

ISAAC C. SHAW

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EDUCATION

Bachelor of Science in Mechanical Engineering

Cumulative GPA 3.92/4.00

Minors in Computer Science and Mathematics

Brigham Young University, Provo, Utah, April 2023

PROJECTS

BYU Mars Rover

- Led a team of 40 student engineers from various disciplines including computer science, electrical, mechanical, and computer engineering to design a rover for the Mars Society's University Rover Challenge.
- Coordinated efforts and integration between four sub-teams with primary responsibility for the mechanical systems.
- Designed and managed technical reports between 200- and 500-pages using LaTeX.
- Regularly presented project proposals, planning, and design reports to a panel of industry experts and professors.
- Designed hardware and software to point an antenna with manual and autonomous operating modes.

Mechatronics Robot

- Developed the mechanical, electrical and software systems for an autonomous robot capable of collecting and depositing ping-pong balls within a predetermined arena.
- Executed control via two finite state machines running on two independent PIC24 microcontrollers programmed in C.
- Implemented a compressed air firing system capable of hitting a 4x6 inch target at 4 feet.

Tabletop Click-to-Go Planar Robotic Arm

- Developed a three-link robotic arm using Dynamixel bus servos with position feedback for joint actuation.
- Implemented joint-by-joint and inverse kinematic control modes for use with an Xbox controller and a direct linear transformation algorithm to enable Click-to-Go functionality.
- Implemented project in Linux using the melodic ROS release and Python.

Pipsqueak Engine

- Produced a functioning engine capable of operating at pressures as low as five PSI using manual machining processes.
- Designed and produced engineering drawings for all engine components in Solidworks.

Datalog Interpreter

- Developed a lexer, parser, and interpreter in C++ for the declarative logic programming language, Datalog.
- Implemented discrete math concepts including grammars, relational algebra, and graphs.

Thermodynamics Property Calculator

- Designed a GUI application using the Kivy Python framework for the open source CoolProp library to calculate thermodynamic properties of various fluids.
- Implemented conversion between International Standard and U.S. Customary units.

WORK EXPERIENCE

Mechatronics TA, *Brigham Young University*, Provo, Utah

Sep 2022 – Dec 2022

- Led three lab sections per week implementing course concepts on physical hardware.
- Provided troubleshooting and design assistance to students on an open-ended robotics project.

Bus Driver, *Alpine School District*, American Fork, Utah

Nov 2017 – Dec 2022

- Managed behavior and discipline for students of all grades K-12.
- Performed daily safety inspections and completed associated reports.

SKILLS

Programming Languages: C/C++, Java, Python, ROS, SQL, MATLAB, JavaScript, HTML, CSS, LaTeX

Microcontrollers: PIC24, Arduino, Raspberry Pi, ESP32

Software and Technologies: Solidworks, MATLAB, Ansys, VSCode, Xcode, JetBrains IDEs, Overleaf, Linux

Equipment and Tools: Manual Lathe, Manual Mill, Micrometer, Oscilloscope, Multimeter, MIG Welding