

Nicklaus Witham

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EDUCATION

Bachelor of Science: Mechanical Engineering

AUG 2024 – DEC 2027

University of Florida | GPA: 3.95

Coursework: Controls, Adv. Robotic System Design, Dynamics, Design & Manufact. Lab, Mechanics of Materials, Fluids

EXPERIENCE

Robotic Perception & Intelligence Lab | Undergraduate Researcher

May 2026 – Present | Gainesville, FL

- Commissioned wheeled and quadruped ground robots for autonomous navigation, fusing wheel odometry, IMU, and 2D LiDAR through an EKF and running a RB particle filter SLAM to map 7 indoor and outdoor environments.
- Implemented Bug0/Bug2 path planners in C++/Python with ROS 2, validating in Gazebo and MuJoCo before sim-to-real transfer for robot data collection, and an A* planner generating trajectories for RL policy pretraining in simulation.
- Built an OpenCV person-following data pipeline recording synchronized RGB-D, odometry, and LiDAR rosbags on Jetson-based robots, generating 2 hours of skill-specific training data for a cross-embodiment navigation policy.

Non-Linear Controls & Robotics Lab | Undergraduate Researcher

Aug 2025 – Present | Gainesville, FL

- Designed and tuned MPC controller in MATLAB/Simulink for a bicopter balancing testbed, performing system identification of the plant, experimentation setup, and deployment on Arduino 33 IoT for closed loop angle tracking.
- Developed a 2 UGV robot testbed for collaborative visual-inertial SLAM with ZED stereo camera, replacing onboard computer with an ARM64 NVIDIA Jetson and configuring multi-machine ROS 2 networking between agents and the host.
- Built and commissioned 15 autonomous quadcopters, integrating LiDAR, optical flow, RTK GPS, and stereo vision across a CubePilot/PX4 flight controller and Jetson Orin Nano to support the lab's autonomous flight experiments.

Robotic Bamboo Harvester | Team Member

Sep 2025 – Present | Gainesville, FL

- Built Gazebo simulation environment for SAM2 and YOLO perception pipeline testing with custom STL models generated from real bamboo culm superquadrics parameter values to gather synthetic point clouds for ground truth benchmark.
- Designed a velocity state machine using a tangent point entry and a PID controlled orbit radius for uniform scan coverage, enabling map-less navigation for 3D reconstruction without the compute overhead of SLAM or Nav2.

Gator Motorsports | Suspension Engineer

Aug 2024 – May 2026 | Gainesville, FL

- Built a MATLAB quarter-car simulation modeling the suspension as a two-mass spring-damper system, using measured vehicle dynamics to tune damper rates and visualize transient response leading to a 12 second lap time improvement.
- Wrote a MATLAB fatigue-life script correlating ANSYS static FEA stresses with lateral acceleration from track test data to estimate cycles to failure and verify all 7 primary components exceeded the endurance requirement with a 5x margin.

PROJECTS

4 DOF Robotic Arm | Personal Project

Dec 2025 – Dec 2025 | Gainesville, FL

- Designed and built a fully functional miniature robotic arm using four MG90 servos and an ELEGOO Uno microcontroller, implementing inverse kinematics, forward kinematics and controls to map joystick inputs to coordinated joint motion.
- Constructed a 16-part robotic arm assembly in SOLIDWORKS, optimizing joint functionality, servo placement, wire routing, manufacturability for 3D printing, and fastener integration.

SKILLS

Language & Tools: Python, C++, Matlab, Simulink, Linux, Docker, Git, MS Office

Applications: ROS 2, ROS, Gazebo, MuJoCo, Isaac Sim, RViz, Nav2, MoveIt2, PX4, ArduPilot

Hardware: NVIDIA Jetson, CubePilot, Arduino, Raspberry PI, SolidWorks, CNC, 3D Printing, Manual Machining

Methods: State Estimation, Kalman Filters, Particle Filters, SLAM, motion planning, Inverse Kinematics, Sensor Fusion, MPC