Sumukh Vaidya

Purdue University | vaidyasumukh@gmail.com |+1-765-479-9514| LinkedIn| sumukhvaidya.github.io

Expertise: Laser Systems, Optics, Nanofab, Cryogenics, Vacuum systems, Programming, Data Analysis

SUMMARY

- Researcher with **5+ years of academic experience** in leading experimental physics laboratories.
- Author and coauthor on **5 peer reviewed publications**. Google Scholar
- Interdisciplinary and collaborative experience of **optical system design**, **high-vacuum systems**, RF circuits, **nanofabrication**, ion implantation and **instrument control for data acquisition**.
- Extensive **data analysis** and **programming experience** in **Python**, **Matlab** and **LabVIEW**.

RESEARCH EXPERIENCE

- **Graduate Research Assistant,** *Purdue University, Indiana, USA* *Jan '22-Current*
  - 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**.
  - Quantum sensing research in **sensing magnetic fields** via **laser-based measurements**.
  - Built a **confocal microscopy** with integrated **RF electronics** for **quantum sensing experiments**.
  - Used the confocal microscope to **optically measure** the **electron spin resonance (ESR)** spectrum.
  - **COMSOL simulations** for **RF waveguide** design, to improve the **microwave transmission** characteristics.
  - **Python** and **LabVIEW** programming to **automate** combined **laser and RF experiments**.
  - Coauthored **3 peer reviewed papers** in leading journals including ACS Photonics and Nature Materials.
- **Graduate Data Science Researcher,** The Data Mine, Purdue University *Jul '18-Aug '20*
  - Collaborated with **Howmet Aerospace** on developing an **ML model** to **identify manufacturing defects**.
  - Used **PyTorch** and **TensorFlow** to build and test ML models and **improve detection accuracy**.
  - **Achieved 94% accuracy** by using image transforms and tuning hyperparameters.
- **Master's Thesis Student,** *IIT Bombay, India* *Jul '18-Aug '20*
  - **Matlab simulations** of charge carrier transport in organic semiconductors to study **OLED efficiency**.
  - **Fabricated next-gen Perovskite Solar Cells** in a **clean room** environment using specialized equipment.
  - **Built a Fourier imaging** setup for thin film **organic semiconductors** to determine photoemitter orientation.
  - **Built** and deployed the **research group website** using Jekyll. Link

INTERNSHIP EXPERIENCE

- **Visiting Student Researcher** *JPARC, Tokai, Japan.* *Dec '17*
  - Project: Noise reduction for Central Drift Chamber
  - Implemented **algorithms for tracking the trajectories** of cosmic rays entering the drift chamber.
- **Visiting Summer Student Researcher** *KEK, Tsukuba, Japan* *May '17*
  - Project: Characterization of PMTs as Muon Beam Counters
  - 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-Current*
  Advisor: Prof. Tongcang Li, Department of Physics and ECE, Purdue University
- **B.Tech+M.Tech, Specialization: Nanoscience** *IIT Bombay, India* (*CPI 8.32/10.0)* *Jul '15-Aug '20*
  Advisor: Prof. Dinesh Kabra, Department of Physics, IIT Bombay

TECHNICAL SKILLS

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