MATTHEW WESTBROOK

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EDUCATION

Master of Science | *Mechanical Engineering - Control Systems* **(GPA 3.83/4)**   August 2018 – September 2020
University of New Hampshire   Durham, New Hampshire

Bachelor of Science | *Mechanical Engineering* **(GPA 3.23/4)**   August 2014 – May 2018
University of New Hampshire   Durham, New Hampshire

Computer Science Coursework:

Algorithms, Mobile Robotics, Planning for Robots, Artificial Intelligence, Scientific Programming,
Engineering Computing

Control Systems Coursework:

Digital Signal Processing, Non-linear Controls, Robust and Optimal Controls, Advanced Control Systems I/II,
Experimental Systems/Analysis, Control Systems and Modelling, Electro-mechanical Systems

PUBLICATIONS

Anytime Kinodynamic Motion Planning using Region-Guided Search   October 2020
Matthew Westbrook and Wheeler Ruml
Proceedings of the IEEE/RSJ Conference on Intelligent Robots and Systems (IROS)

Shared Control for Mobile Robot Obstacle Avoidance   September 2020
Matthew Westbrook
ProQuest

WORK EXPERIENCE

Production Engineer (Full Time)   May 2018 – Present
Beswick Engineering   Greenland, NH

- Model pressure regulator dynamics and and develop test stands and data analysis for design and validation.
- Developed ERP software for sales, applications, and purchasing groups with automation using APIs and hardware.
- Leveraged knowledge: C++, Python, SQL, LabView

Healthcare Specialist (Part Time)   June 2012 – June 2018
Army National Guard   Milford, NH

- Trained and provided medical care for mountain infantry unit.
- Led a medical team of six people for two of the six years.

Engineering Intern (Full Time)   May 2017 – August 2017
GE Aviation   Hooksett, NH

- Assisted engineers in developing manufacturing automation software.
- Intern program involved learning business and operations aspects of the company.

PROJECTS AND RESEARCH

UNH Lunacats - Engineering Team Lead/Graduate Student Advisor   September 2017 – May 2020

University of New Hampshire

- Built robot to compete in the NASA Robotic Mining Competition (RMC)
- Developed algorithms for computer vision localization, LiDAR mapping, motion planning, and control systems.
- <u>Leveraged knowledge</u>: C++, Python, Electro-mechanical Design, Computer Vision, Filtering, SLAM, Motion Planning

Artificial Intelligence Group   September 2018 – September 2020

University of New Hampshire

- Read and contributed to state-of-the-art artificial intelligence algorithms.
- <u>Leveraged knowledge</u>: C++, Python, Matlab, Artificial Intelligence, Machine Learning, Motion Planning

Mechatronics Lab Research   September 2018 – September 2020

University of New Hampshire

- Developed swarm navigation algorithms.
- Implemented autonomous control on UAVs and UGVs.
- <u>Leveraged knowledge</u>: Matlab, Multi-agent Control, Obstacle Avoidance, Real-time Planning

Artificial Intelligence Final Project   February 2019 – May 2019

University of New Hampshire

- Combine BIT^* with RRT_x for pseudo-real-time motion planning algorithm with improved time to reach goal.

- <u>Leveraged knowledge</u>: C++, Heuristics, Sampling Based Planning

Mobile Robots Final Project   September 2019 – December 2019

University of New Hampshire

- Used computer vision to implement SLAM on Turtlebot.
- <u>Leveraged knowledge</u>: ROS, Python, Computer Vision, SLAM, Probabilistic Filtering

Personal Website   June 2020 – Present

www.mattwestbrook.com

- Programmed personal website to show research and experience.
- <u>Leveraged knowledge</u>: HTML, CSS, Javascript, React, Git

Coding Competitions/Challenges   May 2020 – Present

HackerRank and TopCoder

- Winner of Topcoder NASA Lunar Image Co-Registration Code Challenge
- TopCoder competitive SRM rating: 1202 for account: mgw10
- Competitions and challenges completed on LeetCode: mwestbrook300

SKILLS

Programming: C/C++, Python, MATLAB/Simulink, SQL
Computer Science: Algorithms, Data Structures, Motion Planning, Heuristic Search, Scheduling, Real-Time Planning, Sampling-Based Planning, Kinodynamic Plannning, Optimization, Artificial Intelligence, Machine Learning
Simulation/Rendering: SolidWorks, Blender, Unreal Engine 4
Web: HTML, CSS, Node, React, Django, Git, TCP/IP, APIs, XML
Robotics: ROS, Gazebo, Arduino, Micro-Controllers, Raspberry Pi, Computer Vision, Filtering
Document Creation: Microsoft Office Suite, LaTex, Markdown