Brandon Simpson

brandonglynnsimpson@gmail.com (802) 522-5565 brandonsimpson.me

Professional Experience

DEKA Research and Development **Manchester, NH**
Robotics Engineer May 2023 – Present

- Designed, programmed, and built complex electromechanical systems with iterative **hardware testing, debugging, and performance optimization**.
- Developed and integrated **real-time control systems**, including **motor control, sensor interfacing, and safety systems** for medical and automated manufacturing devices.
- Provided technical leadership for cross-functional software, electrical, and mechanical teams, leading aggressive timelines for design and implementation of reliable manufacturing equipment.
- Engineered PLC and embedded control solutions, implemented **dual feedback loops and inverse kinematics** for precision motion control.
- Established **FAT/SAT protocols and diagnostics** for validation and reliability testing of robotic systems.
- Tested and debugged system behaviors on production hardware, improving system throughput by more than 80%.

Control Systems Engineering Intern May 2022 – January 2023

- Designed and tested subsystems for **Roxo autonomous delivery robot**, including human-machine interfaces and environment-controlled validation testing.
- Created automated test scripts (Bash) to accelerate evaluation and data logging for sensor packages.
- Produced parts via multiple manufacturing methods (3D printing, sheet metal, machining) and iterated based on cost/performance feedback.

Raven Laboratories **Manchester, NH**
Robotics Engineering Intern June 2020 – April 2022

- Modified and programmed an engraving machine into a **CNC mill** for rapid prototyping and part production.
- Managed 3D printer fleet used for prototyping and manufacturing, optimizing workflows and quality control.
- Coordinated fabrication and vendor communication to ensure design intent and manufacturability.

Technical Skills

Programming: Git, **C++**, **Python**, Bash, PLC Logic (Ladder, Function Block, Structured Text), MATLAB
Robotics & Controls: Motor Controls, Forward/Inverse Kinematics, PID/Feedback Systems, Sensor Selection/Integration, Behavior Control Logic, Safety Controls, Sensor Fusion, Linux
Systems & Tools: Embedded Systems, ROS, Real-Time Debugging, EVT/FAT/SAT Testing, Automated Diagnostics
Manufacturing: 3D Printing, CNC Machining, Sheet Metal, Injection Molding, Design for Manufacturing/Assembly

Education

Worcester Polytechnic Institute
Master of Science & Bachelor of Science in Robotics Engineering 2024

Selected Projects (Controls & Robotics Focused)

Reinforcement Learning for Quadcopter Control January – May 2024

- Trained a **Deep Q-Network** to control a quadcopter to autonomously avoid obstacles.
- Implemented a real-time controller using motion primitives to discretize action space for RL integration.

Swarm Dynamics: Predator-Prey Interaction Simulation January – May 2024

- Developed Python simulation models to analyze emergent swarm behaviors under dynamic interactions.
- Performed mathematical analysis to extract phase behaviors critical for multi-agent control insight.

Robotic Pick & Place System January – March 2022

- Built a **3-DOF manipulator system** interfacting vision detection and kinematics to perform dynamic pick-and-place tasks.
- Applied forward and inverse position and velocity kinematics in our control scheme to guide motion; integrated basic perception.