Roy Xing

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EDUCATION

New York University — New York, NY
Ph.D. Electrical Engineering | GPA: 4.0 — *Sept. 2024 – Present*

Boston University — Boston, MA
B.S. Electrical Engineering | GPA: 3.80 | Magna Cum Laude — *Sept. 2021 – Jan. 2024*

RESEARCH AND INDUSTRY EXPERIENCE

NYU Robotics Lab — New York, NY
Research Assistant — *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 — Boston, MA
Research Assistant | PI: Dr. John Baillieul, Dr. Roberto Tron — *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 — Boston, MA
Robotics Assistant Lab Manager and Developer — *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.
- Managed the robotics lab's various equipment from industrial robot arms, 3D printers, and numerous 3D sensors.

Thinking Robots Inc. — Boston, MA
Robotics Intern — *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 — Corvallis, OR
Research Assistant | PI: Dr. Jonathan Hurst — *Sept. 2018 – Aug. 2019*
- Wrote MATLAB simulations for foot impact dynamics that minimize transient forces during heel strike.
- Conducted 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) — Boston, MA
Systems Operations Intern — *June 2018 – Sept. 2018*
- Built scheduling system for consulting operations in Python.

Aptima Inc. — Human-Centered Engineering — Woburn, MA
Computer Vision and Robotics Intern — *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, PyTorch, OpenCV, Git, 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

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