Sofia Kwok

Seattle, WA 98144 | sofiakwok8@gmail.com | Linkedin | Portfolio | Github | US Citizen

EDUCATION

Carnegie Mellon University **August 2024**
Master of Science in Robotics GPA: 4.0/4.0

California Institute of Technology **June 2022**
Bachelor of Science in Mechanical Engineering, Minor in Aerospace Engineering GPA: 3.9/4.0

INDUSTRY EXPERIENCE

Starfish Space — MANTA **September 2024 - Present**
Mechanical Engineer

- Designing subassemblies for a robotic arm performing in-orbit satellite servicing
- Building ground support equipment and performing structural, thermal, vacuum, and modal analysis
- Simulating arm behavior and kinematic trajectories during spiral-out and mission lifetime

Honeybee Robotics — Deep Drilling Team **June 2021 - December 2021**
Mechanical Engineering Intern

- Developed a new percussive drill system for in-situ sampling of lunar regolith
- Designed parts, sourced a custom optics system, and built testing setup for in-house evaluation
- Held a PDR and tested final design at NASA Ames, resulting in an overall Technology Readiness Level (TRL) increase from TRL 1 to TRL 6

Elementary Robotics — Hardware Team **June 2020 - September 2020**
Mechanical Engineering Intern

- Designed a dynamometer for internal testing of company motors & drivers
- Prototyped and tested hardware using a combination of 3D printed parts, machined parts, and COTS parts
- Developed a control system using motor drivers and a LabJack U3

RESEARCH EXPERIENCE

Carnegie Mellon University — Robotic Exploration Lab **August 2022 - August 2024**
Graduate Student Researcher — Advisor: Prof. Zac Manchester

- Manufactured low-cost, dynamic biped from ODRI (Open Dynamic Robot Initiative)
- Selected motors, prototyped, and manufactured a reaction wheel system to control bipedal pitch
- Developed control policies for highly dynamic bipedal maneuvers such as jumps & backflips
- Designed & manufactured a bio-inspired robotic jellyfish for fluid simulation validation testing

Massachusetts Institute of Technology — BioInstrumentation Lab **June 2022 - August 2022**
Research Assistant — Advisor: Dr. Lynette Jones

- Developed and manufactured a new thermal haptic feedback system for use in experiments
- Tuned a control policy for generating various thermal profiles

California Institute of Technology — Colonius Lab **March 2021 - June 2021**
Undergraduate Researcher — Advisor: Prof. Tim Colonius

- Independently researched how to recreate a time-resolved full velocity field using pressure measurements
- Found the reduced-order model of the velocity field using the pressure coefficients and a singular value decomposition of the velocity field over a specific time segment sample
- Compared the reduced order model to the original velocity field with accurate results

California Institute of Technology — AMBER Lab **June 2019 - August 2019**
Summer Undergraduate Research Fellow — Advisor: Prof. Aaron Ames

- Designed an autonomous ankle exoskeleton for assisted walking
- Built and programmed a prototype for basic assistance with ankle torque while walking
- Paired a Teensy Arduino with a pressure sensor to measure contact events

PUBLICATIONS

- J. Alvarez, J. Zhang, **S. Kwok**, Z. Manchester. *Real-Time Whole-Body Control of Legged Robots with Model-Predictive Path Integral Control*. IEEE International Conference on Robotics and Automation 2025.

- L. Stolov, K. Zacny, J. Heldmann, K. Bywaters, **S. Kwok**, C. Fortuin, A. Colaprete, A. Dave, R. Elphic, D. Kemp, K. Chin. *SMART: Instrumented Drill for ISRU Investigations on the Moon*. 18th International ASCE Earth and Space Conference 2022.

TALKS AND PRESENTATIONS

- Satellites and Robotics: Developing Novel Hardware for On-Orbit Satellite Servicing. RSS Space Robotics Workshop, 2025.
- Enhancing Bipedal Locomotion with Reaction Wheels. Master of Science in Robotics Thesis Talk, 2024.
- Building an Ankle Exoskeleton for Assisted Walking. Summer Undergraduate Research Fellowship presentation, 2019.

SKILLS

Mechanical Modeling: Solidworks, Autodesk Inventor, Ansys FEA & CFD
Machining: GD&T, 3D printing (FDM), waterjet, laser cutter, lathe, mill, vertical bandsaw, etc.
Software: C++, Python, Julia, Java, ROS, MATLAB, Mathematica
Other: Adobe Photoshop, Adobe Lightroom, Microsoft Project, Microsoft Office, LaTeX
Languages: English (fluent), Spanish (fluent)

TEACHING EXPERIENCE

Carnegie Mellon University

- Teaching Assistant for 10-601: Introduction to Machine Learning (Summer 2023)

California Institute of Technology

- Teaching Assistant for ME 11: Thermodynamics (Fall 2020)
- Teaching Assistant for ME 12: Mechanics (Fall 2021)
- Teaching Assistant for ME 50ab: Experiments and Modeling in Mechanical Engineering (Winter-Spring 2022)

AWARDS

37th Annual Engineering Design Competition Winner (2022)
Member of the winning team for ME72: Engineering Design Laboratory. News link: https://me72.caltech.edu/me72/2022
Toni and Bob Perpall Research Fellow (2019)
Research grant for an outstanding initial proposal in the field of mechanical engineering

DIVERSITY, EQUITY, AND INCLUSION EFFORTS

Society of Women Engineers, Treasurer **September 2018 - June 2022**

- Treasurer duties included allotting club funds, writing applications for funding, and handling the budget
- Oversaw social media outreach & handled all registrations for WE20
- Student liaison with the Caltech Center for Inclusion and Diversity