

Roy Xing

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EDUCATION

New York University

Ph.D. Electrical Engineering | GPA: 4.0

New York, NY

Sept. 2024 – Present

Boston University

B.S. Electrical Engineering | GPA: 3.80 | Magna Cum Laude

Boston, MA

Sept. 2021 – Jan. 2024

RESEARCH AND INDUSTRY EXPERIENCE

NYU Robotics Lab

Research Assistant

New York, NY

Sept. 2024 – Present

- Developing centroidal model predictive control (MPC) for the Unitree G1 humanoid robot in MuJoCo for loco-manipulation tasks.
- Created Sequential Quadratic Programming (SQP) solver from scratch for MPC.

BU Robotics Lab

Research Assistant | PI: Dr. John Baillieul, Dr. Roberto Tron

Boston, MA

Sept. 2021 – Aug. 2024

- Designed linear quadratic regulator (LQR) control strategies integrated with RL for a cart-pole system.
- Built whole-body MPC for a mobile manipulator platform using robot operating system (ROS).
- Contributed to optical flow-based navigation on autonomous mobile robots (AMRs) and conducted real-world experiments.
- Implemented sample-based path planning with bearing-only measurements.

MassRobotics

Robotics Assistant Lab Manager and Developer

Boston, MA

Oct. 2019 – Aug. 2021

- Developed pick-and-place demos for the Toyota HSR (Human Support Robot) and various collaborative robots.
- Designed custom grippers and supported startups in hardware/software integration and HRI (human-robot-interaction) experiments.

Thinking Robots Inc.

Robotics Intern

Boston, MA

Jan. 2021 – Aug. 2021

- CAD design and electronics prototyping for UV-sanitizing AMR system; implemented tethered cascaded PID control.
- CAD design for extending Temi robot platform with modular hardware for social robotics.

Dynamic Robotics Lab

Research Assistant | PI: Dr. Jonathan Hurst

Corvallis, OR

Sept. 2018 – Aug. 2019

- Wrote MATLAB simulations for foot impact dynamics that minimize transient forces during heel strike.
- Conducted real-world experiments on reinforcement learning (RL) control policies deployed on the bipedal Cassie robot.
- Helped implement MPC in MATLAB meant for control of a linear inverted pendulum reduced order model for walking.

Booz Allen Hamilton (Air Force Division)

Systems Operations Intern

Boston, MA

June 2018 – Sept. 2018

- Built scheduling system for consulting operations in Python.

Aptima Inc. — Human-Centered Engineering

Computer Vision and Robotics Intern

Woburn, MA

June 2016 – Sept. 2016

- Developed OpenCV-based object detection for aerial footage and brain-control interface based robotic control systems in C++.

TECHNICAL SKILLS

Programming: C++, Python, MATLAB, LaTeX, Verilog, ROS 1 and 2, Git, PyTorch, OpenCV, Linux

Control Theory and Robotics: MPC, SQP, (Differential) Dynamic Programming, Reinforcement Learning, Trajectory Optimization, Machine Learning, SLAM, Legged Locomotion Control, Manipulation Control

Simulation: MuJoCo, PyBullet, Drake, Gazebo

Hardware: EagleCAD, SolidWorks, OnShape, 3D Printing, Microcontrollers, Oscilloscopes

SELECTED PROJECTS

ODRI Bipedal Robot

2023 – 2024

Personal Project

- Recreated the ODRI open-source biped including 3D-printed chassis, BLDC actuators, and MuJoCo simulation.

Wheeled Biped

2022

Personal Project

- Built a hybrid leg-wheeled robot with Teensy microcontroller and Raspberry Pi control stack.
- Implemented cascaded PID and LQR for leg and balance control.

Furuta Pendulum

2021

Personal Project

- Designed and 3D-printed a Furuta pendulum; implemented LQR controller using Moteus motor controllers.

PUBLICATIONS AND HONORS

Preprint: M. Bahreinian, M. Mitjans, R. Xing, and R. Tron. "Sample-Based Output-Feedback Navigation Bearing Measurements." (2022)

Paper acknowledgments, "Visual Navigation Using Sparse Optical Flow and Time-to-Transit" (2021)

Journal simulation and figures acknowledgments, "Mitigating Peak Impact Forces by Customizing the Passive Foot Dynamics of Legged Robots" (2020)

Paper simulation and figures acknowledgments, "Eliminating Peak Impact Forces by Customizing the Passive Foot Dynamics of Legged Robots" (2019)

NYU School of Engineering PhD Fellowship (2024)

Boston University Dean's List (2021-2024)

Oregon State University Dean's List (2018-2019)

Oregon State University Presidential Scholarship (2018)

AFCEA (Armed Forces Communications and Electronics Association) Fellowship Award (2018)

Letter of Commendation by Commonwealth of MA Speaker of the House for Achievement in STEM

Official Citation by MA State Senate for STEM excellence for winning the RWDC State Championship and National Challenge Merit Award