

Tae Rugh

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BRIEF

Robotician with breadth of applied knowledge in mechanical, electrical, and software engineering. Full-stack ownership of complex electromechanical systems, from requirements to design to integration and field testing.

SKILLS

Software: C++ (CMake, gtest, Eigen, OpenCV, rclcpp), Python (NumPy, pandas, Matplotlib, PyTorch), MATLAB (control, robotics, symbolic, optimization), ROS2, Linux, Git

Electrical: Communication (CAN CANopen/J1939, Ethernet TCP/UDP, Serial UART/USB/HID), PCB Design (Autodesk Eagle), Edge Compute (Jetson NX/Nano, Raspberry Pi), Microcontrollers (Pi Pico, Arduino), Battery/power systems, Sensor/actuator/controller/telemetry integrations

Mechanical: CAD (SolidWorks, Catia, Onshape), FEA (ANSYS Mechanical), GD&T, Manual & CNC Machining (Mastercam), 3D Printing, Prototyping

Concepts: Modeling (kinematics, dynamics, state-space, stability), Estimation (Kalman filter, EKF, particle filter, SLAM), Control (PID, LQR, MPC, reinforcement learning), Planning (A*, RRT, iLQR/DDP, Behavior tree)

EXPERIENCE

Clippership // Co-founder & Engineer

Redwood City, CA · Jun 2024 - Present

- Raised \$4.5M in venture capital seed funding, reaching a \$22.6M valuation, led by Fifty Years
- Built an autonomous sailboat proof-of-concept prototype in 3 months [Project Page [↗](#)]
 - Owned the electrical system, including battery, power distribution, actuators, and sensors
 - Worked at all levels, including system architecture, detailed design, component sourcing, hands-on manufacturing, hardware and software integration, and on-the-water testing
 - Demonstrated waypoint-following, autonomous maneuvering, obstacle detection, and collision avoidance

CMU Robotic Exploration Lab // Graduate Researcher

Pittsburgh, PA · Sep 2023 - May 2024

- State estimation of cloth for robotic manipulation [Project Page [↗](#)]
 - Developed and tested an EKF in C++ using a differentiable cloth simulation and vision-based measurement
- Path planning and optimal control of an autonomous sailboat [Project Page [↗](#)]
 - Route planning (RRT*), dynamics modeling, trajectory optimization (direct collocation), and tracking (MPC)

Tesla // Intern, New Programs Engineering

Los Angeles, CA · Mar 2022 - Sep 2022

- Developed a robot arm (UR10e) to gather aerodynamic data of prototype vehicles during wind tunnel tests
 - Environment modeling, coordinate alignment, path/trajectory planning (RRT, TSP), and collision avoidance
 - Designed various end-effector probes, analyzed wind loads, and integrated sensors
 - Achieved a successful testing campaign, made iterative improvements, and built a data visualization GUI
- Integrated sensors, telemetry, and data logging systems, and developed data analysis tools for a prototype vehicle
 - Integrated the sensor suite, CANbus network, data logger, and RF communication
 - Responsible for live data monitoring and logging during track tests, as well as post-test data analysis

Xos // Intern, Battery Manufacturing Engineering

Los Angeles, CA · Jun 2021 - Sep 2021

- Designed and built an end-of-line battery module tester for an electric truck OEM
- Designed numerous manufacturing, testing, and quality control fixtures for the battery manufacturing line

EDUCATION

Carnegie Mellon University

Pittsburgh, PA · Aug 2023 - May 2024

M.S. Mechanical Engineering*

Research Focus: Estimation and control of robotic systems GPA: 4.0/4.0

Courses: Optimal Control & Reinforcement Learning, Robot Localization & Mapping, Robot Dynamics & Analysis, Modern Control Theory, Machine Learning & Artificial Intelligence

**Incomplete—withdrew to start Clippership*

University of California, Irvine

Irvine, CA · Sep 2019 - Jun 2023

B.S. Mechanical Engineering

Minor: Computer Science Specialization: Mechanical Systems Design GPA: 3.8/4.0

Courses: Robot Kinematics, Classical Control Theory, Data Structures, Mechatronics, Digital Image Processing