

# D. Sebastian Heredia

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## EDUCATION

**Harvey Mudd College**, Claremont, CA

*Exp. Grad. May 2027*

- *B.S. Engineering, GPA: 3.60 / 4.00*
- *Activities:* Mudd Amateur Rocketry Club, Division-III Ultimate Frisbee, SALSA Mudd, Chamber Music

## Selected Coursework

- Manufacturing & Design, Mechanical Design, Applied Mathematics for Engineers, Experimental Engineering, Microprocessor Systems, Digital Electronics & Computer Architecture, Signals & Systems, Control Systems, Engineering Clinic Program

## PROJECTS

**Iris Table**, *Mechanical Design*

*Mar. 2026 - May 2026*

- Designed and fabricated a mechanically actuated iris table featuring synchronized multi-link motion and smooth expansion.
- Developed CAD models, manufactured custom components, and integrated multi-material assemblies through iterative prototyping and testing.
- Evaluated mechanical failure modes and implemented design improvements for durability, consistency, and manufacturability.

**Instrument Tuner Integrating FFT on FPGA**, *Microprocessor Systems: Design & Application*

*Oct. 2025 - Dec. 2025*

- Built a real-time pitch detection system to enable low-latency, high-precision audio analysis on resource-constrained hardware.
- Implemented a 512-point fixed-point FFT on FPGA, achieving sub-Hz frequency resolution without floating-point hardware.
- Demonstrated how FPGA acceleration can outperform MCU-only solutions for real-time signal processing.

**Harvey Mudd College Clinic Project (Apple Inc.)**, *Fall Clinic I Engineering (NDA)*

*Aug. 2025 - Dec. 2025*

- Conducted R&D towards an automated polishing system to reduce variability in cosmetic manufacturing processes.
- Improved surface finish consistency and production yield, addressing manufacturing bottlenecks in elastomeric component fabrication.
- Contributed to automation strategy for scaling high-precision finishing in industrial settings.

**Autonomous Surface Vehicle (ASV)**, *Experimental Engineering*

*Jan. 2025 - April 2025*

- Designed a low-cost autonomous sensing platform for shallow-water mapping (<\$50 total system cost).
- Integrated Hall-effect, pressure, and motor-based sensors to improve robustness against noise and sensor failure.
- Validated that low-cost systems can achieve high-resolution bathymetric mapping comparable to commercial equipment.

**32-Bit Multicycle Computer Processor (RISC-V)**, *Digital Electronics & Computer Architecture*

*Sept. 2024 - Dec. 2024*

- Designed and implemented a 32-bit multicycle RISC-V processor in SystemVerilog including datapath, ALU, register file, and control FSM, exploring tradeoffs between performance and hardware complexity.
- Verified instruction execution through waveform-level debugging, ensuring correct control sequence and data path timing.

## WORK EXPERIENCE

**Engineering Course Staff**, *Teaching Assistant*, Claremont, CA

*Sept. 2025 - Present*

- Led tutorials and mentoring sessions for 100+ students across core engineering courses (E72, E79, E80).
- Taught analytical modeling of linear time-invariant systems and supported MATLAB-based problem solving.
- Provided structured feedback on technical writing, lab reports, and experimental methodology.

**Harvey Mudd College Machine Shop**, *Shop Proctor*, Claremont, CA

*Sept. 2024 - Present*

- Trained 100+ first-time users each semester in the safe operation of machining equipment to promote safe fabrication practices.
- Provided users with on-the-spot guidance to improve machining techniques, fostering confidence and competence.

**Department of Medicine Statistics Core (DOMStat) at UCLA**, *Student Assistant*, Westwood, CA

*Aug. 2024 - Present*

- Designed and tested a REDCap database to streamline project proposal tracking for 80+ Department of Medicine PIs.
- Developed a user-focused DOMStat website interface emphasizing accessibility and information architecture.

## SKILLS

- **Machining & Lab:** Mill, Lathe, CNC Router, Laser Cutter, 3D Printer, Oscilloscope, Soldering, Power Tools
- **Design & CAD:** KiCad, EAGLE, COMSOL, SolidWorks, Fusion360
- **Hardware / FPGA:** SystemVerilog, FPGA Design, Fixed-Point DSP, Lattice Radiant, Quartus, Questa
- **Embedded / Programming:** C, Python, MATLAB, Simulink, Arduino
- **Other:** GitHub, REDCap, MS Office, Spanish (Native / Fluent)