SAMUEL MAXWELL

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GRADUATING MECHANICAL ENGINEER. Currently employed by a start-up and associated university research lab to develop experimental exoskeleton. Brings practical experience in electromechanical systems design, software and firmware programming, sensor design, integration and calibration, and hardware testing analysis. Highly collaborative and life-long mechanical enthusiast who seeks ground-level robotics design and testing opportunity in a rigorous work environment.

Skills & Qualifications

Technology & Tools

- ✓ MATLAB / Simulink
- ✓ SOLIDWORKS
- ✓ Eagle AutoCAD
- ✓ STEPCRAFT CNC
- ✓ Fusion 360 CAM
- ✓ Arduino
- ✓ Python
- ✓ C++
- ✓ Microsoft Office
- ✓ Lab-View
- ✓ Github

Techniques

- ✓ Rapid Prototyping
- ✓ Electromechanical Design
- ✓ Software & Firmware Programming
- ✓ Sensor Design
- ✓ Integration & Calibration
- ✓ Hardware Testing Analysis
- ✓ 3D Printing
- ✓ Welding & Manual Milling
- ✓ Data Visualization

Achievements at Biomotum

- ✓ Designed the third prototype concept for a leaf spring actuated ankle foot orthotic device.

- ✓ Simplified a sensor testing process and updated designs to help improve device reliability and reduce assembly time by 30%. Documentation of work processes reduced training time for new employees.

- ✓ Tested and calibrated device sensors under critical deadline constraints, with refined processes for use in FDA clinical trials.

Education & Certification

Bachelor of Science (BS) in Mechanical Engineering, anticipated 12/2022
Northern Arizona University (NAU), Flagstaff, AZ

Relevant Coursework: Completed graduate-level robotics course (ME-599) focused on industry design standards for controls/hardware and mathematical modeling for multi-link mechanical arms. Completed all required engineering coursework with a cumulative GPA of 3.3. (Completed)

Capstone Project: Tasked with designing and manufacturing a new research prototype of a spring actuated ankle exoskeleton. Functions include increased walking/running efficiency. To be measured through metabolic cost and muscle activity. (In Progress)

Rocket Club Leadership: Chosen to advise rocket club senior capstone on robotics and give design inspiration as a robotics engineering consultant/fellow. (In Progress)

Rocket Club Competition: Collaboratively developed an on-board sensor system to detect and correct a simulated anomaly during flight closure of a rotating door left open during launch with a minimum height requirement. During first launch, a photo-sensor in the avionics bay failed to trigger the door closure and the height requirement was missed. On-site soldering corrected the door functionality, and removal of excess assembly materials reduced the craft's weight. The door functioned properly at relaunch, and the rocket reached an additional 300 feet, though not the height requirement, to place 2nd in the competition. (Completed)

Work Experience

BIOMOTUM, Flagstaff, AZ
Lab Technician/Junior Engineer, 03/2020 to Present

- Support research and engineering development of an exoskeleton, reporting to CTO and co-founder Zachary Lerner, Ph.D., assistant professor and head of the Biomechatronics Lab at NAU
- Design mechanical and electrical components, software, and firmware for testing; collect, organize, and analyze data using MATLAB to report performance and/or recommend design and process adjustments
- Monitor outsourced component assembly and vendor quality
- Meet regularly with medical researchers to collect and translate design and device status into engineering specifications

NORTHERN ARIZONA UNIVERSITY, Flagstaff, AZ
Research Assistant – Biomechatronics Lab, 03/2020 to Present

- Produce PCB designs using Eagle AutoCAD
- Create custom carbon fiber molds
- Custom analog sensor design and calibration
- Conduct real-time debugging on experimental exoskeleton firmware
- Interface with common serial communication protocols using C++ programming
- Complete mathematical modeling and design optimizations using MATLAB
- Mentor new students on design concepts and custom design tools

Teaching Assistant – Mechanical Engineering, 02/2020 to 02/2021

- Developed practical lab activities and wrote supplementary materials on control theory for upcoming mechatronics program.
- Set up hardware and MATLAB/Simulink programs to demonstrate complex control schemes