

Justin Abel

Software/Robotics Engineer

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EDUCATION **Carnegie Mellon University, Pittsburgh, PA**

Master of Science in Robotics 08/2018
GPA: 3.87/4.0
Thesis: "A Rapid and Robust Approach to Robotic Leaf Grasping and Automated Crop Spectroscopy"

Bachelor of Science in Mechanical Engineering 05/2017
GPA: 3.67/4.0

RELEVANT COURSES Computer Vision Numerical Methods Kinematics, Dynamic Systems, & Control
Machine Learning Mobile Robots Robotic Systems & Internet of Things

SKILLS **Languages:** C++, C, Python, JavaScript, HTML, CSS
Technologies/Tools: Git, CMake, Unix/Linux, Docker, Robot Operating System (ROS), GitLab CI/CD
Other Applications: MATLAB, Solidworks, AutoCAD, Arduino

WORK EXPERIENCE **Software Engineer** 08/2018 - Present
Boeing - Research and Technology, Charleston, SC

- Developing algorithms for optimizing robotic task sequencing and motion planning
- Created web applications (using React and Node.js) and 3D visualization tools (using Three.js) to provide engineers with simple and scalable interface to custom robotic planning algorithms
- Built up continuous integration and continuous delivery pipeline to automate testing, containerization, and deployment to cloud environment

Robotics Engineer (Contractor) 12/2017 - 05/2018
Edge Tech Labs, Arlington, VA

- Implemented autonomous navigation and path planning capability of a mobile robot using ROS
- Integrated stereo cameras and lidar for localization, indoor mapping, and obstacle detection
- Performed sensor fusion of wheel odometry, visual odometry, and accelerometers into Kalman filter for improved robot state estimation

Mechanical/Robotics Intern 05/2016 - 08/2016
Field Robotics Center - The Robotics Institute, Pittsburgh, PA

- Helped integrate GPS into an agricultural robot and develop autonomous in-field navigation algorithms based on GPS waypoint following and crop row detection
- Designed and manufactured many custom components for agricultural based robotic systems

ACADEMIC PROJECTS **Autonomous Leaf Detection and Manipulation** 05/2017 - 08/2018
Masters Research - Carnegie Mellon University

- Worked on a small research team to develop a mobile robot used to autonomously survey and phenotype crops (mainly sorghum) in a large scale agricultural setting
- Used 3D reconstruction techniques from stereo images to detect and grasp leaves with a custom robotic manipulator for automated spectroscopy
- Trained a neural network to predict compositional traits of the plant (i.e. protein, cellulose)

Thermal Simulation at the Nanoscale 03/2015 - 09/2016
Nanoscale Transport Phenomena Lab - Carnegie Mellon University

- Developed custom MATLAB and C code to run nanoscale Monte Carlo ray-tracing simulations for thermal property calculations in nanoscale structures (published)

ACTIVITIES & HONORS **Dean's List, College of Engineering, CMU:** Fall 2013 - Spring 2017
Teaching Assistant, CMU: 2016 - 2018 (Numerical Methods, DIY Design and Fabrication)
Elementary School Mentor/Volunteer: Be A Mentor, Charleston, SC
