Aryan Kulkarni

Mechanical Engineering Candidate, UC Berkeley

Aryan Kulkarni
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Experience

SPEED ENGINEERING SOLUTIONS | Mechanical Engineering Intern

May 2024 – Jul 2024 | Pune, India

- Performed FEA validation in ANSYS Workbench to assess pressure vessel integrity under complex thermal and mechanical loads.
- Executed structural, thermal, and harmonic analyses, identifying high-risk failure modes and critical design weaknesses.
- Optimized system safety factors **by 89%** through iterative simulation, providing data-driven technical documentation for design improvements.

INDIRA GANDHI CENTRE FOR ATOMIC RESEARCH | Research Intern

May 2023 – Jul 2023 | Kalpakkam, India

- Diagnosed mechanical degradation of nuclear reactor cooling pipes caused by sodium insulation interaction.
- Communicated technical findings to cross-functional teams across 6 departments, presenting failure analysis results to engineering stakeholders.
- Quantified changes in bulk and surface properties, highlighting potential losses of **over Rs. 4,000,000/day**.

Projects

HELICAL MANUFACTURING SYSTEM

Aug 2025 – Present | Berkeley, California

- Executing structural and opto-mechanical design for a large-format novel lithography system.
- Leading development of a high-precision metrology setup; established a tolerance budget to ensure sub-micron accuracy.
- Engineered a **4-axis motion control system** using a custom G-Code pipeline to synchronize hardware with optical projections.

EEG SIGNAL ACQUISITION PRINTED CIRCUIT BOARD

Aug 2025 - Dec 2025 | Berkeley, California

- Designed and debugged a custom PCB in KiCAD for high-sensitivity analog signal acquisition.
- Implemented analog filtering and amplification stages, utilizing DFM-optimized layout to isolate micro-volt signals from ambient noise.
- Performed hands-on board bring-up - **soldered 20+ SMD components**, debugged signal chain; Delivered prototype meeting functional requirements.

METAL HYDRIDE-BASED VEHICLE COOLING SYSTEM

Jan 2024 - May 2024 | Pilani, India

- Devised novel cooling architecture, leveraging metal hydride (MH) properties to solve high-density heat transfer challenges.
- Automated material analysis via custom MATLAB script; modeled their isothermal pressure-composition behaviors in SIMULINK.
- Designed an open MH cooling system and integrated it into US DoE's FCEV model, reducing AC load **by 18.8%**.

NATURAL REFRIGERANT-BASED DEEP FREEZING SYSTEM

Jan 2023 - Jun 2023 | Pilani, India

- Analytical study of naturally-occurring fluids against high-GWP/ODP synthetic options.
- Simulated and optimized various refrigeration cycles using REFPROP database in MATLAB.
- Designed R290-R744 cascade system to improve performance for deep freezing; achieved **15% COP** improvement over R-404a cycle.

Vision

Bridging R&D and manufacturing, specializing in high-pressure fluid systems, and robotics integration.

Education

UC BERKELEY

Master's in Mechanical Engineering

Aug 2025 - Present | Berkeley, USA

Cum. GPA: 3.8 / 4.0

BITS PILANI

Bachelor's in Mechanical Engineering

Aug 2021 - Jun 2025 | Pilani, India

Cum. GPA: 9.32 / 10.0

Skills

Computer Aided Design (CAD):
Solidworks • KiCAD • Fusion 360 • AutoCAD 2D

Engineering Analysis:
ANSYS • MATLAB • SIMULINK

Programming:
Python • C++ • ROS2

Lab & Prototyping:
3D Printing • Soldering • Solid Modeling

Other Research

Semiconductor Defect Detection: Wafer classifier using Python (TensorFlow, Scikit-learn) on sensor telemetry data.

Robotics: MPC-based balancing bot (Python - Pyomo, CasADI, CVXOpt); autonomous rover with SLAM and CNN sign detection (ROS2).

Achievements

University Merit Scholarship, Top 2% amongst 1000+ students across all depts.

P&G Spotlight Top 50, amongst 1000+ applicants for product supply forum.