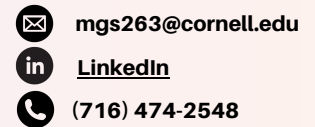


MADELINE MAE SLIWINSKI

MECHANICAL ENGINEERING AT CORNELL UNIVERSITY



CUSTOM WHEELCHAIR TABLE

Cornell Assistive Technologies



What?

- Low cost custom table designed to interface with a custom-made wheelchair

How?

- Designed in **Fusion360**. Assembled in a machine shop with **power tools**, **band saw**, **lathe**, and a **laser cutter**

Results

- Given to a gentleman in Ithaca for free. Interfaced with his wheelchair on the first client meeting

ADAPTED TOY CAR

Cornell Assistive Technologies



How?

- Collaborated with occupational therapists at Ithaca College for an event called GoBabyGo. The goal was to adapt a toy car on site with **power/hand tools** and **solder** for boy named River who has cerebral palsy

Results

- Within eight hours, we fully rewired the steering to be controlled by a joystick so the car could be used with one hand. We designed trunk support using a paddle board and pool noodle, and a PVC pipe stand for the joystick [Video](#)

IMPROVING PERFORMANCE OF BOX FAN BLADE

MAE 3230: Intro Fluid Mechanics



How?

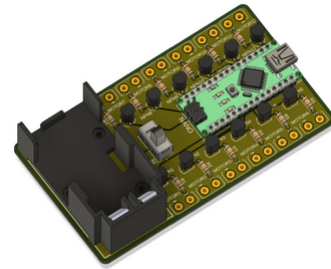
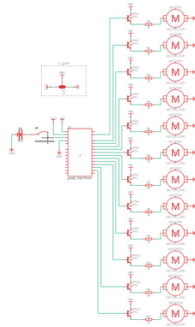
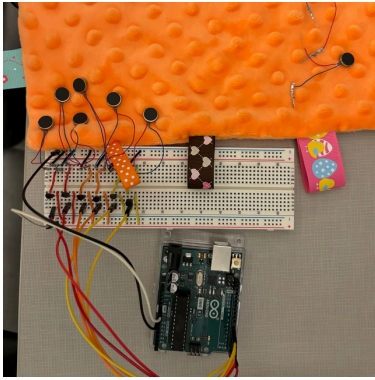
- Took apart a box fan and cut cross sections of the fan to measure and model on **Fusion360**. Measured fan speeds using an anemometer.

Results

- Found an optimal angle of attack from the measured geometry to be used if the fan were to be redesigned to provide optimal cooling power. Analyzed the box fan using concepts of fluid mechanics [Video](#)

SENSORY MUSIC TOUCH PAD

Cornell Assistive Technologies



What?

- Collaboration with TST Boces to develop a touchpad that releases a pattern of vibrations for a deaf student to feel music.

How?

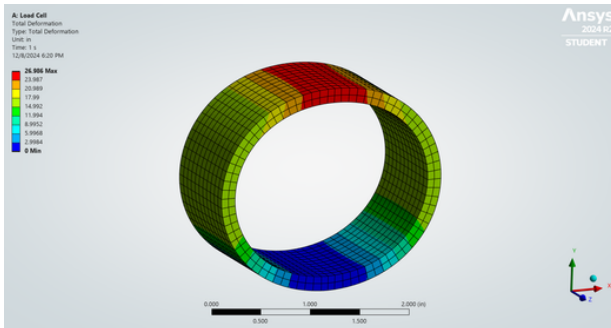
- Prototyped the initial design using an **Arduino** and vibration motors. Then led a team to design a **custom PCB** in **Fusion360**.

Results

- Learned how to design a custom Printed Circuit Board. Continuously reiterating on the code to improve musical vibration patterns.

ANALYSIS OF A LOAD CELL USING FEM

MAE 3270: Mechanics of Engineering Materials



How?

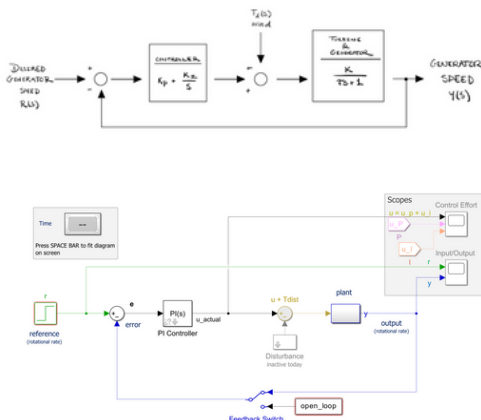
- Applied the finite element method on a load cell using **Ansys** to predict how a given geometry and material behaves under certain loading conditions.

Results

- Learned how to use results from Ansys to redesign a load cell to meet design specifications, full analysis.

WIND TURBINE PI CONTROLLER

MAE 3260: System Dynamics



How?

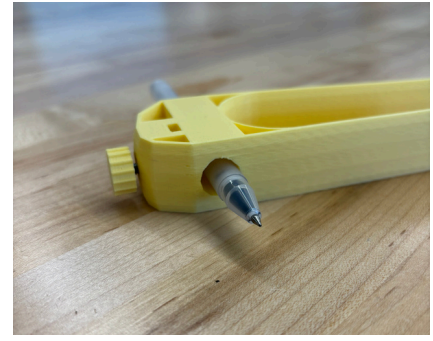
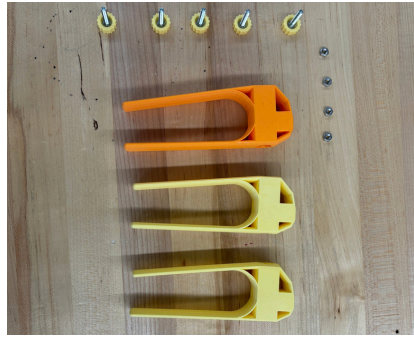
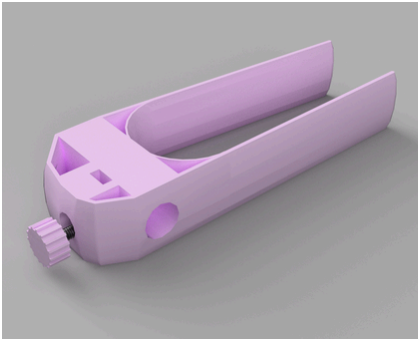
- Using **MATLAB Simulink** to simulate a model that keeps generator speed constant while pitch angles of a wind turbine are adjusted for maximum power generation.

Results

- Developed a block diagram, picked a control type, and derived differential equations to model the system.

PEN HOLDER WITH THUMBSCREW

Cornell Assistive Technologies



What?

- Design a pen holder for people with motor disabilities to stabilize writing
- Eliminate the need for a screwdriver to change the pen, thus promoting independence

How?

- Designed in **Fusion360**. Used assembly features such as revolute joints to verify tolerances before printing.

Results

- Given to a family in Ithaca who shared the pen holders with their local school.

ASSISTIVE ZIPPER PULL

Cornell Assistive Technologies



What?

- Design a zipper pull for people with motor disabilities
- Eliminate the need for assistance thus promoting independence. Also, helps develop pincer grasp with limited hand mobility.

How?

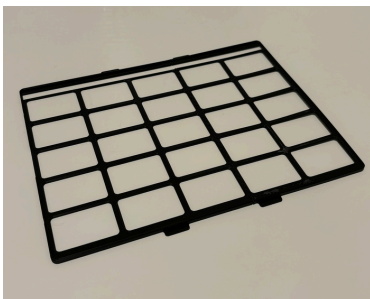
- Designed in **Fusion360** then 3D printed vertically with low infill to be lightweight and smooth.

Results

- Given to a family in Ithaca

KEYGUARDS

Cornell Assistive Technologies



What?

- Design a keyguard that interfaces with an iPad and nonverbal communication apps
- Provides a clear barrier between buttons to prevent misclicks for those using typing aids or with limited hand mobility.

How?

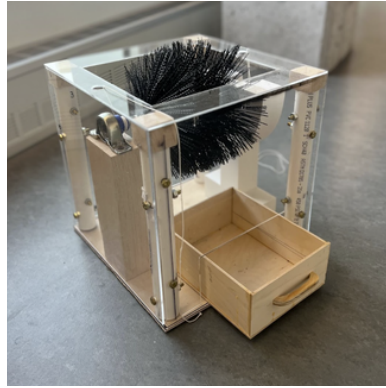
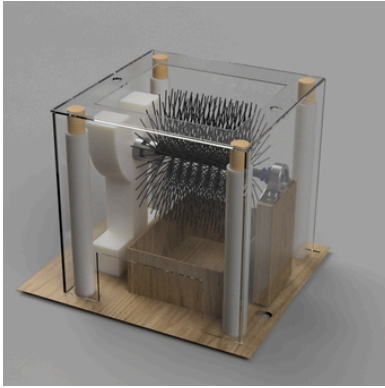
- Designed in **OpenSCAD** then 3D Printed with dovetail joints toleranced to fit together.

Results

- Given to a family in Ithaca

SHOE CLEANING DEVICE

MAE 2250: Mechanical Synthesis



What?

- Final prototype created as part of a team in an open design project

How?

- Designed in **Fusion360**.
- Developed rapid prototyping skills such as laser cutting, 3D printing and use of power tools .

Results

- Mechanically automated mechanism that has its own resetting mechanism
- Achieved 1.5 factor of safety

CAD MODELS

MAE 2250: Mechanical Synthesis



What?

- Modeled everyday objects in from real life measurements

How?

- Designed in **Fusion360**.
- Used measurement tools such as calipers ensure accuracy