Pronoy Das

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Education

Purdue University **Aug 2021 – Present**
Ph.D. in Electrical & Computer Engineering, GPA: 3.89/4.0, Achievements listed below: *West Lafayette, IN, USA*

- **Bilsland Fellow (2025)**: Awarded by Purdue University for research excellence
- **Published multiple first-authored articles in high-impact journals, over 9,000 downloads** (Google Scholar).
- **Purdue ECE Excellence in Teaching Award (2024)**: Recognized for excellence and outstanding contributions as a Graduate Course Instructor
- **Summer Research Grant (2024)**: Awarded by Purdue University for full-time summer research.

Indian Institute of Science Education and Research (IISER) Kolkata **Aug 2016 – Jun 2021**
Bachelor and Master in Physical Sciences, GPA: 8.82/10 *Kalyani, WB, IN*

Skills

- **Optics** & **Photonics:** Nonlinear and quantum optics, many-body physics modeling, lattice Hamiltonians, nonequilibrium dynamics, statistical physics.
- **Computation Tools:** Python, C++, CST, COMSOL, Matlab.
- **Experimental:** ODMR spectroscopy, interferometry, cryogenic optical setups, microwave antenna design.
- **Communication:** Strong verbal skills, collaborative teamwork, technical reporting and grant-writing.

Research Experience and Projects

Graduate Research Assistant **Aug 2021 – Present**
Purdue University, Prof. Zubin Jacob's Research Group

Theory and Computational Research: Sub-wavelength quantum light-matter interactions

- Formulated the quantum theory for highly-dispersive optical activity in chiral materials by quantifying hidden optical modes, discovered optical spin textures in these systems; applied statistical analysis and optimization to solve high dimensional Hamiltonians.
- Developed a software module for the open-source C++ software: Purdue-PicoMax, a computational quantum ED platform, to model nonlocal optical responses in topological quantum materials (e.g., tellurium, Weyl semimetals), with errors $< 10\%$ vs. $\sim 50\%$ in similar platforms.
- Discovered new fundamental quantum fluctuations in the orbital angular momentum of spatiotemporal optical vortices using low-photon Poissonian statistics.

Experimental Research: Quantum metrology using NV centers in diamonds

- Developed a GHz phase and amplitude modulation setup for spin textured light using Sagnac interferometry.
- Fabricated shallow NV defects (30nm from surface) in diamond using ion implantation and vacuum annealing.
- Partnered with collaborators to build NV Optically-Detected Magnetic Resonance (ODMR) cryogenic setup.

Undergraduate Researcher **Aug 2019 – Jul 2021**
IISER Kolkata, Prof. Chiranjib Mitra's Research Group

- Developed a home-built confocal and ODMR spectroscopy setup for bulk NV setup.
- Conceptualized the phenomenon of quantum synchronization in the ground state of NV diamond centers.
- Devised on-chip microwave antenna designs and performed EM simulation in S-band in CST Studio Suite.
- Fabricated μm-scale microwave antennas using UV photolithography, and collaborated in developing a home-built ESR setup at <10K.

Outreach, Leadership, and Teaching

- Purdue Course Instructor: Instructed 60-80 undergraduate students per semester + led a team of 6 Teaching Assistants (Fall 2023 – Spring 2024). Recognized by the Purdue ECE Excellence in Teaching Award.
- Scientific Reviewer for *Physical Review A.* (APS Publishing), *New Journal of Physics* (IOP Publishing), *Proceedings of the Royal Society A*, *SciPost Physics* (2024 – present)
- Head of Media Design, IISER Kolkata: Volunteer leader of the media design team of 8 people, for one of the largest fests in the state (Fall 2017 – Spring 2018)