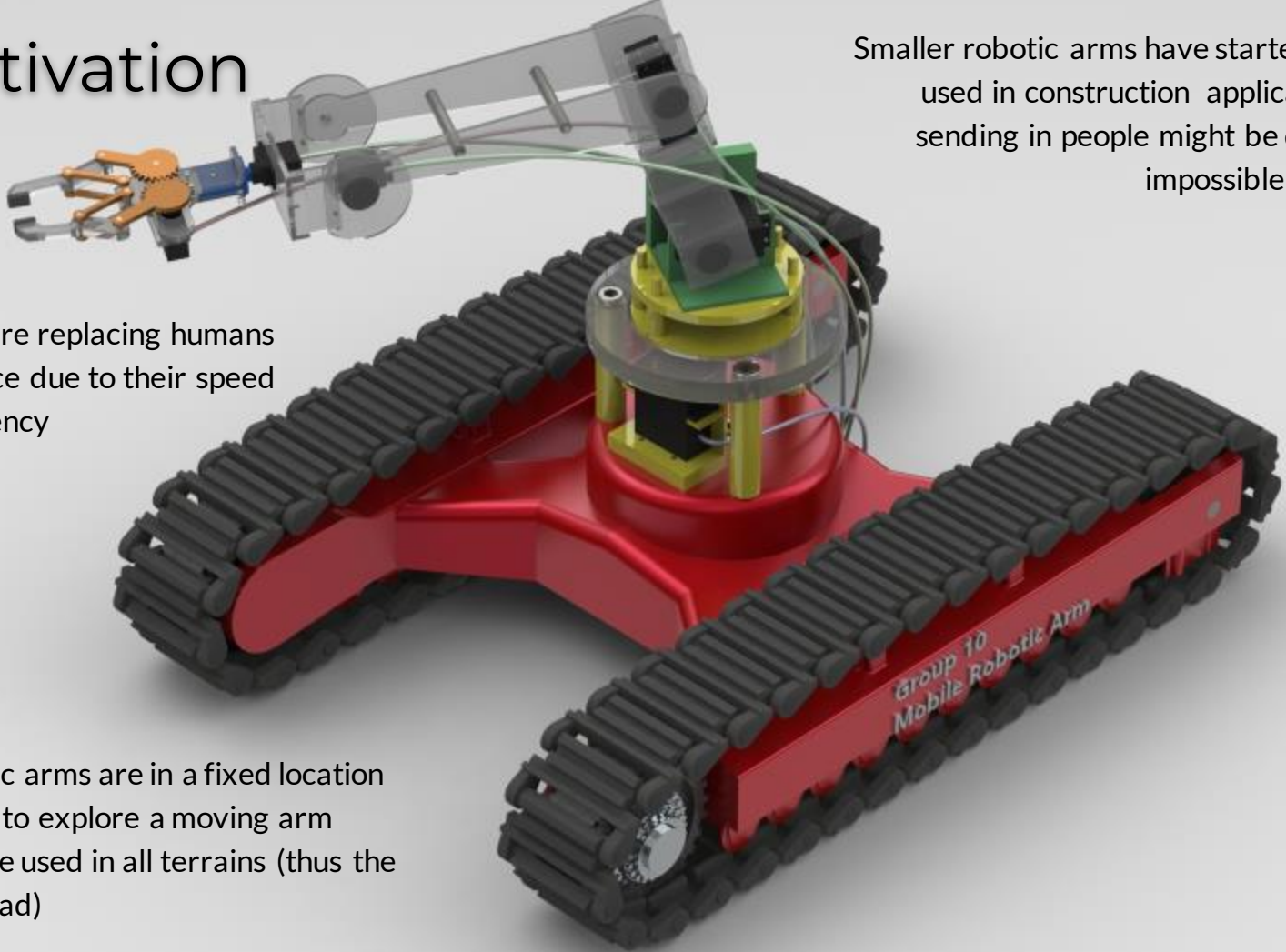




# Mobile Robotic Arm

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Kondapalli, Justin Duran, Daniel Kraftmann

# Motivation

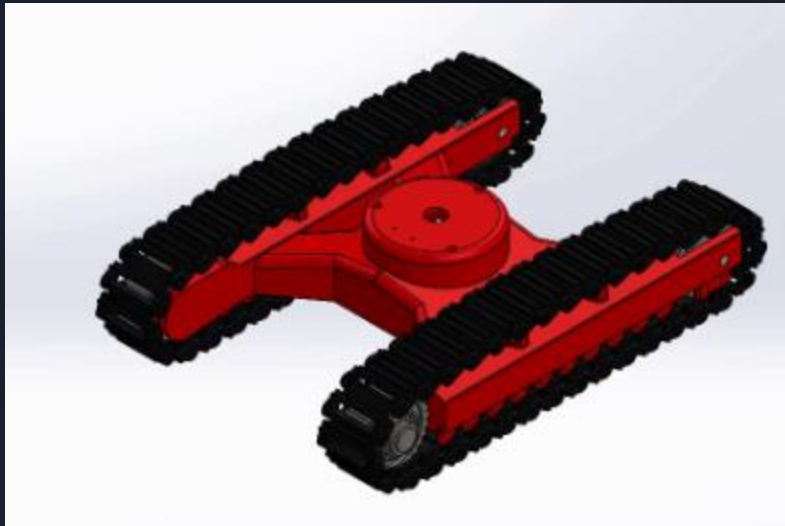
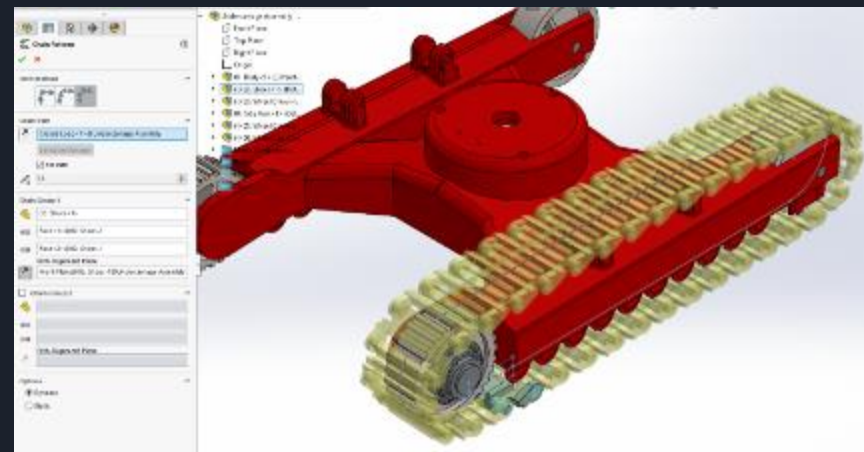
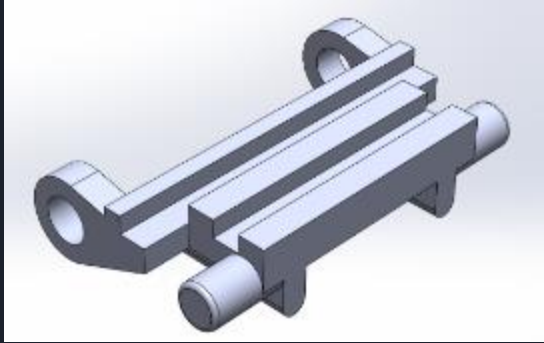


Smaller robotic arms have started to become used in construction applications where sending in people might be dangerous or impossible due to sizing

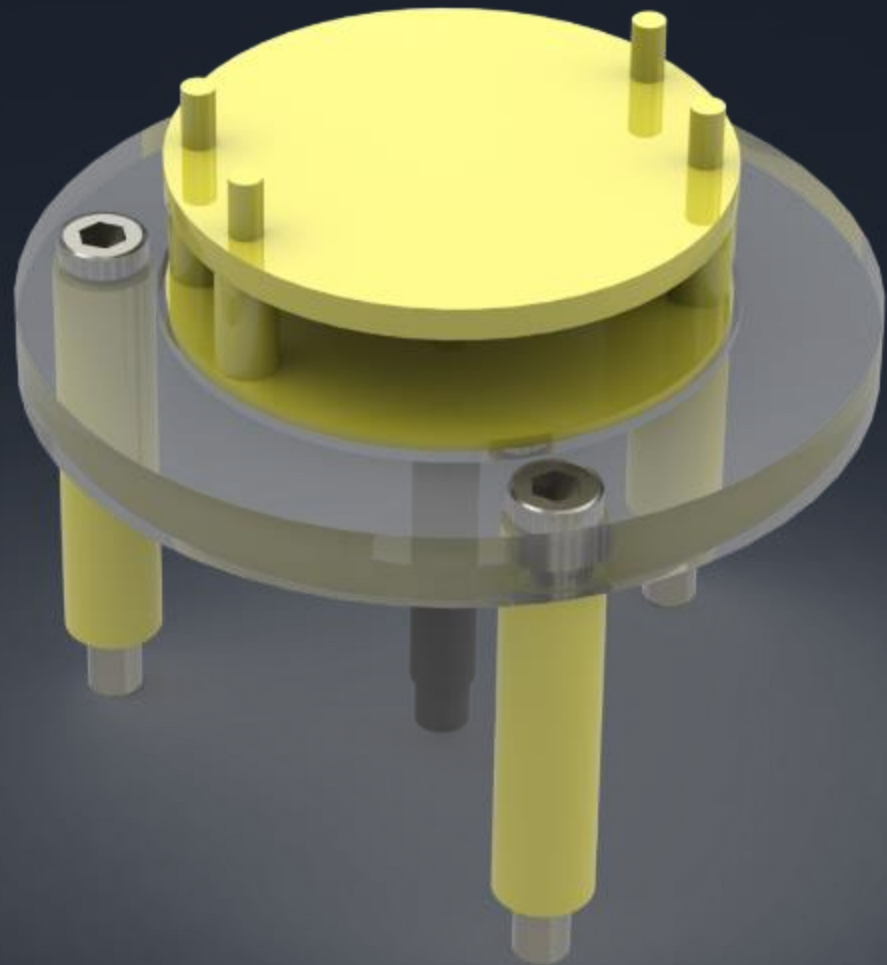
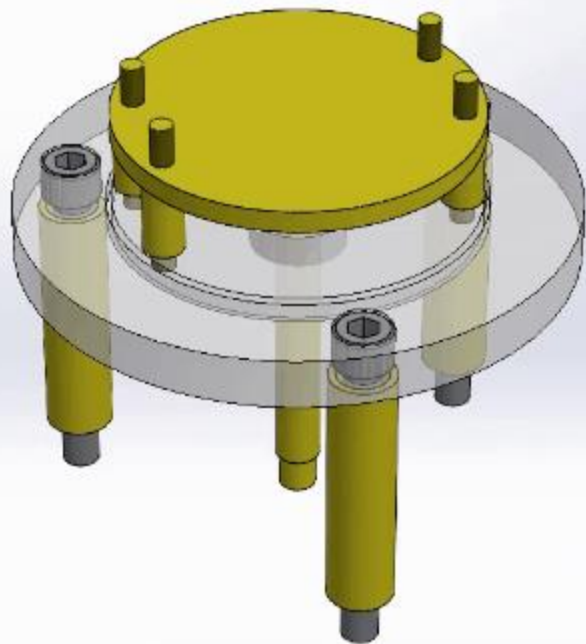
Robotic arms are replacing humans in the workplace due to their speed and cost efficiency

Usually robotic arms are in a fixed location so we wanted to explore a moving arm which could be used in all terrains (thus the caterpillar tread)

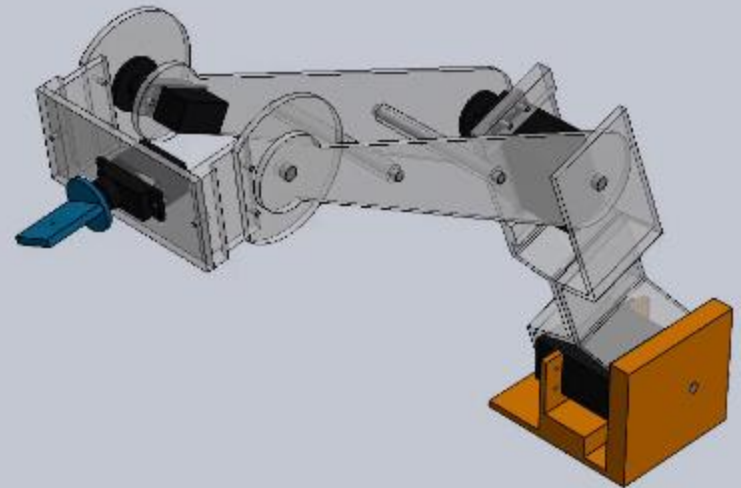
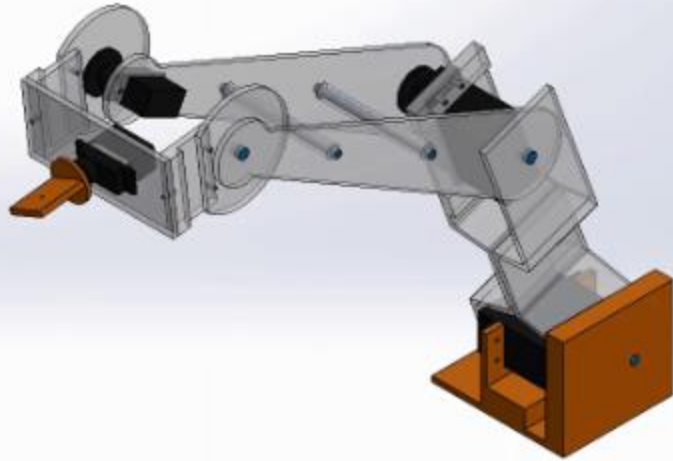
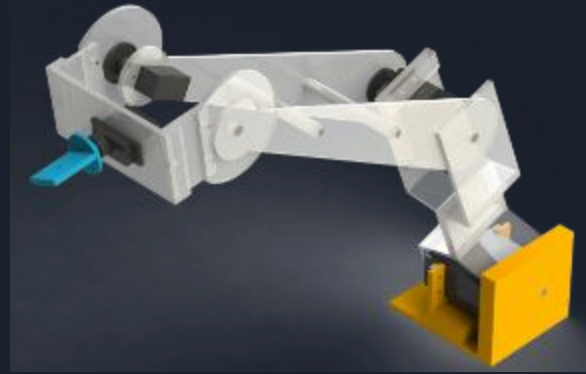
# Undercarriage



Base

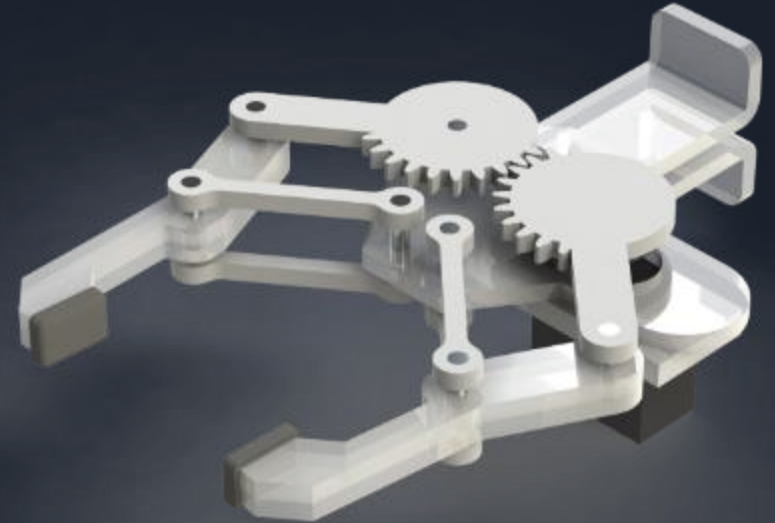
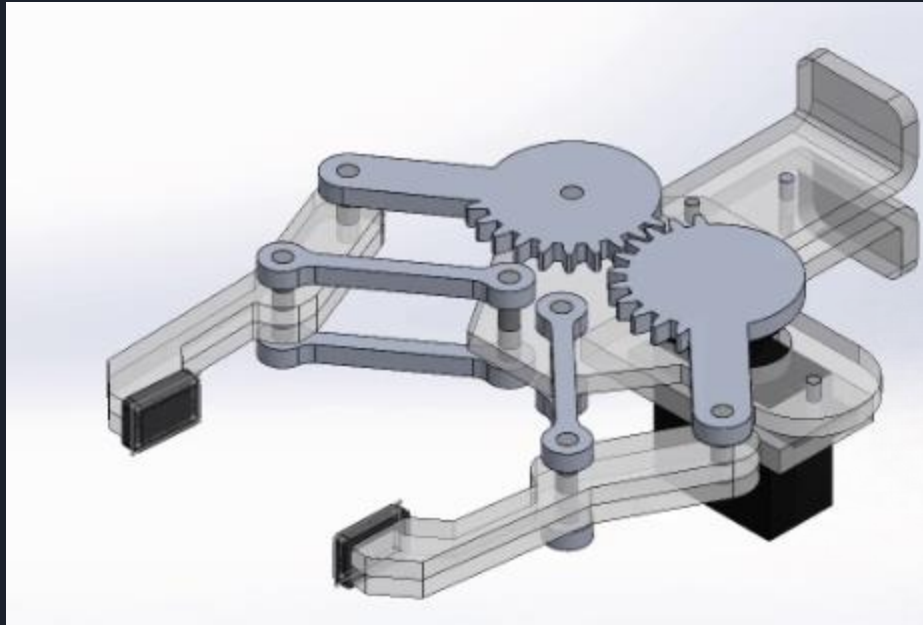


Arm

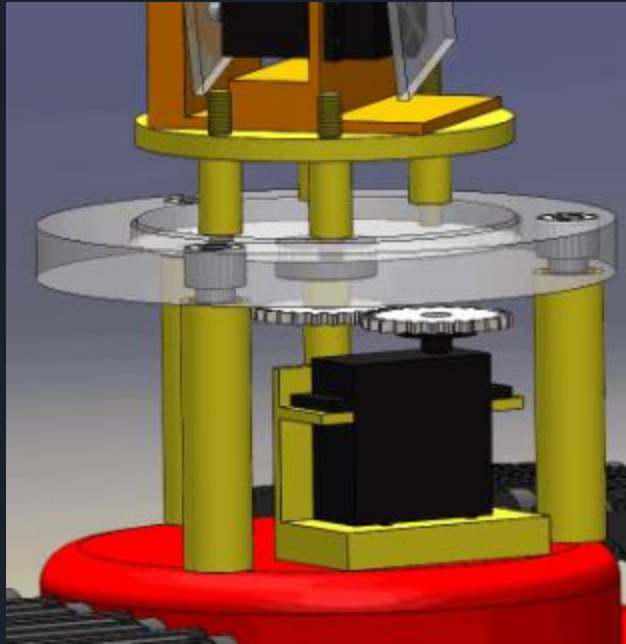




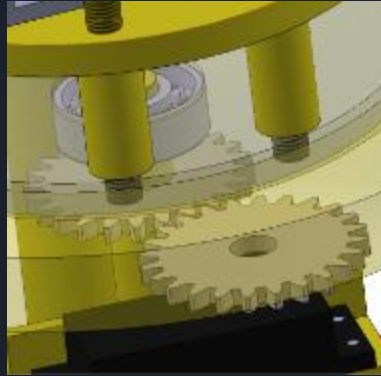
# Gripper



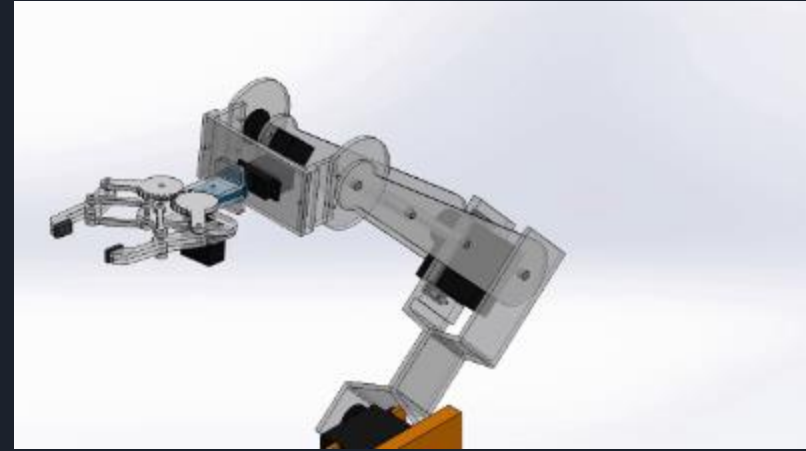
# How they connect



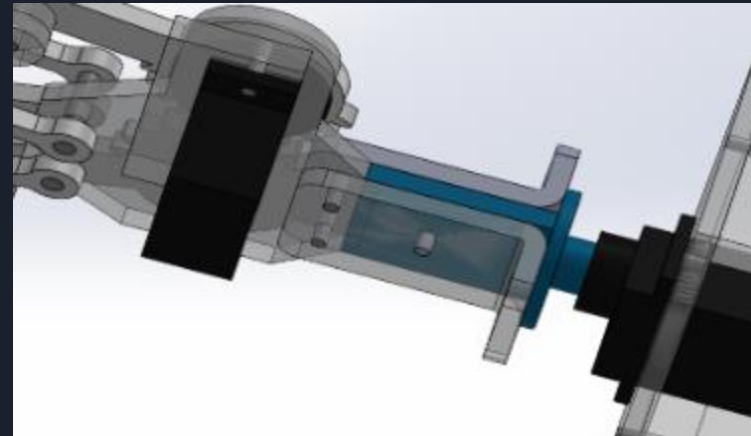
Rotating Base and Arm connection



Rotations and movements come from electrical motors

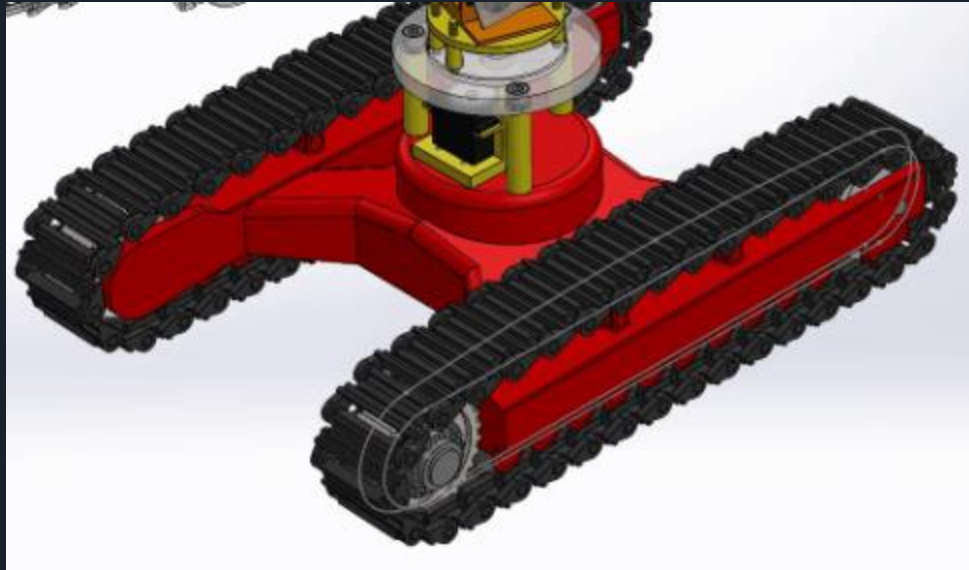


Arm and Gripper connection



# Issues We Encountered

- It doesn't seem possible to make the tread and the gear wheel move at the same rate, so we instead paired together a belt that would move both wheels and a rotary motor feature that would rotate the wheels at some given rate. We then calculated the circumference of the largest wheel to find the linear speed per second, and set this to a linear motor.







# Issues With Our Original Models

- Tread model was designed for a real-life crane assembly, at approximately 11x the scale of the gripper assembly
- Tread chain intersected wheels and the side arms, and did not properly connect (empty space between first and last shoe)
- Several self-intersecting parts on the arm and gripper
- Complete lack of dowels/bolts/screws on the entire assembly, as well missing places for connections on the arm that needed to be added
- The SolidWorks sheet metal feature was used on bottom parts of the arm that needed to be converted to acrylic, so a normal extrude and cut part was needed instead