Ravi Dhaliwal

ravidhaliwal@ucla.edu

Education

University of California, Los Angeles - Physics B.S. Expected Graduation Dec 2025

Coursework: Quantum Mechanics, Quantum Optics Laboratory, Electricity & Magnetism, Analog Circuits
GPA: 3.5

Experience

Student Researcher, UCLA Basic Plasma Science Facility June 2024 – Present

- Simulated doppler backscattering and cross-polarization scattering of mm waves in plasma using COMSOL.
- Verify COMSOL simulation accuracy to match known linear and non linear relations of plasma turbulence with scattered beam power
- Developed and automated simulation workflows for millimeter-wave propagation in plasma using GENRAY, integrating Python scripts with OMFIT's DBS module to enhance wave propagation analysis.

Aerodynamics Subteam, Bruin Formula SAE Sept 2023 – June 2024

- Attached Pitot tubes to 3D printed mounts on the vehicle to measure the flow rate of air around the chassis
- Analyzed the flow rate data to determine if any aerodynamic elements on the chassis needed to be changed to make the vehicle experience decreased drag forces

Principle Investigator, NASA NPWEE – Remote Sept 2023 – Dec 2023

- Lead a proposal for funding a conceptual engineering project to enhance thrust in satellite electronic propulsion systems.
- Specifically focused on investigating the feasibility of utilizing super-capacitors to induce large current increases in the thruster, which in turn increased thrust output
- Led research efforts, organized and managed teams by assigning roles and responsibilities, and conducted various simulations using pSpice
- Cumulated in a ten page proposal that was presented to a NASA board.

Student Researcher, University of California, Riverside – Riverside, CA June 2022 – Feb 2023

- Tasked with designing a venturi tube that would be used in a water filtration system
- Conducted CFD simulations in SolidWorks to verify the designs functionality under load, ensuring a sufficient pressure drop was achieved.
- The designed venturi tube achieved an 87% increase in efficiency compared to traditional methods of distillation

Lab Experience

Quantum Optics Laboratory PHYS 180Q

- Aligned free-space optics (lasers, mirrors, lenses, beam splitters) and performed fiber-coupling of laser beams, gaining extensive experience in beam steering, focusing, and maximizing coupling efficiency
- Investigated quantum interference and entanglement (e.g., Bell's inequality, Hong-Ou-Mandel effect) using single-photon detectors, time-correlation electronics, and polarization analysis
- Automated experiment control and data analysis using Python/Matlab, capturing and processing optical measurements.

Skills

Software: COMSOL, STAR CCM+, SolidWorks, Inventor, AutoCAD
Languages: MATLAB, Python, R, SQL, C++, C, C#, Java, Excel