Grace Kwak

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EDUCATION

Bachelor of Science in Electrical Engineering 2020-2024
University of California, Los Angeles GPA: 3.66/4.00
Research Advisor: Dr. Brett T. Lopez

HONORS & AWARDS

Electrical and Computer Engineering Departmental Honors 2020 - 2024
Awarded to top 20% of department class cohort

University of California Regents Scholar 2020
Awarded to top 1.5% of UCLA undergraduate applicants

RESEARCH EXPERIENCE

Verifiable & Control-Theoretic Robotics Laboratory (VECTR) **Los Angeles, CA**
Undergraduate Research Assistant 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) **Los Angeles, CA**
Undergraduate Research Assistant 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

Zipline International **South San Francisco, CA**
Guidance, Navigation, and Control (GNC) Intern 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 **Kent, WA**
Controls Engineering Intern 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 **Dallas, TX**
Test Engineering Intern 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

IEEE at UCLA - Wireless, RF, & Analog Project **Los Angeles, CA**
Digital Signal Processing Lead December 2022 – May 2024

- Co-led a 40-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 **Los Angeles, CA**
Advocacy Committee Director 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

Recurse Center **Brooklyn, NY**
Self-directed Coder November 2024 – Present

- Attending a 12-week programming retreat to invest in my software skills and pursue my own projects alongside motivated peers

Baja Society of Automotive Engineers (SAE) at UCLA **Los Angeles, CA**
Actuator Project Engineer June 2022 – June 2023

- Used SolidWorks to design linear actuator subsystem for controlling the gear ratio of the vehicle's transmission
- Performed calculations and tests to ensure sufficient shift speed, load capacity, and reliability

IEEE at UCLA - Digital Audio Visualizer Project **Los Angeles, CA**
Digital Design Engineer 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 **Remote**
Author of The Glitch*, a sci-fi novel* (amzn.to/3epmnvz) 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

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)