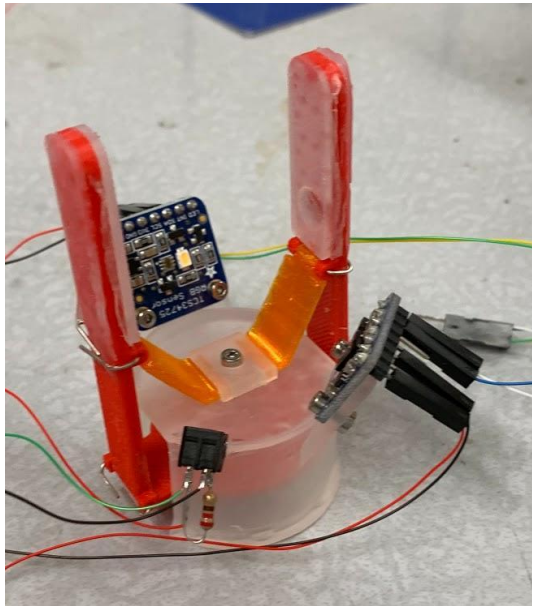
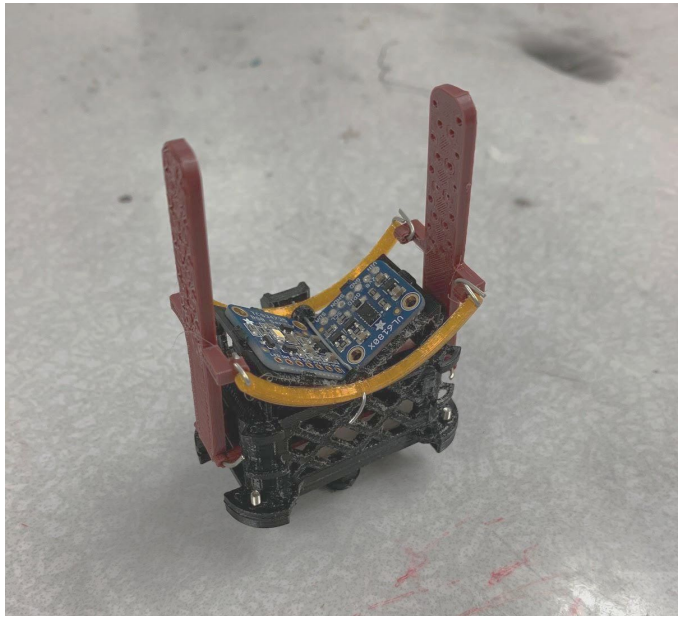
Portfolio

Lucas A Semitka

Robotic Gripping Head Redesign (Senior Design Project)





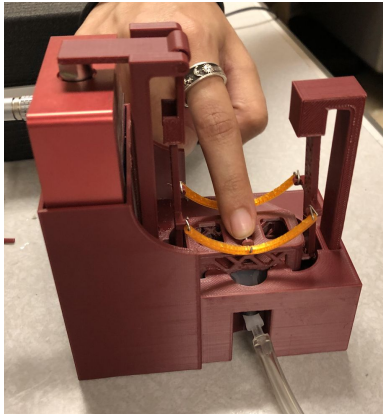
Gripper Redesign - Palm Comparison

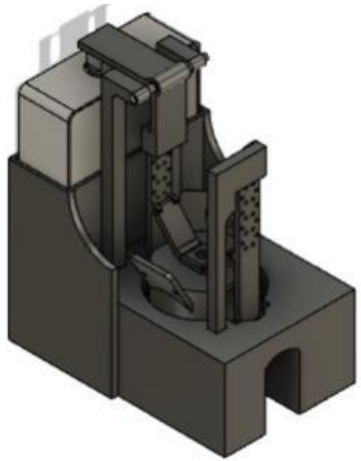
Characteristic	Original Value	Percent Reduction	Final Value	Target Value
Volume	2.218E4 mm^3	6.5%	2.082E4 mm^3	1.774E4 mm^3 (∽20% reduction)
Weight	∽40 g	27.5%	29 g	30 g (~25% reduction)
Footprint	2484 mm^2	19.6%	1997.5 mm^2	1987 mm^2 (∽20% reduction)

Testing

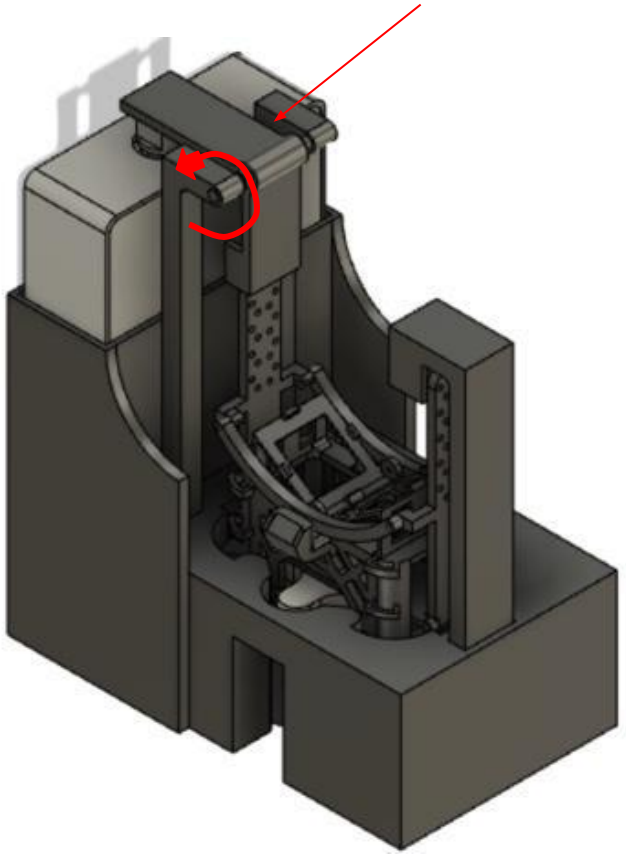
Trial	New Gripper Force (N)	Old Gripper Force (N)
1	3.02	1.02
2	1.4	0.98
3	2.45	1.07
4	2.98	1.31
5	2.18	1.64
6	2.87	1.75
7	2.48	N/A
Average	**2.48**	**1.295**

- One finger locked, other applies force to a hinge that is touching the force sensor
- Bladder at max inflation distance



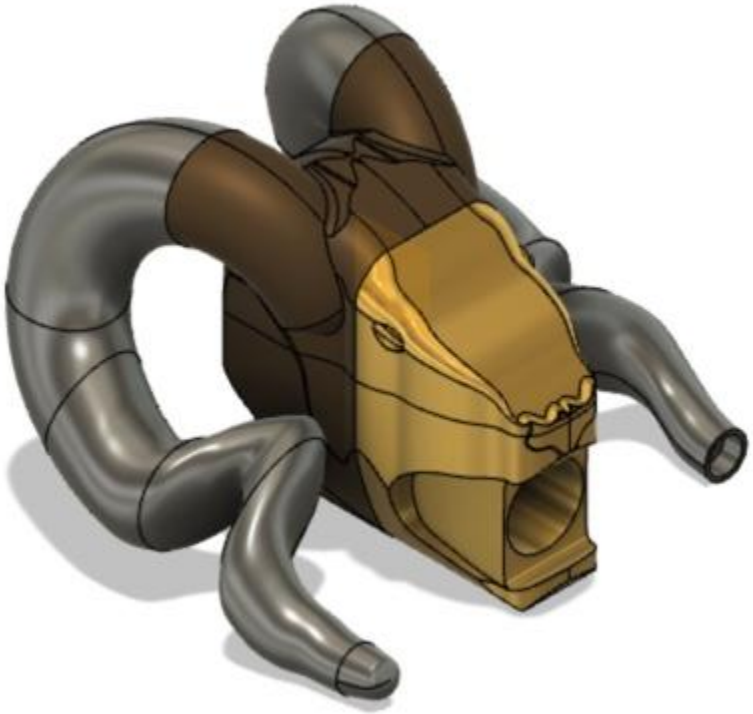


Hinge System

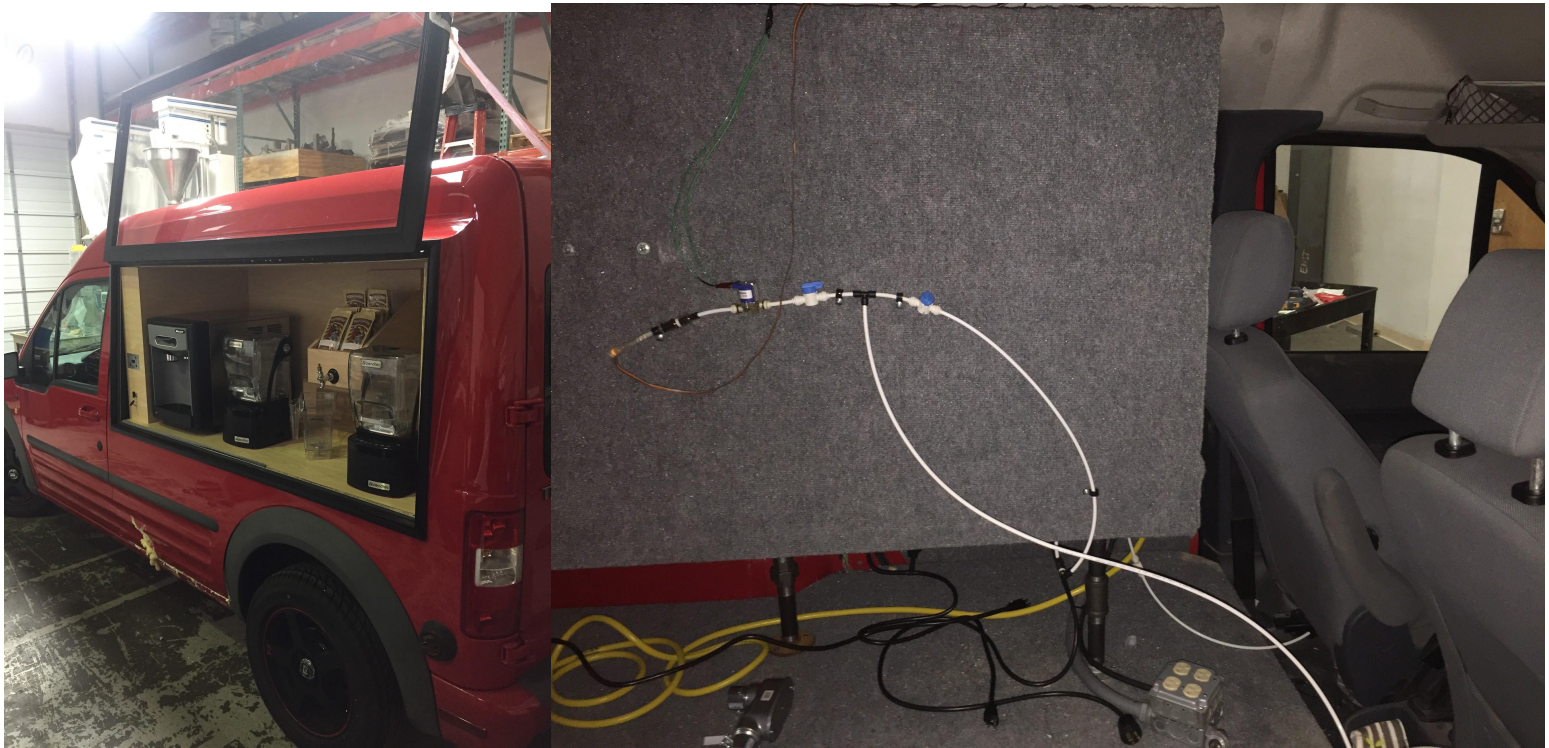


3D Printed Table Idea

3D Printed Ram Head Speaker, Printing in Progress

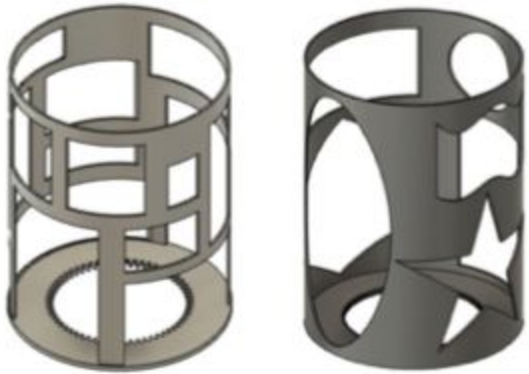


Internship 2018 (Food Demo Van Interior remodel)



Product: Rotating Picture Projecting Lamp

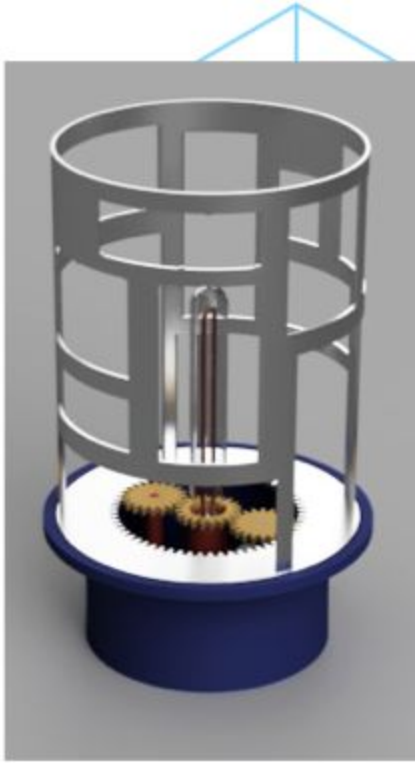
- Pictures are chosen by customers, printed semi-transparently and inserted into cut-outs on lamp
- Cut-outs have small slots to fix pictures in place
- Light located in center projects colored images onto wall
- Adjustable rotation speed controlled by stepper motor
- Cable of cutting out small messages on sides



3D printed customizable portion

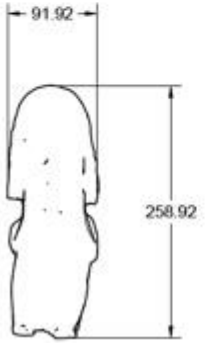
Printing

- Printed on FDM printer using PLA with small amounts of support structure
- FDM chosen because dimensional accuracy and surface finish are less important than cost
- Large size printed frame depicted: 6”x6”x8”



Full Lamp

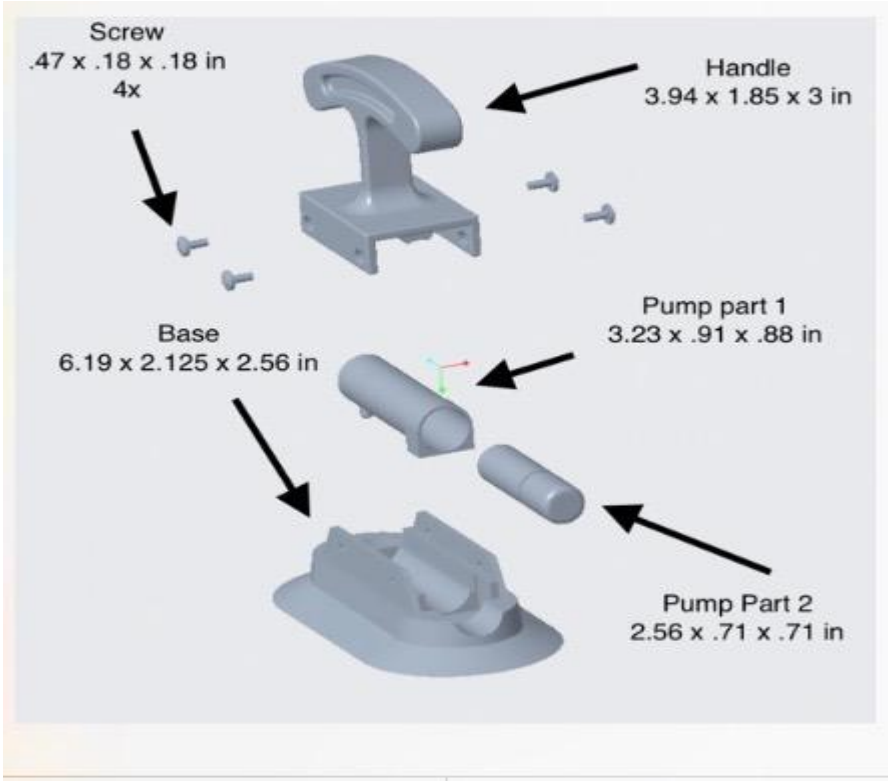
3D Scanning Project



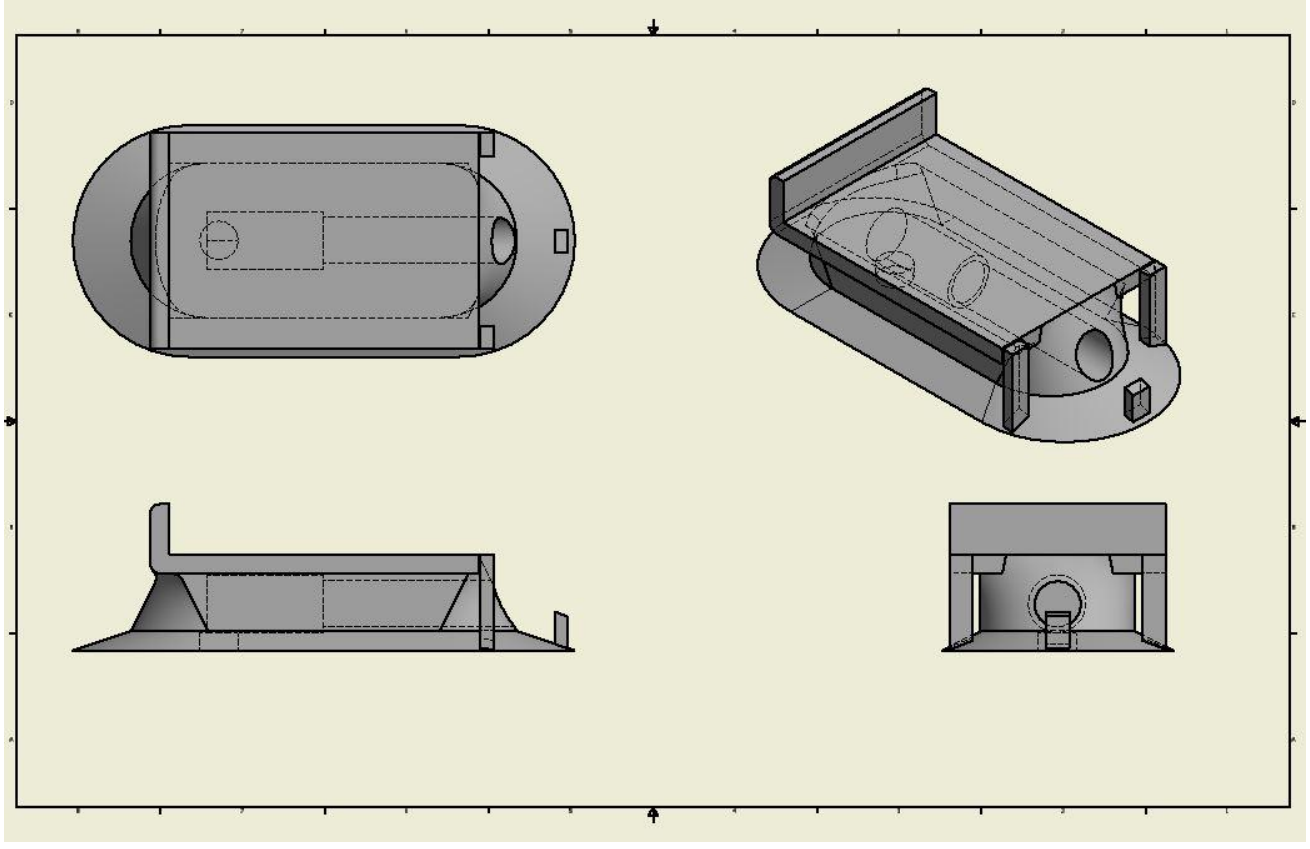
Design for Manufacturability main project, product redesign

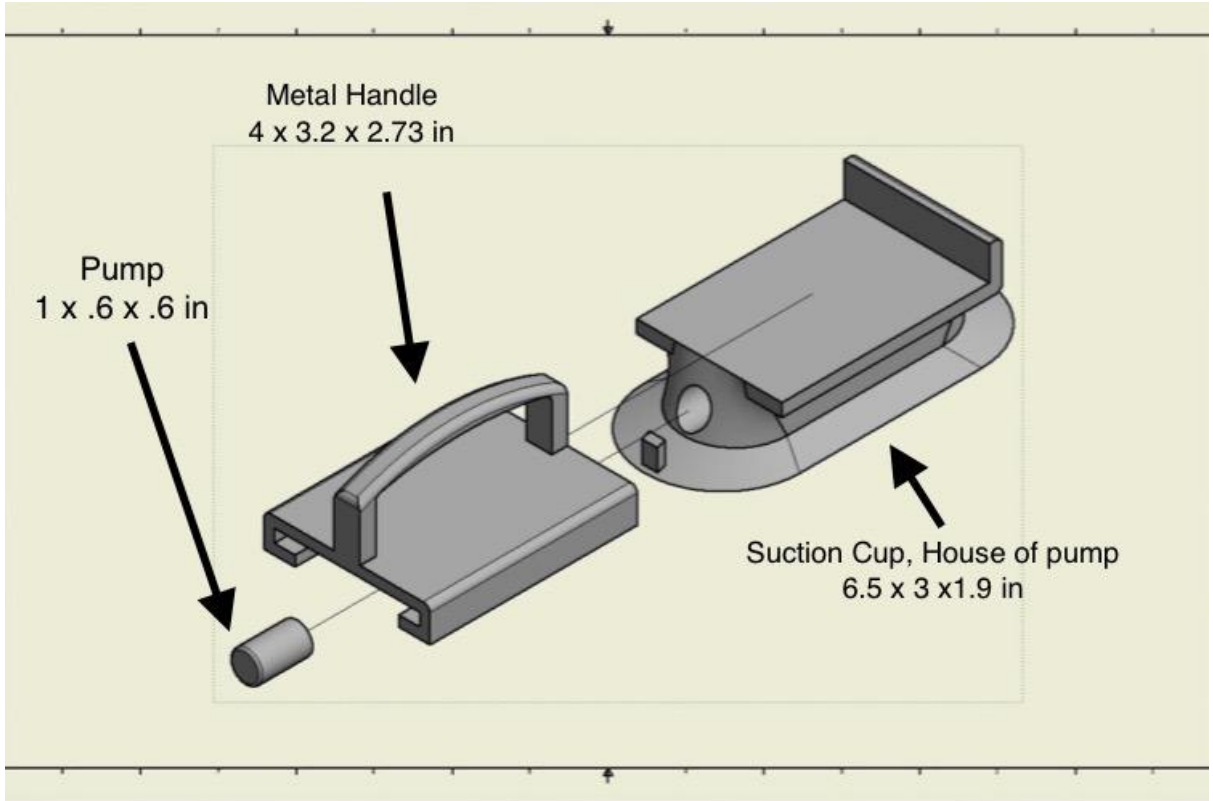
I redesigned a glass suction cup to reduce cost of this product (estimated ⅓ of original manufacturing cost) and improve functionality. I created a CAD file of the finished design using Autodesk Inventor as well as 3D printed a prototype.

Original design



Redesign




Metal Handle
4 x 3.2 x 2.73 in
Pump
1 x .6 x .6 in
Suction Cup, House of pump
6.5 x 3 x1.9 in

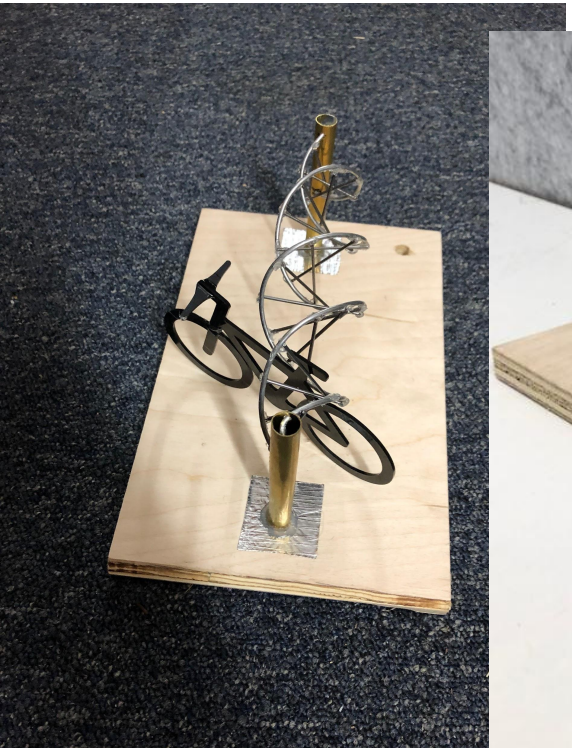
RC helicopter CAD creation project

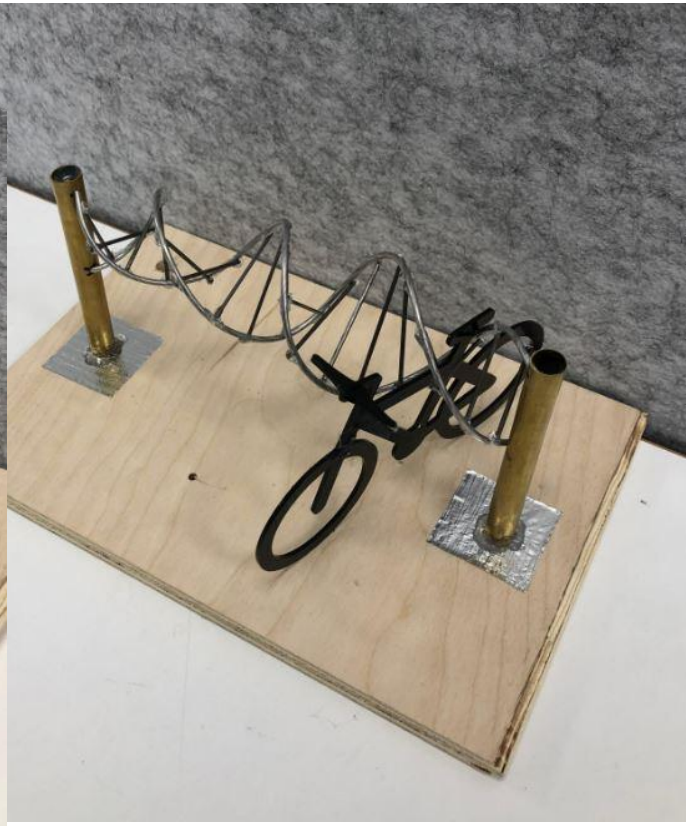
I created an assembly CAD file of an RC helicopter for a class project using Inventor.

Real Product

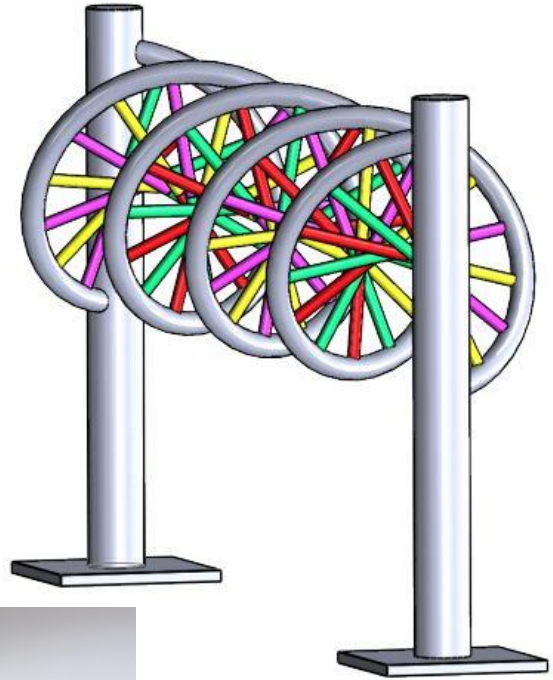
CAD rendering

Bike Rack Design Project

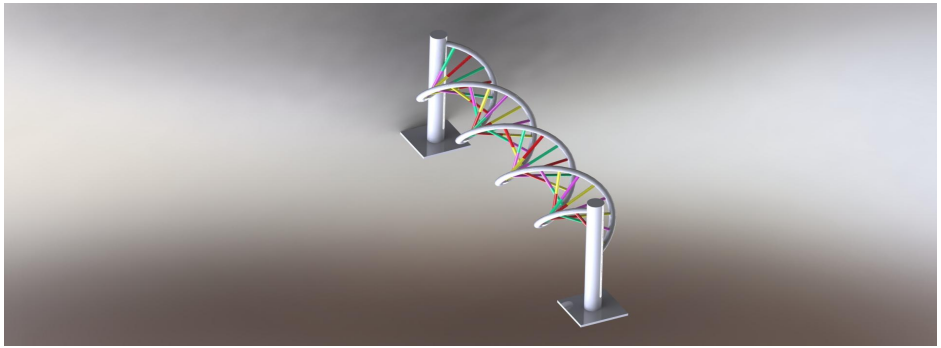


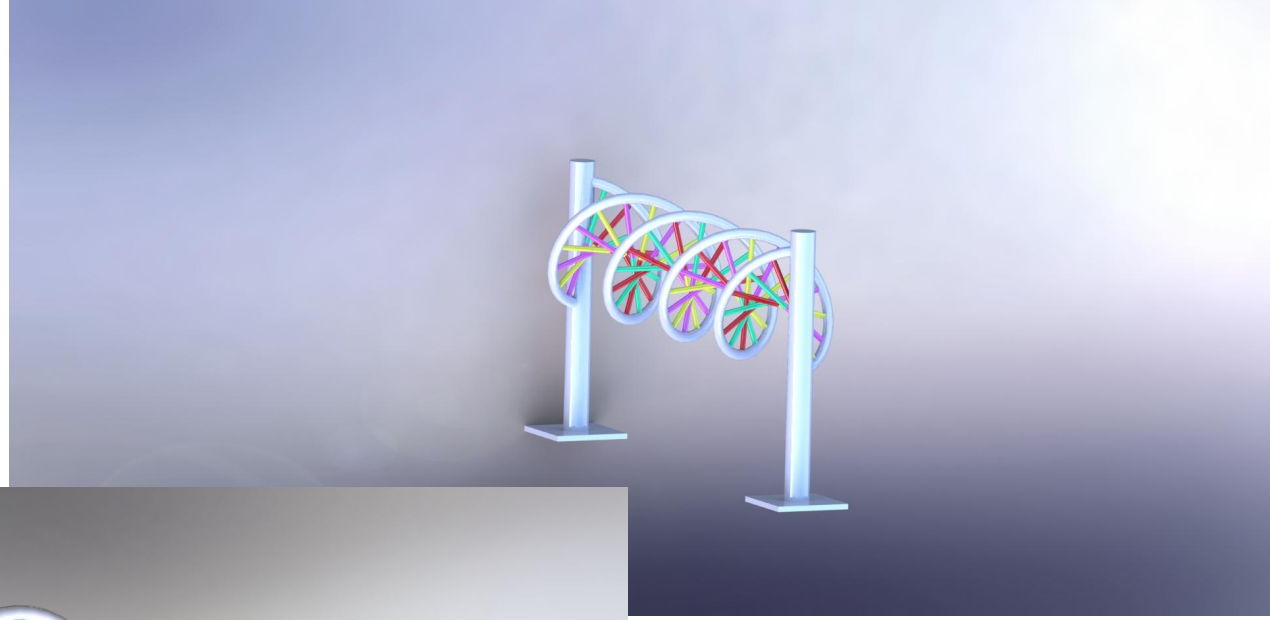


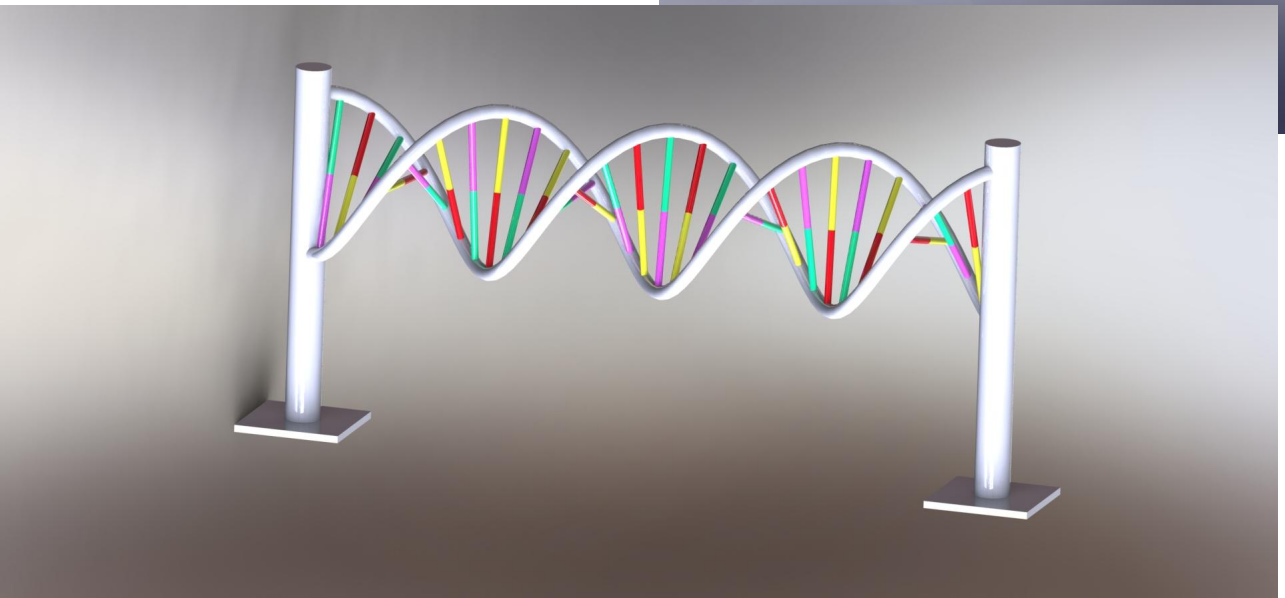
Renderings



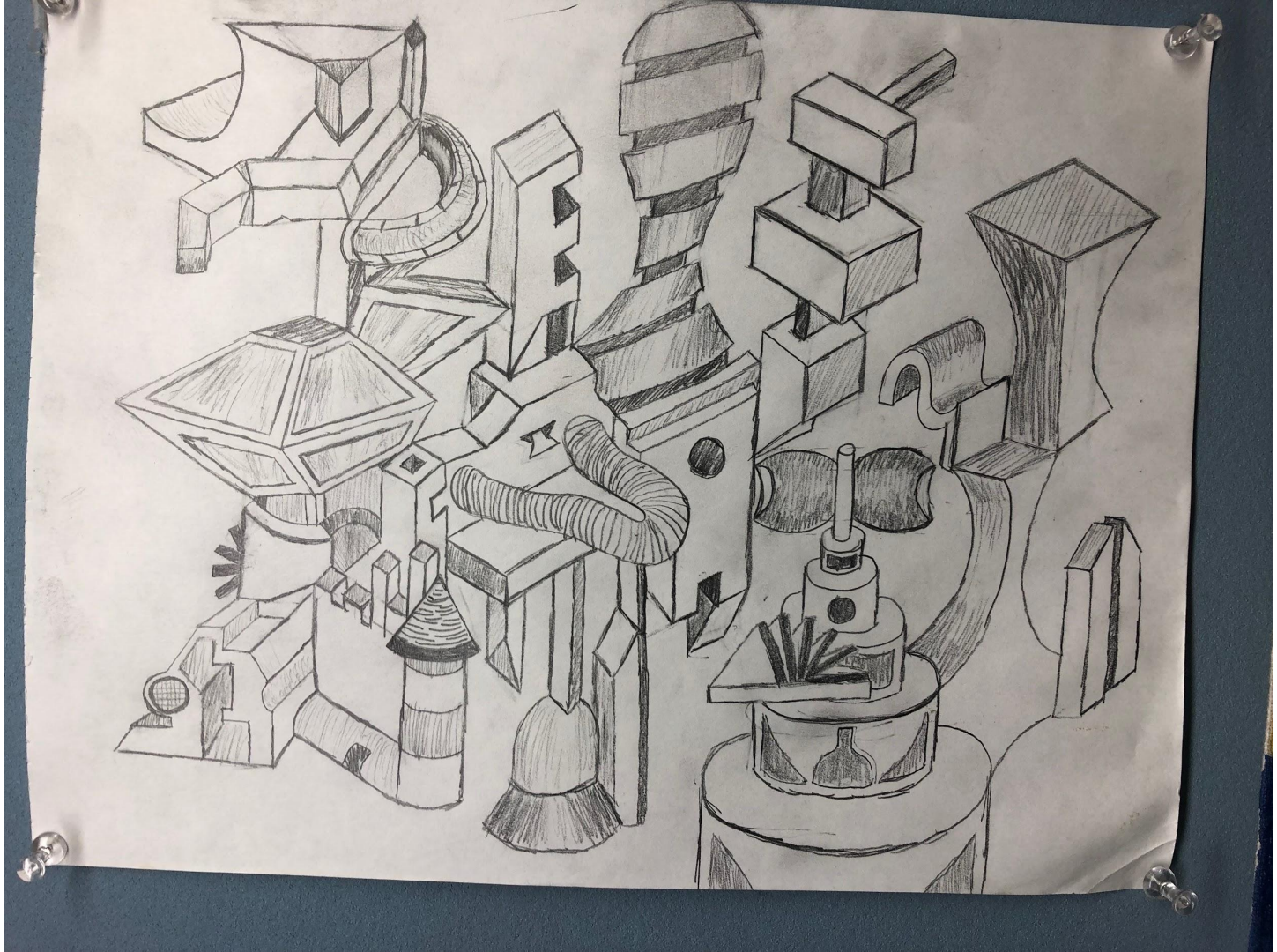
1:10 Scale Drawing



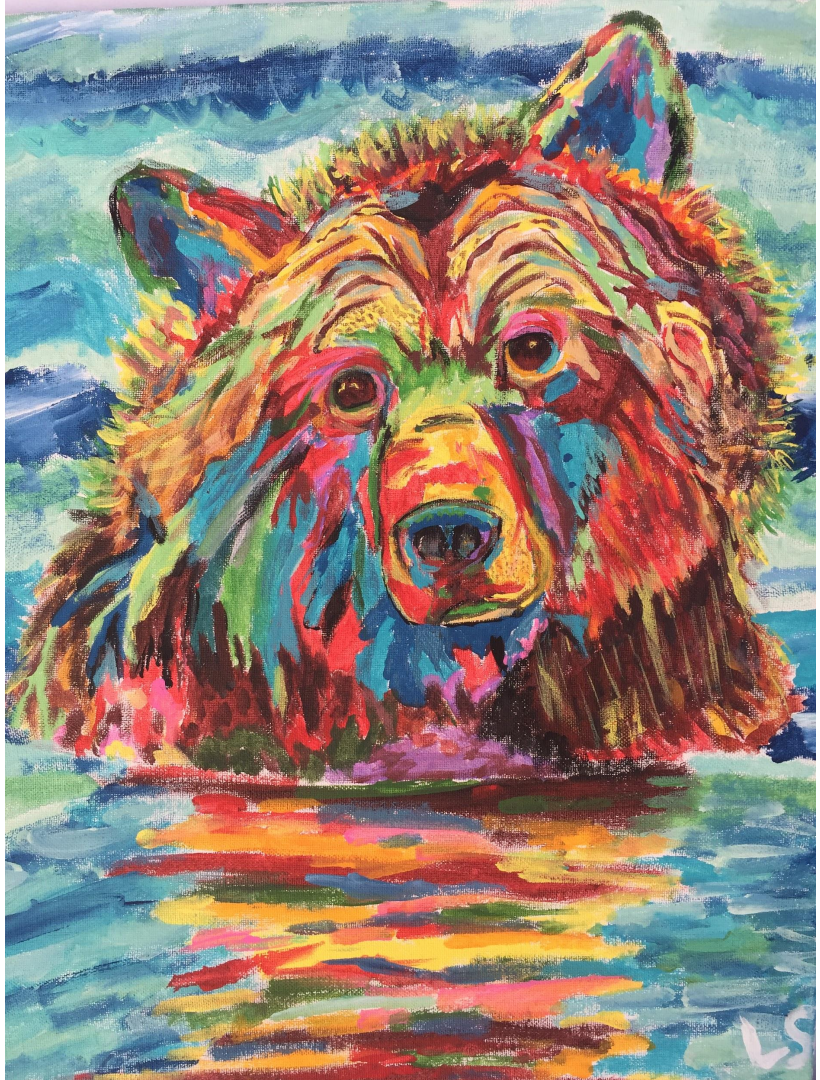




I don’t have my engineering drawings, but here is some of my art to demonstrate my abilities and creativity




25



Missing most relevant CAD files from work due to non-disclosure agreement. Also missing CAD from recent classes.