Edward Lukania Kuoha IV

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Undergraduate Mechanical Engineer interested in working in space robotics and rovers with lunar and martian applications

EDUCATION

University of Hawaii at Mānoa | BS Mechanical Engineering (May 2028) | Major GPA: **3.85 (**Dean's List Fall '24 - Spring '26)

ENGINEERING EXPERIENCE

University of Washington Molecular Engineering Materials Center (MEM-C) | REU Fellow **June 2026 – August 2026**

Under Dr. Leo Brody (UW Chemical Engineering), researched antiperovskite carbides, magnetically tunable materials being explored as low-energy replacements for conventional catalysts.

- Built a gas-handling line and ran temperature-programmed carburization toward Co_3InC, a route intended to avoid the excess carbon of conventional sol-gel synthesis, using X-Ray Diffraction (XRD) to identify the resulting phases.
- Rewrote the reactor's LabVIEW controls (valves, gas flow, furnace) in open-source Python, eliminating license costs, adding a fail-safe default state for the flammable-gas line, and laying groundwork for automated runs.
- Diagnosed a failed synthesis run by tracing the wrong product to insufficient carbon in the gas mixture, supported by a review of the carburization literature, and raised the methane ratio for subsequent runs.

Team Robotic Space Exploration (RoSE) - NASA RASC-AL 2026 | Lead Systems Engineer **September 2025 - June 2026**

Designed a nuclear fission power grid for the lunar surface. Selected as 1 of 14 teams from 150+ applicants nationwide (alongside MIT, Texas A&M, University of Michigan); defended the design before 11 NASA and industry judges, Cocoa Beach, FL, June 2026.

- Executed steady-state thermal simulation (Autodesk CFD) showing 3 m of regolith burial passively insulates a 15 kWe fission reactor from the lunar surface, with a 508 K drop across the berm.
- Led system-level architecture selection for a 120 kWe modular lunar power grid, evaluating 3 subsystems to converge on a configuration within a 34,300 kg launched mass constraint.
- Designed a 679 m^3 sintered-regolith thermal vault enabling 336-hour lunar night survival at 2.7× energy margin.
- As systems lead, tracked interface compatibility across 3 subsystems (Deployment, Power, & Sustainability) and kept a team split between UH Mānoa and UH Hilo on pace to deliver the proposal on deadline.

AlphaTuring – QuackHacks 3 | Head of Hardware **May 2026**

Only hardware member of a 4-person team building an autonomous search-and-rescue rover at QuackHacks 3, the University of Oregon's 24-hour hackathon.

- Designed and built the full electronics architecture in under 5 hours, including motor driver circuits, buck converter tuning, and the complete wiring harness.
- Recovered from two fried buck converters mid-build by restructuring the power delivery architecture, avoiding a full concept overhaul and delivering an untethered platform that carried the team's autonomy and vision stack.

ME 213 – Stair-Climbing Egg Retrieval Robot | Lead Systems Engineer **January 2026 - May 2026**

- Ran SolidWorks FEA with h-Adaptive meshing (57K–91K elements, <5% strain energy error) to redesign the wheels, raising the minimum factor of safety from 2.05 to 7.5+, well above the 2.0 requirement.
- Fabricated and assembled the platform end to end: metal machining, FDM printing (PETG), soldering, and iterative CAD to satisfy structural, assembly, and manufacturability requirements.

ENGINEERING SKILLS

Fabrication & Lab: 3D Printing, Soldering, Tube furnace, LabVIEW, XRD, Metal Machining (UH Machine shop certified)
Software: Onshape (CAD), SolidWorks (CAD, FEA), Autodesk (CFD), GitHub

COMMUNITY

Special Olympics Hawaii | *Volunteer* **June 2018 – Present**
Raised $3,500+ through direct outreach for the "Over the Edge" fundraiser and provide ongoing annual support at the "Cheer for Champions" gala.

Team RoSE | *Volunteer* **September 2025 – Present**
Introducing K-12 to engineering and design processes through craft activities, live robotics demonstrations, and poster infosessions.

EXTRACURRICULAR

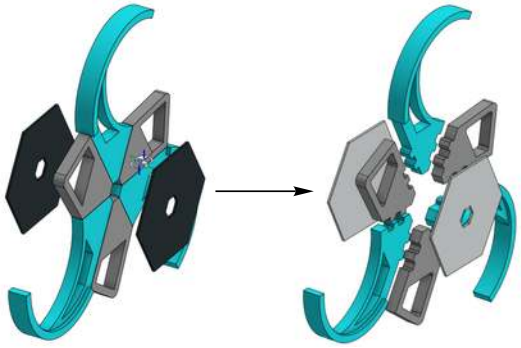
Clubs: Team Robotic Space Exploration (Sep 2025-Present), IEEE Robotics and Automation (Co-Founder of UHM Chapter Sep 2026-Present), Pi Tau Sigma Mechanical Engineering Honor Society (Sep 2026-Present), College of Engineering Mentorship (Mentor: Evan Kawamura)

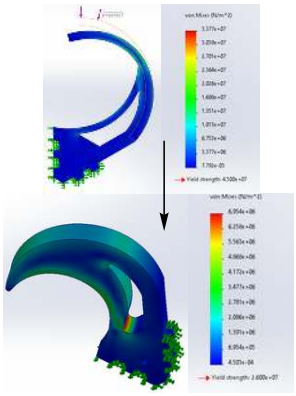
Hobbies: Weightlifting, running, drums and ukulele, engineering content on Instagram, learning Japanese and Vietnamese

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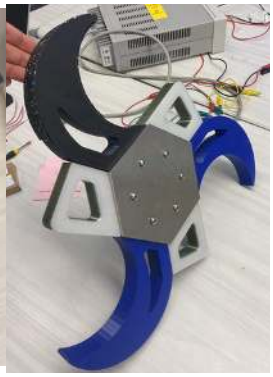
Mechanical Engineering, University of Hawai'i at Mānoa

Egg Retriever Robot — Tri-Spoke Wheel









What

Tri-spoke wheel designed to climb stairs and obstacles for an intro engineering design course.

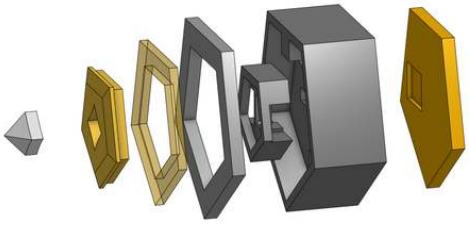
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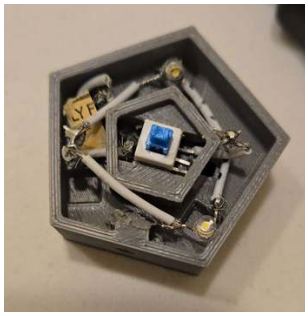
Adapted the tri-spoke geometry from published research. Modeled in Onshape, then iterated the design against SolidWorks FEA results.

Results

FEA applied a 196 N design load (10 kg robot, 2× dynamic factor), raising FoS from 2.05 to 7.5+. Confirmed structurally with a static 20 kg (~196 N) load test, no visible deflection.

Lit Valorant Charm — Self-Directed Build







What

Self-directed gift project: a lit multi-material Valorant charm, taken from concept to finished object solo.

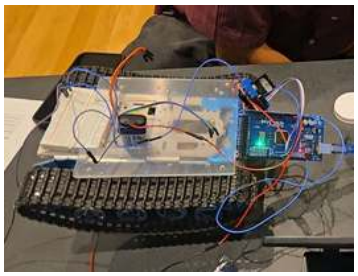
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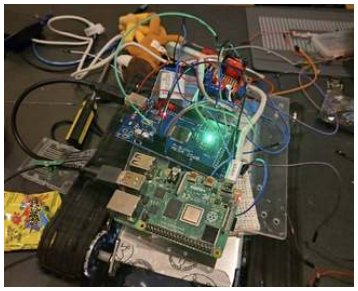
4-part parametric Onshape assembly, multi-material and single-color FDM. Soldered LED circuit with latching switch, chrome post-processing. Tuned print settings and supports to transmit light evenly and finish clean.

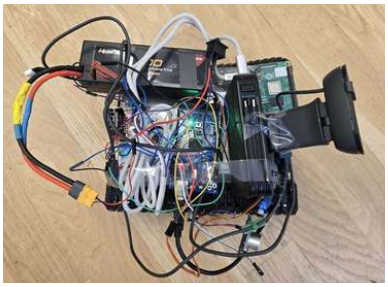
Results

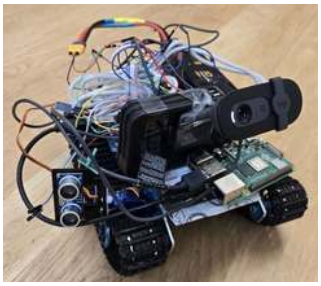
Delivered a working unit; LED and switch reliable in daily use, no structural or finish failures after a month+ of keychain carry.

AlphaTuring — QuackHacks Rover









What

Assembled the full hardware stack for an autonomous search and rescue robot at QuackHacks, University of Oregon's 24-hour hackathon.

How

Built complete wiring architecture from scratch using a tank chassis, Raspberry Pi 4, Arduino Mega 2560, L298N motor driver, LiPo battery, ultrasonic sensor, and others. Debugged power faults and motor control issues live under time pressure.

Results

Delivered a functional robot with working computer vision via Google Gemini, ultrasonic obstacle detection, and autonomous motor control within the 24-hour window.