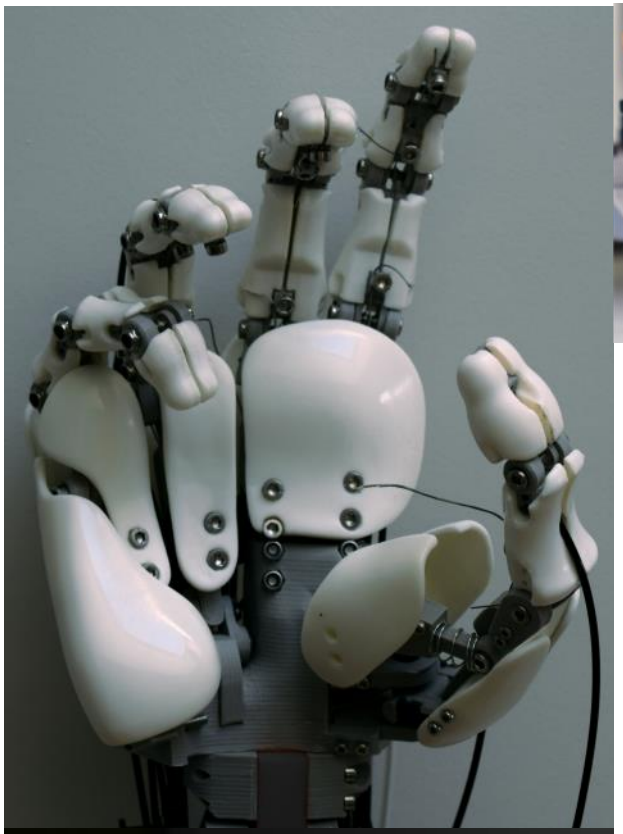

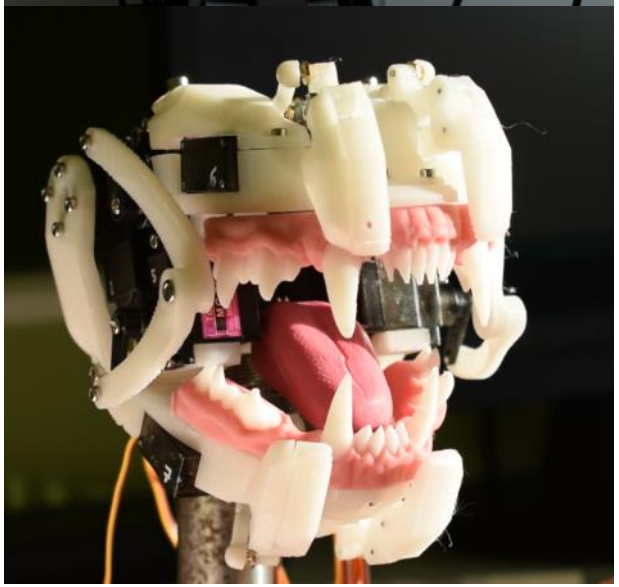

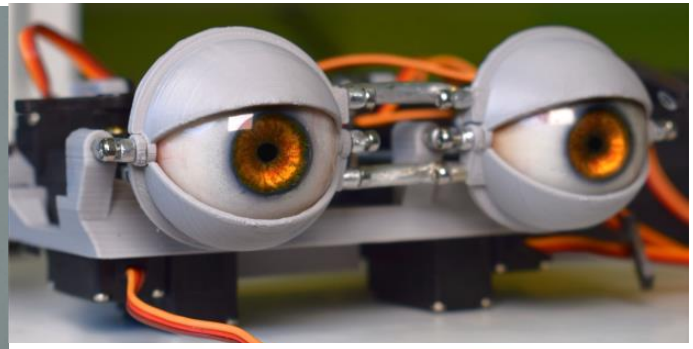

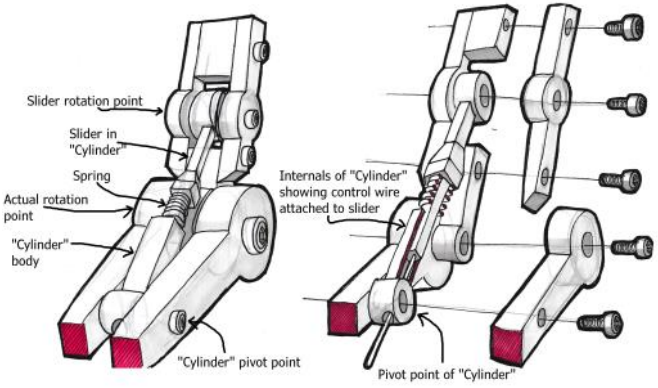

WILL COGLEY

PORTFOLIO

- Product Development
- Engineering
- Conceptualisation
- Prototyping
- Visualisation
- Computational Analysis
- Research
- Documentation

CONTACT:
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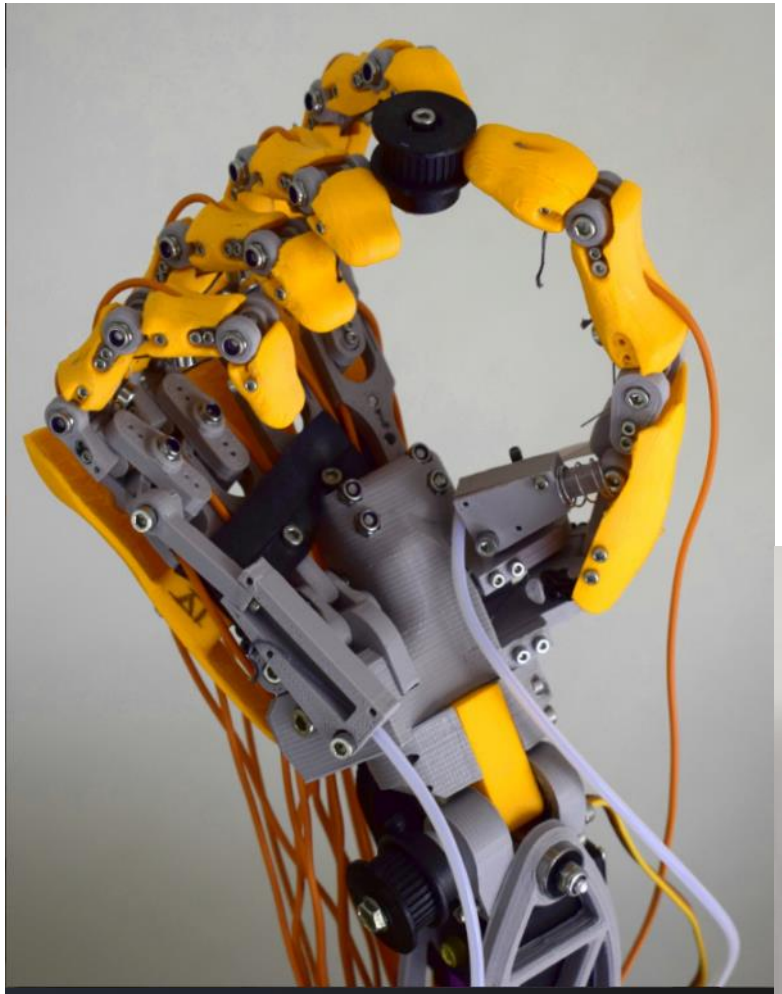
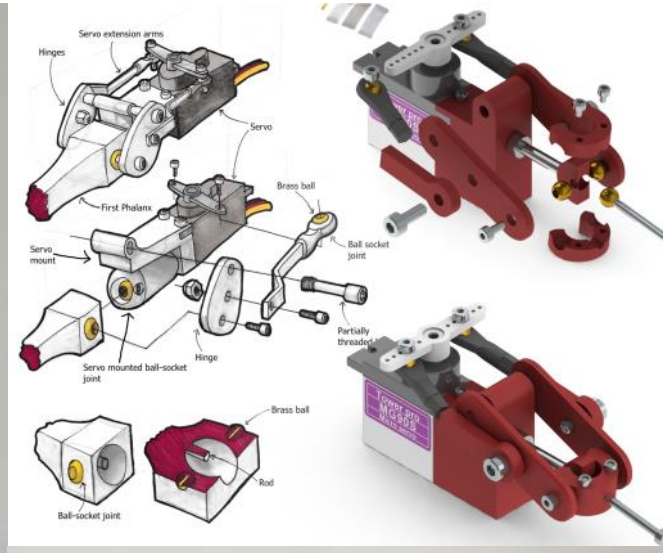
BIOMIMETIC MECHATRONIC HAND

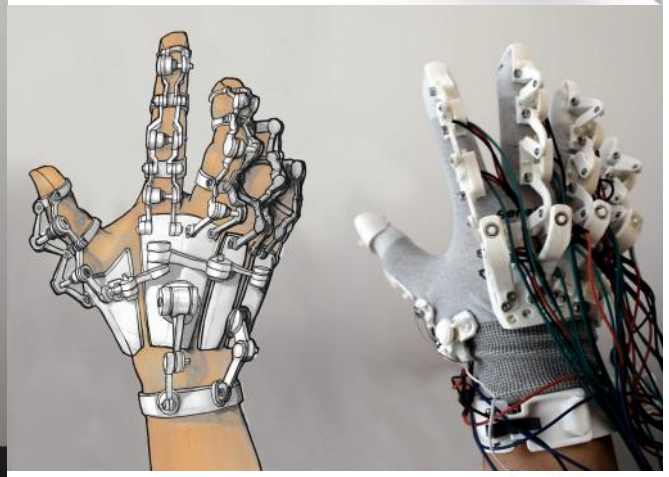
Winner of the Institution of Mechanical Engineers Project Award 2017/18
Graded 88%
Project Poster Award 2nd Place

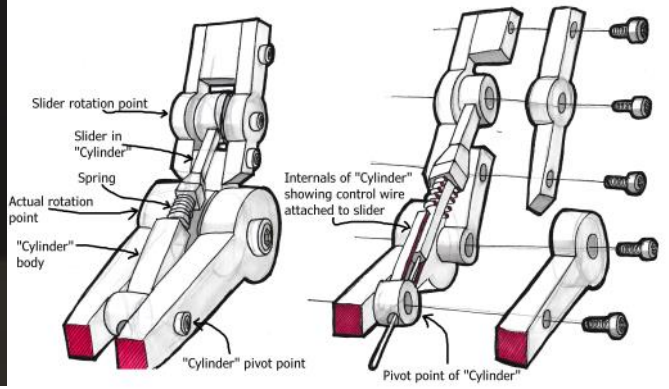
A bionic hand designed with a focus on mimicking biological function, with an accompanying control glove. Final prototype was shown to be a feasible design with 27 degrees of freedom, winning the Institution of Mechanical Engineers Project Award as a design with vastly higher articulation than many bionic hand designs. Developed skills in research, CAD, 3D printing, visualisation, electronics/programming with Arduino, Unity, Blender and project management.

- Conceptualisation
- CAD
- Engineering
- Prototyping
- Visualisation
- Programming

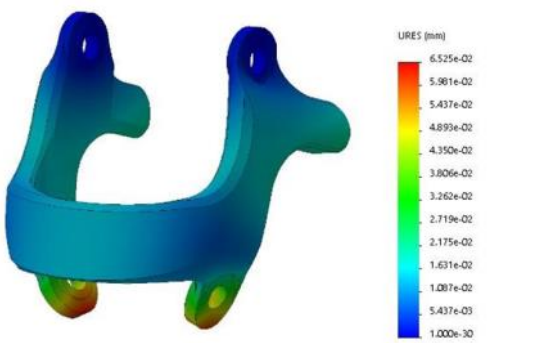


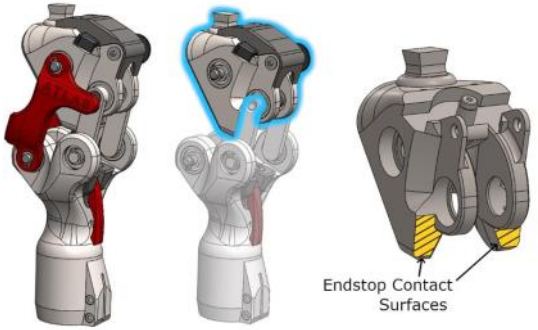


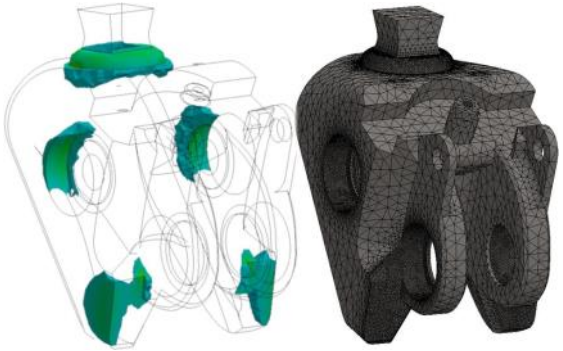


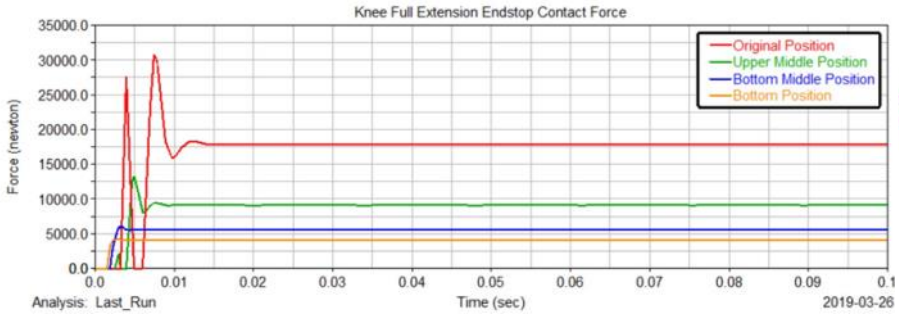


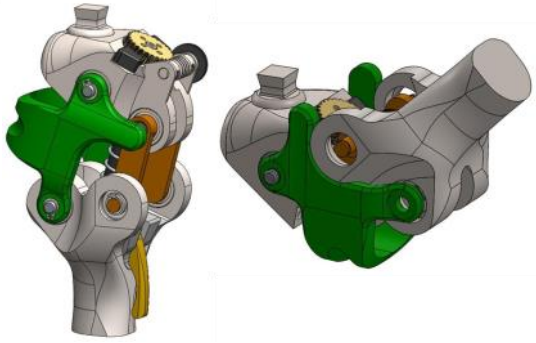
INNOVATIVE ADUSTABLE PROSTHETIC KNEE











Winner of the Institution of Mechanical Engineers Project Award 2018/19
Graded 85%
Project Poster Award 2nd Place

Designed, built and computationally analysed a prosthetic leg intended to be a budget alternative to microprocessor-controlled prosthetics, including rapidly-selectable modes for different sports and activities.

Effectively lead a small team, taking an idea from the early conceptualisation stages through to refinement, engineering analysis and prototyping.

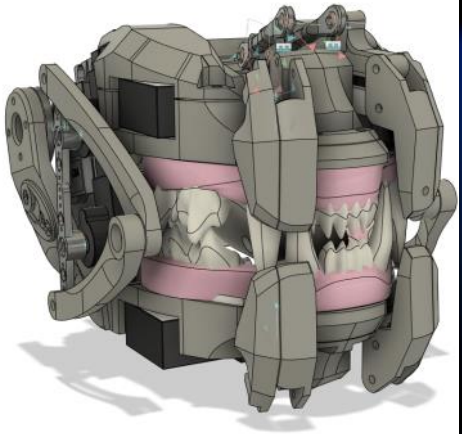
- **Product Development**
- **Conceptualisation**
- **CAD**
- **Engineering**
- **Prototyping**
- **Visualisation**
- **FEA and Multi-Body Simulation**
- **Teamwork and Leadership**

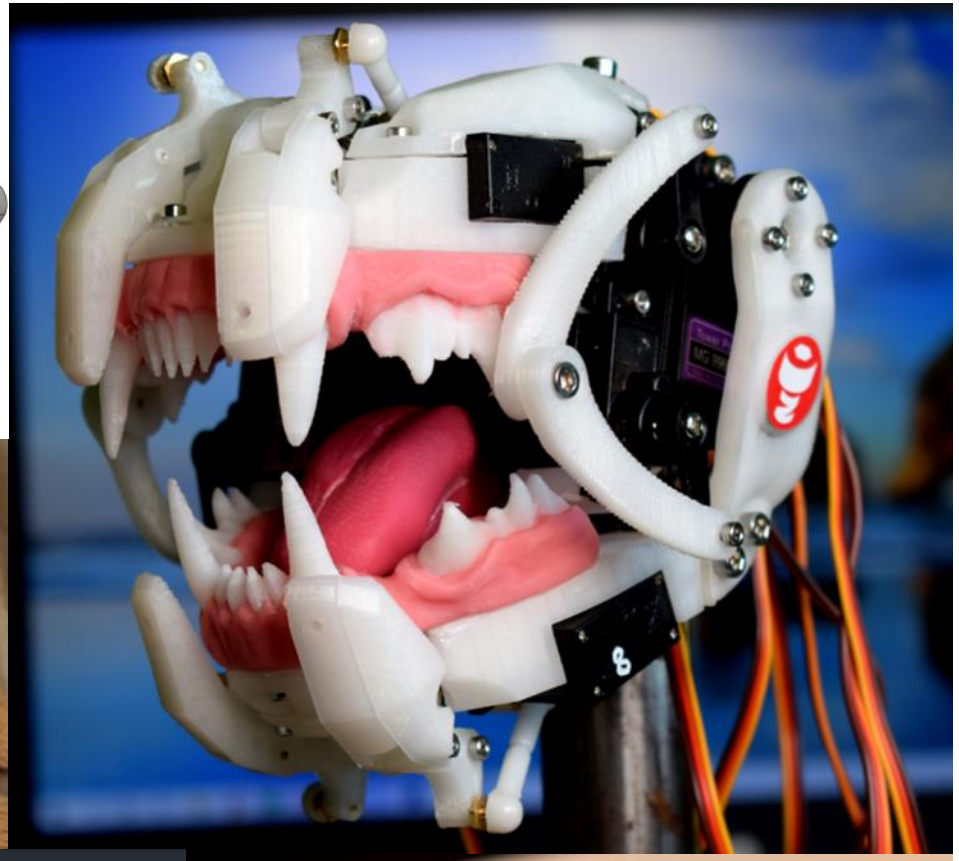
ANIMATRONIC MOUTH
+ SPEECH SYNTHESIS

Designed and built an animatronic mouth which simulates speech with lip, jaw and tongue movements. Alongside the mechanical design, software was built to take a user's sentence as an input and translate it into a sequence of phonetics, which were matched to pre-programmed mouth positions. This greatly streamlined the process of creating an animation sequence from an audio sample.

The project was open-source, and thoroughly documented with accompanying assembly videos, diagrams and written instructions to assist hobbyists in building the project.

- Conceptualisation
- CAD
- Engineering
- Prototyping
- Visualisation
- Programming
- Documentation



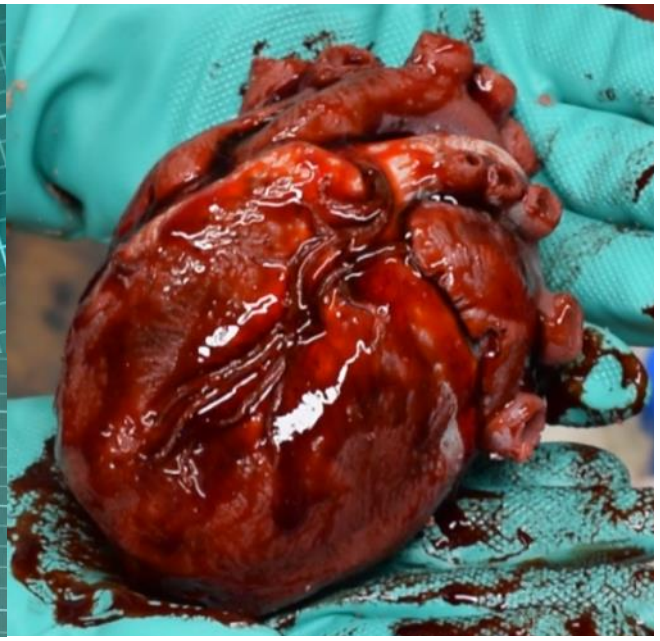


Programming > 0 Python > ARPAbet_Text_to_pronunciation.py > ...

```python
import nltk
import time
import serial

arpabet = nltk.corpus.cmudict.dict()
ser = serial.Serial('COM4',9600) #Change this to the port your arduino is connected to

while True:
    #Take input sentence and separate into a list
    print('Enter your sentence:')
    your_sentence = input()
    your_sentence = your_sentence.split()
    print("You Typed:", your_sentence)

    #Find arpabet translation of each word in the sentence and store in result array
    result = []
    for words in (your_sentence):
        result.append(arpabet[words])
    array_length = len(result)

    #Print each phoneme seperated by a "."
    for x in range(0, array_length):
        word_length = len(result[x][0])
        for y in range(0, word_length):
            print(result[x][0][y], end = '')
            ser.write(result[x][0][y].encode())
            print(".", end = '')
            ser.write('.'.encode())
    print("$", end = '')
    ser.write('$'.encode())

    print(" wrote to arduino")
```

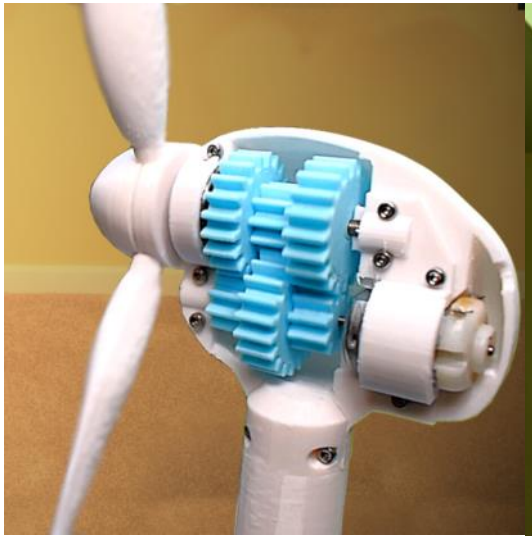
EASY-ASSEMBLY SERVO TESTER

Another project called for a tool which could adjust 16 actuators simultaneously, which initially appeared to require a complex assembly and wiring process. The optimised design could be assembled with a single 3D-printed shape, which was folded up to contain the circuitry and wiring. This folding design made the wiring process very simple.



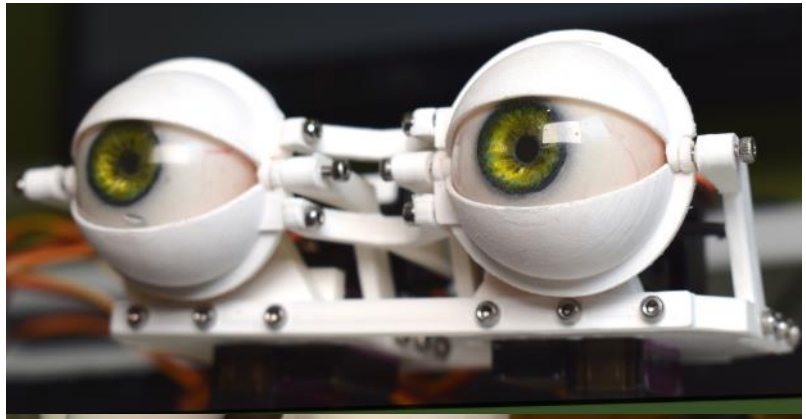
REALISTIC ANIMATRONIC HEART

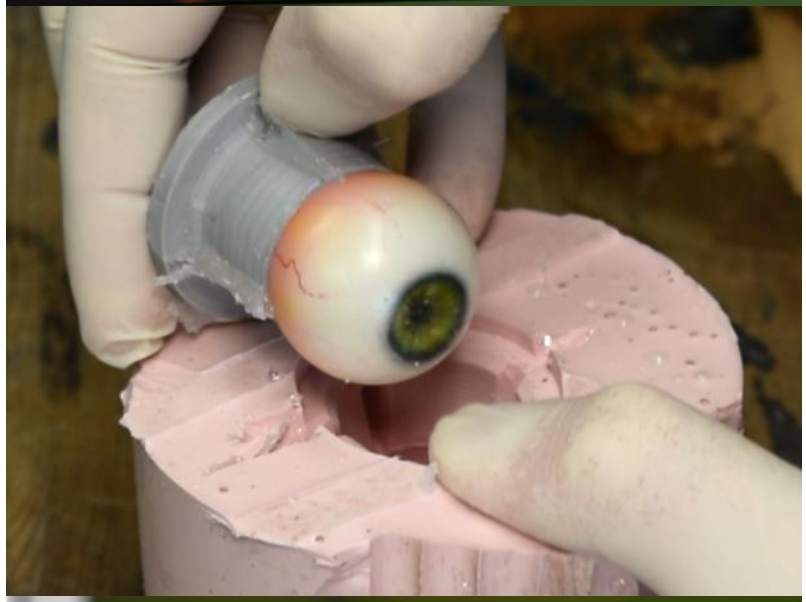
A compact and effective mechanism which uses a microcontroller to create a natural and fluid motion. The project required careful planning to fit the three actuators and two circuit boards within the enclosed space. A silicone jacket was fitted to the mechanism which greatly added to the realism. Featured on Arduino.cc, Adafruit.com, Hackster.io and Instructables.com.

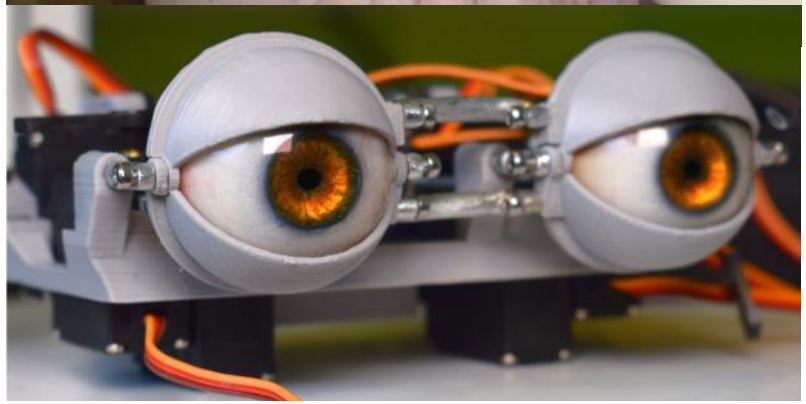


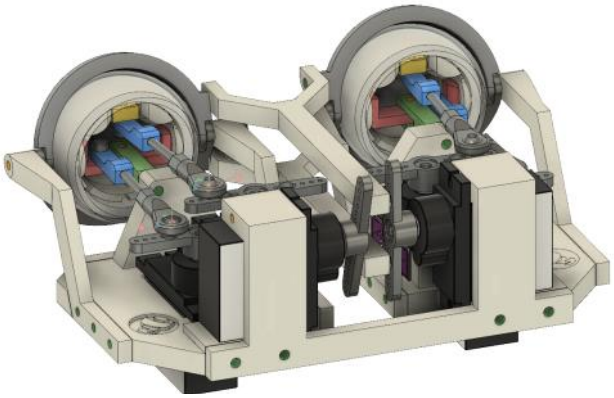
WIND TURBINE MODEL

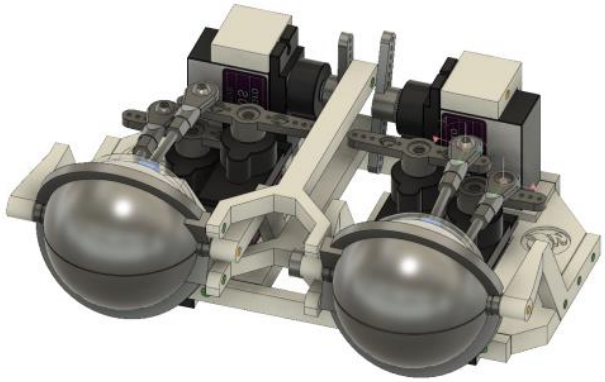
As part of a video review for a STEM education focused 3D printer manufacturer, I designed and built a simple wind turbine model which showcased a simple gear train when air was blown at the model. I was able to demonstrate the 3D printer's efficacy with a project that would be suitable for the manufacturer's target market.

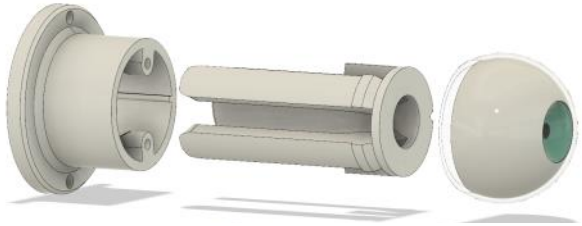


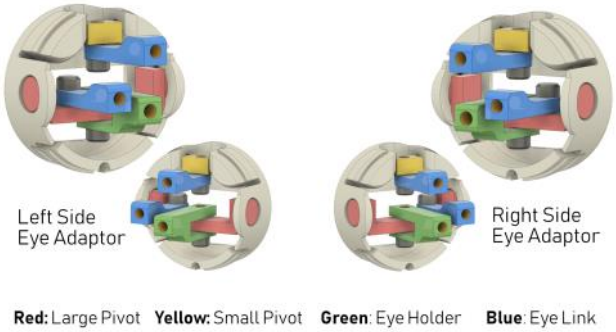












STANDARDISED ANIMATRONIC EYE SYSTEM

Featured on Arduino.cc, Adafruit.com, Hackster.io and Instructables.com

Created a system with which eyes for animatronic mechanisms can be painted, cast and assembled with one standardised snap-fitting. Using this system, multiple different open-source mechanism designs were created for different skill levels and price ranges.

These designs were documented in various formats, notably videos, diagrams and instructions to make assembly accessible to a broad audience.

Conceptualisation .
CAD .
Engineering .
Prototyping .
Visualisation .
Programming .
Documentation .