

JACOB SAYONO

CONTACT	Email: jacobsayono@ucla.edu Website: jacobsayono.github.io GitHub: github.com/jacobsayono		
EDUCATION	University of California, Los Angeles (UCLA) Expected 2024 B.S. in Mechanical Engineering, Minor in Data Science Engineering. Saddleback College Irvine Valley College Graduated 2019 A.S. in Engineering, Physics, and Mathematics.		
PUBLICATIONS	CubeSense++: Smart Environment Sensing with Interaction-Powered Corner Reflector Mechanisms. Xiaoying Yang, Jacob Sayono , Yang Zhang. <i>Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology (UIST)</i> , 2023. [PDF][DOI][Video] MiniKers: Interaction-Powered Smart Environment Automation. (Initial Accept – Top 4%) Xiaoying Yang, Jacob Sayono , Jess Xu, Jiahao “Nick” Li, Josiah Hester, Yang Zhang. <i>Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)</i> , 2022. [PDF][DOI][Code] CubeSense#: Visible Light Backscatter with Interaction-Powered LCD Shutter Mechanisms for Smart Sensing. Jacob Sayono , Emory Lu, Xiaoying Yang, Jeeun Kim, Yang Zhang. <i>Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)</i> , 2024. [PDF][Poster] Interaction-Power Stations: Turning Environments into Mini Power Stations for Charging Wearables. Xiaoying Yang, Jacob Sayono , Jess Xu, Yang Zhang. <i>Conference on Human Factors in Computing Systems (CHI)</i> , 2024. [PDF][Video]		
PENDING REVIEWS	Verifiable & Control-Theoretic Robotics Laboratory (VECTR at UCLA) Jun 2022 – Present <i>Undergraduate Researcher</i> <ul style="list-style-type: none">Generated grid environments (office-like, forest-like, and random maps), streamlined initialization of multi-robot cluster and task locations for outputs of performance benchmarks against existing algorithms, and created detailed figures that cumulated into a research paper for ICRA ‘24. [Code]Proposed mathematical theory for conditional task swapping in a multi-robot system, implemented code into preliminary test scripts, and provided ROS support for simulations to verify optimization algorithms for time-sensitive missions involving online task allocation and path planning. [Code] Human-Centered Computing & Intelligent Sensing Laboratory (HiLab at UCLA) Jan 2022 – Present <i>Undergraduate Researcher</i> <ul style="list-style-type: none">First-authored research paper: Developed real-time light analysis and area tracking in mobile apps for experiments, prototyped mechanisms to verify backscatter signals, and shared codes and designs with collaborators from external universities to utilize in their experiments that amplified project scope. [Code]CubeSense++: Designed retrofitting mechanisms that transforms interactive human motion into RPM values that simultaneously: (1) exhibit a gradual change in radar cross-section signal pattern, (2) induce reflector frequency signals much higher than human noise, (3) do not exceed the maximum framerate threshold of the radar hardware, and (4) do not produce a torque increase that would be too noticeable by the user.Enabled a more comprehensive design comparison for most optimal radar cross-section signal pattern, in addition to a standard and a computational design approach, by developing a cone-shaped shielding mechanism with vents of varying sizes layered above a reflector to discretize the incoming reflected signals.		
RESEARCH EXPERIENCE			
PRESENTATIONS	UCLA Summer Undergraduate Research Program (SURP) Symposium: “CubeSense#” [Journal] Sep 2023 UCLA Undergraduate Research Week: “MiniKers” [Media] May 2023		
SKILLS	Mechanical: 3D Printing, SolidWorks (Certified License), Product Design. Basic: CNC, Wire EDM. Electrical: Arduino, Raspberry Pi, Sensors, Motors, Soldering, Controls. Basic: Circuit Design/Analysis. Software: C++, Python, Java, Linux, ROS, MATLAB, Jupyter, LaTeX, Git Basic: CV, ML, SLAM.		

EXTRA-
CURRICULAR
PROJECTS

DevX: Autonomous Rover

Dec 2021 – Present

Product Manager | Autonomy Team Lead

- Rallied 4 cross-functional teams (mechanical, electrical, software, autonomy) to plan each timeline and iteration for all aspects of BruinBot: mobile app, database server, rover hardware.
- Mentored engineers to establish fundamental vision, localization, and path planning algorithms to create **ROS-powered** autonomy and teleoperation both in simulation and on physical hardware. [\[Code\]](#)[\[Media\]](#)

The American Society of Mechanical Engineers (ASME)

Oct 2019 – May 2022

Robotics Software Engineer | Computer Vision Engineer | Control Systems Engineer

- Established image processing and object detection pipeline using Python OpenCV and MATLAB to identify lattice points and boundaries of underwater path with Canny edge detection and Hough transform.
- Built robotic controls architecture and motion planning using simulations in ROS for tasks determined by RoboSub competition, visualizing all nodes across system on RQT graph for modularization of team work.
- Avoided expenses in buying additional controllers for drivetrain/arm motors by creating DIY high-power H-Bridge solution, allowing for high torque bi-directional motor control with high-resolution encoder.

The Society of Automotive Engineers (SAE) Supermileage Vehicle

Sep 2021 – Apr 2022

Powertrain Engineer

- Redesigned a Hall effect sensor-based encoder for real-time RPM detection on embedded system (C++) and implemented PID throttle control that utilized interrupts to minimize latency for duty cycle adjustments.

INDUSTRY
EXPERIENCE

ROBOTIS (Robot is ...)

Jan 2019 – Aug 2019

Mechatronics Intern | Technical Skills Trainee

- Demonstrated control in servos with microcontrollers, programming sets of movements (dancing, waving, bowing) on RoboPlus software for young customers (ages 12 and under) requesting customized poses.
- Avoided expenses on testing hardware material analysis by creating stress analysis machine for company's office under a \$300 budget and using ROBOTIS-servo (i.e., Dynamixel) encoders.
- Abstracted different final print outcomes based on various settings of company's 3D printer for future interns to reference to in their own 3D printing, which included dual-nozzle print settings.

Unison Consulting, Inc.

Jun 2018 – Dec 2018

Data Analyst Intern

- Created budgets and cost-volume-profit analyses for car rentals in multiple airports from monthly enplanements data, presenting documented analyses to team meetings to convey projected revenues.
- Introduced systematic formulas for rapid calculations and storage to compile and cross-reference massive numerical data into digestible chunks for company clients.

GRADUATE-
EQUIVALENT
COURSES

MAE C163B: Dynamics of Robotic Systems *[Grade: A+]*

- Simulated motion planning and trajectory optimization of robotic arm given set of constraints. [\[Code\]](#)

MAE C163A: Kinematics of Robotic Systems *[Grade: A]*

- Developed 4-DOF robotic arm to verify FK/IK solutions on 3D-printed hardware. [\[Code\]](#)

PRIVATE/ONLINE
EDUCATION

Udacity: School of Autonomous Systems

- Robotics Software Engineer Nanodegree Program Certification.
- Self-Driving Car Nanodegree Program Certification.

Sep 2023

Sep 2022

CONFERENCE
SYMPOSIUMS

2022 Southern California Robotics Symposium (SCR)

- Attended educational robotics workshops and participated in research panel discussions.

AWARDS

2023 NSF REU: Summer Undergraduate Research Program (SURP) at UCLA (\$6500)

2023 UCLA Dutra-Liu Family Endowed Centennial Scholarship in Engineering (\$4500)

2022 UCLA Chih-Ming Ho Quasi-Endowed Scholarship Fund (\$1000)

- Awarded to 1 student who has exemplified academic and research excellence on an interdisciplinary level.

2018 Saddleback College Honors Certificate-Track Program

COMMUNITY
INVOLVEMENT

Mongolia International University: Visiting Volunteer, Teacher.

Spring 2023

Phi Theta Kappa Honor Society: Administrator Coordinator, Volunteer, and Tutor.

Jan 2017 – May 2019

Associated Student Government at Saddleback College: Honors Board Spokesman.

Sep 2016 – May 2019