This week I continued to build the shell. Coming in from last week with only a couple of layers of Kevlar added, we continued to shape the cutout triangle pieces to the mold to add additionally layers. At the end of the week we had about 8 layers of Kevlar added. The main problems we had were adding more Kevlar after the other layers had dried, as when we came back to work on the shell different days. When the Kevlar dried, some edges may have curled up or the fabric frayed and dried. When we went to add another layer of Kevlar, the epoxy did not stick well to the dried material in addition to not shaping well with it. This caused the additional layers to propagate the irregularities and bumps and deformities as additional layers were added.

After eight layers, the helmet began to slightly lose its shape that it started with. Hopefully with sanding and polishing the shell can be restored to its original shape of the mold. The best technique would be to build the whole shell and all of its layers at once. This would require probably about 8 hours which is very time consuming and hard to schedule and work for that period of time without breaks. However, if built this way, the helmet would keep its appropriate shape and not have any bumps or major deformities.

We spent a considerable amount of time this week trying to remove the shell from the mold. Despite the mold being waxed and prepped very well, the shell seemed like it was
permanently stuck to the mold due to all of the epoxy and drips over the edges. We tried various techniques and strength to pull the mold out but nothing was working. We tried using a knife to cut the dried epoxy on the mold. We tried wedging a chisel up between the mold and shell but this only worked a very small area and very difficultly. Our final option was to go to the machine shop and use different tools there. We found a rather thin and flexible joint knife that we were able to bend in between the mold and shell shimmying it all the way around the mold to break the epoxy seal everywhere. When we turned the helmet back upright and slammed it on the table, the mold successfully dislodged and fell out. The shell had a very smooth and waxy finish on the inside. The outside, as mentioned before, will need sanding and other work.

Figure 1. Mold after taken out of the shell.
Figure 2. Shell after being removed from the mold. The mold edges were traced with a marker.