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Justin Abel

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OBJECTIVE

To apply my skills and experience on projects related to field and exploratory robotics with a focus on controls, navigation, vision, and mechanical design.

EDUCATION

CARNEGIE MELLON UNIVERSITY (CMU), Pittsburgh, PA

Master of Science in Robotics — *August 2018*
Overall GPA: 4.0/4.0

Bachelor of Science in Mechanical Engineering — *May 2017*
Overall GPA: 3.87/4.0

RELEVANT COURSES

Computer Vision (16-720)	Kinematics, Dynamic Systems, & Control (16-711)
Engineering Design II (24-441)	Mathematical Foundations for Robotics (16-811)
Mechanics of Manipulation (16-741)	Robotic Systems & Internet of Things (24-662)

SKILLS

Programming Experience: Python, C, C++, ROS
Software: MATLAB, Solidworks, Arduino, ANSYS, AutoCAD, Microsoft Office, Linux OS
Shop Experience: 3D Printer, Laser Cutter, Mill, Lathe, CNC

WORK EXPERIENCE

Intern - Field Robotics Center — *Summer 2016*
Robotics Institute - CMU**,** Pittsburgh, PA

- Worked on a team responsible for developing "The Robotanist," a ground based robot used to autonomously survey and phenotype plants (mainly sorghum) in an agricultural setting
- Helped integrate GPS technology to aid in autonomous row navigation as well as 3D plant reconstruction/modelling
- Designed and manufactured many custom components for the robot

Research Assistant - Nanoscale Transport Phenomena Lab — *Spring 2015 - Fall 2016*
Mechanical Engineering Department - CMU**,** Pittsburgh, PA

- Thermal conductivity and specific heat calculations on silicon using theoretical phonon, vibrational properties
- Developing MATLAB and C code to run nanoscale Monte Carlo simulations for thermal property calculations

Teaching Assistant — *Spring 2016 - Current*
Mechanical Engineering Department - CMU, Pittsburgh, PA

- Numerical Methods: held weekly office hours and in class demonstrations using MATLAB
- DIY Design & Fabrication: Teach lectures on DIY fabrication techniques, grading projects

PROJECTS

Automated Spectroscopy of Crop Stalks (Master's Research), CMU — *Summer 2017 - Current*

- Developing a custom reflectance spectroscopy sensor that is mounted on the manipulator of an autonomous, ground based field robot
- Using CV and 3D reconstruction, the sensor/manipulator servos to a stalk to acquire a reflectance spectra over visible light and NIR wavelength bands
- A neural network is trained to predict compositional traits of the plant (i.e. protein, cellulose)

2D Multicolored Pancake Printer, Engineering Design II, CMU — *Spring 2017*

- Designed and manufactured an automated, two-axis pancake printing system with the capability to print pancakes in four unique colors for my capstone project
- Developed a software interface for the user to create custom shapes and designs and also included a Nintendo controller input for manual control of the printing head
- Won best overall capstone project design among all groups in the class

Industrial Soup Cooler Design, Thermal Fluids Experimentation, CMU — *Spring 2016*

- Prototyped an efficient industrial cooling system for 10-20 L of soup using direct injection of nitrogen gas
- Performed rigorous structural and stress analysis as well as thermal analysis for all forms of heat transfer to determine an overall cooling time and power usage for the system

ACTIVITIES & HONORS

American Society of Mechanical Engineers, CMU: 2014-Current
Club Ultimate Frisbee Captain, CMU: 2013-2017
Dean's List, College of Engineering, CMU: Fall 2013 - Spring 2017