Maxwell Thomas Asselmeier

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Education

Georgia Institute of Technology December 2026
Ph.D. in Robotics *GPA: 3.83/4.00*
Thesis Topic: Perception-driven Semantic Autonomy for Legged Systems

University of Illinois at Urbana-Champaign May 2021
B.S. in Mechanical Engineering *GPA: 3.97/4.00*
Minor in Computer Science

Research Experience

Georgia Tech Institute for Robotics and Intelligent Machines Atlanta, GA
Graduate Research Assistant - LIDAR Lab, IVALab *August 2021 - Present*
Advisors: Ye Zhao, Patricio Vela

- Track local free space from a laser scan through an egocentric perception paradigm to plan collision-free trajectories using MPC onboard a Turtlebot and Unitree A1 quadruped through C++ and ROS
- Adapt primitive shapes-based synthetic data generation policies to simulation engines including CoppeliaSim and IsaacSim to train a semantic segmentation model in PyTorch to identify semantic behaviors for legged locomotion
- Leverage an offline trajectory library to solve an interleaved graph search and nonlinear trajectory optimization-based footstep planner using A* and sequential quadratic programming onboard a Unitree Go2 quadruped

Carnegie Mellon University Robotics Institute Summer Scholars Program Pittsburgh, PA
Undergraduate Researcher - Biorobotics Lab *May 2020 - May 2021*
Mentor: Howie Choset

- Refined a modular robotic arm design by training a Deep-Q neural network in the PyBullet physics engine to select and parameterize added modules
- Optimized design variables for modular robot arms including length and weight through the soft actor-critic reinforcement learning algorithm

Oregon State University Robots in the Real World Program Corvallis, OR
Undergraduate Researcher - mLab *June 2019 - November 2019*
Mentor: Ross L. Hatton

- Prototyped circumferential pneumatic artificial muscles to investigate the integration of antagonistic actuator systems into soft robotics arms
- Characterized the custom manufactured antagonistic actuators through experimental evaluation of the soft arm's strength, extension, and curvature

University of Illinois at Urbana-Champaign Champaign, IL
Undergraduate Researcher - The Robotics, Automation, and Dance Lab *May 2018 - January 2020*
Mentor: Amy LaViers

- Designed user studies for comprehending mechanisms and perceptions of two separate, multidisciplinary methods of mapping task-level and joint-level commands to a robot
- Designed complex articulated robotic systems in Unity3D to validate task-level and joint-level robot controllers

Work Experience

Institute for Human and Machine Cognition Pensacola, FL
Software Engineering Intern *June 2021 - September 2021*
Mentor: Robert Griffin

- Benchmarked semantic segmentation models for indoor object detection using PyTorch and finetuned pre-trained models using manually labeled door datasets
- Deployed finetuned segmentation models on a custom perception engine onboard the Boston Dynamics Atlas humanoid for task-conditioned object classification including door opening and stair climbing

Teaching Experience

Engineering Ambassadors (ENG 198) Champaign, IL

President *August 2019 - May 2020*

- Instructed weekly class meetings with 35 general members to practice technical communication skills through presentations and discussions
- Led executive board and advisor meetings with eight executive board members and four faculty advisors to establish and organize objectives and events for the semester
- Conducted STEM-focused presentations and hands-on activities to classes of 10 to 50 K-12 students to foster interest in engineering

Grainger Engineering First-Year Experience (ENG 100) Champaign, IL

Engineering Learning Assistant *August 2018 - December 2020*

- Instructed a sixteen-week engineering orientation class twice per week to incoming freshmen to guide in the acclimation to college as well as engineering
- Participated in an eight-week training course to prepare for facilitating classes

Projects

Senior Capstone: Wheelchair Obstacle Detection January 2021 - May 2021

- Integrated an obstacle detection module using RGB and depth image streams based on the YOLO object detection neural network onboard a microcontroller
- Alerted wheelchair users of incoming obstacles on their personal electronic devices through a haptic feedback notification sent with a messaging API

Publications

Conference Proceedings

7. **Max Asselmeier**, Dhruv Ahuja, Abdel Zaro, Ahmad Abuaish, Ye Zhao, and Patricio A. Vela. Dynamic Gap: Safe Gap-based Navigation in Dynamic Environments. *IEEE International Conference on Robotics and Automation (ICRA)*. 2025.

6. **Max Asselmeier**, Jane Ivanova, Ziyi Zhou, Patricio A. Vela, and Ye Zhao. Hierarchical Experience-informed Navigation for Multi-modal Quadrupedal Rebar Grid Traversal. *IEEE International Conference on Robotics and Automation (ICRA)*. 2024.

5. Shiyu Feng, Ziyi Zhou, Justin S. Smith, **Max Asselmeier**, Ye Zhao, and Patricio A. Vela. GPF-BG: A Hierarchical Vision-Based Planning Framework for Safe Quadrupedal Navigation. *IEEE International Conference on Robotics and Automation (ICRA)*. 2023.

4. Bhavyansh Mishra, Duncan Calvert, Brendon Ortolano, **Max Asselmeier**, Luke Fina, Stephen McCrory, Hakki Erhan Sevil, Robert Griffin. Perception Engine Using a Multi-Sensor Head to Enable High-level Humanoid Robot Behaviors. *IEEE International Conference on Robotics and Automation (ICRA)*. 2022.

3. Alison Bushman, **Max Asselmeier**, Justin Won, and Amy LaViers. Toward Human-like Teleoperated Robot Motion: Performance and Perception of a Choreography-inspired Method in Static and Dynamic Tasks for Rapid Pose Selection of Articulated Robots. *IEEE International Conference on Robotics and Automation (ICRA)*. 2020.

2. **Max Asselmeier**, Ross L. Hatton, Yiğit Mengüç, and Gina Olson. Evaluation of a Circumferential Extending Antagonist Actuator in a Soft Arm. *IEEE International Conference on Soft Robots (RoboSoft)*. 2020.

1. Yichen Zhou, **Max Asselmeier**, and Amy LaViers. Toward Expressive Multi-Platform Teleoperation: Laban-Inspired Concurrent Operation of Multiple Joints on the Rethink Robotics Baxter Robot in Static and Dynamic Tasks. *ACM International Conference on Movement and Computing (MOCO)*. 2019.

Workshop Proceedings

3. **Max Asselmeier**, Ye Zhao, and Patricio A. Vela. Steppability-informed Quadrupedal Contact Planning through Deep Visual Search Heuristics. *Workshop on Resilient Off-road Autonomy at the IEEE International Conference on Robotics and Automation (ICRA)*. 2024.

2. **Max Asselmeier**, Eohan George, Patricio A. Vela, and Ye Zhao. Hierarchical Multi-modal Navigation for Experience-informed Quadrupedal Rebar Grid Traversal. *Workshop on Integrated Perception, Planning, and Control for Physically and Contextually-Aware Robot Autonomy at the IEEE International Conference on Intelligent Robots and Systems (IROS)*. 2023.

1. Ziyi Zhou, Nathan Boyd, Vishwa Ramkumar, **Max Asselmeier**, and Ye Zhao. Agile Locomotion and Backflip Demonstrations on Mini Cheetah. *IEEE American Control Conference (ACC)*. 2022.

Awards

National Science Foundation Gradudate Research Fellowship Fall 2023 - Present

- Five-year fellowship that provides three years of full financial support
- Awarded to 2,555 out of 12,664 applicants (20.2% acceptance rate)
- Awarded for the research proposal *Towards a Formally-Guaranteed Framework for Perception-Informed Legged Navigation*

Herbert P. Haley Fellowship Fall 2022 - Spring 2023

- Merit-based award for Georgia Tech graduate students

President's Fellowship Fall 2021 - Present

- Merit-based topper fellowship awarded to the top 10% of the incoming doctoral class

Technical Skills

Languages: C, C#, C++, HTML/CSS, Java, JavaScript, Python, R
Frameworks: Gazebo, IsaacSim, MuJoCo, PyBullet, ROS, ROS2
Tools: BitBucket, Docker, Eclipse, Git, GitLab, Google Cloud platform, Google Colab, Gradle, IntelliJ, Jupyter Notebook, Linux, MATLAB, PyCharm, Visual Studio, VS Code
Libraries: CasADi, OCS2, OMPL, OpenCV, OSQP, Pinocchio, PyTorch, scikit-learn, TensorFlow
Hardware: Arduino Uno, Intel NUC, Intel RealSense D435, Intel Realsense T265, NVIDIA Jetson, Ouster OS0, Raspberry Pi
Skills: Computer Vision, Convex Optimization, Deep Learning, Graph Search, Model Predictive Control, Motion Planning, Nonconvex Optimization, Reinforcement Learning, Trajectory Optimization