ARYAN KULKARNI

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Mechanical engineering graduate student at UC Berkeley with hands-on FEA, thermal analysis, and 3D CAD experience. Passionate about design and fabrication of electro-mechanical systems for semiconductor manufacturing.

EDUCATION

University of California, Berkeley | M.Eng. Mechanical Engineering | *GPA*: 3.8/4.0 | Aug 2025 - Present
BITS Pilani | B.E. Mechanical Engineering (Hons.) | *GPA*: 9.32/10.0 | Aug 2021 - May 2025

EXPERIENCE

Product Control Intern | UBS | Capital Markets Financing | Jan 2025 - May 2025 | Mumbai, India
- Supported daily P&L reporting across major trading books with **average run rates up to $300k**.
- Investigated variances down to sub-attribute level, resolved breaks through ledger adjustments, validated figures with trading desk.

Mechanical Engineering Intern | Speed Engineering Solutions | 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.
- Implemented design changes to **improve safety margin by 89%**; prepared technical documentation and reports communicating design evaluation and validation findings.

Research Intern | Indira Gandhi Centre for Atomic Research | May 2023 - Jul 2023 | Kalpakkam, India
- Studied mechanical degradation of nuclear reactor cooling pipes caused by sodium insulation interaction.
- Collaborated cross-functionally across 6 departments to run chemical and morphological evaluation under varying conditions.
- Delivered technical presentation on changes in bulk and surface properties, highlighting **potential losses of over Rs. 4,000,000/day.**

Undergraduate Teaching Assistant | BITS Pilani, Heat Transfer Lab | Jan 2024 - May 2024
- Prepared comprehensive problem sets and assessments for a **cohort of 200+ engineering students.**
- Demonstrated and supervised lab experiments and provided academic support to the students, enhancing their course comprehension and performance.

PROJECTS

HeliCAL Manufacturing System | UC Berkeley | Aug 2025 - Present
- 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 | UC Berkeley | Aug 2025 - Dec 2025
- 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 | BITS Pilani | Jan 2024 - May 2024
- 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%**.

Semiconductor Defect Detection ML Model | UC Berkeley | Aug 2025 - Dec 2025
- Built a defective wafer classifier using Python (TensorFlow, Scikit-learn) on semiconductor sensor telemetry data.

Automation Projects | UC Berkeley | Aug 2025 - Dec 2025
- Balancing bot using MPC for real-time stabilization; autonomous bot with SLAM and CNN-based sign detection.

SKILLS

CAD & Design: SolidWorks, Fusion 360, AutoCAD, KiCAD
Analysis: ANSYS Workbench (Structural, Thermal, Harmonic, FEA), MATLAB, SIMULINK, Heat Transfer, Stress Analysis
Programming: Python, C++, ROS2, Microsoft Office Suite
Lab & Prototyping: 3D Printing, Soldering, Solid Modeling, Design Validation

LEADERSHIP & ACHIEVEMENTS

President, ISHRAE-BITS Pilani Student Chapter - Led chapter re-installation; *secured Rs. 25,000* project grant; conducted design event with 150+ participants |
Berkeley SkyDeck ACE Program Certification | **Fung Institute Grant Awardee** (UC Berkeley) | **University Merit Scholarship** (Top 2%, BITS Pilani) | **P&G Spotlight Top 50** |
Volunteering Tutor, Jagruti Seva Sanstha (NPO for poverty alleviation based in Pune, India)