

Andrew Carlson

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Summary

Robotics Engineering Junior specializing in prototyping (**3D printing, Laser cutting**) using **CAD** software, and computer modeling using **MATLAB, Python** and **C programing**.

Technical Skills

SOLIDWORKS, MATLAB, Python, C programing, **Excel**, Word, **PowerPoint**, Popug cad, NI LabVIEW, **JMP**, PSOC Creator, Soldering Iron, **GD&T**, **OpenCV**, **UART Communication**, Inverse kinematics, AI: SVM & Neural Network

Education

BACHELOR OF SCIENCE | EXPECTED MAY 2019 | ARIZONA STATE UNIVERSITY | GPA: 3.48

- Major: Engineering (Mechanical Robotic Systems)
- Secondary focus: Manufacturing techniques
- Related coursework: Semester-long **team** Engineering project courses requiring design, prototyping, analysis and programing.

ASSOCIATES | MAY 2016 | MESA COMMUNITY COLLEGE

- Major: Associates in Science
- Related coursework: Engineering projects requiring Solidworks designs, Flowsim, and MATLAB calculations.

Technical Experience

ASU INTEGRATED DESIGN, ENGINEERING, & ANALYSIS LAB (IDEA LAB) | 4/17-PRESENT

- Designed and prototyped multiple iterations of robotic mechanism using Solidworks and other CAD software.
- Optimized design using parametric study of material properties to achieve desired stiffness in the mechanism.
- Developed test procedure, performed testing and analyzed results using Excel.
- Communicated research progress weekly in presentation format to the lab members and semester poster event
- Use of an Arduino for servo control of a laminate gripper.
- Use of an Arduino for flex sensor data collection using voltage divider.
- Matlab used to simultaneously collect force reading from a force gauge and adc signal from an Arduino.
- Universal Robotics 5 arm programmed for consistent data collection method.
- Python used to analysis csv data collected for sensor calibration.

Engineering Projects

MESA COMMUNITY COLLEGE, EGR102 LEGO MINDSTORM | 12/13

- Assembled Lego Mindstorm robots for the class.
- Debug non-working robots and add programs for MATLAB programming.
- Program robots in MATLAB to move and react to color signals

MESA COMMUNITY COLLEGE, ENGINEERING CLUB, AVNET TECH GAMES | 1/14-5/14

- Design a water pump circuit to be shut off automatically.
- Power water pump with a solar panel.
- Design manual shut off valve using a float with relay switch.
- Preset pitch for our design.

MESA COMMUNITY COLLEGE, ENGINEERING CLUB, AVNET TECH GAMES | 1/15-5/15

- Design Lego mindstorm robot for line following and maze following.
- Program robot for line following.
- Calibrate robot movements for maze navigation.

MESA COMMUNITY COLLEGE, EGR103 ROCKET LAUNCH PROJECT | 1/15-5/15

- Design rocket in Solidworks.
- Use Solidworks flow sim to get model's drag force coefficient.
- Root cause and analysis of broken rocket, finding the cause of break was force of nose cone on elastic cord not ground impact.
- Model launch height using MATLAB drag force from flow sim.

MESA COMMUNITY COLLEGE, ENGINEERING CLUB, 21 DOF ROBOT WALKER | 8/15-5/16

- Build robot as a club project
- Use Arduino to program robot to wave a 2 degree of freedom arm.
- Select battery for use by Arduino and servos.

ASU, EGR304 SMART AIRCONDITIONER| 8/17-12/17

- Use PSOC to program servo to restrict airflow based on thermistor reading
- Use voltage divider rule to calculate temperature using thermistor
- Design PCB layout for project.

ASU, EGR455/456 INTRO TO ROBOTICS I & II| 8/17-5/18

- Use PSOC to program servos read sensors
- Use PSOC to communicate using UART to python on computer.
- Use python open cv for object location, masking for object identification, and motion tracking.
- Use python for machine learning.
- Build 3 degree of freedom pic and place robot using open cv for object location.
- Program dc motor with encoder for feedback control.
- Use jacobian matrix for reverse kinematics

ASU, EGR498 LAMINATE ROBOTICS| 1/18-5/18

- Use Python to model the kinematics of a proposed foldable device.
- Use Python to design cut files for a laminate device.
- Laser cut and assemble a 5-layer device using a universal middle layer to act as a hinge.
- Make rapid iterations of device using low cost materials to implement design changes.
- 3D print parts to assist with connecting laminate robot.

Program dc motor with encoder for feedback control Model launch height using MATLAB drag force from flow sim Academic Achievements

- Presented on IDEA Lab research at Southwestern Robotics Symposium 2018
- 2x ASU Fulton Deans list 2016-2017
- President of MCC Engineering club 2015-2016
- Phi Theta Kappa Honors community college fraternity
- Winner of Avnet Tech Games Solar water pump challenge 2014