Began involvement with project after approaching Josh Feinberg for opportunities to expand upon my prior experience with 3D modelling and manufacturing.

Began with a prototype given to me by Michael Volk

* Began design with an arbitrary number of magnets, chose 8 to begin with
  + Shifted to 12 after the design for the first prototype became somewhat problematic with symmetry, as well as for the purpose of producing a stronger field
* In fine-tuning the design, a tolerance was found for the magnet wells, with a side length of 9.95 found to be a good balance between ensuring the secure fit of the magnets such that they would not slide out even when the mechanism was overturned and loose enough that it is still possible to remove individual magnets.
* In the style of the first protype, originally envisioned creating two printed, thin rings
  + Effectively, one ring had shallow wells into which the magnets could be set, and a second, matching ring would be placed over the top, sandwiching the magnets between the two sets of rings.
  + This design was found to be unsuitable, as the strength of the magnets is such that it was virtually impossible to maintain the exacting fit desired and be able to place the magnets into the housing in the proper orientations.
* From there, switched into a single ring-design, where the depth of the wells was such that the magnets could be slid into the housing and prevented from shifting during the placement of surrounding magnets.
* Once the design of the first, inner ring was finalized, the outer ring was designed to fit snugly to the inner ring, with the greatest emplacement of magnets
  + More magnets= a stronger field

**Inner Ring Prototypes**

1. First attempt at a print, 8 magnets, and distorted model in Cura- printed with no center hole
2. Switched to 12 magnets, added pinholes in bottoms of each magnet well to ease removal
3. Smaller magnet wells, closer together. Changed total diameter to current value. Larger diameter for the pinholes
4. Added mark on bottom to indicate field direction- shallow- began testing ideal height for magnet emplacement
5. Added mark on top as well, taller ring
6. Taller ring, 10mm?
7. Tallest ring, present configuration
8. **Added a component used for the turning mechanism created with the outer ring**
9. Adjusted the fiducial mark to line up with both the component as well as the markings along the outer ring

**Outer Ring Prototypes**

1. First design of outer ring, partial print. No holes for magnet removal
2. Added pinholes- gradual marks at 5 and 10 degrees.
3. Removed pinholes along groove, drilling planned instead for smoother groove surface for mechanism. Adjusted mark widths to print more clearly. High detail
4. Fixed erroneous marking placement, added additional length to grooves to compensate for thickness of turning protrusion.

**Other Components:**

1. Created a cover for the inner ring
   1. Split into two due to invalid model configurations
      1. First, smaller half of the cover printed, lifted from print bed and curved
      2. Reprinted smaller cover half with brim to ensure good adhesion to print bed
      3. Printed larger cover half with brim as well
         1. Removed brim and sanded for smooth effect
2. Created a back cover for the inner ring/outer ring assembly
   1. High detail, includes a inset for the turning component of inner ring as well as ridged edges for both gripping purposes as well as distinction from the outer ring while turning mechanism