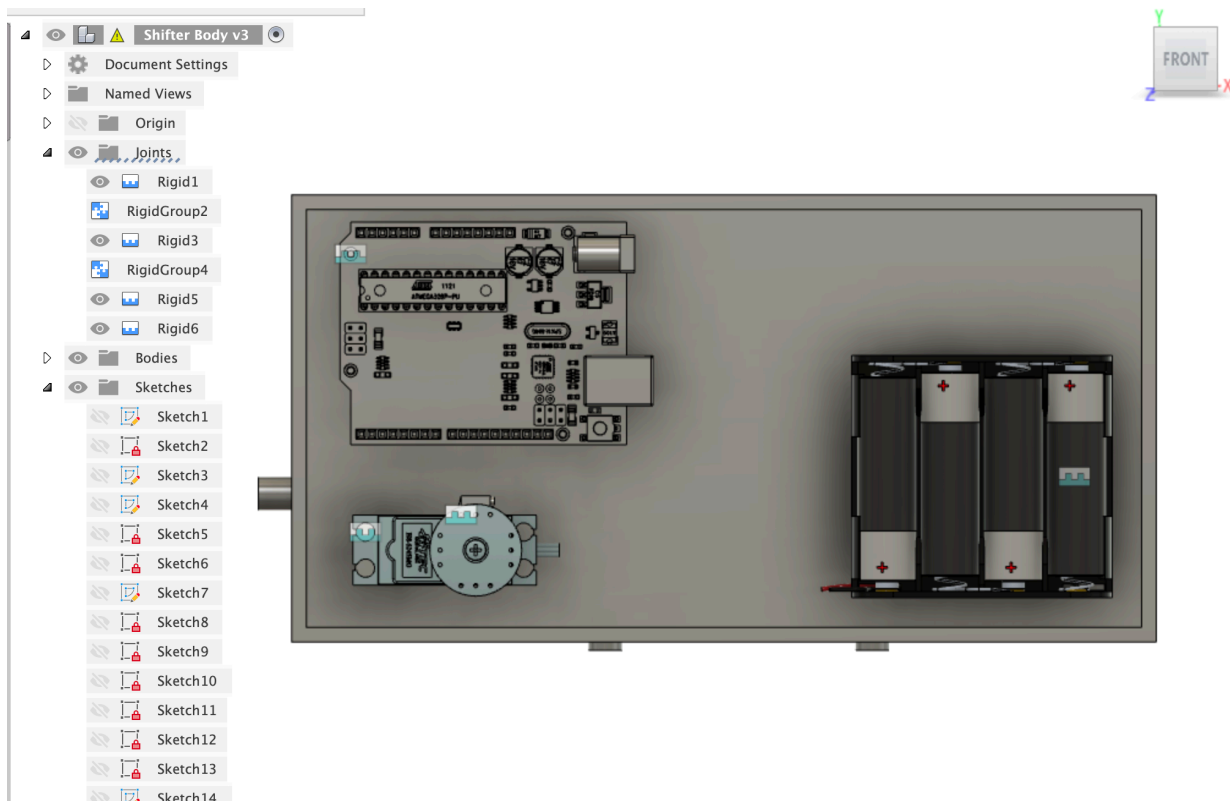
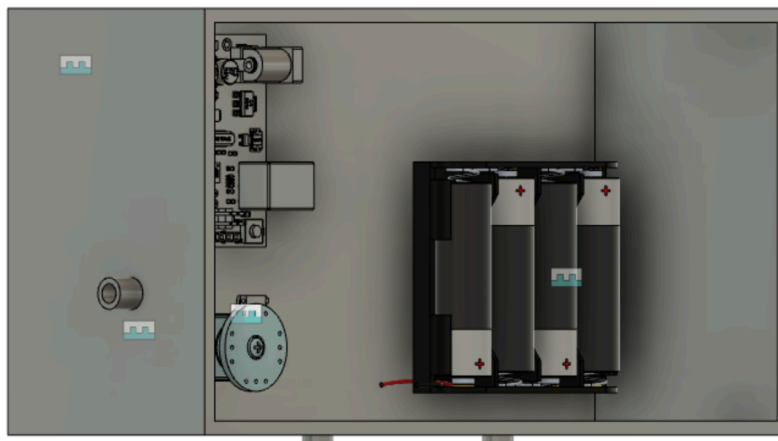
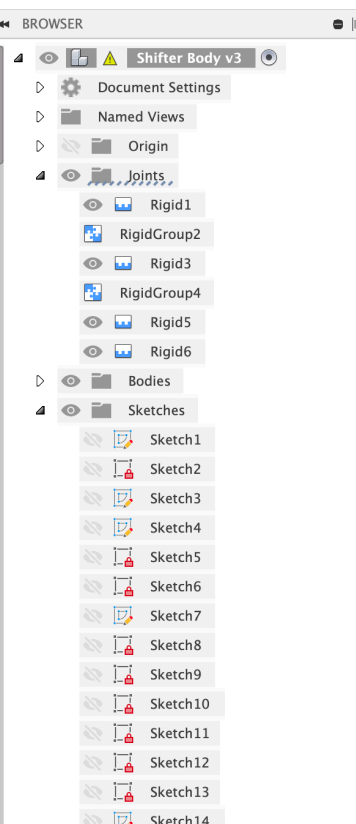


Smart Shifter

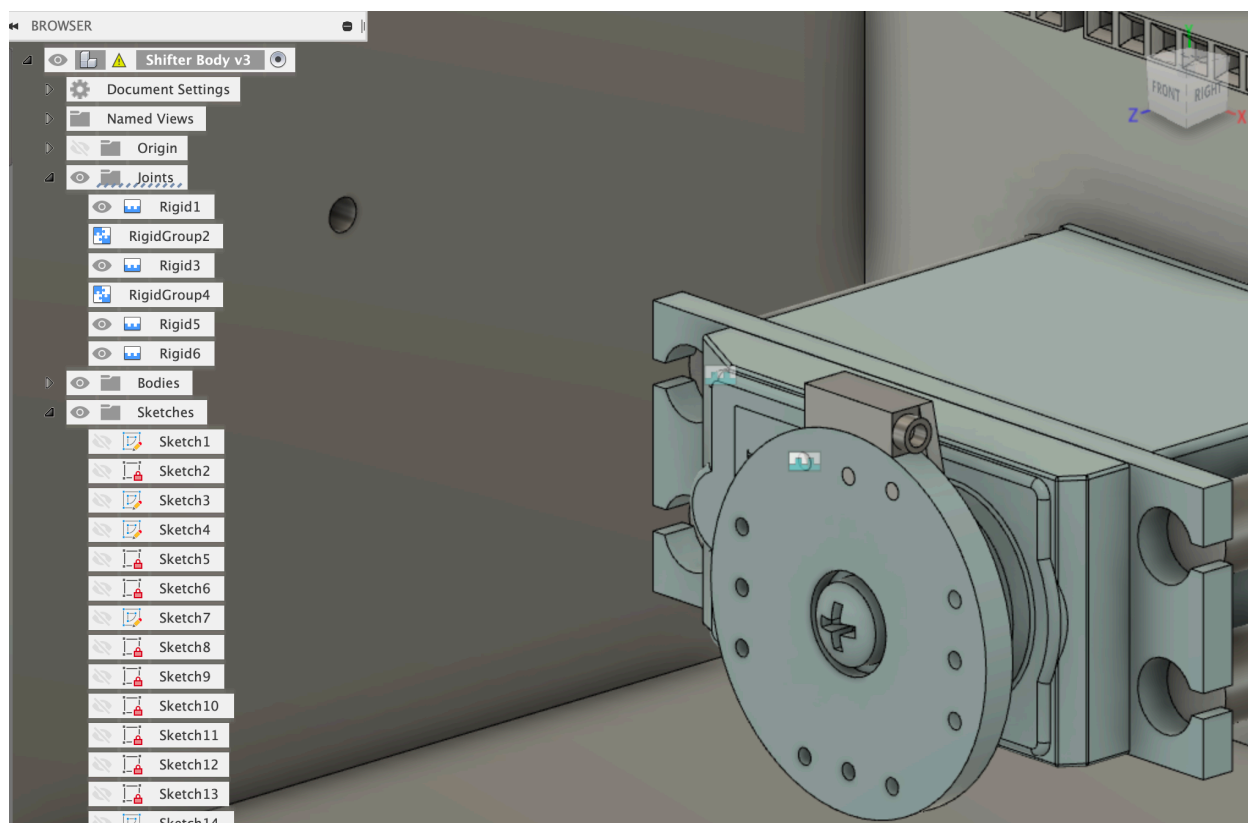
This is a fully virtual design of my smart shifter for a bicycle. This body that is shown below holds the arduino, batteries, servo, and wiring. This body screws directly into the bottle cage mounts on any bicycle. The dimensions for these mounts are the same on all bikes. Meaning this design can work for any bike you want it to, and very easily. The first picture below shows a view from the right side when mounted on a bicycle. It is pictured without the cover on the right side so you can view the internals. The small extrusion on the left side is where the rear shifter cable housing connects to the body.



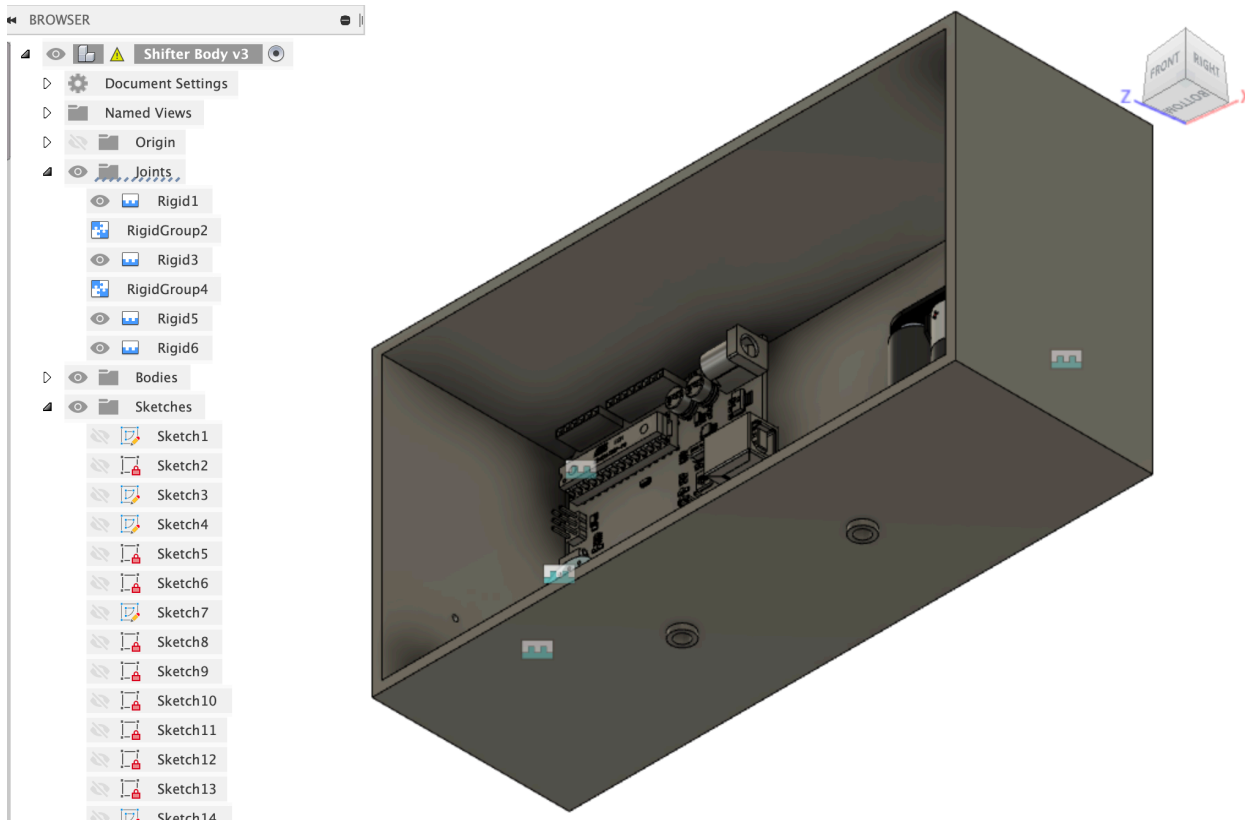
The next picture shows a better view of the rear of the body and the insert point of the cable.



Next is a close up of the servo motor. I chose to use a Hitec 5245MG servo. This should provide enough torque to move the cable. The darker piece that is mounted to the wheel on the motor is a custom piece I designed to hold onto the end of the shift cable. It fits perfectly onto the wheel that comes on the Hitec 5245MG. As the servo moves it pulls the cable which shifts the rear derailleur.



This picture below shows the two holes that align with the bottle cage mounts on any bicycle. The bolts that come with the bicycle are then inserted through these holes to secure the body.



The design then has two buttons and two led lights mounted on the handlebars with wires connecting them to the body. The buttons will allow you to choose when to shift. The lights also indicate when you shift. The red light flashes when you shift down and the green light shifts when you shift up. The code to make this all work will be in a separate file. Everything in this design is measured perfectly and the body would work if 3D printed as it is now.

Future plans for this design would include a feature that uses machine learning to shift the bike for you. The arduino would be connected to a cadence sensor that measures how fast

you pedal. The first few rides you would have to shift it yourself. It would then keep track of the cadence range you use the most. Then it would start shifting by itself to keep you in that cadence range.