JUSTIN HUMPHREYS

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PROFESSIONAL SUMMARY

Dedicated mechanical engineering and computational math student equipped with over 6 years of engineering and leadership experience through internship, projects, and competitive student teams. Seeking opportunities to tackle unique, critical challenges and drive meaningful solutions.

EDUCATION

University of California, Los Angeles (UCLA) **Los Angeles, CA**

Bachelor of Science (B.S), Mechanical Engineering *Expected June 2026*

- Relevant Coursework: Statics, Mechanics of Materials, Fluid Mechanics, Thermodynamics, Circuits, Modeling of Dynamic Systems

Bachelor of Science (B.S), Mathematics of Computation

- Relevant Coursework: Data Structures, Computer Architecture, Linear Algebra, Differential Equations, Numerical Methods

SKILLS

Software: Siemens NX, SolidWorks, ANSYS, EPLAN, Onshape, Linux/Unix, Git
Programming: Python, C/C++, Java, MATLAB, Arduino, STM32, Bash, JavaScript, HTML, CSS

EXPERIENCE

SpaceX **Bastrop, TX**

Hardware Reliability Engineering Intern *June 2024 - September 2024*

- Developed automated IPX9 test chamber to spray water at 3500 PSI, 6 GPM, and 98°C, recreating extreme cleaning conditions for consumer-grade satellite dishes, involving a watertight enclosure, heated tank, and recirculating pump system designed with Siemens NX
- Designed UL508A compliant 480V PLC control panel using EPLAN Pro Panel, with two VFDs to drive pump motors, servo controller module to drive a turntable, and solid state relay to power tank heaters
- Implemented PLC program and HMI using Beckhoff TwinCAT software, used to automate tests and maintain water temperatures
- Finished test chamber was 30% cheaper than quoted alternatives, while providing higher pressure and temperature spray, as well as seamless integration with SpaceX telemetry infrastructure
- Created pressurized IPX8 test chamber to simulate water immersion up to 3.5 meters depth for Starlink user terminal testing

Formula SAE: Bruin Racing **Los Angeles, CA**

Software Lead (EV) *June 2024 - Present*

- Leading software subteam in developing and implementing an STM32 based vehicle control unit (VCU), live telemetry and data logging firmware with a Compute Module 4, and data visualization software using InfluxDB and Grafana
- Programmed custom battery management system to monitor battery state of charge, health, temperatures, voltages, currents, and communicate with VCU to manage charging and regenerative braking torque requests using a Teensy 4.1

Controls Lead + Brakes & Pedalbox Responsible Engineer (EV) *May 2023 - June 2024*

- Defined data-driven goals and directed a subteam of 6 engineers responsible for design, testing, and integration of all safety-critical systems, including brakes, steering, and ergonomics
- Created a drive-by-wire system for pedalbox using SOLIDWORKS, enabling precise control and integration with vehicle's control systems
- Optimized braking subsystem performance through MATLAB simulations and ANSYS finite element analysis, reducing overall subsystem weight by 12% while increasing stopping power by 21%
- Built heat transfer model in ANSYS to simulate brake rotor heat dissipation, used to determine optimal geometry

Controls + Powertrain General Member (Internal Combustion) *September 2022 - May 2023*

- Calibrated flat-foot shifting and launch control using sensor feedback, contributing to 0.19s faster acceleration
- Tuned fuel maps and ignition timing for optimized performance, increasing horsepower from 45 hp to 68 hp

First Robotics Competition: Team 7461 **Redmond, WA**

Electronics Lead *August 2018 - September 2022*

- Implemented robust electrical control systems, achieving 0% failure rate during 2022 season by prioritizing serviceability and reliability
- Developed and enforced pre-match and post-match checklists to validate electrical and mechanical functionality, enabling rapid inspection, testing, and repair of robot within a 5-minute turnaround between matches

PROJECTS

Project Car: 1991 Mazda Miata

- Performed complete powertrain overhaul, including a custom tuned MegaSquirt 3 ECU, engine replacement, custom transmission mounts, and upgraded drivetrain components to handle more torque

BruinsOnBoard

- Constructed a platform for UCLA students to find and join rideshares to/from LAX with authentication, real time data updates, and email notifications using React.js and MongoDB

Eagle Scout Project

- Engineered and built six produce washing stations for a local food bank, expediting beet harvest process