Sumukh Vaidya

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Expertise: Machine Learning, Data Science, Laser Optics, Nanofabrication, Quantum Sensing

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**, vacuum systems, **nanofabrication**, ion implantation, RF circuits and **instrument control for data acquisition**.
- Extensive **data analysis** and **programming experience** in **Python**, **Matlab** and **LabVIEW**.

TECHNICAL PROJECTS

- **Graduate Research Assistant** *Purdue University, USA* *Jan '22-Current*
  - Built a **confocal microscope** and integrated it with **RF electronics** for **quantum sensing experiments**.
  - Used **Python** and **LabVIEW FPGA** to automate laser experiments.
  - **Shifted** the lab from **LabVIEW** to **Python** for better cross compatibility
  - Built a **high-vacuum ion implantation** machine to create and study solid state quantum defects
- **Graduate Data Science Researcher** *The Data Mine, Purdue University* *Jan '24-May '24*
  - 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.
- **ECE 570: Artificial Intelligence, Course Project** *Purdue University* *Aug '22-Nov '22*
  - Built an autoencoder to denoise low-light, poisson noise limited confocal microscope images
  - Used PyTorch to build, train and test the model on a standard dataset
  - Wrote a term paper detailing the physics and the results and scored a grade of A Link
- **Master's Thesis Student** *IIT Bombay, India* *Jul '18-Aug '20*
  - Performed **Matlab simulations** to study carrier dynamics in organic LEDs
  - **Built** and deployed the **research group website** using Jekyll. Link
  - **Built a setup** for **Fourier imaging** of thin film organic semiconductors.
  - **Fabricated Perovskite Solar cells** in clean room environment using specialized equipment.

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 tube photodetectors in for the Muon g-2/EDM experiment.

EDUCATION

- **PhD, Physics** (*GPA 3.91/4.0*) *Jan '21-Current*
  Purdue University, Indiana, USA. Advisor: Prof Tongcang Li
- **B.Tech+M.Tech, Specialization: Nanoscience** *Jul '15-Aug '20*
  Indian Institute of Technology Bombay (IIT Bombay), India. Advisor: Prof Dinesh Kabra

TECHNICAL SKILLS

- **Programming:** Machine Learning, PyTorch, TendorFlow, MATLAB, LabView, Arduino, LATEX, C++, Mathematica, Zemax OpticStudio, Comsol Multiphysics, KLayout, FPGA, git, github.
- **Experimental:** Laser systems, Optical Measurements, Ion Implantation, Optical system design, Nanofabrication, RF circuits, Instrument Automation, Photolithography, Confocal Microscopy, AFM, SEM, FIB, High Vacuum.