# Reach into the Future II

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The purpose of this researcher's project is to design, 3D print, construct, and code a mind controlled robotic prosthesis that models and functions anatomically similar to the human left arm. In order to do this the researcher 3D scanned and CAD designed the separate pieces of the arm based upon their background in engineering and anatomy. After the design process, the 3D files were sent to the printer, a Makerbot Replicator Z18 industrial printer. The printer constructed all of the separate pieces for the arm in a total of 195 print hours. The parts were then sanded down and placed together how the researcher had designed them. Some parts are held together with industrial glue, others with machine screws, bolts, and nuts. The arm was then fitted with eight servo motors to control each of the fingers separately, the rotation of the wrist, the flexion and extension of the bicep and the rotation of the bicep. Each of these is connected to an Arduino microcontroller. The Arduino board is coded in C++ programming language which controls all of the servos connected to the arm. Synced with the Arduino board is an electroencephalogram headset which manipulates the arm via brainwaves. The headset is placed on the researcher’s head and transmits a real time graph of his or her brainwaves. The feedback is sent to the researcher’s laptop where they edit and capture certain sections to be remembered by the arm. When a certain wave is recorded, a correlated movement follows.

**Awards Won:**