Milad Noah Mesbahi

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Education

- **University of Pennsylvania** — Philadelphia, Pennsylvania
  M.S. Robotics — *August 2024 - May 2026*
  Courses: *ML, Perception, Robotics (Intro/Advanced), Bayesian & Convex Optimization, Physical Intelligence, Underactuated Robotics*

- **University of California, Los Angeles** — Los Angeles, California
  B.S. Mechanical Engineering — *September 2020 - June 2024*

Experience

- **Blue Origin** — Seattle, WA
  Guidance, Navigation, and Control (GNC) Intern — *May 2025 - August 2025*
  - **Work**: Developed Blue Origin's first high-fidelity EMA Simulink model for an upper-stage engine, including FOC current control, cascaded loop structure, and valve actuation, with a physics-based electrical–mechanical plant model.
  - **Impact**: Delivered an auto-code-generating model well-documented and ready for hardware-in-the-loop testing.

- **UPenn - George Pappas GRASP Lab** — Philadelphia, PA
  Graduate Researcher & Teaching Assistant — *November 2024 – Present*
  - **Research**: Developing a multi-agent RL system for long-term AUV plume mapping using DQN and Gaussian Process estimation for real-time salinity prediction.
  - **Impact**: Achieved improved single- and multi-agent performance and endurance over baselines in Delft3D simulations; ICRA 2026 submission under review. Extending system to 3D mapping and hardware deployment.
  - **Teaching**: TA for *Linear Systems Theory* (Fall 2025); responsible for recitations, homework design, and student support. Will serve as lead TA for *Convex Optimization* under Professor Nikolai Matni in Spring 2026.

- **NASA Jet Propulsion Laboratory** — Pasadena, CA
  Mechanical Engineering Intern — *June 2023 – September 2023*
  - **Work**: Evaluated and modeled Caltech chainmail solids as a damping maechnaism for aerospace shock/vibration mitigation through multi-axis testing, modal analysis (MATLAB), and FEM modeling.
  - **Impact**: Found the material reduced vibrations by 98% compared to baselines and presented results to the JPL Dynamics team for future use in spacecraft structures.

- **UCLA - Sungtaek Ju Thermosciences Laboratory** — Los Angeles, CA
  Undergraduate Researcher — *Jan 2023 – Jun 2024*
  - **Research**: Investigated how string tension and material properties affect liquid desiccant flow in string-based mass exchangers, designing experiments and analyzing capillary-driven film formation and droplet behavior.
  - **Impact**: Fabricated and modified the measurement setup, automated droplet tracking with MATLAB image processing, identified tension as a key factor in transport efficiency, and created tutorial videos for future researchers.

Technical Skills

- **Programming & ML**: Python, C++, MATLAB, Bash, JavaScript/HTML/CSS, ML (kernels, GPs, deep learning, SVMs), RL (PPO, MAPPO, Q-learning)
- **Robotics & Tooling**: PyTorch, OpenCV, CVXPY, ROS, Drake, COLMAP, Isaac Sim, Gazebo, MuJoCo, Simulink
- **Systems & Hardware**: Linux (Ubuntu), Docker/VM, Git, AWS, SolidWorks, NX, FEM/FEA, Arduino, Raspberry Pi, 3D printing, custom PC workstation

Projects

- **Reinforcement Learning Drone Racing**: Built a full RL pipeline for quadrotor gate racing using a custom PPO implementation in Isaac Sim, with reward shaping, gate-relative observations, and domain randomization. Achieved fast (5.72s lap time), stable multi-lap performance with hardware deployment.
- **Autonomous VIO Quadrotor**: Built an autonomous quadrotor controller for GPS-denied flight using voxel-based A* planning, flat-output trajectory generation, a geometric SE(3) controller, and visual–inertial state estimation via an error-state Kalman filter. Achieved accurate EuRoC 6-DOF tracking with real-time replanning for obstacle avoidance.
- **Autonomous Rover (Senior Capstone)**: Mechanical lead and co-lead programmer for a rover performing line following, obstacle avoidance, and camera-based die recognition. Built a mecanum drive, stepper manipulator, IR/ultrasonic perception, and a dual-Arduino FSM controller.
- **Autonomous Pick-and-Place System**: Implemented a vision-guided pick-and-place pipeline for a 7-DoF arm with AprilTag pose estimation, IK, orientation correction, and a pick–drop FSM. Achieved reliable block stacking in simulation with a robust sweeping strategy for dynamic blocks.
- **Me and You Always — UCLA Social Network**: Co-founded and led product design and growth for a campus-wide social app; built core features via self-taught web development and UI/UX design, and grew the platform to 4,000+ UCLA students.

Publications

- **Long-Term Mapping of the Douro River Plume with Multi-Agent Reinforcement Learning**: ICRA 2026 (under review). Multi-agent RL + GP-based mapping for long-term AUV plume monitoring (September 2025)