Theo McArn

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EDUCATION

Northeastern University, *Master of Science in Robotics, Electrical and Computer Engineering*   **Boston, MA | May 2027**
Relevant Courses: Reinforcement Learning, Legged Robotics, Mobile Robotics, Assistive Robotics

Brown University, *Bachelor of Science in Computer Science, Machine Learning and Design*   **Providence, RI | May 2024**
Relevant Courses: Introduction to Robotics, Deep Learning, Machine Learning, Computer Vision, Computational Cognitive Science

TECHNICAL SKILLS

Programming Languages: Python, C/C++, MATLAB, Java, HTML, CSS, Javascript, React, SQL
Software Skills: IsaacSim/IsaacLab, MuJoCo, Tensorflow/PyTorch, GTSAM, ROS, Arduino/RaspberryPi, Linux, Git
Design Skills: CAD, 3D Printing, Laser Cutting, CNC Machining, PCB Design, Soldering, Adobe Creative Cloud

INDUSTRY & RESEARCH

Silicon Synapse Lab, Northeastern University, *Research Assistant*   **Boston, MA | September 2025 - Present**
- Developing a whole-body controller for a bipedal robot using IsaacSim and IsaacLab to achieve dynamic locomotion and object manipulation based on MPC-guided Reinforcement Learning methods
- Implementing Model Predictive Control (MPC) based on Single Rigid Body Dynamics and Linearized Inverted Pendulum models to derive ideal contact forces and positions for each foot

Engineering for Change, *Machine Learning Engineer Fellow*   **San Francisco, CA | May 2025 - September 2025**
- Designed and trained a model for automated deforestation segmentation using a U-Net architecture implemented in PyTorch
- Assembled a custom dataset for training by collecting, and geospatially aligning, +4TB of satellite imagery from Sentinel 2
- Utilized AWS for data storage and high-performance compute capabilities to store data and train the model
- Collaborated with partner organization, Organized Matter, to integrate this machine learning solution into their pre-existing geospatial analysis application.

BRown Interaction Capture Systems (BRICS), *Design Engineer*   **Providence, RI | June 2022 - Present**
- Led the hardware team in designing video capture systems that enable 3D, spatial-temporal analysis of human-object interaction
- Designed and iterated systems using CAD with the goal of using cheap, off the shelf components in addition to 3D printing
- Reduced manufacturing and assembly cost by three orders of magnitude compared to existing, commercially available products

DroneDeploy, *Backend Software Engineering Intern*   **Providence, RI | July 2023 - September 2023**
- Carried out a project to allow customers to access their private organizational data through new API calls and SQL queries
- Utilized the AGILE development method and GitHub version control to collaborate with other members on this project
- Integrated additions into the preexisting code base and ensured functionality with continuous integration and unit testing
- Assisted in drafting the Responsible Technology Guidelines for DroneDeploy as member of the Social Impact Team

PROGRAMMING EXPERIENCE

Visual SLAM, *Mobile Robotics*   **Boston, MA | November 2025**
- Implemented an algorithm for Visual-based Simultaneous Localization and Mapping (VSLAM) by building a pose graph with GTSAM and performing Pose Graph Optimization to determine the world poses of the camera and April Tags in the scene

Balancing Robot Simulation, *Personal Project*   **Providence, RI | April 2025**
- Designed cascading PID controller for planar balancing robot using a custom-built physics-based simulation environment
- Achieved simultaneous orientation and position control through two-level control architecture
- Implemented PID controller on hardware using a balancing robot that was custom designed, 3D printed and assembled

Reinforcement Learning for Optimized Drone Flight, *Machine Learning Capstone*   **Providence, RI | May 2024**
- Designed a flight controller using Reinforcement Learning (RL) to control a reduced order drone with only 2 rotors and 3 DOFs
- Implemented a custom environment using rigid body physics and optimized flight utilizing Reinforcement Learning techniques

Autonomous Drone with Localization, *Introduction to Robotics*   **Providence, RI | September 2023**
- Developed ROS-based flight controller integrating optical flow, ToF, and IMU sensor data for autonomous control
- Implemented an Unscented Kalman Filter (UKF) to fuse information from Optical Flow and IMU for reliable state estimation
- Enabled simultaneous localization and mapping (SLAM) by implementing the FAST-SLAM algorithm using a Particle Filter

Image Generator utilizing Stable Diffusion, *Deep Learning*   **Dunedin, NZ | April 2023**
- Implemented a version of the Stable Diffusion model architecture to generate novel 32x32 grayscale images
- Trained the network over 30 epochs to optimize the model and produce images similar to that in the dataset