

# Kaden Dadabhoy

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## EDUCATION

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**University of California, Irvine**  
Bachelor of Science, *Double Major: Mechanical Engineering and Aerospace Engineering*  
*Minor in Information and Computer Science*

**Expected Graduation: March 2027**  
Cumulative GPA: 3.90/4.0

## PROJECTS

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**30lb Combat Robot**, *Anteater Combat Engineering Robotics*

**January 2026 – Present**

- Executed Ansys CFD simulations on an angular drisk weapon system, using a Rotating Reference Frame (RRF) to quantify aerodynamic drag torque across an RPM range, informing a transient system model used to optimize blade geometry and pulley ratios to achieve a 240-mph top tip speed in under 4 seconds
- Developed a modular C++ drive-train simulator by deriving the governing dynamics of a 4WD indirect pulley system, utilizing file I/O to rapidly iterate on torque-speed curves and pulley ratios to ensure adherence to performance specifications.
- Developed an ESP32 firmware bridge in C++ to decode AM32 serial telemetry via KISS protocol, establishing a real-time Bluetooth data stream to analyze drivetrain metrics (velocity, voltage, current). Utilized this live data acquisition to verify actual performance with the theoretical drivetrain calculations.
- Designed chassis components using SolidWorks and managed the procurement lifecycle, including vendor quoting for CNC-machined weapon hubs and laser-cut Ti-6Al-4V/7075-T6 parts and assembled the robot.

**Subsonic Aircraft MDA Tool**, *Flight Performance Analysis / Independent Project*

**November 2025 – December 2025**

- Developed a 7,000-line multi-disciplinary analysis (MDA) tool in C++ to model the interdependence between wing geometry, propulsion performance, and atmospheric physics for preliminary aircraft design.
- Integrated high-fidelity aerodynamic and propulsion models that account for altitude-dependent thrust performance (for a CF34-3B1 engine), drag (including compressibility), Raymer-based wing weight approximations, and a lot more, to generate a discrete power curve and a full-scale flight envelope for a given subsonic conventional aircraft.
- Developed two user-oriented tools (for wingspan and sweep angle) that iterate across multiple configurations to maximize climb performance.
- Successfully validated this tool by designing a wing that beats the FAI C-1k world record for time-to-climb to 9,000 m.

**Electric Formula SAE**, *Anteater Electric Racing*

**September 2024 – April 2025**

- Designed aerodynamic body components, including the nose cone and body panels, using SolidWorks to ensure strict conformance with FSAE regulations.
- Manufactured high-strength, lightweight, aerodynamic parts from carbon fiber using wet layup vacuum bagging techniques.

**Earth to Didymos Mission Analysis**, *Astronautics*

**January 2026 – March 2026**

- Implemented a semi-analytical mission analysis framework by developing algorithms to convert between Cartesian states and Keplerian elements, solving the transcendental Kepler's Problem for state propagation, and utilizing a universal Lambert solver to calculate required  $\Delta V$  for prograde intercepts.
- Applied this framework to NEO 65803 Didymos to perform a 1,000-day preliminary mission analysis, generating a Porkchop Plot to identify the optimal minimum  $\Delta V$  launch window.

**Pneumatic Rover**, *Mechanical Systems Laboratory*

**January 2025 – March 2025**

- Integrated pneumatic/electrical subsystems on an autonomous rover using an Arduino and MOSFET to control solenoid propulsion, servo steering, and sensor suites.
- Led C++ software development for autonomous navigation via dead reckoning and digital filtering, achieving a 233% range increase through experimental optimization of piston timing

**Game Engine / 2D Simulation Framework**, *Independent Project*

**December 2025 – Present**

- Architected a modular C++ framework using OpenGL, GLAD, and GLFW for hardware-accelerated 2D rendering, utilizing abstracted architecture with a decoupled event system and LayerStack to manage complex application states.
- Streamlined the conversion of technical engineering projects into user-friendly applications by integrating Dear ImGui for real-time parameter tuning and a deterministic fixed-timestep loop for stable, high-fidelity simulations.

## SKILLS

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**Design / Manufacturing:** SolidWorks, Ansys Fluent, 3D Printing, Laser Cutting, Basic Hand Tools

**Programming Languages:** C++, MATLAB, Python, Git/GitHub, Arduino

**Notable Coursework:** Flight Dynamics, Aircraft Performance, Heat Transfer, Applied Thermodynamics, Vibrations, Fluid Dynamics, Aerodynamics, Mechanics of Structures, Control Theory, Astronautics, Data Structures and Algorithms, and more.