

# Grace Kwak

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## EDUCATION

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### Bachelor of Science in Electrical Engineering

University of California, Los Angeles

Research Advisor: Professor Brett T. Lopez

2020-2024

GPA: 3.66/4.00

## HONORS & AWARDS

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### Electrical and Computer Engineering Departmental Honors

*Awarded to top 20% of department class cohort*

2020 - 2024

### University of California Regents Scholar

*Awarded to top 1.5% of UCLA undergraduate applicants*

2020

## RESEARCH EXPERIENCE

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### Verifiable & Control-Theoretic Robotics Laboratory (VECTR)

*Undergraduate Research Assistant*

Los Angeles, CA

September 2023 - Present

- Developing learning-enabled approach to predict solution case for optimization-based trajectory generation
- Implemented behavior cloning neural network to learn heuristics for efficient motion primitive sampling in time-optimal long-range planner, using Eigen and ROS C++ simulation
- Built greedy benchmark algorithm that performed 200x faster with only a 5% longer trajectory time for vehicles with low maximum velocity and high maximum acceleration
- Implemented jump-point search algorithm and ran ablation studies in order to compare performance to A\*

### Laboratory for Embedded Machines & Ubiquitous Robots (LEMUR)

*Undergraduate Research Assistant*

Los Angeles, CA

June 2021 - September 2021

- Designed propellers, paddle-wheels, and rudders for Arduino-controlled foldable robotic boats
- Published findings in 2021 UCLA Summer Undergraduate Research Program Journal

## PROFESSIONAL EXPERIENCE

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### Zipline International

*Guidance, Navigation, and Control (GNC) Intern*

South San Francisco, CA

June 2024 - October 2024

- Developed a Julia-Rust software tool that enables seamless software-in-the-loop simulation between the drone's Julia plant model and its onboard Rust controller; eliminates over 80% of code iteration overhead and saves 15+ engineering hours/week
- Built model validation tool in Julia to quantify and visualize model mismatch in drone actuation forces and passive aerodynamic forces from flight test data; tool is integrated into model development workflow as a key validation step

### Blue Origin

*Controls Engineering Intern*

Kent, WA

June 2023 - September 2023

- Determined root cause of out-of-spec thrust oscillations on engine model by characterizing system in MATLAB
- Performed in-depth analysis of linearized state-space system, including impact of numerical interpolation
- Discovered significant nonlinear distortion in Bode magnitude and phase plots in implemented model vs. intended model via Simulink simulation outputs
- Accelerated return-to-flight of New Shepard rocket and provided impetus for comprehensive model overhaul

### Texas Instruments

*Test Engineering Intern*

Dallas, TX

June 2022 - September 2022

- Created Python script to flag errors in any Device Interface Board (DIB) Cadence schematic for Automatic Testing Equipment (ATE), saving up to \$200,000 per test project
- Added C++ quality control program flows to battery gauge device on ATE in electrical characterization lab

## LEADERSHIP

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### IEEE at UCLA - Wireless, RF, & Analog Project ([program website](#))

*Digital Signal Processing Lead*

Los Angeles, CA

December 2022 - May 2024

- Co-led a 45-person student team building a wireless RF digital communication system between microcontrollers
- Overhauled project curriculum toward iterative prototyping; increased student retention by 3x
- Launched and supported 5 quarter-long R&D projects which were presented at IEEE Projects Showcase
- Simulated RF circuits in LTspice and designed PCBs with Autodesk EAGLE

**Society of Women Engineers at UCLA**

*Advocacy Committee Director*

**Los Angeles, CA**

May 2022 – June 2023

- Led 5-person team to establish partnerships between SWE and IEEE, Bruin Racing, and AIAA
- Spearheaded flagship Engineers for Professional Inclusion Conference (EPIC), sparking honest conversations about inclusion and actionable ways to become a better ally
- Increased EPIC’s overall attendance by 4x and men’s attendance by 30x

**ACTIVITIES**

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**Recurse Center**

*Self-directed Coder*

**New York, NY**

November 2024 – Present

- Attending a 12-week programming retreat to invest in my software skills and pursue my own projects alongside motivated peers (documenting my experience in my [blog](#))
- Completing intensive online course in deep learning including deep reinforcement learning
- Led a group through MIT’s “The Missing Semester of Your CS Education” course

**Baja Society of Automotive Engineers (SAE) at UCLA**

*Actuator Project Engineer*

**Los Angeles, CA**

June 2022 – June 2023

- Designed and manufactured linear actuator subsystem for controlling gear ratio of the vehicle’s transmission
- Ensured sufficient shift speed, load capacity, and reliability via calculations and tests for national competitions

**IEEE at UCLA - Digital Audio Visualizer Project**

*Digital Design Engineer*

**Los Angeles, CA**

October 2021 – May 2022

- Collaborated in 3-person team to build FPGA-controlled device that calculates frequencies of audio signals and visualizes them onto VGA display in real-time
- Applied combinational and sequential logic to build radix-2 Fast Fourier Transform (FFT) processor

**New Degree Press**

*Author of [The Glitch](#), a sci-fi novel*

**Remote**

January 2020 – December 2020

- Drafted and revised manuscript into full-length novel; published in paperback and e-book with 100+ copies sold
- Amazon Kindle eBooks #1 New Release in Human-Computer Interaction, Social Aspects of the Internet

**SKILLS**

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**Programming Languages**

C/C++, Python, MATLAB, Julia, Rust

**Software Tools**

Git, Linux, Terminal, LaTeX, ROS, PyTorch, PCL, Eigen, OpenCV

**Electrical Engineering**

Oscilloscope, Multimeter, LTspice, Arduino, Raspberry Pi, Soldering

**Mechanical Engineering**

SolidWorks, 3D printing, Mill, Lathe

**Languages**

English, Spanish (Fluent)