CATHERINE MAGLIONE

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EDUCATION

Northwestern University, McCormick School of Engineering
MS Robotics | expected 12.2025

Columbia University, Fu Foundation School of Engineering and Applied Science
BS Operations Research | 5.2022

SKILLS

Robotics Systems: ROS/ROS2 · MoveIt · Gazebo · RViz · CoppeliaSim
Software Engineering: Python · C++ · C · SQL · Linux · Git · Docker · CMake · Unit Testing · Jekyll
Computer Vision & ML: OpenCV · YOLOv8 · MediaPipe · PyTorch · scikit-learn · Differentiable Graphics (DiffVG)
Control Systems: PID Feedback Control · Forward/Inverse Kinematics · Multi-Loop Trajectory Control · Simulation & Optimization
Embedded & Hardware Interfaces: PIC32, ISR scheduling · UART/I2C Communication · Microcontrollers (PIC32, Arduino) Raspberry Pi
Data & Analytics: SQL Pipelines (EHR) · Data Cleansing/Integration · Analytics Dashboards (Tableau, SQL) · GIS & Spatial Analytics
Fabrication & Prototyping: Laser Cutting · 3D Printing (including clay extrusion) · Onshape (CAD) · PCB-level Motor Controller Integration
Leadership & Mentorship: Mentor (Robogals K–12 Robotics) · Program Lead (Columbia Eye to Eye) · Trained & Managed 30-Person Team

PROJECTS

Multi Robot Swarm System | Fall 2025
- Developed a computational choreography framework for a swarm of 50 robots, integrating human pose classification.
- Applied computer vision–based classification of dancer movements to generate real-time, coordinated multi-agent swarm responses.
- Used ORCA-based multi-agent collision avoidance to ensure safe, emergent group behavior in swarm deployments.

Turtlebot Interaction System| Winter 2025
- Built a ROS2-based perception and control pipeline in Python/C++ for TurtleBot, integrating navigation with interactive CV inputs.
- Applied real-time computer vision (YOLOv8, OpenCV) to detect and classify light-traced movement patterns with high accuracy.
- Generated deterministic robot behaviors by integrating perception with ROS2 control loops for human–robot response.

Real Time Motor Controller | Winter 2025
- Designed a PIC32-based motor controller implementing timer-driven interrupts and multi-loop PID for current and position control.
- Integrated UART/I2C protocols with sensors and drivers, enabling precise embedded communication for deterministic motor response.
- Built a Python interface for real-time command parsing, trajectory streaming, and dynamic gain tuning via serial communication.

7-DOF Robot Arm for Autonomous Pool Game | Fall 2024
- Collaborated on a ROS2 package for a Franka 7-DOF arm, integrating calibration, motion planning, and contact force control .
- Developed CV pipelines using Intel RealSense and OpenCV to detect, classify, and track billiard balls.
- Generated precise trajectories for strategic shot planning, enabling autonomous gameplay with repeatable, high-accuracy execution.

Mobile Manipulation Pick and Place with KUKA youBot | Fall 2024
- Simulated a 5-DOF mobile manipulator in CoppeliaSim, applying modern screw theory and odometry for trajectory generation.
- Implemented a feedforward + PI controller with physics-based simulation to minimize error between commanded and actual motion.

EXPERIENCE

Refik Anadol Studios
Robotics Intern | Los Angeles, CA | 6.25 - 9.25
- Engineered a robotic painting system in Python in 10 weeks, building an exhibit-ready installation pipeline for DATALAND museum.
- Developed KUKA control software with safety constraints, ensuring reliable brush handling and deterministic tool-switch execution.
- Designed optimization-driven image-to-stroke rendering methods, transforming digital inputs into executable robotic paint motions.
- Implemented automated color-matching algorithms for paint dispensing, enabling accurate reproduction of target colors in hardware.

Planned Parenthood of Illinois
Business Operations and Data Intelligence Analyst | Chicago, IL | 9.22- 5.24
- Engineered SQL pipelines and dashboards to maintain integrity of patient records during a system-wide EHR migration, ensuring continuity of care during a 47% surge in patient volume post-Dobbs.
- Conducted large-scale data cleansing and deduplication, achieving interoperability across two electronic health record systems.
- Built real-time analytics tools (Tableau, SQL) to inform staffing models and resource allocation across statewide health centers.

ThredUP
Industrial Engineer Summer Intern | Atlanta, GA | 6.21 - 9.21 & 6.22- 8.22
- Reduced inventory reprocessing rates by 8% through optimization of inbound checkpoint times across automated system.
- Directed launch of thredEX, consolidating multi-DC shipments into single orders, reducing CO_2 emissions and fulfillment overhead.
- Redefined warehouse layouts and trained 30-person teams to accelerate pick–pack–load cycles, surpassing throughput expectations.
- Advanced circular logistics by scaling thredEX across facilities, driving measurable sustainability and spatial optimization gains.