Matthew Westbrook

3 Rock Street Apt. 1, Newmarket, NH 03857
+1 (603)860-7601
mgw10@wildcats.unh.edu

MASTER'S RESEARCH

Mobile Robot Control and Planning

My research is examining several areas of robotic control and path planning for systems with dynamics. Navigation advancements include a novel kinodynamic, any-time motion planner which is probabilistically complete and asymptotically optimal. The algorithm is proven to hold these properties and experiments show excellent performance compared to other state of the art motion planning algorithms. Control advancements include applying a shared control scheme to non-holonomic robots and quad-rotors to ensure obstacle avoidance while accounting for saturation and disturbance. The control methods are proven stable using Lyapunov analysis and experiments. I was motivated to conduct this research by my passion for robotics along with the real life demand for safe and efficient mobile robots.

EDUCATION

CURRENT **Master of Science (GPA 3.77)**
Mechanical Engineering: Control Systems
University of New Hampshire

2014-2018 **Bachelor of Science (GPA 3.23)**
Mechanical Engineering
University of New Hampshire

COMPUTER SKILLS

EXPERT Python, C/C++, Matlab
Visual Basic, SQL, ROS
LabView, SolidWorks, LaTeX
Windows, Linux

INTERMEDIATE Java, Javascript
TensorFlow, Scikit-learn
Computer Hardware

CLASSWORK

COMPUTER SCIENCE Artificial Intellgience
Machine Learning
Robot Planning
Algorithms
Data Structures
Proofs

MECHANICAL Computer Aided Design
Thermo/Fluid Dynamics
Machine Design
System Modelling and Estimation
Nonlinear Control
Robust and Optimal Control

WORK EXPERIENCE

CURRENT, FROM MAY 2018 (FT)
Beswick Engineering
Production Engineer

The company develops, manufactures and sells high end miniature fluid power products. My main focus is automation of all work processes (inspection, shipping, credit card processing, etc.). As part of a small group of engineers, I also do product design and web developement.

JUNE 2012 – JUNE 2018 (PT)
NH Army National Guard
Health Care Specialist (Medic)

EMT certified medic for mountain infantry company. Experience working under stress and strict time constraints. Developed leadership skills while head medic for two of the six years.

MAY 2017 – AUGUST 2017 (FT)
General Electric: Aviation
Engineering Intern

This position involved working with a team of engineeers to automate manufacturing processes. The internship program also focused on learning the business operation and management aspects of the company.

MAY 2016 – AUGUST 2016 (FT)
Contract Support Grroup
Engineering Intern

Improve workflow efficiency and design manufacturing fixtures. Experience with work process documentation and ISO compliance standards.

PROJECTS & GROUPS

Region Informed Optimal Trees

Novel kinodynamic motion planning algorithm which uses an abstraction of the state space of the robot to guide the full dimensional planning. This planner finds solutions quickly and converges to optimal even for complex robots and difficult environments.

UNH Lunacats: Graduate Advisor, Former Mechanical Lead

Team which designs and builds a robot to compete in the NASA Robotic Mining Competition. Involves visual processing and tracking, autonomous navigation, wireless communcations, and electro-mechanical design.