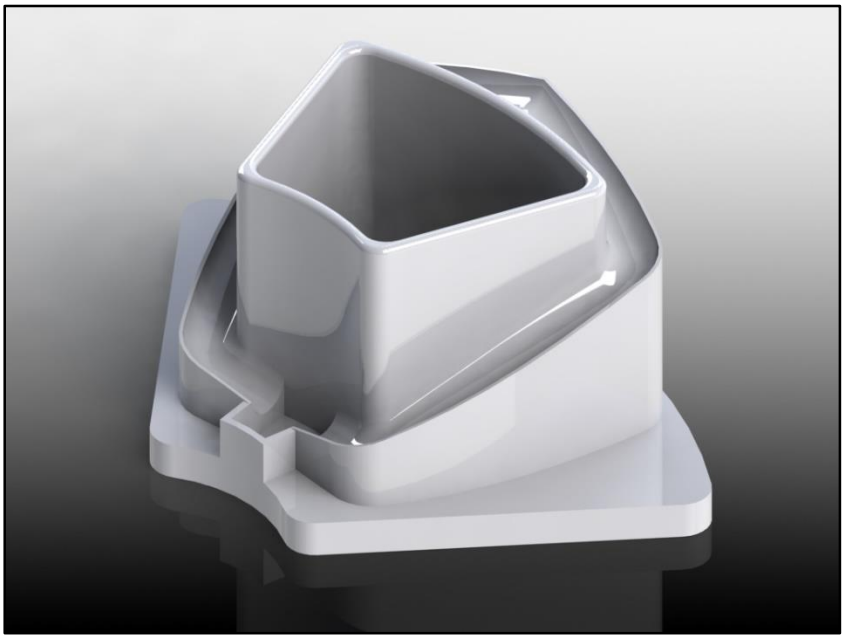
CAD/Manufacturing Showcase

CAD Software

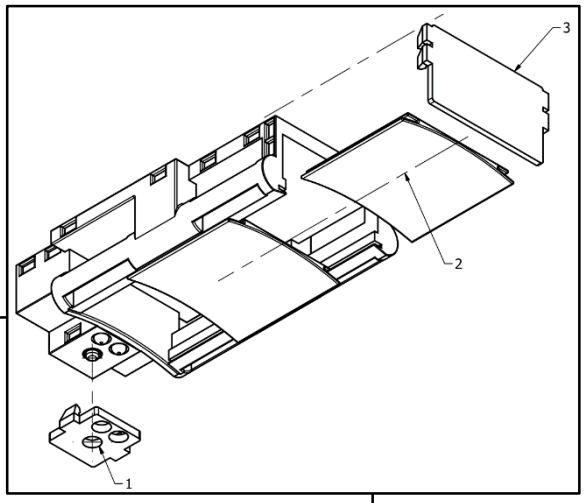
Solidworks

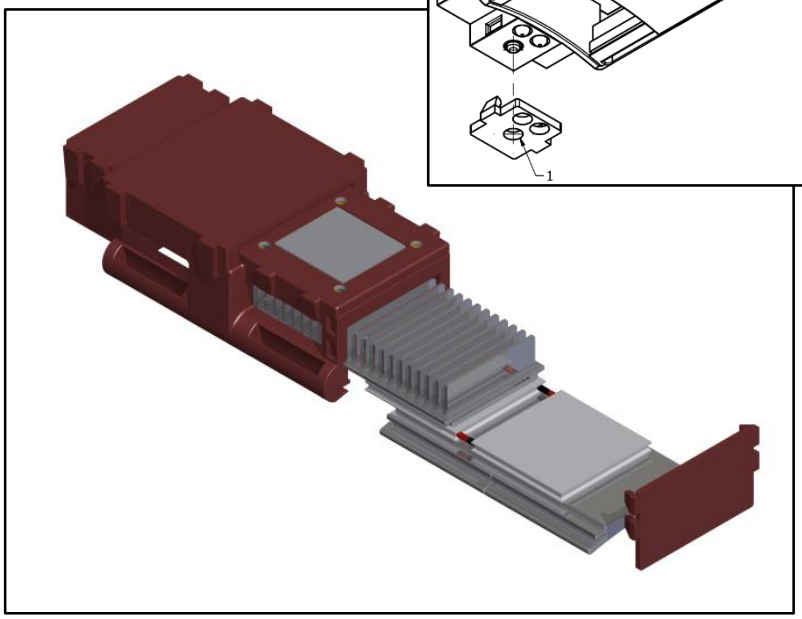
This is an early prototype of one of the material vats which allowed for material to overflow onto a wrap-around ramp. The ramp was created by lofting through a series of profiles along a curved profile following the vat's outline. The entire design was parameterized using global variables, allowing for extremely quick modification and preventing unexpected build errors. This kind of modularity and planning for change is a huge part of my design philosophy.



Inventor

The render at bottom and drawing at right highlight my work on my design team's pulse oximeter. They demonstrate not only my ability to create complex geometry and assemblies, but also my expertise in producing high-quality presentation materials. To make these, I utilized a combination of views and positional representations that allowed me to easily switch between a variety of representations without having to continuously suppress and enable individual constraints and components.

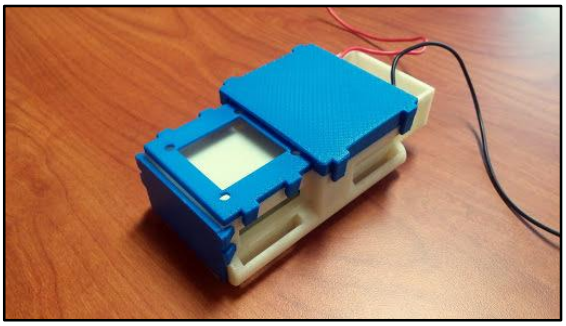




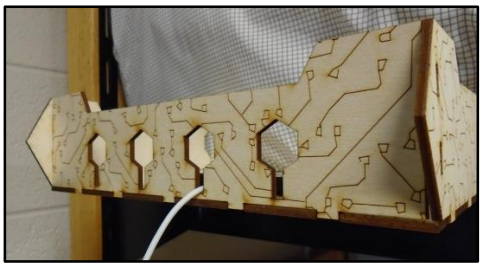
The drawing at upper right was used in the provisional patent application for the design, and shows the action of removing the detachable elements for sanitation.

Modern Manufacturing Experience

Additive Manufacturing, Investment Casting




The above images show the physical realization of my earlier-highlighted work on the pulse oximeter. For the components shown at top left to fit together, I had to carefully determine the optimum tolerances for clips and sliding elements. The above right component was investment cast from an ABS model that was coated in slurry, burned out, and replaced with poured aluminum.



Laser Cutting

During my freshman year I used a laser cutter to make my own bedside table as a fun side project. I used AutoCAD to create the custom circuit board pattern, and assembled the pieces via interlocking joints.

Computer Numerical Control (CNC)

The Turner's Cube at right was my favorite piece to come out of my work with the ShopBot CNC machine. This piece was particularly challenging because it necessitated a cut for each face, which meant I had to reposition it six times and ensure that it was perfectly aligned each time.

Welding, Turning, Tapping, Milling, Etc

I made the following two pieces as part of an industrial engineering lab, and each demonstrates a number of fabrication techniques. The piece at left was punched, milled on various machines, and then welded together with two CNCed parts via both manual SMAW welding and robotic arc welding. The piece at right was sand cast, turned, chamfered, and tapped.