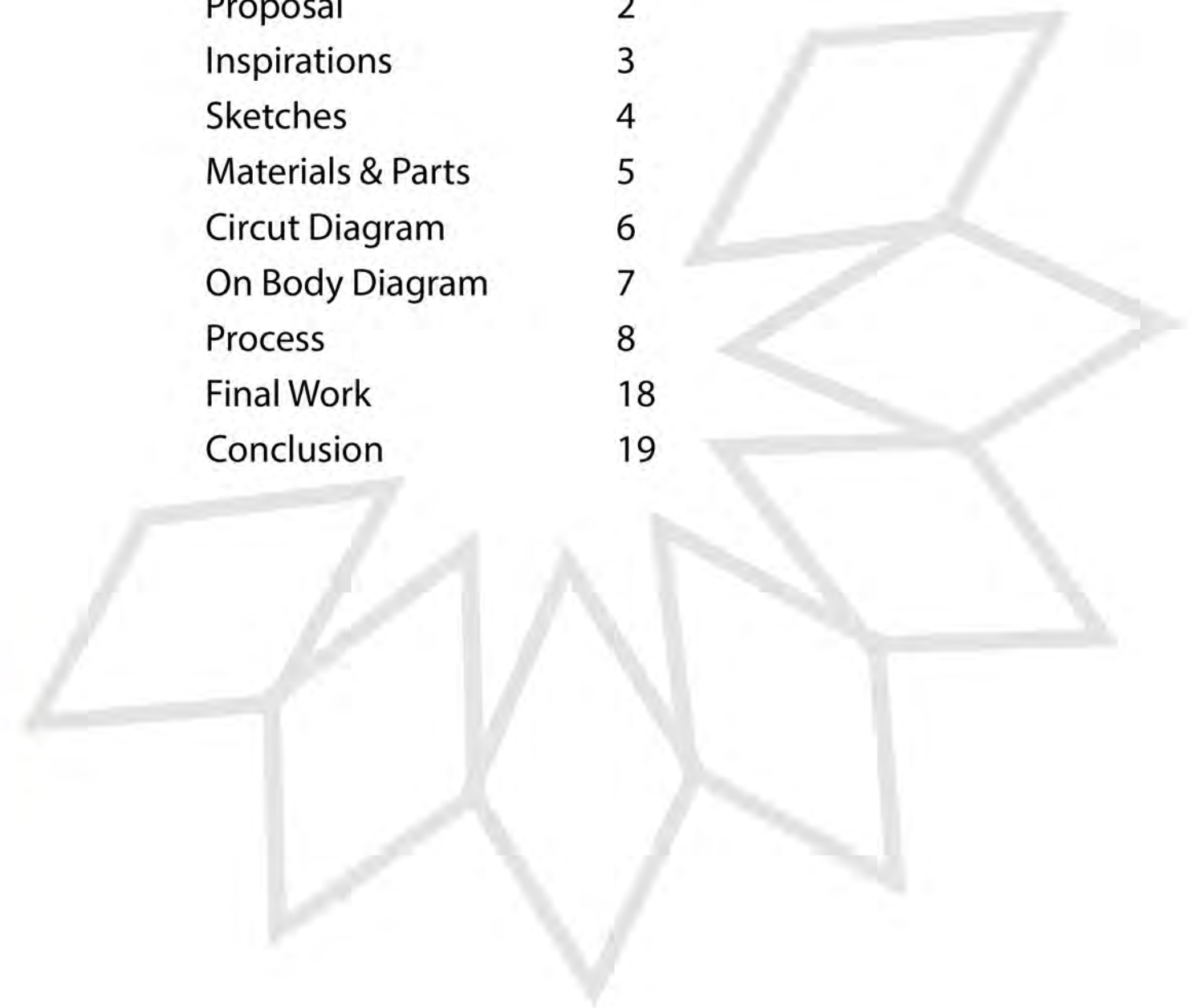


Serkan Ekenel
3160660
Portfolio Wearable
Wearable Computing GDES-3015-001
L. Wilkins

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Expand

Learning from my previous experiences on the Expressive / Performative wearable project, my aim is to focus more on the aesthetic aspect of the project. I would like to decorate and expand the human body and give it a kinetic dimension. The inspiration for this project comes from "A Kinetic Clock That Changes Shape with the Time" project by BY RAIN NOE. This will be an improvement and augmentation of my previous project. I will replace the sound sensor for a flex sensor in order to get a more accurate reading which will activate the servo motors. For my project I am also going to use 3D printer to fabricate the moving parts.



"A clock that turns passing hours into moving art, it gradually changes shape throughout the day to inspire a more relaxed view of time"

Solstice

<https://www.kickstarter.com/projects/animaro/solstice-the-kinetic-clock>



<https://inhabitat.com/ecouterre/3d-printed-adrenaline-dress-reacts-when-youre-stressed/>

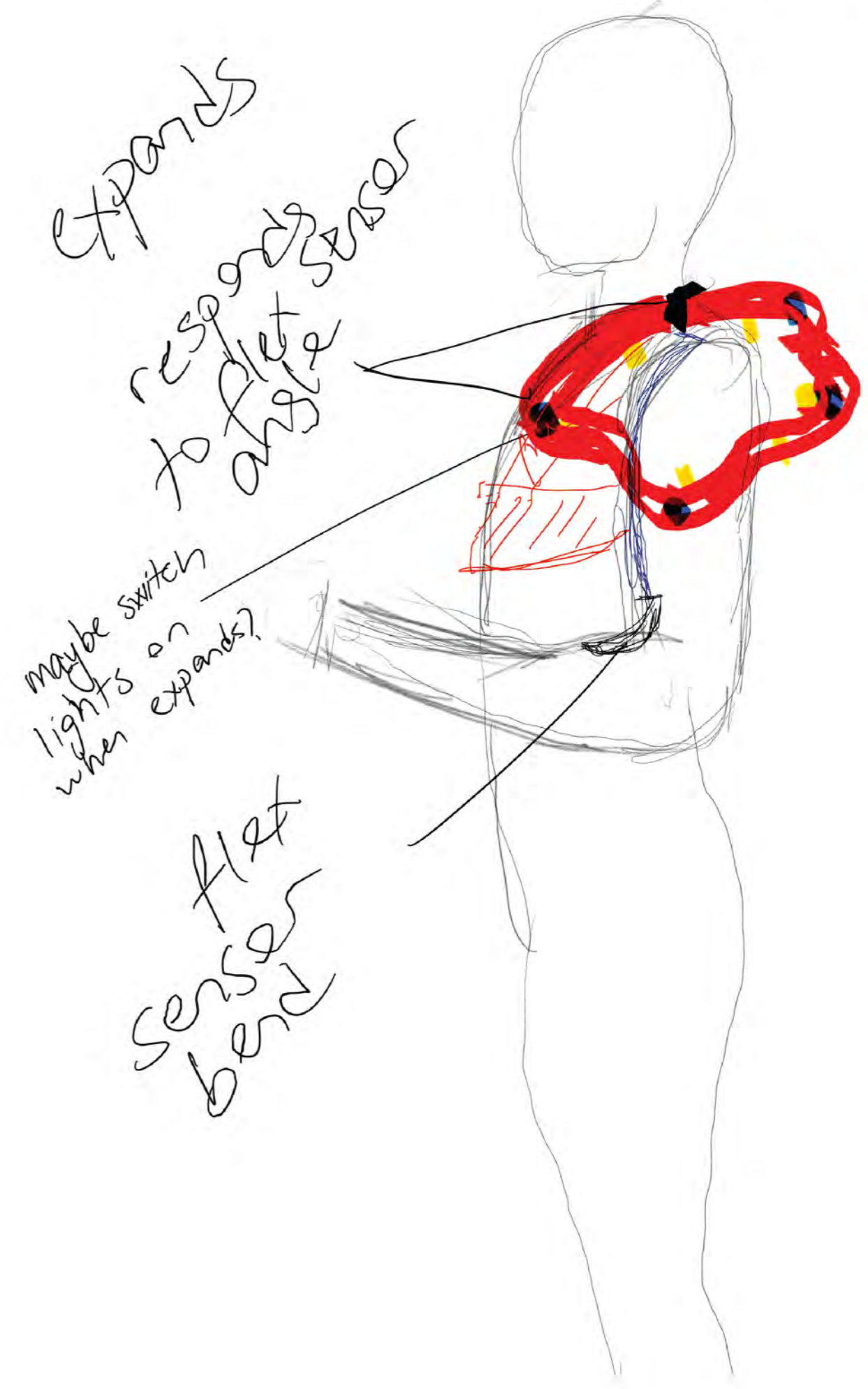


3D-Printed "Adrenaline" Dress Reacts When You're Stressed
The "Adrenaline" dress, which debuted at New York Fashion, uses biometric sensors to keep tabs on its wearer's adrenaline levels.

Another Examples

<https://sola.ai/yurlov/786547>

<https://www.dailymail.co.uk/sciencetech/article-3252668/The-anti-ogling-shirt-3D-printed-outfit-changes-shape-men-stare-it.html>



Materials & Parts

1 * Adafruit Flora board



2 * Servo Motor



1* Flex Sensor



1* 10K Resistor



Harness and Long Sleeves Hood

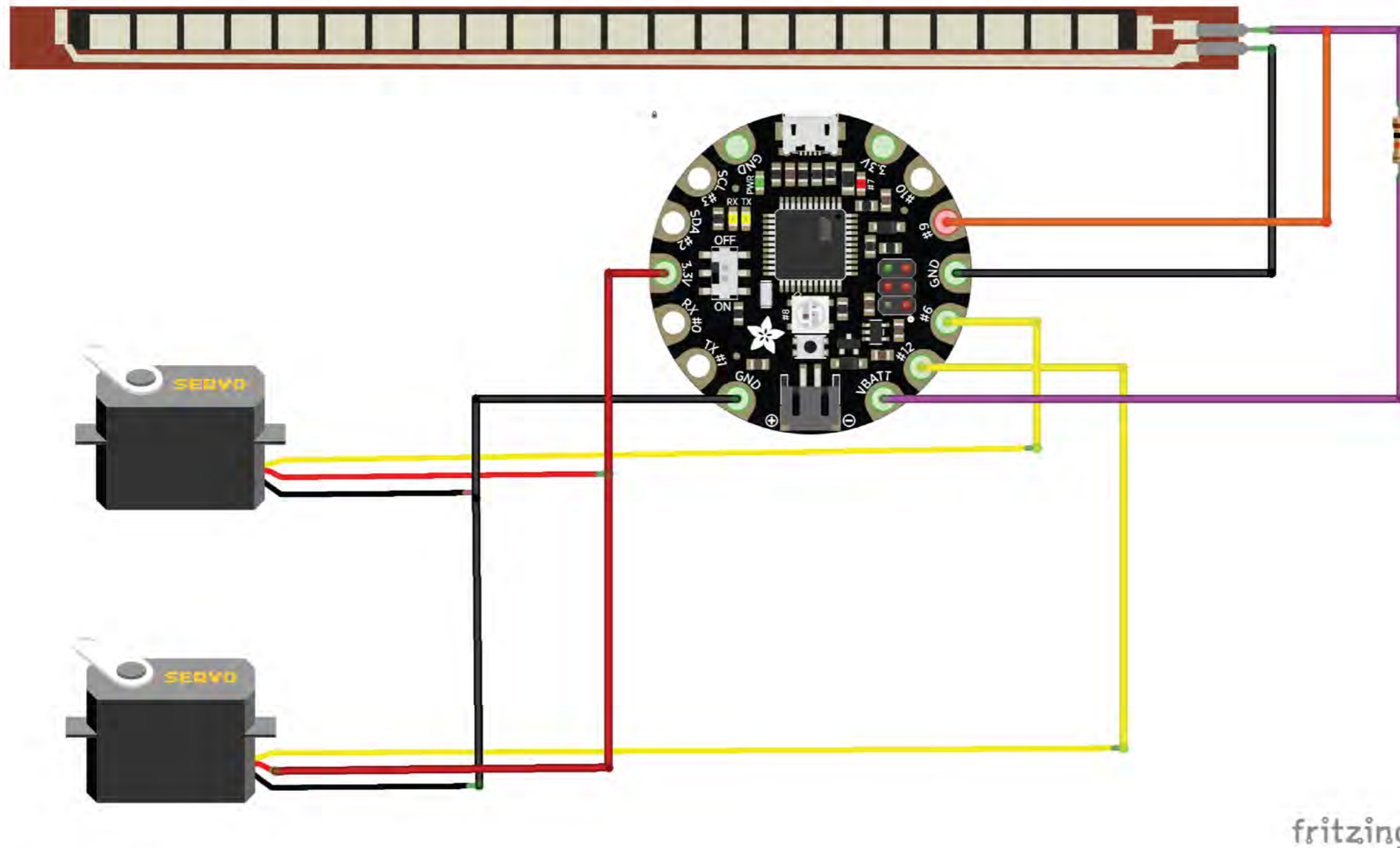


3D Printed Parts



Stranded Wire



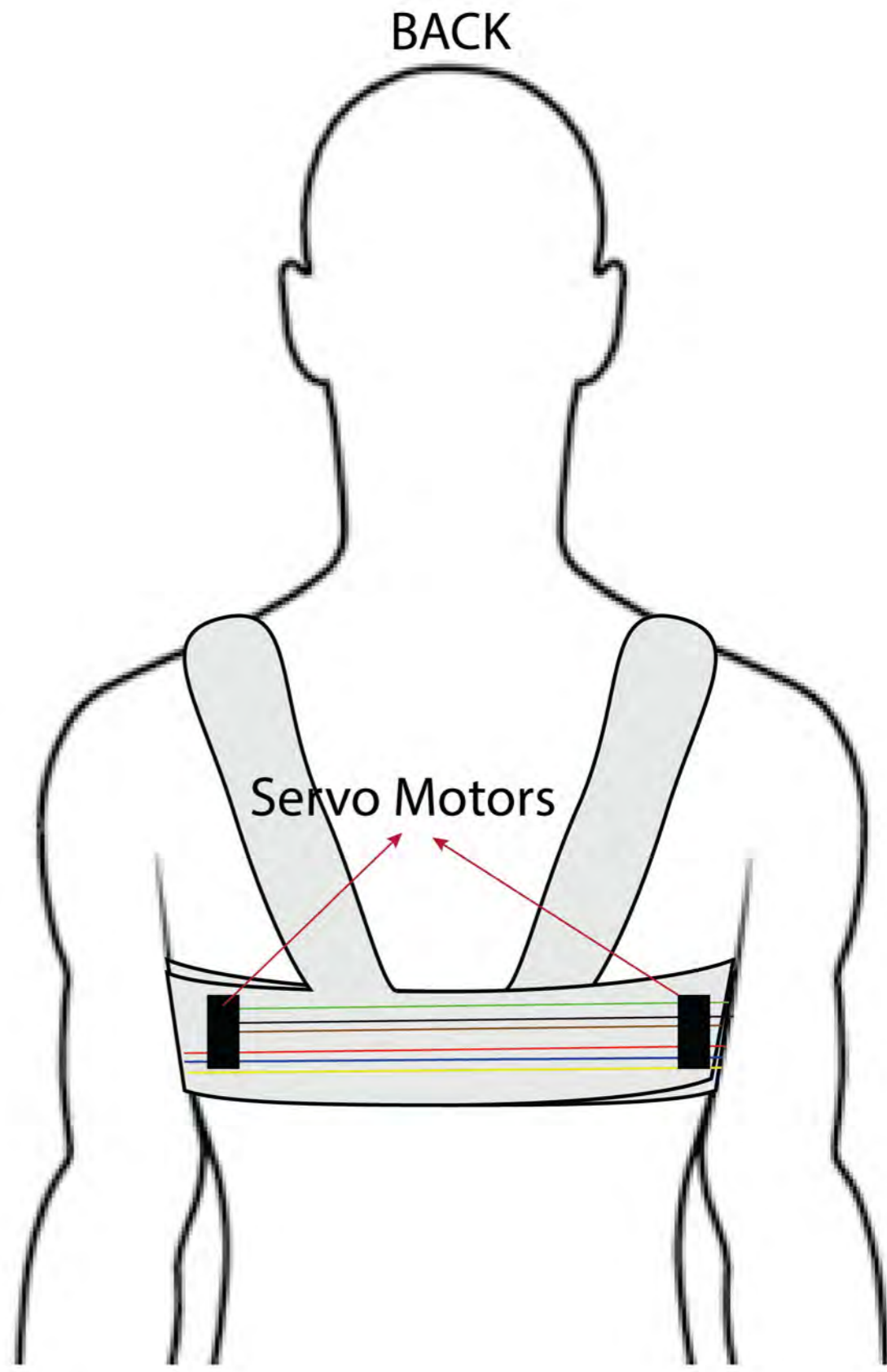
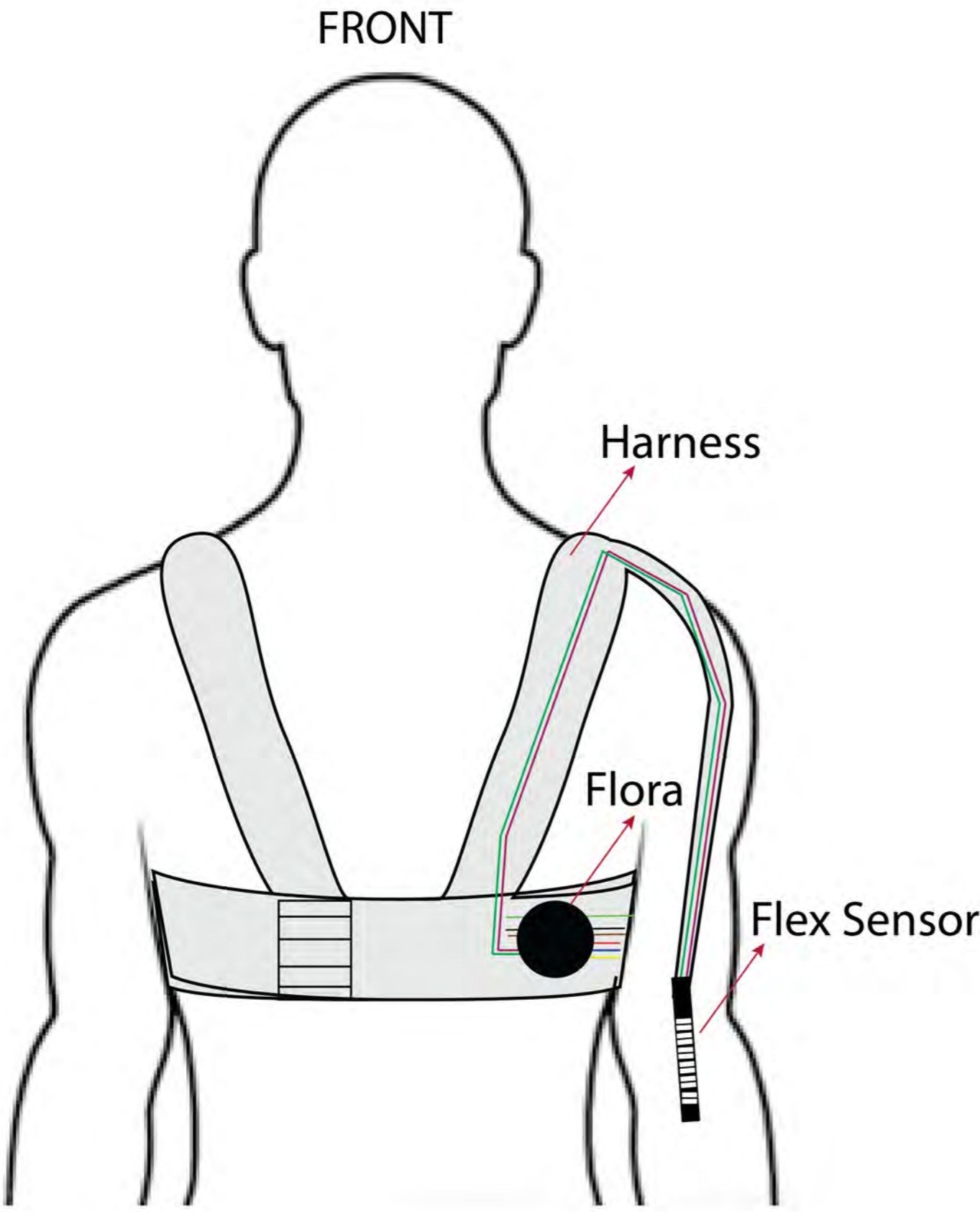


Explanation of construction & material approach

Two servo motors attached on to a Harness on a human back just below shoulders. Flex sensor attached on elbow where it is comfortable, it transfer the values to arduino device and the servo motors will turn and move the construction.

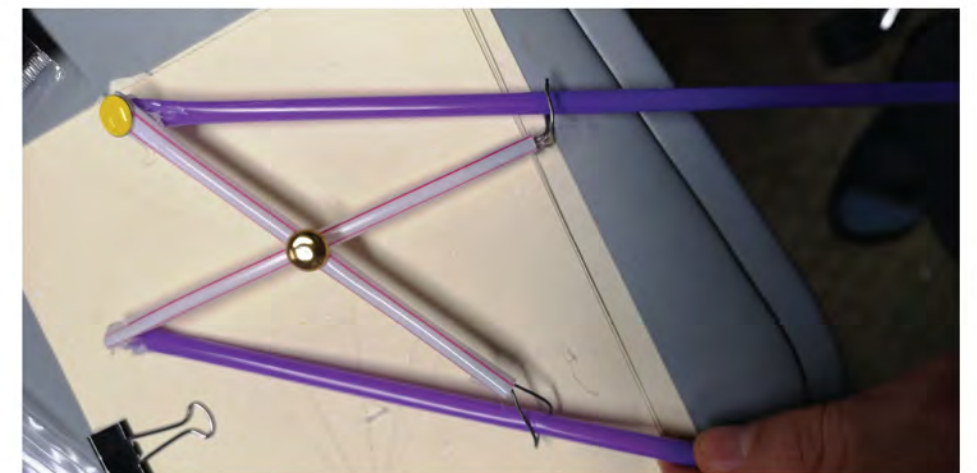
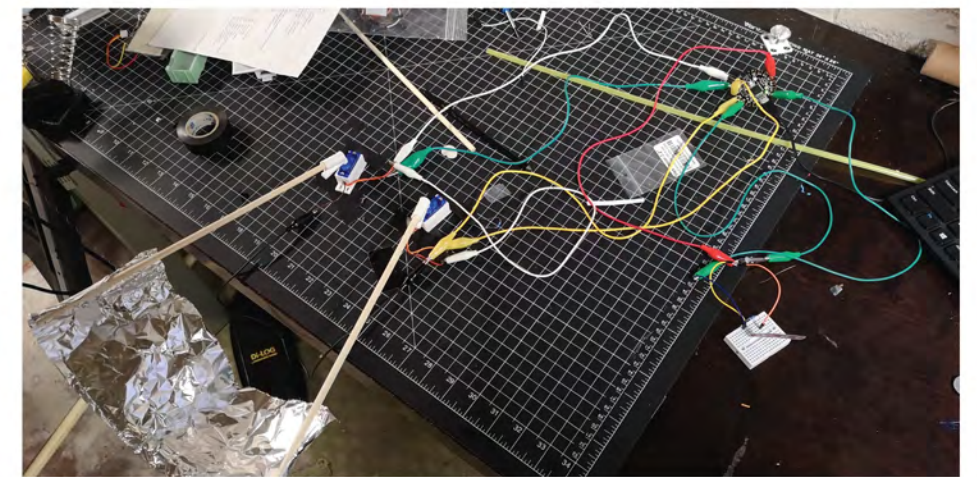
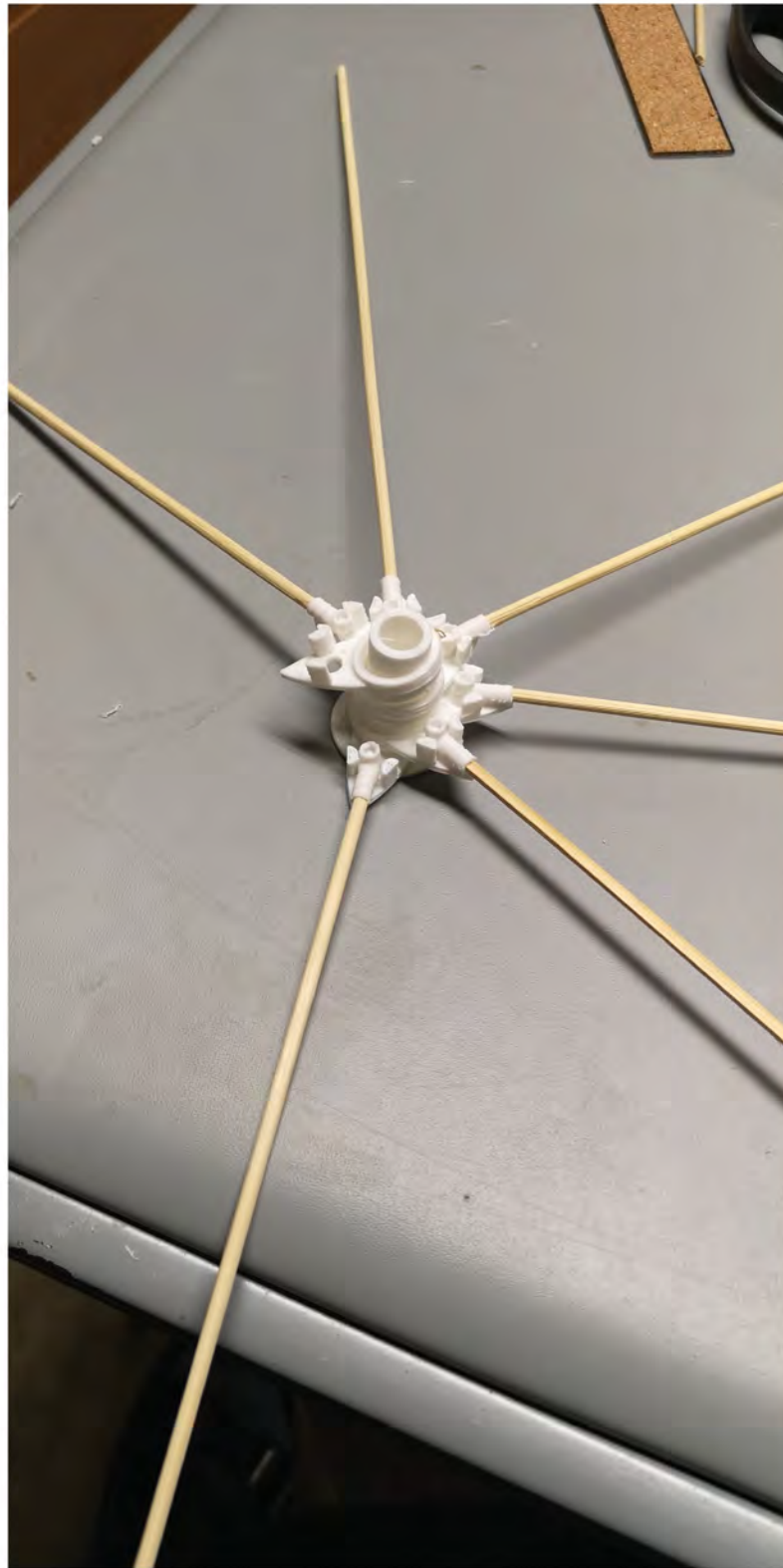
Arduino Code:

<https://gist.github.com/ekenels/9f9e7514d744b0a9d339430530c0b2c9>

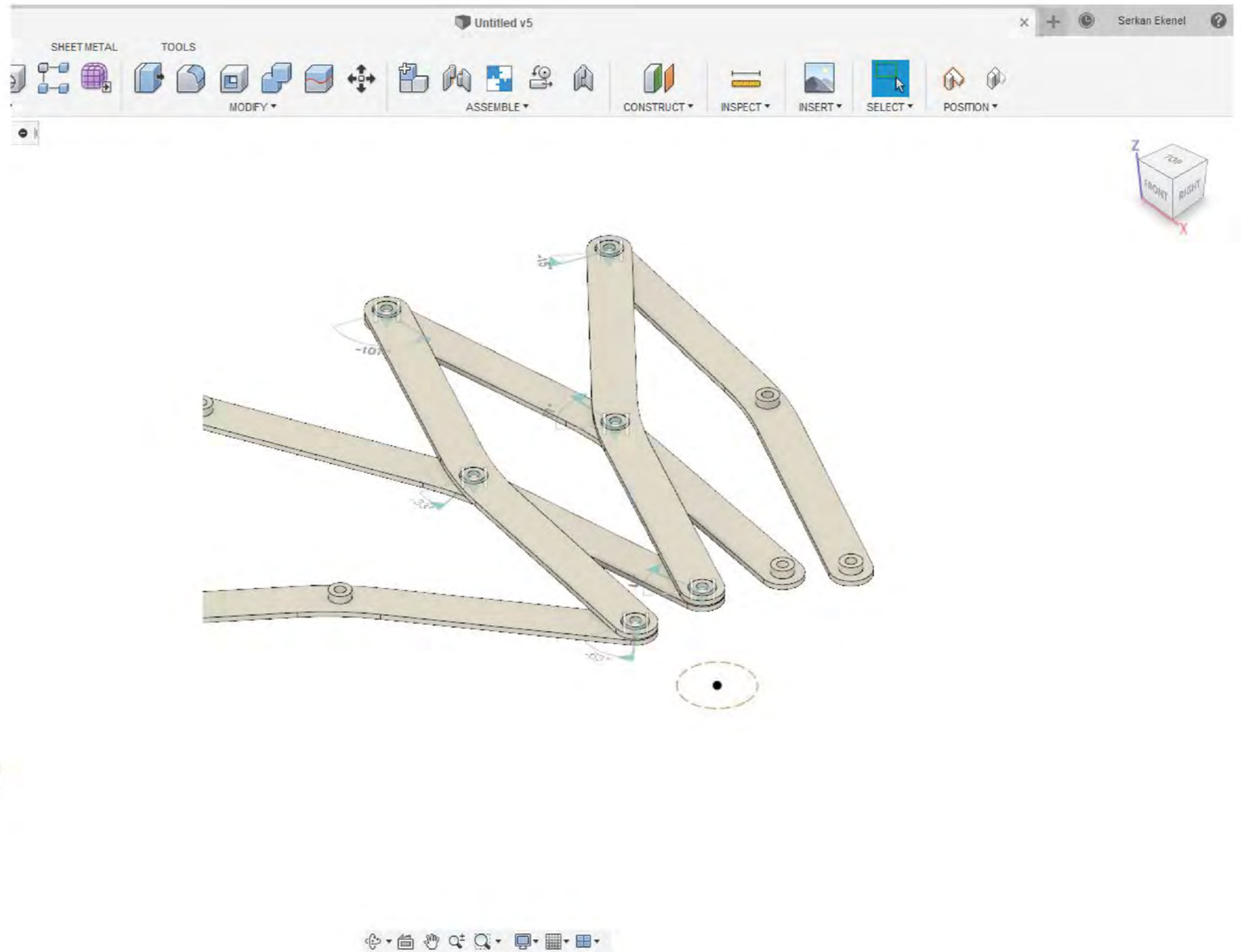
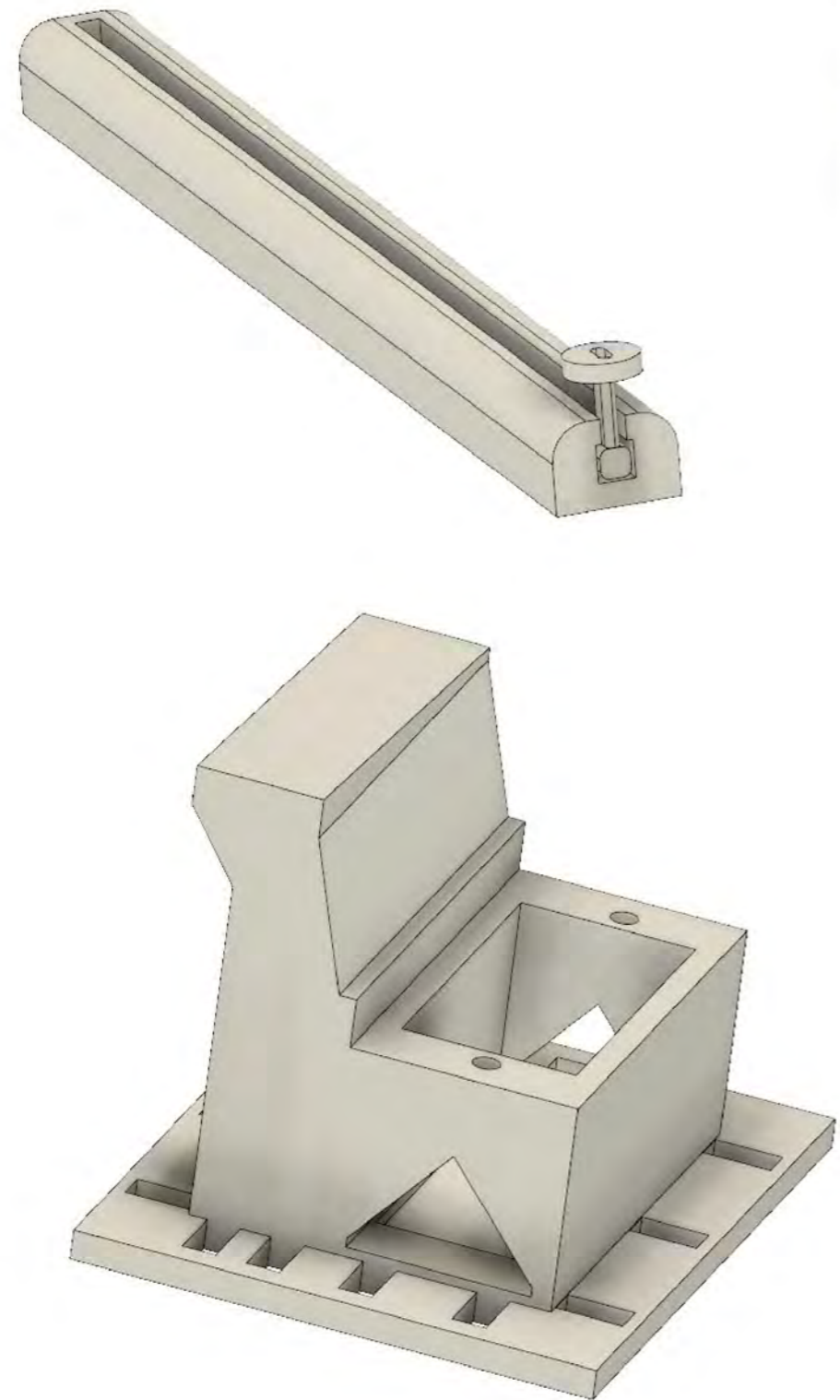


FOR DETAILED CONNECTIONS PLEASE REFER TO FRITZING DIAGRAM

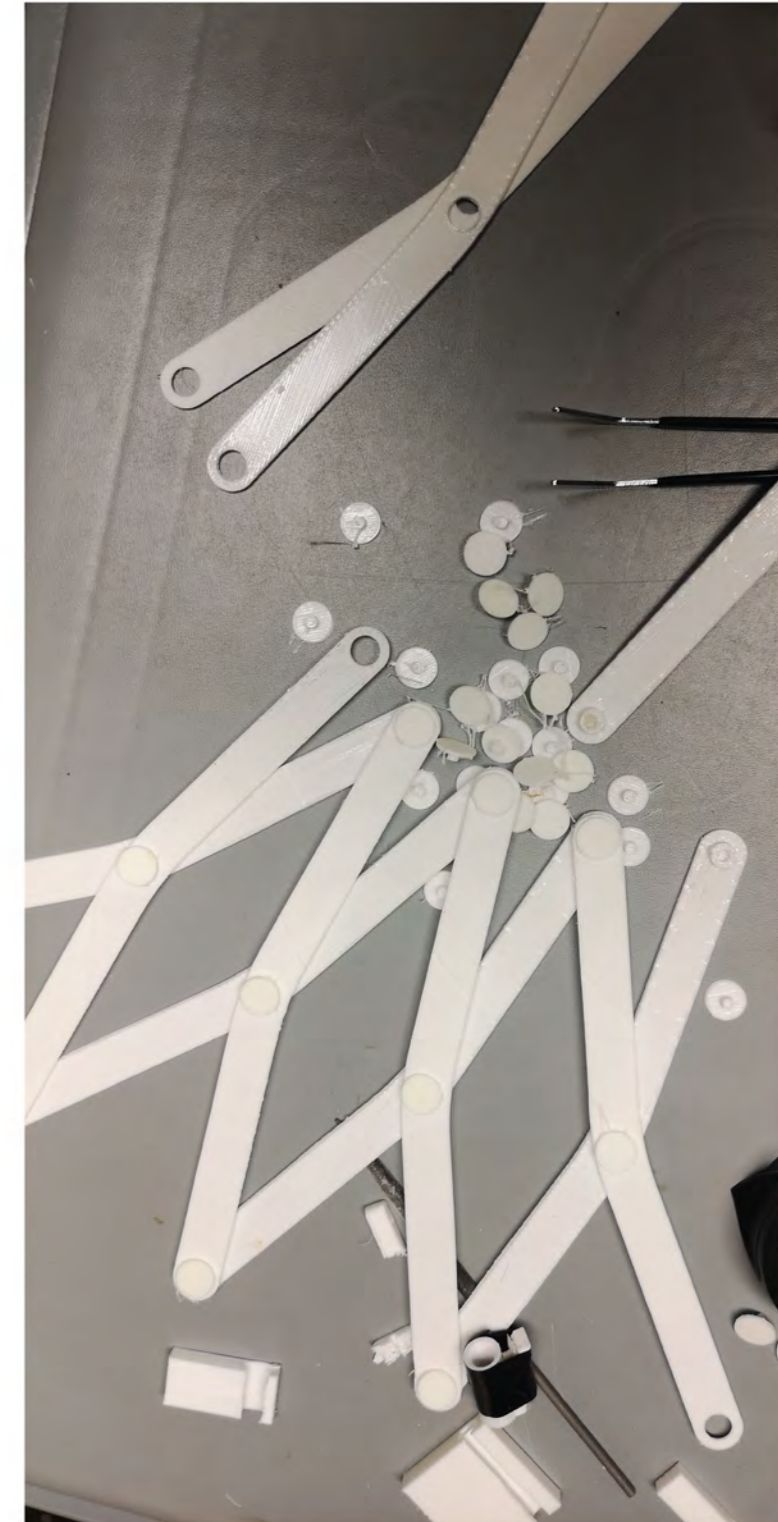
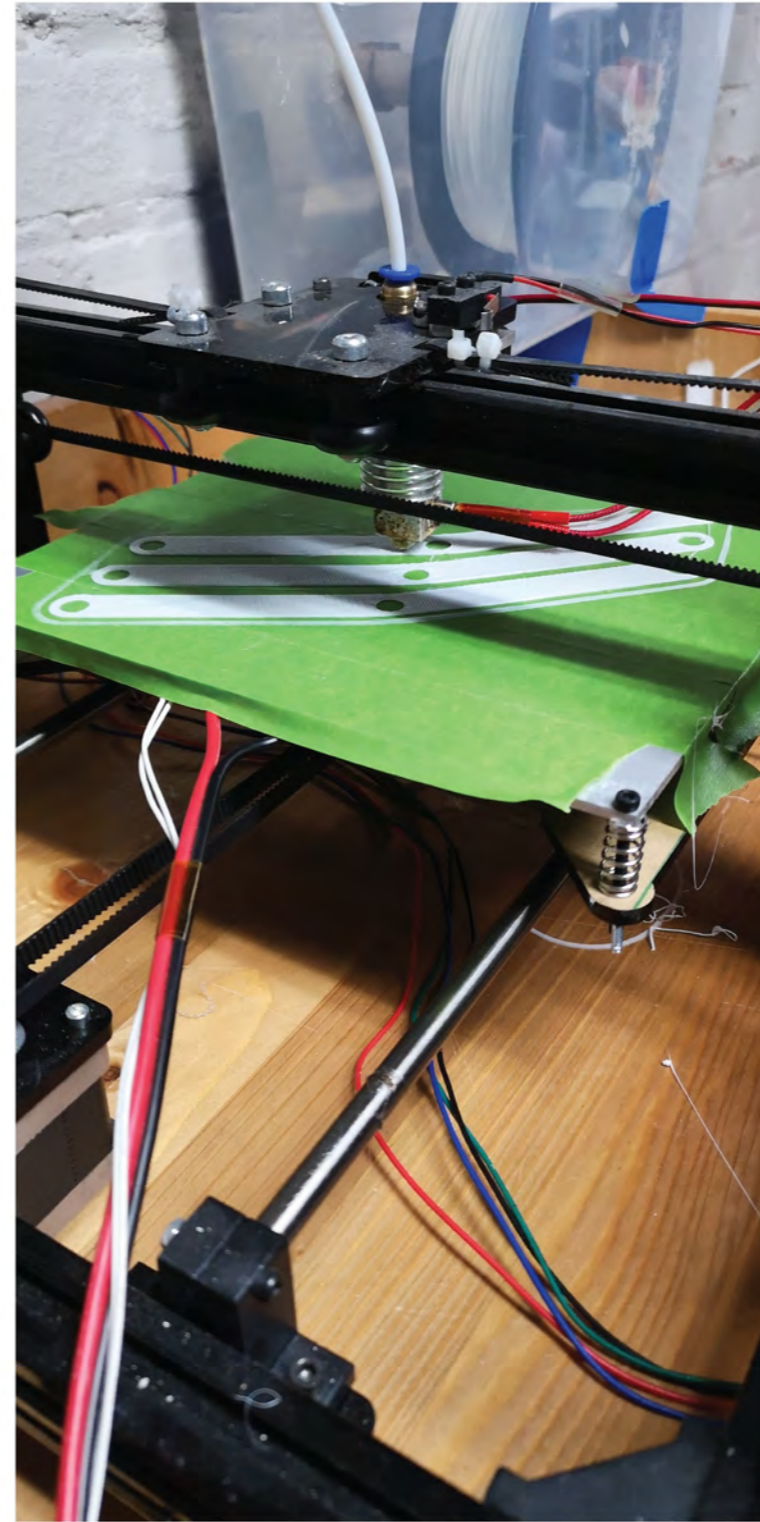
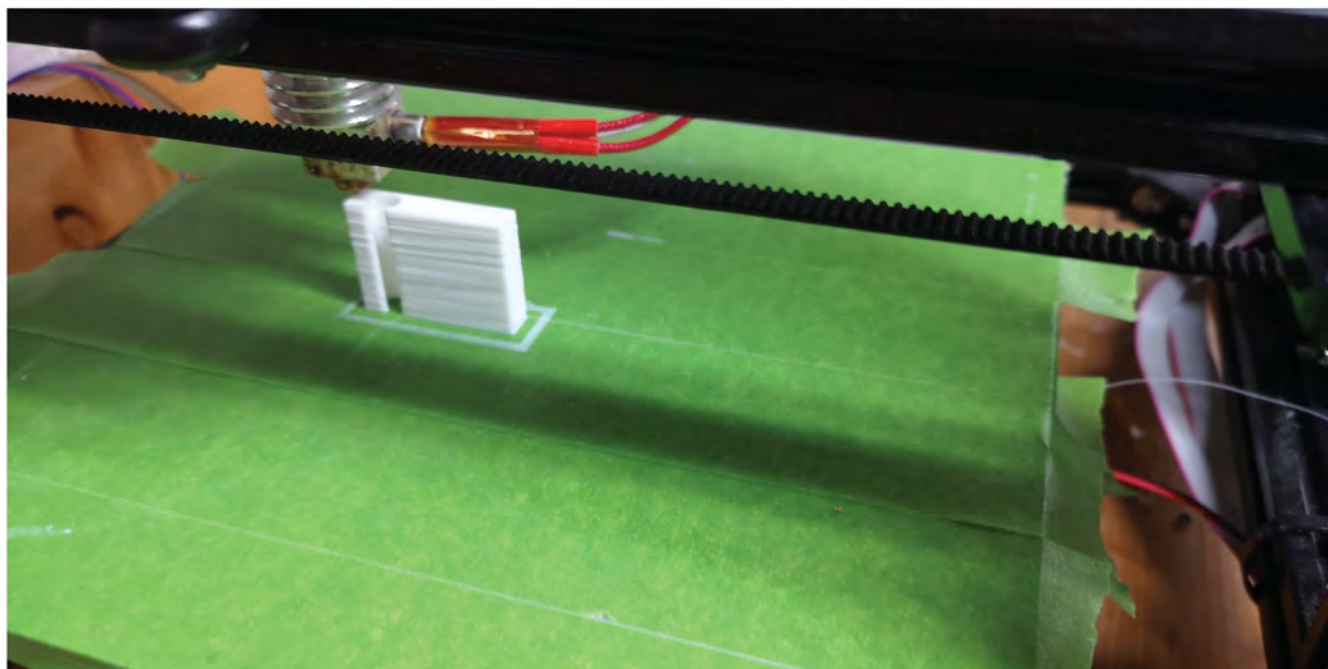
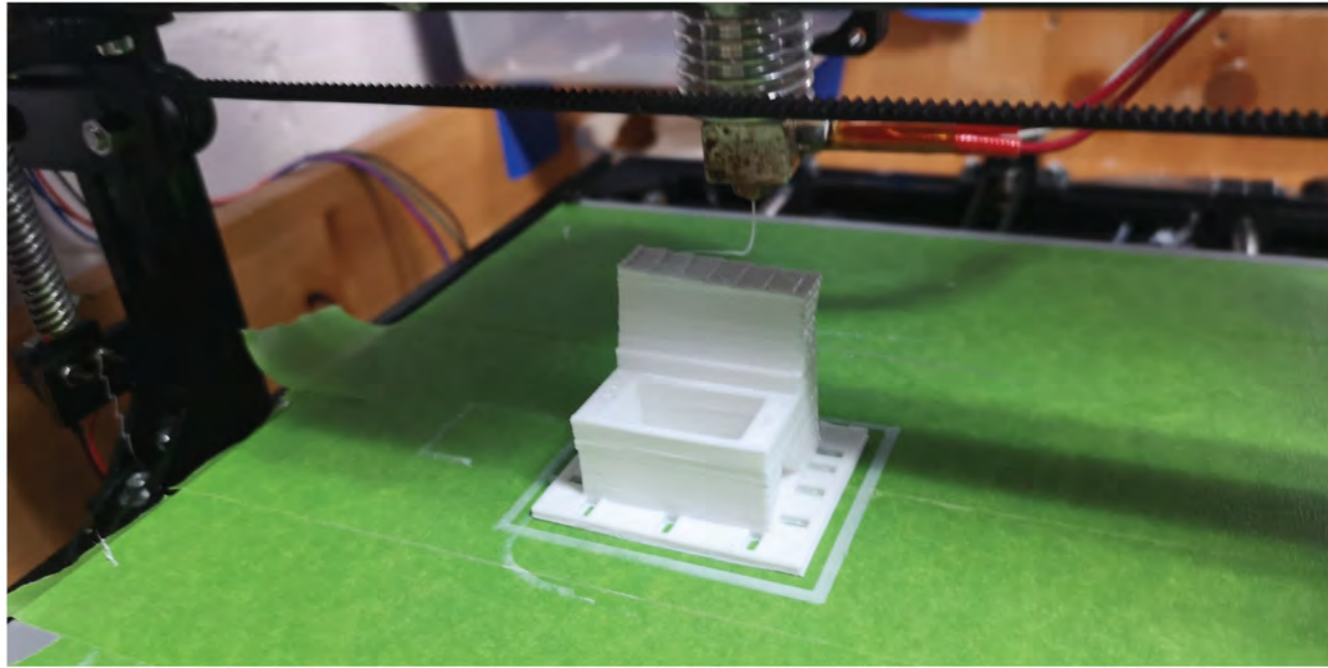
My several attempts to create a kinetic motion with servo.



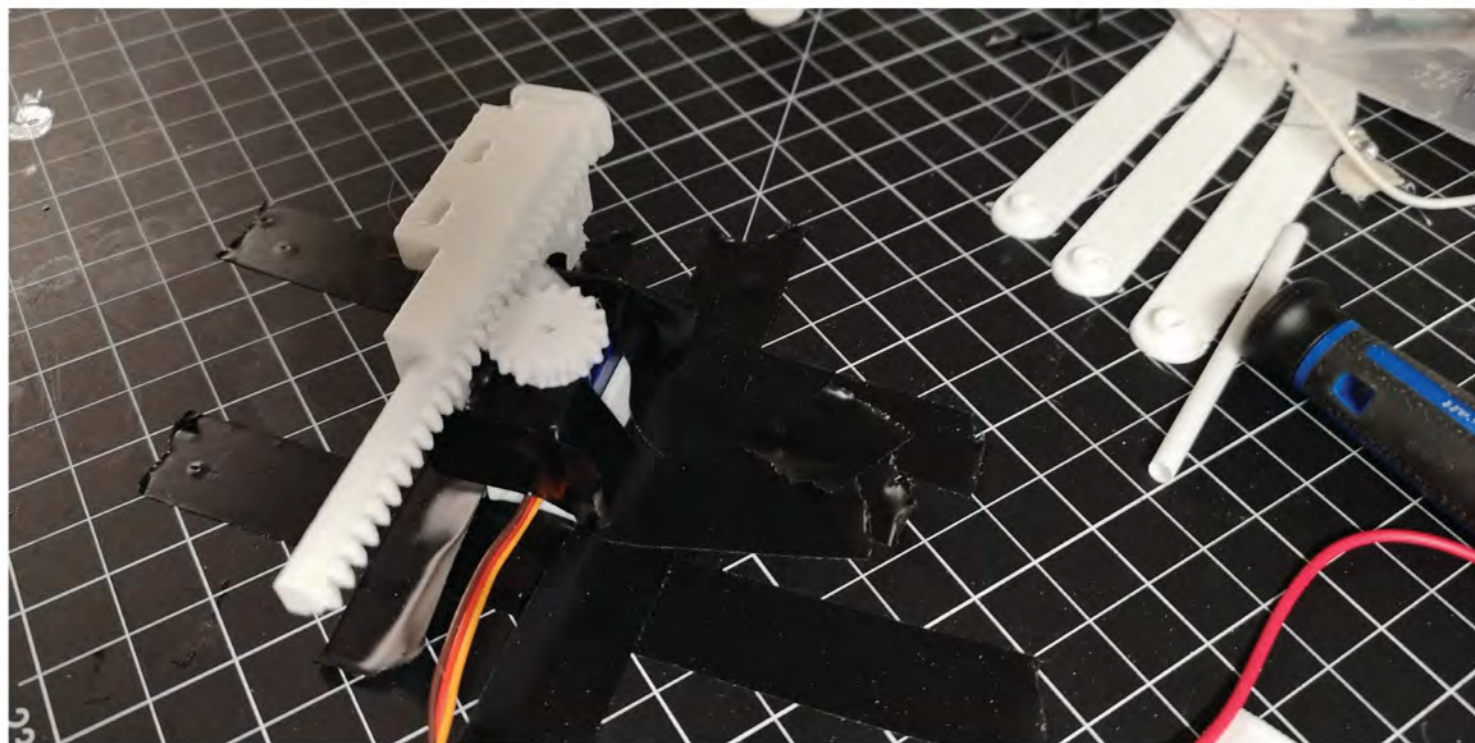
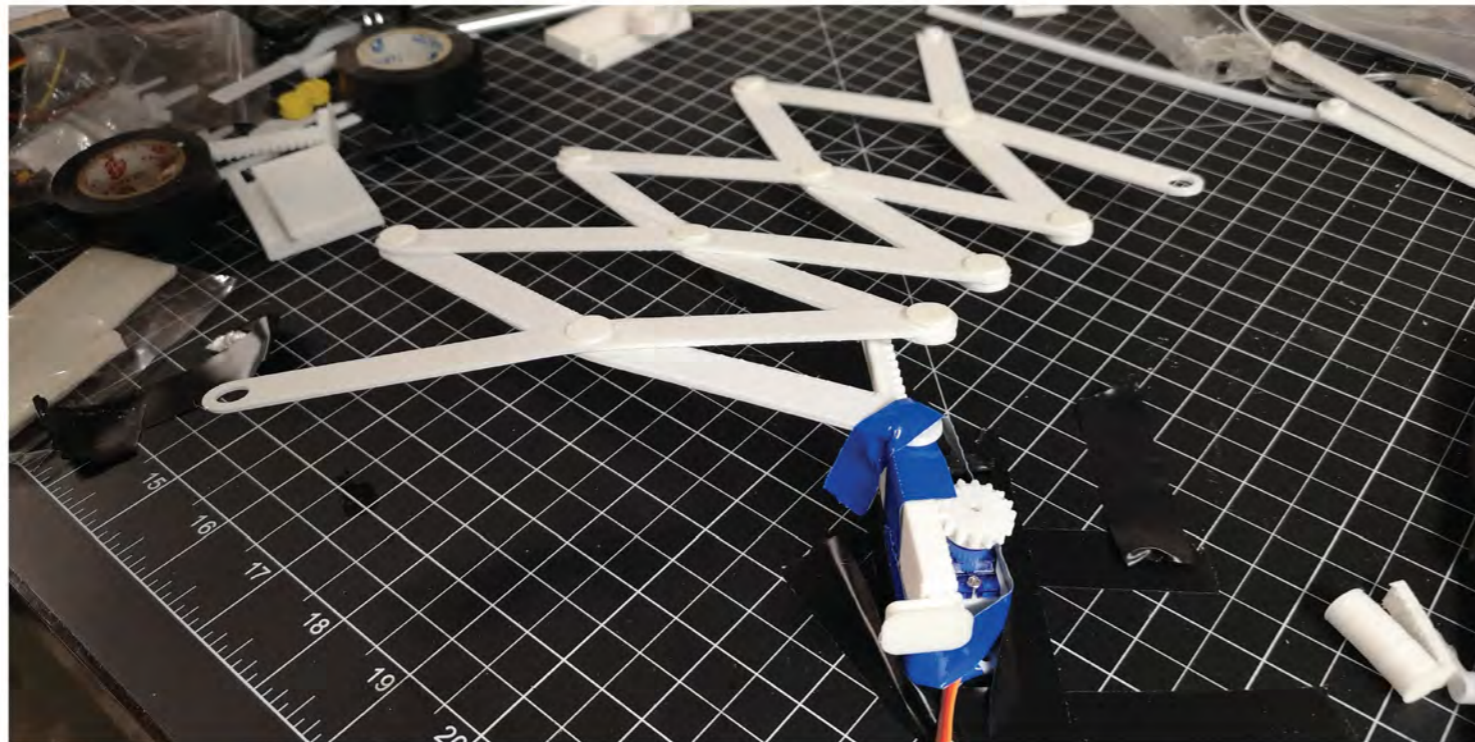
Designing parts on Fusin 360 to 3D print



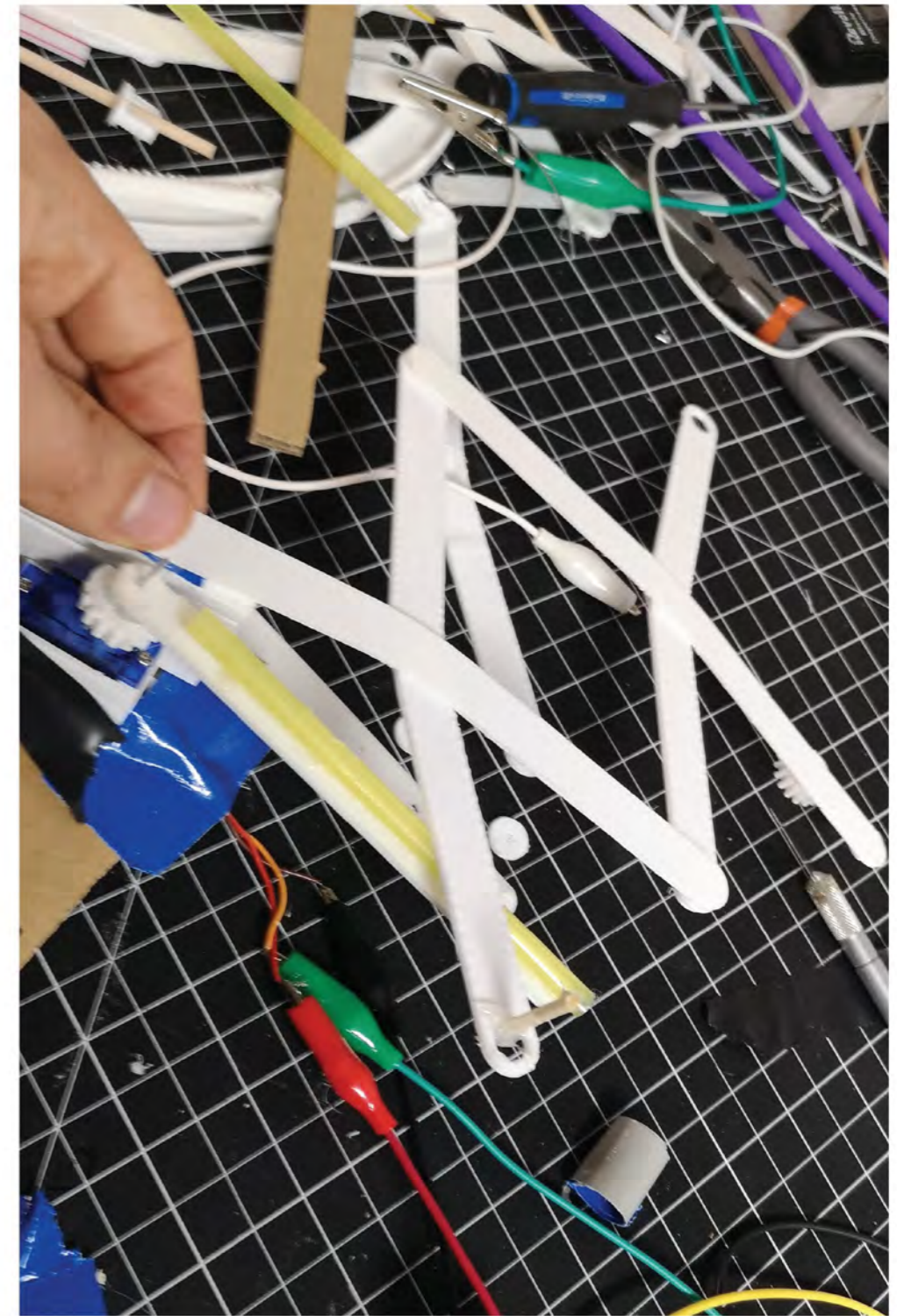
3D print all the components



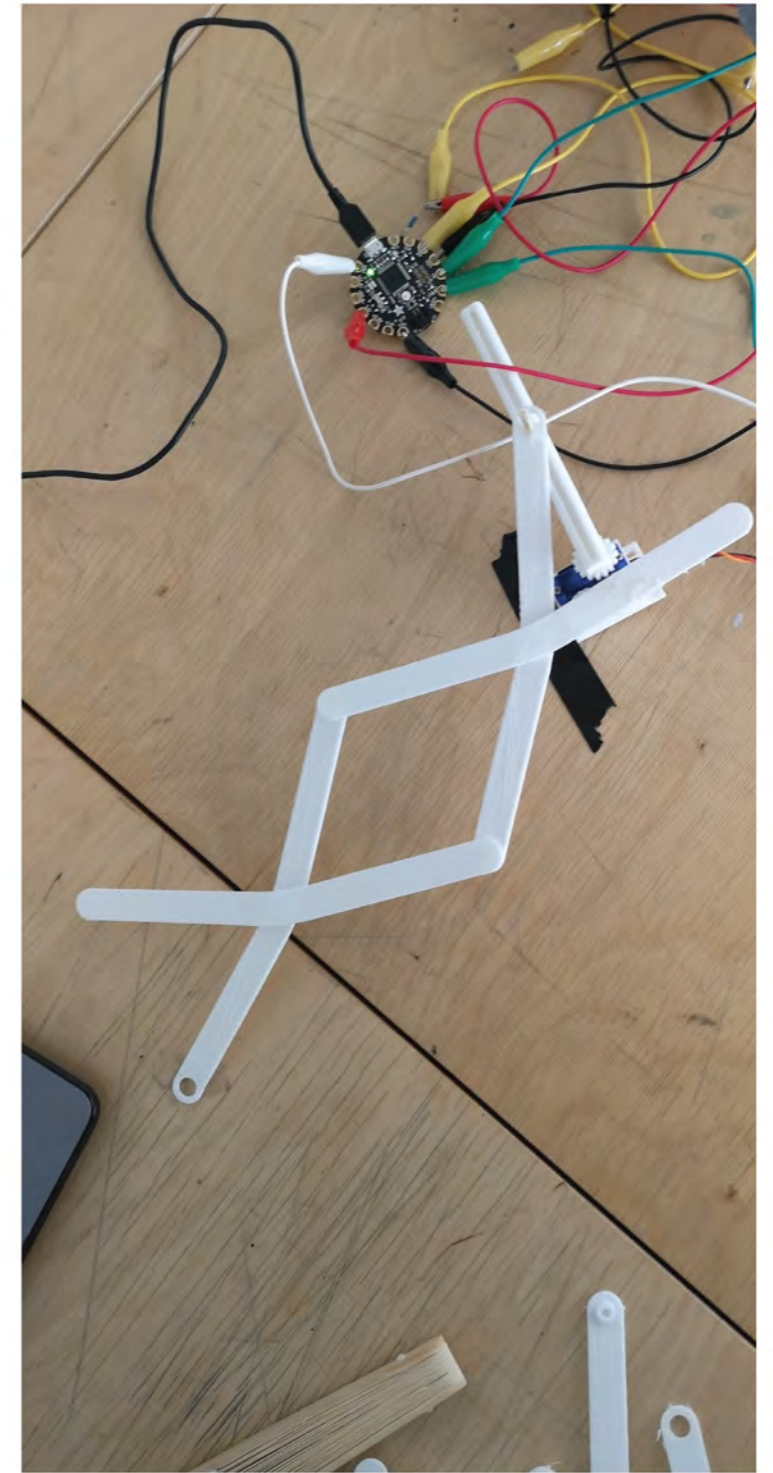
Try servo with linear movement.
Short distance / I avoided.



Used straw to test servos circular movement
& This mechanical movement worked best.



Working on the track that will hold the pin in its place. Test the movement & succesful.

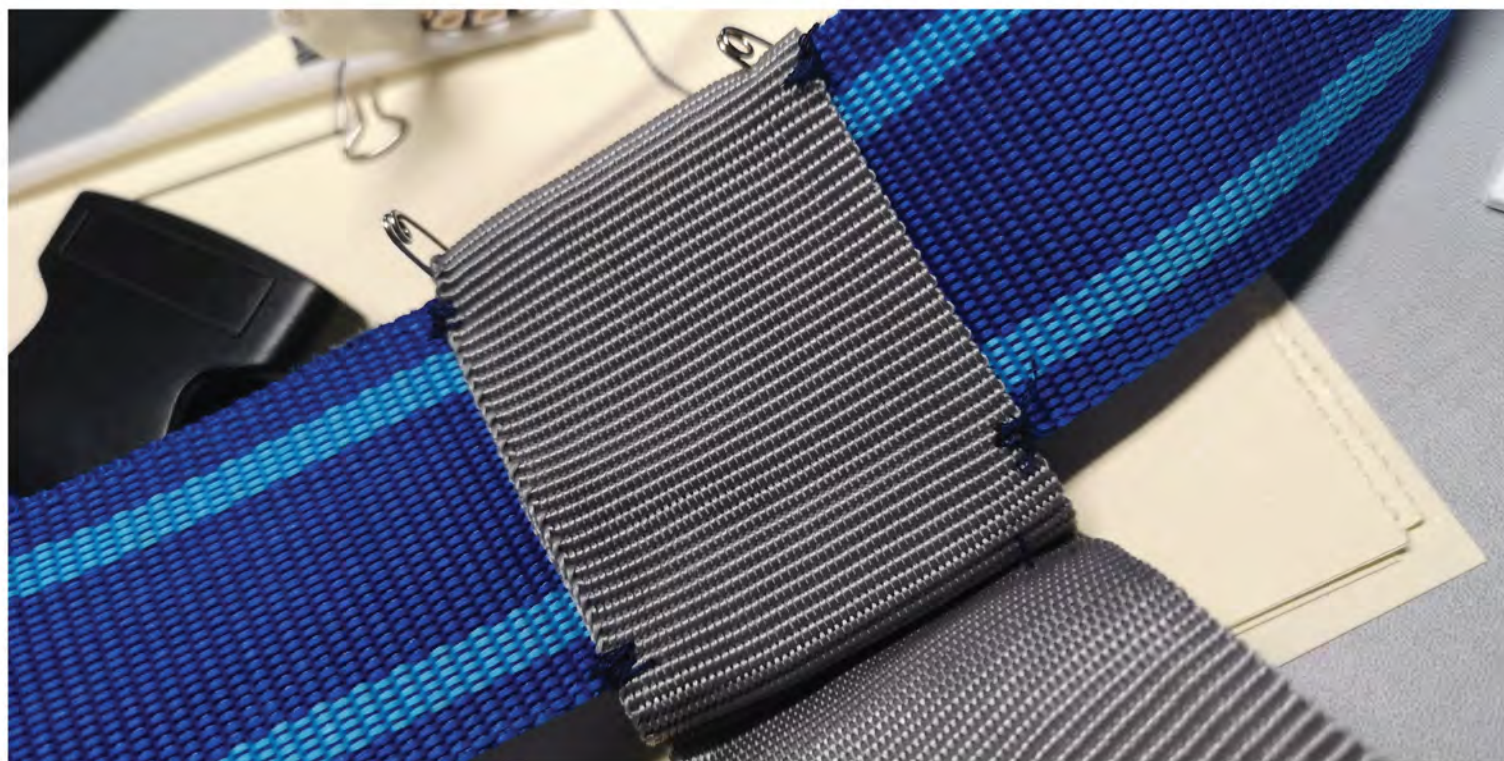


3D Printed and installed parts tried the mechanism movement with flora adafruit controller. All working ready to intall it on the harness.

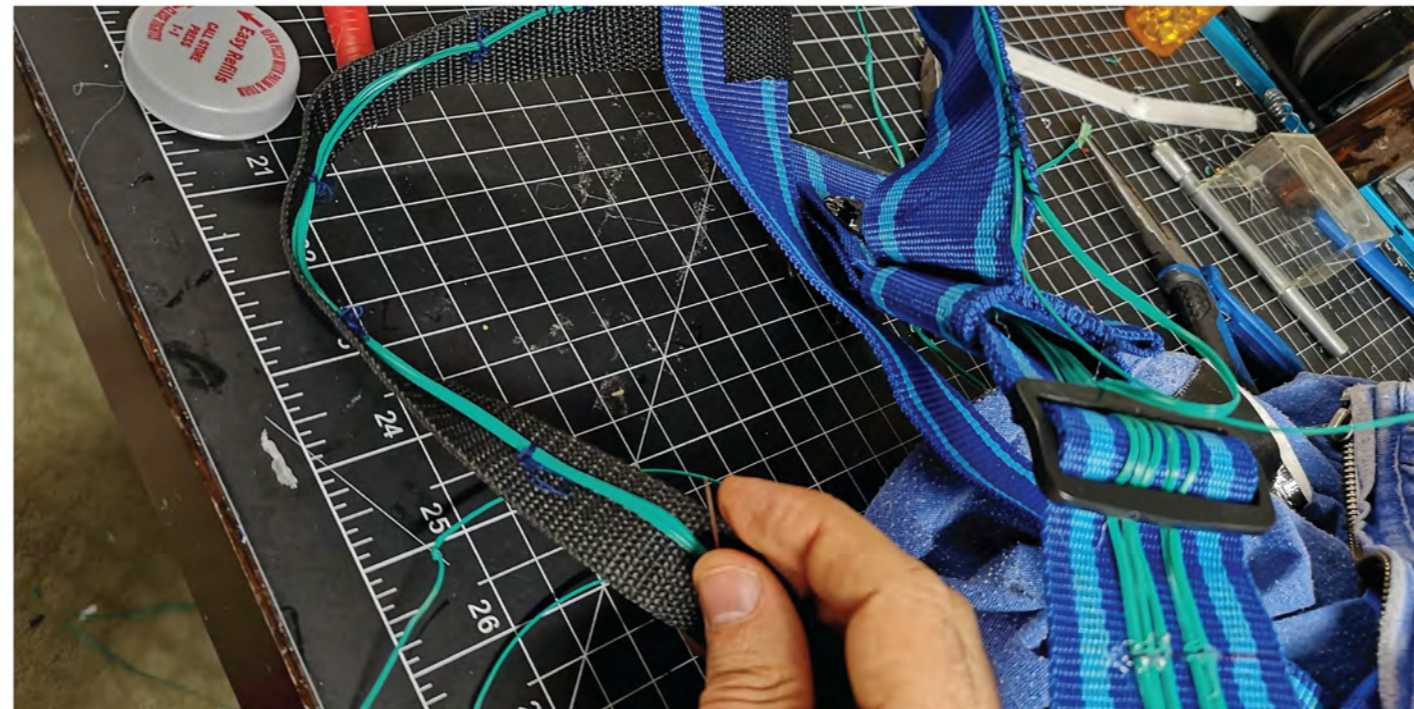
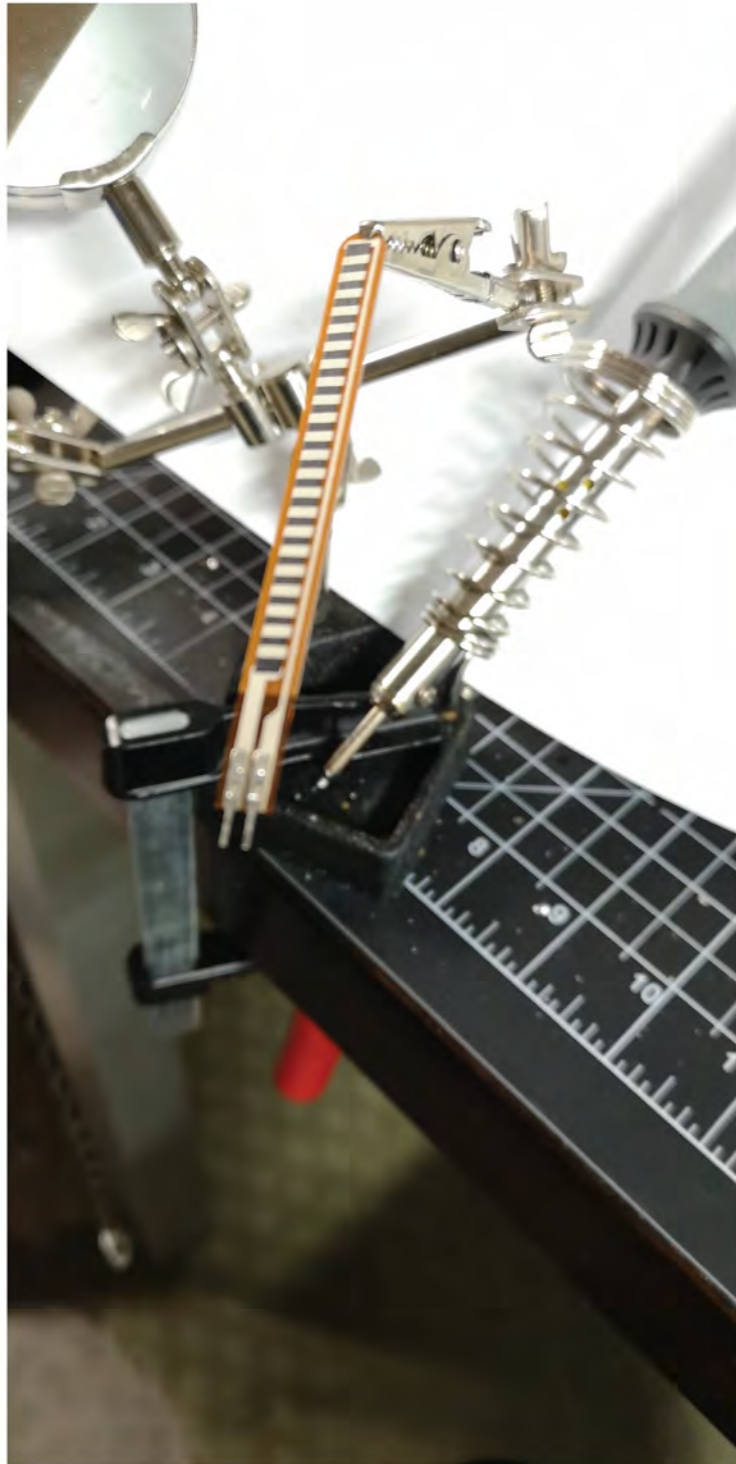


Stiching and building the harness

First use long-sleeves t-shirt but abandon the idea because it will be difficult to put on and off the components on the body



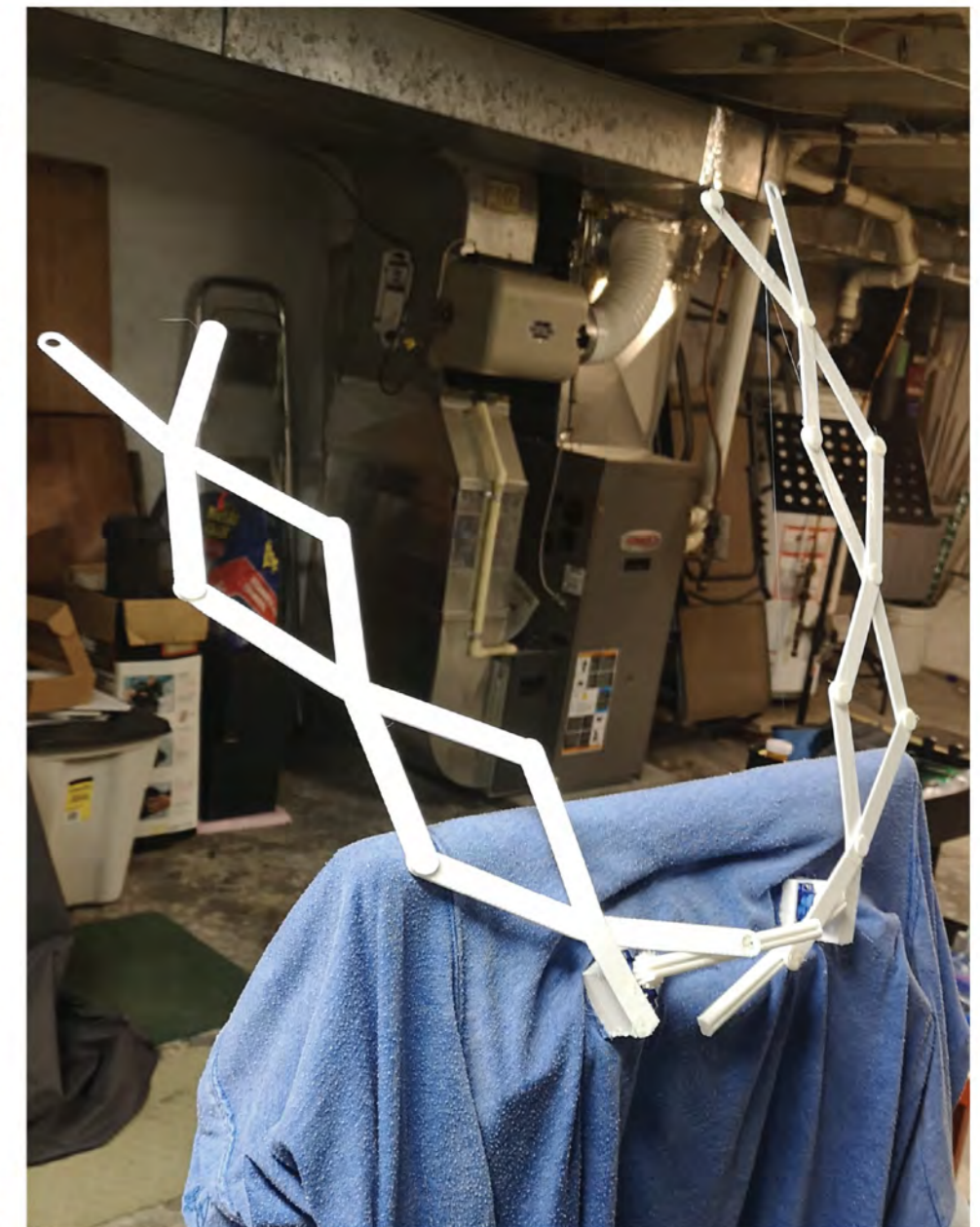
Soldering the flex sensor and placing on the arm where it is comfortable.



Attaching the cables and electronic components on the harness.
Stiching and placing the harness onto the hoodie.



Testing all the movement.



Testing all the components and mechanical movement.



Challenges and failures

- I discovered how little knowledge I have of my own physical dimensions and how difficult it was to adapt my ideas to my own physical form.
- My initial design was based upon a pullover long-sleeved t-shirt but I discovered that it was more practical to use a cardigan type hoody.
- Servo motors are in general designed to move in a circular motion but I needed something that would move in a linear back and forth fashion. It took a long time for me to solve this adaptation problem.

Critique Reflection

- Creating the idea in my head was easy but producing it in real life was very difficult.
- Working within the limits of my own body gave me empathy for those who are truly physically disabled.

Video of final work

- <https://www.dropbox.com/s/aaqxgd72kegmn18/2019-04-01%2009.14.17.mp4?dl=0>
- <https://www.dropbox.com/s/gpuxe7m3k2s8cgh/2019-04-03%2009.16.32.mp4?dl=0>

Successes and moving forward

- While it didn't end up looking the way I thought I was still very satisfied with the way it worked. For my future project I will use more powerful servos to carry more weight and that would allow me to increase the length.
- I would also try to design a cover to mask the mechanism and make it more appealing.
- I believe that my design could be used to provide some sort of bio-feedback when being used by patients who are receiving physiotherapy. If their motion is correct then my design could give them a positive affirmation.