Brian Goodluck Mmari

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EDUCATION

Princeton University (*Princeton, NJ*)
B.S.E: *Electrical and Computer Engineering, Concentration in Robotics and Cyber Physical Systems*   May 2025
Awards: Charlotte Mangum Student Support Program, Excellence in Engineering Funding, Undergraduate Fund for Academic Conferences.

TECHNICAL SKILLS

Equipment: Oscilloscopes, Digital multimeters, Function generators, Voltage & Current probes, Micro-controllers.
Programming & skills: Java, Python, C/C++, ROS, Embedded Systems, Linux, MATLAB, Verilog, Docker, Fusion360, SPICE, PCB.

RESEARCH EXPERIENCE

Mangdang Robotics, *(Remote)*   Oct 2024 – Present
  Software Engineering Intern
- Testing code on MiniPupper 2 before deployment; study and provide feedback on user-guide documents.
- Actively participated at the IEEE Philadelphia Section MiniPupper Workshop, 2024.

Purdue University, RISE Lab, (*West Lafayette, Indiana*)   May 2024 – July 2024
  Summer Undergraduate Research Fellow, *"Enabling Robots to Mimic Natural Behaviours: Exploration in robot control with LLMs and RL"*
- Designed and integrated an aerodynamic tail on Mini Pupper 2, analyzed robotic tail stabilization using ML.
- Developed agility metrics for quadrupeds in unpredictable environments, presented at final research symposium.

Polygone Systems, Inc, (*Princeton, New Jersey*)   Jan 2024 – May 2024
  R & D Engineering Fellow, *"Exploring portable applications for the Plastic Hunter"*
- Developed a USV's electrical system; designed and programmed a Buffer Pad system in C++.
- Helped secure $1.97M from the Marine Debris Challenge to combat microplastic pollution in the Hudson River Watershed.

Princeton University, Self-Organizing Swarms & Robotics Group, *(Princeton, NJ)*   Jan 2023 - Present
  Undergraduate Researcher, *"BlueGuppy"*
- Designed 3 fish-like flapping robots in Fusion360; improved buoyancy by 20% and performance by 15%.
- Enhanced propulsion with magnetic coils, developed C++ code for temporal asymmetric flapping; analysed underwater turning dynamics.
- Co-authored abstracts for SICB conference 2024 (Seattle) and DFD conference 2024 (Salt Lake City).

PROJECTS

Predicting forest fires along trail routes in the Table Mountains   Feb 2024 – May 2024
  Research Projects in Data Science, *Class project*
- Aggregated dataset from AllTrails, NOAA, and NASA FIRMS using geospatial clustering algorithms.
- Selected minimal false negatives as metric; chose Histogram-Based Gradient Boosting Classifier over Logistic Regression and Random Forests.

Autonomous Truck Driving & Obstacles Avoidance   Feb 2024 - May 2024
  Intelligent Robotic Systems (ECE346), *Class project*
- Developed iLQR policy and receding horizon planner with onboard perception; secured 3rd place in lap time.
- Implemented safety filter to monitor and prevent unsafe driver actions.

Car Lab   Sep 2023 - Dec 2023
  Robotic and Autonomous Systems Lab(ECE302), *Class project*
- Implemented PI control system for ramp navigation; designed power, video, motor boards, and PSOC.
- Developed wireless flex-sensor gloves for vehicle control; integrated hall-effect sensor for speed measurement.

Tanzania Weather SMS App   May 2022
  Computer Science: An Interdisciplinary Approach(COS126), *Class project*
- Developed a real-time SMS server using the Twilio library by extracting relevant rainfall CSV data.
- Improved server query code, increasing accessibility by nearly 10% with each active region's major symbol table data.

Harvard PacBot Competition, Harvard Undergraduate Robotics Club (*Cambridge, MA*)   April 2022
  Princeton Robotics Club Low-Level Systems Programmer
- Enhanced server communication reliability between the Raspberry Pi, Harvard server, and local PC using C++.
- Optimised baud rate while maintaining debugging capability, securing 5th place in the Harvard Robotics Competition.