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## **CHARACTERIZATION OF AN OPEN-SOURCE 3D-PRINTED ROBOTIC HAND**

**Moriah Henning (Melynda Schreiber, M.S., Andrew Merryweather, PhD.)**

**Department of Mechanical Engineering**

The goal of this study was to analyze the compatibility of a 3D-printed open-source robotic hand – specifically, the InMoov robot – with a brain computer interface (BCI) during activities of daily living (ADLs). In order to better understand the InMoov hand's limitations and abilities, this study characterized the grasping movement of the InMoov hand with respect to its maximum fingertip and grasping force. A model of the index finger was created in MATLAB, and the maximum force provided by servos was calculated. Denavit-Hartenberg (DH) parameters were used to find the connection between links of a given finger joint length and range of joint angles found in SOLIDWORKS models. The InMoov arm was then 3D-printed and built to test actual fingertip and grip forces using force sensitive resistors (FSR) and to compare to the calculated force values. The results found an average 1N orthogonal force in the fingers, which differs from the 37N of orthogonal force calculated for the index finger. The average measured grip force of the InMoov hand was found to be insufficient for ADLs. The study concluded the InMoov hand is limited by a lack of tendons and abduction/adduction movement that is available in a human finger, but the addition of friction pads and adduction/abduction in all fingers may increase the InMoov hand's ability to grip and perform ADLs.