

# Alexander Hay

(515) 229-2192

Chicago, IL

alexanderhay90@gmail.com

## Education

---

### Northwestern University

M.S. Robotics

Evanston, IL

Expected 2020

### Iowa State University

B.S. Mechanical Engineering

Ames, IA

2014

## Skills

- 
- Coding: Python, C, C++, OpenCV, Git, ROS, MatLab
  - Design: AutoCAD, Solidworks, Inventor, Onshape
  - Relevant Classwork: Neural Mechanics, Biomechanics, Machine Design, Biomedical Mfg & Design, Multidisciplinary Design

## Projects

**Portfolio:** [alexanderhay2020.github.io](https://alexanderhay2020.github.io)

---

### Rethink Robotics Baxter Object Manipulation and Target Acquisition - Embedded Systems

- Utilized apriltags\_ros and darknet\_ros for object detection and tracking
- Applied moveit\_ros inverse kinematics for motion control and planning

### Learning Motion Model using Neural Network - ML/AI for Robots

- Implemented a neural network from scratch using gradient descent to generate a motion model of a roomba-like robot exploring its space

### Biomimicry using SMA - Winter Project 2020

- Utilized shape memory alloy actuators to mimic the movement of a human elbow joint
- Apparatus used four actuators as analogues to the tricep, bicep, and brachialis muscles

## Experience

---

### Pearce Services - Des Moines, IA

Apr 2016 - Aug 2019

*Design Engineer*

- Created infrastructure plans and designs for subdivisions, banks, and clinics for construction crews
- Project Management; responsible for defining scope and cost of the project
- Collaborated with lead and field engineers to ensure the project met city/county/state reqs

### Drive Spotter - Omaha, NE

Jun 2015 - Jan 2016

*Product Engineer*

- Developed a working prototype using OpenCV and cascade classifiers to identify traffic signs and zones
- Acted as many roles within a startup company, addressing CEOs, investors, and vendors
- Conducted prior art research; assisted in writing, editing, and revising patents and proposals

### Medline Industries - Mundelein, IL

Jan 2015 - May 2015

*R&D Material Technician*

- Conducted tests evaluating material properties of medical products for manufacturers
- Constructed new testing procedures in compliance with relevant ISO regulations
- Quantified experimental data using Excel in final report of quality assurance investigation

### Rehabilitation Institute of Chicago - Chicago, IL

Jun 2014 - Sep 2014

*Research Intern*

- Developed an adaptive wheelchair controller for spinal cord injury patients
- Implemented a machine learning algorithm to calibrate and integrate IMU data streams
- Utilized Matlab to analyze the efficacy of the human-computer-interface