

# Katherine Robertson

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## EDUCATION

- California Institute of Technology (Caltech)** - Pasadena, California Graduating in June 2028
- Majoring in electrical engineering
  - GPA: 4.0
- Sage Hill School** - Newport Coast, California Graduated in June 2024
- GPA: 4.69 (weighted)

## SELECTED PROJECTS

### Prosthetic Hand with Muscular and Neural Interfacing (exhibited at Open Sauce)

- Designed and built a 7-DOF prosthetic hand incorporating biosignal classification for open, closed, and pinch grasps
- Led mechanical design and manufacturing of modular, 3D-printed fingers and opposable thumb using hybrid compliant and rigid mechanisms with auxiliary sensors for closed-loop control
- Developed control software for homing, kinematics, and control logic
- Contributed to time-series classifiers for biosignal interpretation and PCB design

### Software for Semi-Automatic Generation of Low-Cost Partial Hand Prostheses

- Built a procedural 3D CAD pipeline to generate custom 3D-printable partial hand prostheses from residual limb scans (*Python, VTK, PyQt5, Pyvista, Numpy, Pandas*) | [GitHub Link](#)
- Focused on accessibility through intuitive UI and computationally efficient and parametric algorithms

### Light-Painting Robot

- Designed and built a 3-DOF robotic arm for image-based trajectory drawing
- Developed control algorithms using a finite state machine with smooth spline interpolations and a custom kinematics simulation (*Python*)

## EXPERIENCE

- TA for Robotics Class at Caltech** Fall of 2025
- Aided students in the design and programming of gimbal-based robot capable of interpreting visual input and smoothly interpolating its path for object-tracking
- Intern at Becton Dickinson's Advanced Patient Monitoring Unit** Summer of 2025
- Developed lightweight deep learning computer vision architectures to segment medical images and derive clinically relevant parameters (*Pytorch, SciPy, Numpy, Pandas, Scikit-Image*)
  - Experimented with modified UNet and spline-based architectures for motion-based performance evaluation of the right ventricle
  - Patent pending on computer vision research toward near real-time, end-to-end automatic right ventricle assessment pipeline
- Haptics Researcher (with the HaRVI Lab at USC)** 2023 - 2025
- Designed accessible haptic toolkit and adjacent generative 3D visualization software with CLI tooling (*Python, Pyvista, PyQt5*) | [GitHub Link](#)
  - Published in conference paper and featured in workshop at CHI 2024
- Software Lead at Capture Thought** 2024-2025
- Developed web app that interfaces with LLMs to automatically process and grade student video submissions of math problems (*AWS, FastAPI, Next.js, PostgreSQL, Typescript, TailwindCSS, Python, OpenAI API, OpenAPI*)
  - Employed AWS services and web app features like CRUD and JWT-based user authentication for RBAC

**AI Education Researcher** (with Professor Yeh at **University of Colorado Boulder**) Summer of 2024

- Published short form videos demonstrating the math behind neural networks for a K-12 audience

**Science Fair** 2018 - 2024

- International Science and Engineering Fair: 2024 3rd place in Systems Software, 4th place special award

**Coder School** | *Programming Instructor* - Irvine, CA Summer of 2024

- Taught middle and high school students fundamental skills in programming and computer science

## **TECHNICAL SKILLS**

**Languages:** Python, C#, Java, Javascript/Typescript

**ML/CV:** Pytorch, Tensorflow, scikit-image, scikit-learn, Pandas

**Mechanical/ECE:** Fusion 360, KiCAD, CAM, Blender, 7+ years machine & wood shop experience

**Web:** AWS, HTML, CSS, Next.js, React, TailwindCSS, FastAPI