Samuel Folorunsho

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EDUCATION

University of Illinois Urbana-Champaign   Champaign, IL
MSc Systems & Industrial Engineering, GPA: 3.83/4.00   Expected May 2026
Research Focus: *Control, Robotics (Navigation & Perception), Computer vision*

University of Illinois Urbana-Champaign   Champaign, IL
MSc Agricultural and Biological Engineering, GPA: 3.86/4.00   Aug 2023
Relevant Coursework: *Robust & Adaptive Control, Computer vision, Instrumentation, Autonomous Vehicle Systems, SLAM*

TECHNICAL SKILLS

Languages: Python, C/C++, MATLAB/Simulink | **Robotics**: ROS/ROS 2, Gazebo, MuJoCo, Isaac Sim, PX4 | **Cloud & DevOps**: Linux, Docker, AWS
ML/CV: PyTorch, TensorFlow/Keras, OpenCV | **Platforms**: Crazyflie, Husky/Jackal, Turtlebot 3, UR 3, GEM e2 | **Data**: Excel, MySQL

EXPERIENCE

Mitsubishi Electric Research Laboratories (MERL)   Cambridge, MA
Robotics Research Intern   May 2025 – Aug 2025
- Developed a **multi-system** coordination stack in **PX4 SITL**, **Gazebo**, and **ROS 2**, benchmarking task completion under communication and obstacle constraint for the autonomous UAV- UGV system.
- Built unknown-environment maps from **3D LiDAR** and integrated them with the task planner enabling **multi-agent** execution.
- Generated smooth, collision-aware **6-DOF** multi-agent **trajectories** via **successive convexification; validated across different scenarios in Gazebo/ ROS 2.**
- Implemented and evaluated an **end-to-end Isaac Sim perception pipeline** to support indoor/outdoor multi-agent navigation.

Autonomous and Unmanned Vehicle Systems Lab   Champaign, IL
Graduate Research Assistant   Dec 2022 – May 2025
- Designed **safe control** for extended **autonomous tethered UAVs** (TUAVs) flight under safe conditions using **nonlinear backstepping** controller and **Control Barrier Functions** (CBF). https://arxiv.org/pdf/2502.08129.
- Built a vision + LiDAR navigation stack with **sensor fusion** for off-road robots; validated on complex, unstructured terrains.
- Developed a **depth-camera** perception + CBF safety controller for a Clearpath Husky robot, enabling **safe navigation** in complex environments.
- Created **Spannotation** (open-source image annotation tool) for **autonomous navigation**, reducing annotation time by over **85%** while maintaining high segmentation accuracy. **14,500+** downloads.
- Built **BaCLNS** (Python package) to automate **backstepping controller** synthesis and simulation for linear and nonlinear; **7,100+** downloads.
- Drafted the first version of an **NSF grant proposal** valued at over **$750,000** for the **Cyber-physical systems** (CPS) Medium track.

Corteva Agriscience   Champaign, IL
Robotics and Automation Intern   May 2022 – Aug 2022
- Shipped a **vision-based navigation stack** on a mobile robot, **reducing** crash rate to ~**1 per 1000** ft of travel.
- Implemented **detection, tracking & counting** algorithms using robot-derived data, leveraging **DeepSORT** with **Kubernetes & AWS.**
- Designed and implemented **semantic segmentation** algorithms for crop traits using **mask-RCNN**, **DeepLab**, and **U-Net.**

John Deere - Allen Research Group   Champaign, IL
Robotics Research Assistant   Jan 2022 – May 2022
- Designed a **data acquisition** & storage pipeline from tractor **onboard sensors**, enabling **ML-driven autonomy** and **decision-making**.
- Built a **computer-vision/ML** classification system for **terrain/scene understanding** to support navigation and control.
- Achieved up to **94% accuracy** on different offroad terrain classifications for autonomous navigation tasks using **ResNet** and **UNet.**

PROJECTS

ROS-Enabled Dynamic Pedestrian Distance Control for Gem e2 Autonomous Vehicle   Jan 2023 – May 2023
- Fused **LiDAR + camer**a with **EKF** to track pedestrians and enforce a dynamic safety buffer; longitudinal control via **PID/MPC** integrated into the **GEM e2 nav stack**. [Video | Code].
- Injected dynamic keep-out zones into **costmaps**; **zero** buffer violations in scripted trials and **17%** fewer hard-brakes vs. baseline.

Adaptive Tractor–Trailer Trajectory Following (Model Reference Adaptive Control & L1 Control)   Jan 2022 – May 2022
- Built MRAC and L1 adaptive controllers in **MATLAB/Simulink** for off-road tractor–trailer path tracking under **uncertainty/disturbance**.
- Integrated **σ-mod / projection**, saturation handling, and low-pass filtered L1 architecture; **≤ 0.03 m RMS** lateral error and **14%** fewer path violations vs. fixed-gain baseline.

AWARDS & ACHIEVEMENTS

- List of teachers **ranked as excellent** by their students for the course **SE 420: Digital Control of Dynamic Systems** at UIUC   Fall 2024
- Second Runner - up UIUC-John Deere-Bayer AgTech Hackathon (Lead: Tri-Deere Team)   Mar 2024
- Startup funding: $25,000 (Fusen Funds), $5,000 (Georgia Tech Create-X), $250 (UIUC Cozad)   2023