

# Sumukh Vaidya

Purdue University | [vaidyasumukh@gmail.com](mailto:vaidyasumukh@gmail.com) | +1-765-479-9514 | [LinkedIn](#) | [sumukhvaidya.github.io](https://sumukhvaidya.github.io)  
*Expertise:* Display, Optics, OLEDs, Laser and Vacuum Systems, Nanofabrication, Cryogenics, Programming

## SUMMARY

- Researcher with **5+ years of academic experience** in cutting-edge experimental physics laboratories.
- Skillset of **optical systems**, RF circuits, **nanofab**, ion implantation and **automated instrument control**.

## KEY PUBLICATIONS

- **Nanotube spin defects for omnidirectional magnetic field sensing\***, Arxiv:2310.02709 2023
- **Quantum sensing and imaging with spin defects in hexagonal boron nitride\***, Adv. In Phys. X 2023
- **Quantum sensing of paramagnetic spins in liquids with spin qubits in hBN**, ACS Photonics 2023
- **Nuclear spin polarization and control in hexagonal boron nitride**, Nature Materials 2022
- \* indicates first author/equal contribution. Please use [Google Scholar](#) to find other publications.

## EXPERIENCE

- **Quantum Sensing with Low Dimensional Materials** *PhD Thesis*, Purdue University Jan '21-Current  
– Research in **Quantum sensing of magnetic fields** via **laser-based measurements** of 2D and 1D materials.  
– Built a **high-vacuum ion implantation** machine for creating and studying solid state quantum defects.  
– Built a **Low-Temperature Vacuum Optical Measurement** setup to perform **cryogenic measurements**.  
– Built a **confocal microscopy system** with integrated **RF electronics** for **quantum sensing experiments**.  
– **Python** and **LabVIEW** programming to **automate** combined **laser and RF experiments**.
- **Graduate Data Science Researcher** *The Data Mine*, Purdue University Jan '24-Apr '24  
– Collaborated with **Howmet Aerospace** on developing an **ML model** to **identify manufacturing defects**.  
– Used **PyTorch** to build and test ML models and **improve anomaly detection accuracy**.  
– **Achieved 94% accuracy** compared to 87% accuracy for human experts.
- **Organic Semiconductor Imaging and Perovskite Solar Cell Fab.** *M.Tech Thesis*, IITB Jul '18-Aug '20  
– Performed **Matlab simulations** of charge transport in organic semiconductors to study **OLED efficiency**.  
– **Built an imaging** setup for thin film **organic semiconductors** to determine photoemitter orientation.  
– **Fabricated next-gen Perovskite Solar Cells** in a **clean room** environment using specialized equipment.  
– **Built** and deployed the **research group website** using Jekyll. [Link](#)

## INTERNSHIPS

- **Display Hardware Engineering Intern** *Apple Inc, Cupertino, CA.* May '24-Aug '24  
– Thermal and lifetime characterization of OLED display panels  
– Automated spectroradiometers and display color sensors to measure display ageing characteristics.
- **Visiting Student Researcher** *JPARC, Tokai, Japan.* Dec '17  
– Implemented **algorithms for tracking the trajectories** of cosmic rays to reduce spurious noisy signals.
- **Visiting Summer Student Researcher** *KEK, Tsukuba, Japan* May '17  
– Studied Photomultiplier tubes in **simulated experimental conditions** for the Muon g-2/EDM experiment.

## EDUCATION

- **PhD, Physics** *Purdue University, Indiana (GPA 3.91/4.0)* Jan '21-May '25  
Advisor: Prof. Tongcang Li, Department of Physics and Department of ECE, Purdue University
- **B.Tech+M.Tech, Specialization: Nanoscience** *IIT Bombay (IITB), India* Jul '15-Aug '20  
Advisor: Prof. Dinesh Kabra, Department of Physics, IIT Bombay

## TECHNICAL SKILLS

- **Programming:** Python, Machine Learning (PyTorch), MATLAB, LabView, LATEX, C++, Mathematica, Zemax OpticStudio, Comsol Multiphysics, KLayout, FPGA, git, github.
- **Experimental:** Display characterization, Laser systems, Optical system design, Optical Measurements (Room and Low-Temperature), Ion Implantation, Nanofabrication, RF circuits, Instrument Automation, AFM, SEM, FIB, Photolithography, Confocal Microscopy, High-Vacuum systems, 2-D materials.