Pitt neurobiologist Andrew Schwartz, left, and bioengineer Douglas Weber are working on developing a brain-controlled robotic arm the research team demonstrated last year.

Microelectrodes embedded in the monkey's brain feed nerve impulses from brain cells to a computer. A mathematical problem-solving formula called an algorithm interprets the monkey's desires from those electrical signals and sends information to the robotic arm and hand, connected by wires to tiny electrodes.

Schwartz faces scientific challenges in creating a more sophisticated system, including design of the prosthesis.

Former Carnegie Mellon University robotics professor Yoki Matsuoaka, who recently moved to the University of Washington, is studying the biomechanics of the human hand in hopes of building a complex robotic version.

She is making engineering upgrades to a robotic hand she built several years ago that was able to type on a keyboard for seven hours a day for six weeks before breaking down. The new hand will be made of lighter, more durable materials to mimic tendons and better mechanical sheaths for the joints and ligaments, Matsuoaka said.

A monkey using this type of neural prosthesis would be able to open a jar, reach in to grab an object and turn it in various directions, Matsuoaka said.

"From my robotics point of view, the hands should be able to do everything a thumb, index finger and middle finger can do," she said.