.
- 5 **T. Shanavas**, M. Grayson, B. Xu, M. Zohrabi, W. Park, and J. T. Gopinath, “Cascaded forward brillouin lasing in a chalcogenide whispering gallery mode microresonator,” *APL Photonics*, vol. 7, no. 11, 2022.
- 6 S. Farsinezhad, **T. Shanavas**, N. Mahdi, *et al.*, “Core-shell titanium dioxide–titanium nitride nanotube arrays with near-infrared plasmon resonances,” *Nanotechnology*, vol. 29, no. 15, p. 154 006, 2018.

Conference Proceedings

- 1 **T. Shanavas**, R. R. McLeod, M. E. Siemens, and J. T. Gopinath, “Comparison of coherent and incoherent donut beams for deep tissue sted microscopy,” in *2023 Conference on Lasers and Electro-Optics (CLEO)*, Optica Publishing Group, 2023.
- 2 B. Xu, M. Grayson, **T. Shanavas**, J. T. Gopinath, and W. Park, “Dispersion control of high-quality ge23sb7s70 reflowed wedge resonators,” in *2023 Conference on Lasers and Electro-Optics (CLEO)*, Optica Publishing Group, 2023.
- 3 **T. Shanavas**, M. B. Grayson, M. Zohrabi, W. Park, and J. T. Gopinath, “Cascaded forward brillouin scattering in a chalcogenide microsphere,” in *2022 Conference on Lasers and Electro-Optics (CLEO)*, Optica Publishing Group, 2022.

References

Available on Request