



# ELIOT WACHTEL

 [eliotwachtel.com](https://eliotwachtel.com)

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 [github.com/TheHolyQuail](https://github.com/TheHolyQuail)

## Education

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### University of California, Santa Cruz

*Bachelor of Science (B.S.) in Robotics Engineering*

*Minor: Electrical Engineering - Honors: Dean's list Win 2020, Spr 2023, Win 2024*

**Expected graduation: December 2024**

*Santa Cruz, CA*

*GPA: 3.7*

## Experience

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### PMU Validation Infrastructure Intern

**Jul. 2024 – Sep. 2024**

*Apple*

*In-person work: Cupertino, CA*

- Designed, simulated space constrained active heat sink solution using Siemens NX and Ansys Discovery
- Verified heat-sink met power dissipation and max temp. specifications by assembling a test rig to run sustained loads
- Visualized and reported heatsink test data in slide format via graphs and Ansys flow visualization
- Designed airflow sealing components for 3D printed prototyping
- Detected and visualized PCB population faults by writing python algorithm to map netlist and BoM files
- Validated algorithm with a mix of artificial and real world data
- Led and coordinated the initial steps in switching team to Apple standard CAD toolset (Siemens NX)
- Organized PDM folders and wrote documentation for using and managing the new CAD tools

### Undergraduate Student Researcher

**Feb. 2023 – Jun. 2024**

*Braingeneers Lab under Dr. Mircea Teodorescu*

*Hybrid work: Santa Cruz, CA*

- Enabled per-servo control of a 50+ servo system by designing a tile-able PCB to expand available PWM lanes
- Ensured proper board production through two versions via direct communication with board house
- Developed code and designing power circuitry to support bulk servo motor control
- Integrated code into overarching project code-base as a modular, abstracted library
- Integrated circuits into the overarching incubator-bound system with conformal coating and custom connector seals

### Electrical Systems Lead

**Jun. 2023 – Jun. 2024**

*Formula Slug, UC Santa Cruz EV FSAE team*

*Hybrid work: Santa Cruz, CA*

- Built up post-pandemic electrical team from two members to 20
- Managed the design and fabrication of the high and low voltage electrical systems for an electric rally car
- Ensured individual systems could be integrated with cross-subteam coordination
- Mentored and guided new members in electrical theory and circuit design, leading the training and on-boarding process
- Lead design review meetings and provided updates and estimates on progress to team leadership
- Hit deliverables on time through task delegation and maintaining open access to feedback and assistance tackling technical blockers

### Senior Electrical team member

**Jun. 2023 – Jun. 2024**

*Autoslug, UC Santa Cruz applied AI/ML club*

*Hybrid work: Santa Cruz, CA*

- Design PCBs in KiCAD, Altium, and Fusion 360 for a modular robot
- Directed and managed the electrical system design of a modular robot
- Ensured long term forward extensibility by designing an electromechanical interconnect
- Simplified modular design by defining power and communication standards
- Designed mechanical parts and source electrical components for a swerve drive module

### Student Instructor, Group Tutor, Reader

**Sep. 2021 – Jun. 2024**

*UC Santa Cruz, Rachel Carson and Computation Media Department*

*Remote/in-person work: Santa Cruz, CA*

- Developed and taught content with co-instructors as part of a university sanctioned course on electrical circuit design
- Designed and wrote pre-labs, lab assignments, quizzes, lecture slides, demos, activities, and accompanying guides
- Lectured and provided live demonstrations on technical concepts, fielding and answering questions
- Topics covered in the course: basic circuit analysis with math and benchtop test equipment, part sourcing and Bill of Materials, basic circuit design with 555 timer IC and buck converter controller ICs, soldering, PCB design for manufacture, and the engineering design cycle
- Lead author writing a case study on student-taught courses published in the 2024 ASEE Annual Conference
- Designed and presented poster on written case study at 2024 ASEE Annual Conference

## Mechatronics Engineering Intern

Jun. 2022 – Aug. 2022, Jun. 2023 – Aug. 2023

Gener8

*In-person work: Sunnyvale, CA*

- Wrote Python scripts to control ARM based hardware for sub-micron flexure actuation and heating element tests
- Performed data analysis and graphing for customer facing presentation on prototype test data
- Sourced components for prototyping, including outlining requirements, quoting, and purchasing a customized product
- Designed fixtures and prototype geometry for subsystem validation and assembly
- Designed PCBA layouts, mounting brackets, and functional parts in SolidWorks, adding them to subsystem assemblies
- Modeled all parts with manufacturing in mind via 3D printing, milling, and sheet metal

## Electrical Lead, Research Co-Lead, President

Sep. 2020 – Jun. 2023

*Slugbotics (UC Santa Cruz Robotics Club)*

*Remote/in-person work: Santa Cruz, CA*

- Ideate, design, and develop circuits and systems using EAGLE, Fusion 360, Solidworks, and OnShape
- Lead meetings, plan meeting agendas, and distribute tasks with team leadership, managing 30 people across three teams
- Past projects involved with: CITRIS Aviation Prize 2021, FAA Airport Design Challenge 2020, MATE underwater robotics, autonomous fleet tracking, combat robotics, and a laboratory move

## Projects (more examples at [eliotwachtel.com/portfolio](http://eliotwachtel.com/portfolio))

### Intro to Mechatronics Final Project

Apr. 2023 – Jun. 2023

- Designed a laser cut frame that maintained its shape without adhesives
- Robot designed in Onshape with 360 degree collision detection, and omnidirectional drive
- Designed op amp based circuits to isolate 2 and 1.5KHz signals using multiple feedback bandpass filters
- Programmed a hierarchical state machine running with a real time service handler in C
- Acted as project manager, ensuring components were created on time and could be integrated together
- Developed a modular interconnect system to speed up assembly and repair

### Underwater Camera Ring Light System

Oct. 2021 – May 2022

- Designed a four-ring underwater lighting system to provide lighting for nocturnal operations at 15 meter depths
- Developed a system composed of a 12 to 31 volt boost converter, current regulating LED driver circuit, and 20 watt, 3,250 lumen light ring with integrated passive cooling
- Designed and documented using Autodesk EAGLE, GitLab, and Maker.io

### Pocket Connect Four

Jun. 2021 – Aug 2021

- Designed an approximately credit-card-sized game of connect four, utilizing a grid of WS2813 LEDs as the game board.
- Developed a system composed of an LED grid, five button control pad, and an ATTINY microcontroller with micro USB power input
- Gameplay programmed in Arduino IDE using C++, ATTINY programmed using Arduino UNO as serial programmer
- Designed and documented using Autodesk EAGLE, GitLab, and Maker.io

## Publications

### Fostering Inclusivity and Engagement while Learning by Doing ...

Published by ASEE 2024

- Primary author on paper demonstrating the effectiveness of student designed and taught classes in providing foundational technical instruction for first year students
- Paper published as part of the 2024 ASEE conference and presented in the student division poster presentations
- Digitally available via the following hyperlink

## Technical Skills

**CAD, 2D design, video editing:** SolidWorks & PDM, Siemens NX, Fusion 360, Onshape, FreeCAD, Ansys Discovery, EAGLE, Altium, KiCAD, SketchUp,

Gimp, Adobe Illustrator, Inkscape, Shotcut

**Business:** Microsoft Office, Google Suite, MacOS Suite, Adobe Acrobat, Slack, Kanban software, LaTeX, Linux (Redhat & Ubuntu), Windows, MacOS

**Programming Languages/tools:** Python, Java, Embedded C/C++, HTML/CSS + JavaScript, Git, Bash, MIPS Assembly, Vivado TCL

### Machining and Shop:

**Mechanical:** Hands-on experience with CNC and manual machining of common metals, plastics, wood, and composites on most common wood and metal shop tools with additive, subtractive, and joining methods (including welding, riveting, threaded fasteners, bolts, and adhesives)

**Electronics:** Experience soldering (through hole and SMD), crimping, and using common bench top equipment

**Misc:** sewing (hand, machine, and CNC), digital and mechanical metrology, and most standard hand and power tools

**Languages:** English (Fluent), Spanish (Conversational and Written)