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Myoelectrically Controlled, 3D Printed Prosthetics KATHERINE CROSBY, ANDREW RHODES, ELI OWENS, Presbyterian College — For this project, we developed a low-cost prosthetic hand using surface mounted myoelectric sensors and 3D printing. The loss of a limb can be a traumatic experience for a person, but prosthetics can restore the functionality of the limb, and confidence to the user. However, insurance often does not cover the cost of prosthetics, and entry-level prosthetics can cost over $10,000. This motivates the need for low-cost prosthetics. We have designed and built a low-cost, highly-functional, myoelectricly controlled, 3D printed prosthetic. We use surface electrodes paired with a signal processing circuit of our design to sense healthy muscle contractions. We then use the electrical signal from the healthy muscles to naturally control the prosthetic hand. The circuit uses multiple electrodes to differentially measure independent muscle contractions. The muscle contraction signals are compared to a reference point on the elbow where little to no muscle movement is made. We use machine learning to help the controller modify the movement based on user input during a startup routine. This startup routine learns the users muscle habits and modifies variables in the code to make the muscular profile unique to the user.

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