

---

Thinking Matters Symposium

2020 Thinking Matters Symposium

---

May 8th, 12:00 AM

## Arm Prosthesis

Deka Djama

*University of Southern Maine, deka.djama@maine.edu*

Brendan Francis

*University of Southern Maine, Brendan.francis@maine.edu*

Conor Sweatt

*University of Southern Maine, Connor.Sweatt1@maine.edu*

Heritier Itangishaka

*University of Southern Maine, heritier.itangishaka@maine.edu*

Nicholas Sotir

*University of Southern Maine, Nicholas.sotir@maine.edu*

*See next page for additional authors*

Follow this and additional works at: <https://digitalcommons.usm.maine.edu/thinking-matters-symposium>

---

Djama, Deka; Francis, Brendan; Sweatt, Conor; Itangishaka, Heritier; Sotir, Nicholas; and Perry, Noah, "Arm Prosthesis" (2020). *Thinking Matters Symposium*. 14.

<https://digitalcommons.usm.maine.edu/thinking-matters-symposium/2020/poster-sessions/14>

This Poster Session is brought to you for free and open access by the Student Scholarship at USM Digital Commons. It has been accepted for inclusion in Thinking Matters Symposium by an authorized administrator of USM Digital Commons. For more information, please contact [jessica.c.hovey@maine.edu](mailto:jessica.c.hovey@maine.edu).

---

**Presenter Information**

Deka Djama, Brendan Francis, Conor Sweatt, Heritier Itangishaka, Nicholas Sotir, and Noah Perry

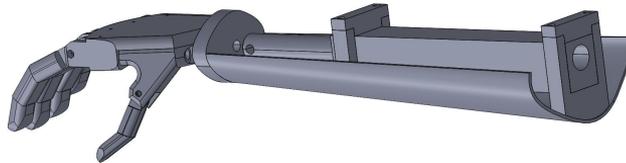


## Abstract

This project is to design and build functional prosthetic limbs in a reproducible, aesthetically pleasing, inexpensive and customizable way for the Portland Rotary. The Portland Rotary is a humanitarian organization that offers common types of prosthetic limbs for free to restore a certain level of functionality for amputees in the Dominican Republic. The organization faces many challenges by focusing on acquiring the highest quality, yet inexpensive prosthetics. The current situation is not focused on the advancement of prosthetic limbs, but to provide simpler alternatives, and improving existing prostheses. These are more aesthetically pleasing with better functionality. This goal will be achieved by increasing the speed of the electric arm, reducing the pressure within the hinge mechanism, and ensuring affordability. More people are willing to use prosthetics to enhance their quality of life if they are affordable and aesthetically pleasing. The project will ensure that Portland Rotary serves more amputees in the Dominican Republic to lead a higher quality life.

## Objective

To design and build an inexpensive prosthetic limb for the Portland Rotary to distribute to amputees. The main priorities were functionality, and ease of maintenance. Aesthetics and comfort were also a focus of this project. Team F elected to include an electrical system to control the gripping movement of the hand.



## Methods

Conceptualization was completed to provide direction and set goals.

The team conducted background research with the intent of implementing aspects of existing designs that fit the theme.

Several designs were created to offer variety of choice to the overall project.

A final design was chosen and members were assigned certain tasks to complete and contribute to the final product.

Simulations were done to test the materials and components. Alterations were then made based on results

Materials were then purchased for final assembly. Additional materials were purchased to enhance the design, and function. This includes heat shrink tubing for the wires, and coatings (grip and aesthetics).



## Results

The final design includes a carbon fiber infused nylon used for the housing and the hand. A solenoid was used as an actuator to control the hand movement. To control the actuator, a three way switch was connected to a 12 volt battery.

## Conclusion

This project was a success and provided clear insight into the engineering design process. Communication, teamwork, and clearly assigned roles provided the necessary structure to complete this project.

