

Will Kraus

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EDUCATION

Carnegie Mellon University <i>Master of Science in Mechanical Engineering - Research; GPA: 3.96 / 4.0</i>	Pittsburgh, PA May 2025
Pennsylvania State University <i>Bachelor of Science in Mechanical Engineering, Minor in Engineering Leadership</i>	State College, PA May 2023

SKILLS

Programming: C++, ROS/ROS2, Python (PyTorch, Pinocchio), Git, Linux, MATLAB/Simulink, Julia
Simulation: MuJoCo, Webots, Gazebo
Hardware: CAD (SolidWorks, Fusion 360, Onshape), Prototyping (3D Printers, Mills, Lathes, CNC, GD&T)

RESEARCH EXPERIENCE

Graduate Researcher <i>Robotic Exploration Lab, under Dr. Zachary Manchester</i>	September 2023 - Present C++, Optimal Control, SysID
<ul style="list-style-type: none">Constructed flexible satellite testbed with reaction wheels, IMUs, and CAN + I^2C communicationIntegrated controller, sensor calibration, state estimation, and System Identification (SysID) for flexible satellite in C++ and MATLAB, mitigating model complexity for controlling flexible structuresDeveloping legged robot gait planner for linearized locomotion model in humanoid and quadruped robots	

WORK EXPERIENCE

Graduate Course Support: Modern Control Theory <i>Carnegie Mellon University</i>	September 2024 - December 2024 Control Theory, Whole Body Control, AWS
<ul style="list-style-type: none">Answered questions about control theory, state estimation, and SLAM course content during weekly office hours for graduate student courseCreated AWS implementation of quadruped bimanual manipulation paper <i>LocoMan: Advancing Versatile Quadrupedal Dexterity with Lightweight Loco-Manipulators</i>Developed whole body control teaching material and extra credit homework assignment, simplifying concepts for future courses	
Vibration Analyst Engineering Intern <i>KCF Technologies</i>	June 2022 - August 2022 Python, Sensor Calibration, Predictive Maintenance
<ul style="list-style-type: none">Presented framework for optimizing sensor collection on different robots into predictive maintenance platform by timing additional sensor collection windows directly to robot movementsInterfaced with 6 product suppliers and customers across the United States for customer support and system triage, reducing downtime of equipment by 10%	

PROJECT EXPERIENCE

UAV Control Sim2Real Pipeline C++, Control Theory, ROS2	September 2024 - December 2024
<ul style="list-style-type: none">Tested cascaded PID, LQR, and Sliding Mode controllers with 4 students in simulation and on hardwareDesigned simulation environment for controller testing with ROS2 and Gazebo in C++, ensuring accurate disturbance modeling of wind in 3DTuned LQR controller in C to stabilize against 1 m/s wind conditions while maintaining target position	
RL & Transformer with Humanoid Robot MuJoCo, Model-based RL	January 2024 - May 2024
<ul style="list-style-type: none">Incorporated a decision transformer with a reinforcement learning algorithm to reduce unnecessary movement in simulation with expected reward levelsConstructed a model-based reinforcement learning architecture with trained and untrained transformer in a MuJoCo simulation of a humanoid robot, shortening training time by >50% with similar reward	
Autonomous Vehicle Control Simulation State Estimation, Control	August 2023 - December 2023
<ul style="list-style-type: none">Created and tested LQR control system, Extended Kalman Filter, SLAM, and A* path planningAchieved 20% faster track speed over PID with < 3.5 meter average distance from road medianTransferred algorithms into ROS and Gazebo framework, improving sim-to-real transfer potential	