Alex Zeng

Mechanical Engineer · Boston, MA

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EDUCATION

Northeastern University *Boston, MA*

Bachelor of Science in Mechanical Engineering · GPA: 3.90 *September 2019 - May 2023*

- Honors and Awards: Graduated summa cum laude, Dean's Scholarship, Dean's List (Fall 2019 – Spring 2023)
- Relevant Courses: ME Capstone, CFD, Robot Mechanics and Controls, ME Design, Controls, Materials

WORK EXPERIENCE

Mechanical Engineer I *Waltham, MA*

Vicarious Surgical, Inc. *January 2022 - Present*

- Revised the rotary joints on a novel 9 DoF robotic instrument to increase their sensing resolution by 2.5x through multiple design iterations while releasing parts, GD&T drawings, and test procedures in Arena QMS
- Redesigned a camera video pipeline test box to be mass produced easily and compatible with EMC testing by using sheet metal fabrication, drastically reducing lead times and assembly steps
- Wrote Python scripts to automate testing via Ubuntu CLI by controlling motorized force testers and sensors
- Prototyped a calibrated, flexure-based force sensor to measure grip force of the instrument and wrote a custom Python module to interface with the sensor via I2C
- Automated tensile testing data collection and analysis using Python (pandas, Matplotlib), streamlining the data analysis workflow and reducing processing time to 30 seconds
- Created a 3D force visualization script in Python using Matplotlib to analyze forces acting on the instrument
- Designed custom arm subassembly test fixtures to isolate features on the arm prone to failure, permitting more iterative design on the arm without requiring a full arm to run testing

Junior Machinist *Boston, MA*

Northeastern University Machine Shop *September 2021 - May 2023*

- Fabricated parts using CNC (HSMWorks) and manual machines to support over 100+ parts requests per semester
- Designed and manufactured custom tooling holders to reduce setup times
- Utilized multiple work coordinate systems (WCS) to reduce cycle time from 2 minutes to 15 seconds

Reliability Engineering Co-op *Andover, MA*

MKS Instruments, Inc. *January 2021 - June 2021*

- Performed highly accelerated life testing on mass flow controllers in temperature and vibration chambers, verifying product performance specifications and writing a life testing report
- Streamlined arduous data entry by using Python scripts to aggregate raw data into Excel spreadsheets, decreasing routine data entry time

PROJECTS

Integration Lead & Treasurer *Boston, MA*

Northeastern University Mars Rover Team (NUROVER) *September 2019 - Present*

- Collaborated with Northeastern students to build a 50kg Mars rover to compete in the University Rover Challenge
- Implemented an imitative haptic controller for the rover arm shaped as a scaled-down model of the arm to increase operator intuition of arm location, resulting in significantly more dextrous control of the arm
- Designed a sheet metal rover frame that increased internal surface area by 34% and decreased weight by 17%
- Led the arm redesign effort, creating a 6 DoF robotic arm capable of lifting up to 6kg of weight at 0.9m away that features a differential miter gear wrist and twin lead screw gripper with interchangeable grips

SKILLS

Engineering	SolidWorks (CSWA), GD&T, SolidWorks Simulation, MATLAB, ANSYS Fluent, Fusion 360, Excel
Fabrication	3D Printing (FDM & SLA), CNC (Mill & Lathe), Manual (Mill & Lathe), Waterjetting, Laser Cutting
Languages	Python, MATLAB, HTML / CSS, PHP, C