

Student Scientist Constructs Bionic Hand Prototype



Above: Antonia Crews holding prototype bionic hand in the lab

For the average person, living with a disability is not a day to day reality. For individuals that do not have full use of their legs, arms or hands, prosthetics can be the difference between maintaining an independent lifestyle and being dependent on others to do everything for them.

Antonia Crews, a 11th grader at Detroit Edison Early College of Excellence and a student scientist in the Ecotek Lab Program, has an interest in robotic medicine and mechanical engineering. Her idea was to construct a battery powered prosthetic hand that would function like a real hand.

The project involved a broad set of activities ranging from understanding the interworkings of the human skeletal and muscular systems. Antonia focused a lot of her energies on learning about the structure of the phalanges and carpals.

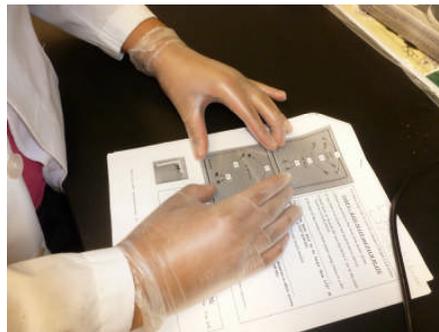
The design and build phases of the project involved constructing the framework of the hand. This included sizing the fingers and thumb as well as aligning the gear system and setting up the power source. To test the bionic hand prototype, Antonia designed a number of human interface scenarios. For example, she used the bionic hand to pick up objects such as pens, markers and wooden blocks.

Throughout the project Antonia ran into several problems. Some were easy fixes (drilling plates to support wrist), while others were potential showstoppers (resolving an electrical circuit integration issue). At every juncture, she never quit. She found a way to succeed even when things became difficult. As a result of her tenacity, Antonia learned how to solder joints, thread switches and build gear boxes. Things that she had not done before.

This summer Antonia will be attending an engineering leadership program at Michigan Tech University and taking science courses at Harvard University in Cambridge, Massachusetts. For the balance of her time in Ecotek Lab she will be expanding her engineering skills to include 3-D printing technology. Based on her work on the bionic hand prototype project she is off to an impressive start!



Antonia drilling plates to support wrist component of bionic hand



Antonia measuring wrist support plates that will connect to power unit



Ventral view of bionic hand prototype showing phalanges and wrist plate

About the Ecotek Science Program

Ecotek is a science research lab program for young inventors and researchers in grades 5 thru 12. Student scientists work on projects aligned with the issues being addressed by world leaders at the United Nations. To learn more about Ecotek Lab go to <http://www.ecotek-us.com>