

PAUL DUBRULLE

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EDUCATION

Georgia Institute of Technology, Atlanta, GA

August 2023 - December 2026(Expected)

Bachelor of Science in Industrial and Systems Engineering

Relevant Coursework: Machine Learning, Optimization, Foundations of Modern Data Science, Stochastic Systems, Regression & Forecasting, Simulation Analysis & Design, Stat Methods, XR for Engineering, Discrete Math, Probability & Applications

WORK EXPERIENCE

Miniature Blimps & Control Systems - Undergraduate Research Assistant

August 2024 - Present

- Implemented Actor-Critic Model Predictive Control (AC-MPC) for blimp path following and swing mitigation: the actor outputs MPC (sampling solver for nl dynamics, MPPI) cost weights online from state and path-error features; validated the training and inference loop on a pendulum proof of concept and integrating into a circle path following task in simulation.
- Designed and implemented a localization algorithm in Rust using communicating anchors and ToF (time of flight) signals by defining the system as a non-linear least squares problem and solving via Gauss-Newton method yielding precise locations within 10cm of actual location.

MoDAL - Undergraduate Research Assistant at Moore Dynamics and Analytics Lab

January 2025 - Present

- Implemented a custom bidirectional gap reconstruction LSTM baseline for high-rate accelerometer vibrational Air Force data, with missing data patterns ranging from point dropouts to contiguous gaps of length 0.5s to 45s using RMSE on masked gaps.
- Prototyping an encoder-decoder Lagrangian Neural Network (LNN) approach to inpaint long gaps over unknown system dynamics using physics-structured dynamics with residual terms for unmodeled effects as a comparison to the LSTM approach for vibrational sensor data reconstruction.
- Modeled a parameter-to-response surrogate for nonlinear beam vibration within a larger system-ID pipeline (data, simulation, GAN-based parameter search), using physics informed operator learning (DeepONet) to emulate vibrational responses across varying parameters (MCK, geometry) comparing runtime and fidelity to MATLAB simulations.

PROJECTS

Roboat GNC Lead - Marine Robotics Group (MRG), [Tracking System Overview](#)

August 2025- Present

- Lead the development of the mapping, control, and navigation systems for our USV, coordinating with perception and autonomy leads to integrate a full GNC pipeline validated through regular SITL/HITL and on-water testing.
- Developing a platform-agnostic (USV, UUV, UAV) semantic mapping system that projects camera detections into 3D rays via intrinsic calibration, associates them with lidar clusters via Joint Integrated Probability Data Association(JIPDA), and composes objects into higher-level structures (e.g., buoy pairs into gates) via geometric constraints.

Dexter - Autonomous Self-Balancing Robot, [Personal Project](#)

March 2025 - Present

- Self-designed inverted-pendulum-based balancing robot using SOLIDWORKS, KiCad, C++, and Python, implementing a PD controller for waypoint navigation (velocity & heading), LQR for balancing, and a second PD for differential drive to account for heading.
- Engineered a complete electrical system (ESP32, IMU6050, Arduino CNC shield, drv8825 motor drivers, stepper motors, buck converter), upgraded it to a custom carrier board to simplify cluttered wiring, and currently exploring Jetson work and reinforcement learning balancing behavior.

AWARDS

Best Hardware Hack - HackPrinceton | [Interactive DAW](#)

November 2025

- Developed an interactive music production system by utilizing an ultrasonic sensor for pitch control, a webcam for instrument state selection, and a Raspberry Pi for distributed computation.

SKILLS

Tech Stack: Python (PyTorch, Sklearn, OpenCV, Pandas, Numpy, Scipy, Matplotlib, ML & DS focus), C++, Rust, ROS2, ArduPilot, Docker, Git CI/CD, Linux/Ubuntu, SOLIDWORKS, Altium, FEA, Edge (Jetson, ESP32)

Languages: Fluent: French, English, Spanish