

Design and Implementation of an Assistive Powered Hand Orthosis for People Post-Stroke

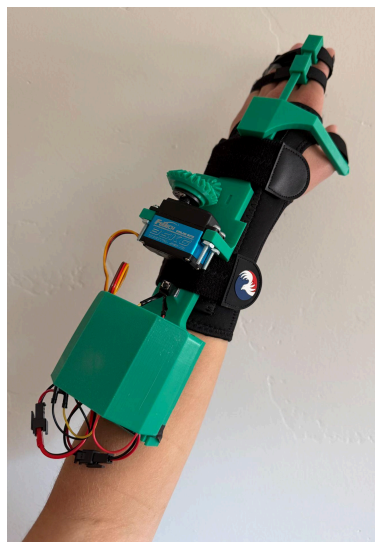
A Master's Thesis Defense in Mechanical Engineering

Presented by: Sydney Alexander

Committee Members: Dr. Eric Espinoza-Wade (Cal Poly ME), Dr. Alan Zhang (Cal Poly ME), Dr. Susan Duff (Chapman University Physical Therapy)

Date and Time: June 1st, 3:30-5:30pm

Location: 13-124b (Zoom: <https://calpoly.zoom.us/j/84299203852>)



After suffering a stroke, many survivors experience physical disability that affects their ability to complete daily tasks using their hands. Physical therapy is often prescribed to people post-stroke, but is not fully effective at restoring hand function. The goal of this project was to design and fabricate an assistive device for people post-stroke to help with grasp and release. The device was designed to address common shortcomings of existing similar devices. Similar devices on the market were researched and possible improvements were identified. A novel motor-actuated hand orthosis was designed to decrease weight, bulkiness, and cost compared to other devices. The wrist-mounted exoskeleton is used to help people post-stroke grasp and release objects used in their daily tasks and activities. Grasping is actuated by the user with a button input, which communicates with a servomotor via microcontroller to bend the four fingers around an object. The device was evaluated using a series of grasp and release tests on common objects. These test results suggest that this device would be helpful for people post-stroke to wear to manipulate low-weight objects with confidence and autonomy.