

Ciril Samuel Prasad

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EDUCATION

Rice University Houston, TX, USA

08/2020 - 08/2024

- PhD in Applied Physics
- Subdiscipline: Nanophotonics.
- MS in Applied Physics

Indian Institute of Science Education and Research Thiruvananthapuram, Kerala, India

08/2015 - 05/2020

- BS and MS in Physics
- Minor in Chemistry

N.S.S Higher Secondary School Pandalam, Kerala, India

08/2013 - 05/2015

- High school education

EXPERIENCE

Postdoctoral Research Associate, Quantum Device Fabrication

09/2024 - Present

- Center for Nanophase Materials Sciences
- Oak Ridge National Laboratory, Oak Ridge, TN, USA

Research Associate, Electrical and Computer Engineering

01/2021 - 08/2024

- Rice University Houston, TX, USA
- Research group: Dr. Guru Naik's lab at Rice University

PUBLICATIONS

- **Ciril S. Prasad**, and Gururaj V. Naik. "Non-Hermitian selective thermal emitter for thermophotovoltaics." npj Nanophotonics (2024)
- **Ciril S. Prasad**, Henry O. Everitt and Gururaj V. Naik. "Thermal imaging through hot emissive windows" Communications Engineering (2024).
- Zhichao Li, **Ciril S. Prasad**, Xielin Wang, Ding Zhang, and Gururaj V. Naik. "Sensing beyond the exceptional point for high detectivity" ACS Photonics (2024).
- Yan He, **Ciril S. Prasad**, Zhanghao Yu, Weijian Li1, Ziyuan Wen, Xielin Wang, Noah Elzner, Qixuan Yu, Ethan Peck, Gururaj Naik, Kaiyuan Yang. "Information Theoretically Secure and CMOS-Integrable Electronic Strong Physically Unclonable Function" (Submitted).
- Bryant Jerome*, **Ciril S. Prasad***, Andrea Schirato, Oliver S. Dewey, Jacques Doumani, Andrey Baydin, Giusseppe Della Valle, Gururaj V. Naik, and Alessandro Alabastri. "Coupling into Hyperbolic Carbon-Nanotube Films with a Deep-Etched Antenna Grating" ACS Photonics (2023).
- Zhichao Li, **Ciril S. Prasad**, Xielin Wang, Ding Zhang, Rosemary Lach, and Gururaj V. Naik. "Balancing detectivity and sensitivity of plasmonic sensors with surface lattice resonance," Nanophotonics, 2023.
- Gururaj V. Naik, **Ciril S. Prasad**. "An imaginary axis for real thermal light sources," Active Photonic Platforms, SPIE, 2023.
- Chacko Mathai, Xielin Wang, **Ciril S. Prasad** and Gururaj V. Naik. "Thermal Stability of aligned carbon nanotubes in ambient air environment," Active Photonic Platforms, SPIE, 2023.
- **Ciril S. Prasad**, Henry O. Everitt, and Gururaj V. Naik. "Non-Hermitian metasurface for asymmetric thermal emission" CLEO, Technical Digest Series, 2023.
- **Ciril S. Prasad**, Sam Raphaelson, and Gururaj V. Naik. "Non-Hermitian selective thermal emitter for thermophotovoltaics" CLEO 2023, Technical Digest Series, 2023

- Zhichao Li, **Ciril S. Prasad**, Xielin Wang, Gururaj V. Naik. "Plasmonic BICs as Biosensors with Better Detectivity," 2022 Conference on Lasers and Electro-Optics (CLEO). IEEE, 2023.
- **Ciril S. Prasad**, Frank Yang, Weijian Li, Rosemary Lach, Henry O. Everitt, and Gururaj V. Naik, "Non-Hermitian metasurface with non-trivial topology." 2022 Conference on Lasers and Electro-Optics (CLEO). IEEE, 2022.
- Frank Yang, **Ciril S. Prasad**, Weijian Li, Rosemary Lach, Henry O. Everitt, and Gururaj V. Naik. "Non-Hermitian metasurface with non-trivial topology" Nanophotonics 2022.
- Dileep, N. P., Vineesh, T. V., Sarma, P. V., Chalil, M. V., **Ciril S. Prasad**, and Shaijumon, M. M. "Electrochemically exfoliated β -Co (OH) 2 nanostructures for enhanced oxygen evolution electrocatalysis." ACS Applied Energy Materials, 2020.

*Equal contribution

PRESENTATIONS/TALKS

- "Nanofabrication and Integration of Quantum Spin Liquid Materials into Test Structures and Devices"
- *Quantum Science Center all hands meeting 2025 (Poster presentation, Baton Rouge, LA, USA)*
- "Thermal Imaging through hot emissive windows,"
- *MRS Spring 2024 (Oral presentation, Seattle, WA, USA)*
- "An imaginary axis for real thermal light sources,"
- *SPIE Optics and Photonics 2023 (Oral presentation, San Diego, CA, USA)*
- "Non-Hermitian selective thermal emitter for thermophotovoltaics,"
- *CLEO 2023 (Oral presentation, San Jose McEnery Convention Center, CA, USA)*
- "Asymmetric thermal emission from a Non-Hermitian metasurface,"
- *CLEO 2023 (Oral presentation, San Jose McEnery Convention Center, CA, USA)*
- "Non-Hermitian metasurface with non-trivial topology,"
- *CLEO 2022 (Oral presentation, San Jose McEnery Convention Center, CA, USA)*
- "Outcoupling Hyperbolic Modes from Aligned Carbon Nanotube Films,"
- *CLEO 2022 (Oral presentation, San Jose McEnery Convention Center, CA, USA)*
- "Carbon-based materials for electrocatalytic CO2 reduction,"
- *Max Planck Institute for Chemistry and Physics of Quantum Materials, 2020*
(Oral Presentation, Dresden, Germany)

PROJECTS

- Thermal transport measurements in 2D - Quantum Spin Liquid materials.** 09/2024 - Present
- Designed and fabricated meso-scale platforms to suspend 2D-QSL materials for thermal transport/interference experiments.
 - Optimized exfoliation, transfer and focused ion/electron beam patterning of 2D layered materials
 - Developing high-resolution on-chip cryogenic thermal sensors compatible with high magnetic fields (>5T).
- Asymmetric thermal emission from silicon metasurface.** 08/2023 - 08/2024
- Enhanced thermal imaging contrast through a lossy infrared window by 100% via engineering optical loss distribution.
 - Designed, fabricated, and characterized the emission/absorption of the metasurface from room temperature to 1200 °C.
 - Presented the results in top optics conferences (SPIE, CLEO, MRS)
- Broadband absorption enhancement in aligned carbon nanotube (CNT) films.** 12/2022 - 12/2023
- Improved broadband infrared absorption in aligned carbon-nanotube films by 50% through enhancing light-matter coupling.
 - Designed and etched deep gratings on films that facilitate coupling into hyperbolic CNT modes.
 - Collected and analyzed angle-resolved reflection and transmission spectra of CNT gratings.
- Thermal emitter optimization for waste heat recovery.** 05/2021 - 05/2023
- Designed and tested thermal emitters with 60% emission convertible to electricity by facilitating coherent interaction between thermal photons.
 - Modified and maintained an FTIR spectrometer, IR microscope, Heating stage, and Cryostat to meet project goals.
 - Performed IV-characterization of low-bandgap photovoltaic cells and photodiodes.
- Nanofabrication in class 100 clean room.** 01/2021 - Present
- Fabricated and assisted in demonstrating an all-electronic, CMOS integrable, and low-power percolation network-based encryption device for the first time.
 - Optimized laboratory silicon deposition process for ten times low-loss device fabrication.

- Led fabrication efforts for 5+ research projects, including on-chip devices in the cleanroom.
- Authored 10+ journal and conference articles in collaboration with multiple research groups.

MENTORING EXPERIENCE

Mentor – ECE REU summer internship- 2022

- Mentored 2 undergraduate students to meet the requirements of the Research Experience for Undergraduates (REU) program.
- Guided the student on all research-related activities, including literature review, experimental design, and data analysis.
- Collaborated closely to publish a conference paper and poster jointly.

Undergraduate Mentor – Nanophotonic Materials Laboratory- Rice University

- Mentored 4 undergraduate students with limited research backgrounds to pursue pioneering research.
- Published research articles and conference papers with students as co-authors.
- Facilitated the acceptance of mentees into prestigious graduate research programs at top institutions such as Caltech, UT-Austin, and UC Berkeley.

Poster evaluator – Rice Undergraduate Research Symposium- 2022

- Evaluated 10 undergraduate research posters from diverse research fields.
- Provided constructive feedback on research and poster presentation

AWARDS

- **Applied Physics student travel award, Robertson-Finley Foundation, 2023** (Awarded to students with excellent academic progress.
- **Innovation in Science Pursuit for Inspired Research Scholar, DST-India, 2015-2020** (Awarded to students with aggregate marks within the top 1% of the central Class XII exam.)

SKILLS

- Design and characterization of nanophotonic components.
- FDTD Simulations, Automation of measurements.
- Cryogenic, high-temperature, and vacuum device testing
- Optical test setups, optoelectronics
- Wafer-scale fabrication in class 100 cleanroom
- High-power laser alignment and waveguide coupling.
- Visible/Infrared spectroscopy and microscopy
- Outstanding written and oral communications

Computing Skills: COMSOL Multiphysics, Ansys Lumerical, Transfer/Scattering matrix, MATLAB, Python, LaTeX

Technical Skills: E-beam/Photolithography, Dry Reactive Ion Etch, Material deposition (PECVD, Evaporation, Sputtering), Electron microscopy, Ellipsometry, Fourier Transform Infrared Spectroscopy, X-ray Diffraction, Cryogenic measurements, I-V characterization of PV cells, Ultra-high vacuum measurements.

SERVICE

- Manuscript reviewer (ACS Journals, Nanophotonics, Optical Materials Express)
- Poster evaluator, International Conference on Surface Plasmon Photonics (SPP10).
- Session Chair, Engineered Coupling and Resonance (FF3D) (CLEO-2023).
- Student Mentor, ECE REU summer 2022
- Volunteer (International Workshop on Advances in 2D materials-2019) .

PROFESSIONAL ASSOCIATIONS

- Quantum Science Center (Member)
- Materials Research Society (Student Member)