

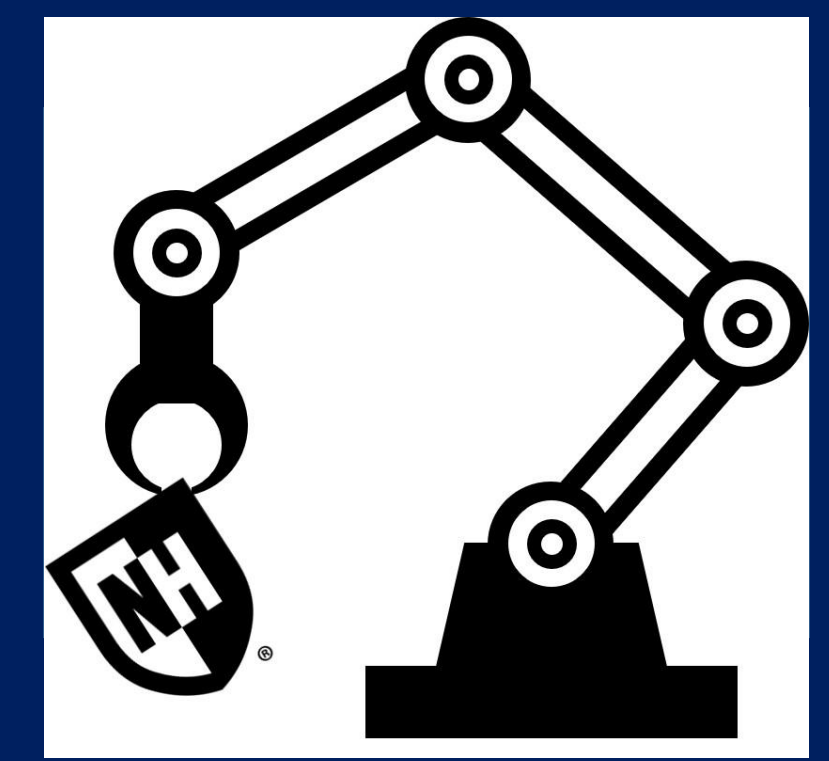


Olson Center Giveaway

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Abstract

A design was created in SolidWorks to be manufactured as a give away product to gain publicity for the John Olson Advanced Manufacturing Center and represent the capabilities of the manufacturing processes there. It was determined that this part should be a decoration small enough to be manufactured quickly and cheaply. This decoration was designed as a robot arm holding the UNH shield. The robot arm piece was 3D printed with onyx to be lightweight to not bear too much weight on the arm. The shield logo was CNC machined with aluminum so that it would be light and easily machined. These two pieces are joined by a nut and bolt with the edges smoothed for safety reasons.

Versions

1. First iteration, with the gripper to be machined with the shield. Was too difficult to produce and attach to the arm.
2. First shield without the gripper. Had design mirrored on both sides, but was too thin.
3. Thicker and with cut through design. Would've been used but the CNC mill's cutting radii limited it.
4. Final design, had a simpler design to accommodate manufacturing limitations.

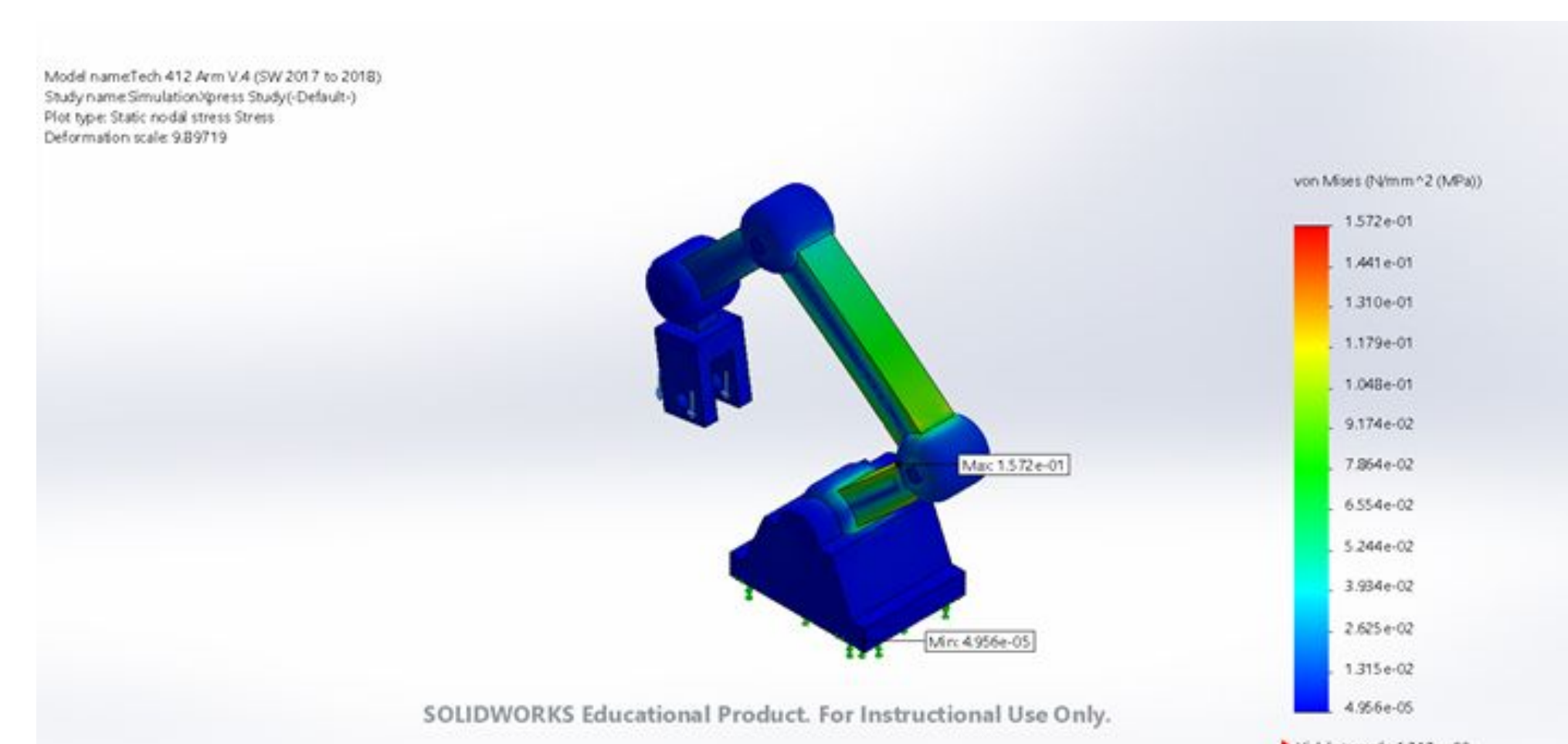
1. First design, had no hook at this point, and a section to place the original shield design.
2. A hook was added, and the gripper was placed on the arm for quicker and easier manufacturing.
3. Scaled up by a factor of 7/4th's, with the hook removed as it was no longer a keychain.

Objectives

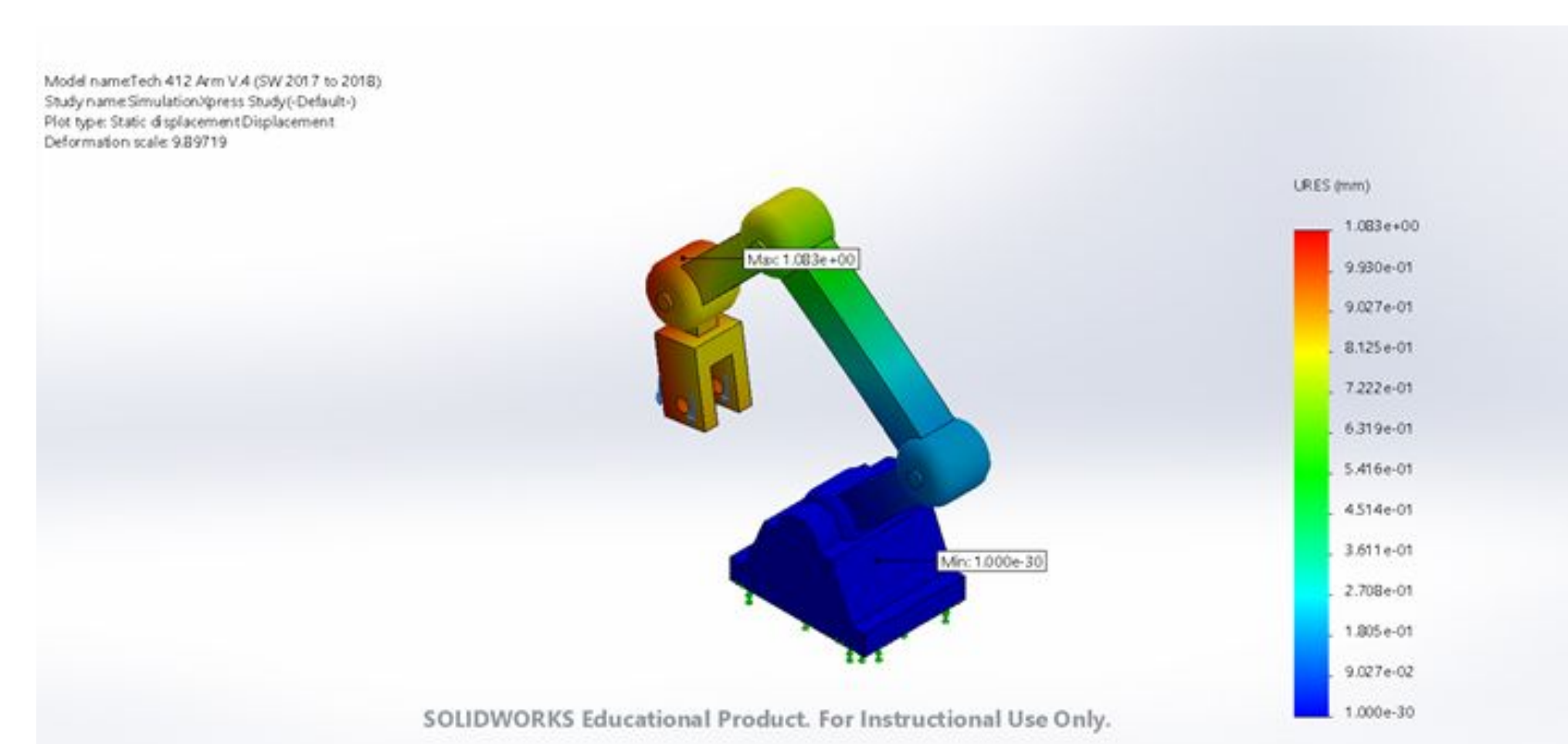
- Our goal was to create a giveaway item for the John Olson Advanced Manufacturing Center.
- We wanted the item we created to represent the John Olson Advanced Manufacturing Center as well as fit the criteria listed below:
 - Easily manufactured
 - Easily reproduced
 - Aesthetically pleasing
 - Portable
 - Durable
 - Versatile

Design

- Our project design is inspired by an image designed to be a symbol for the John Olson Advanced Manufacturing Center. We modeled the shield and robot arm part in SolidWorks.
- The giveaway item is intended to serve as a decorative set piece. Originally we planned on making a small keychain item, however, given our manufacturing limitations the size of the prototype was too large.

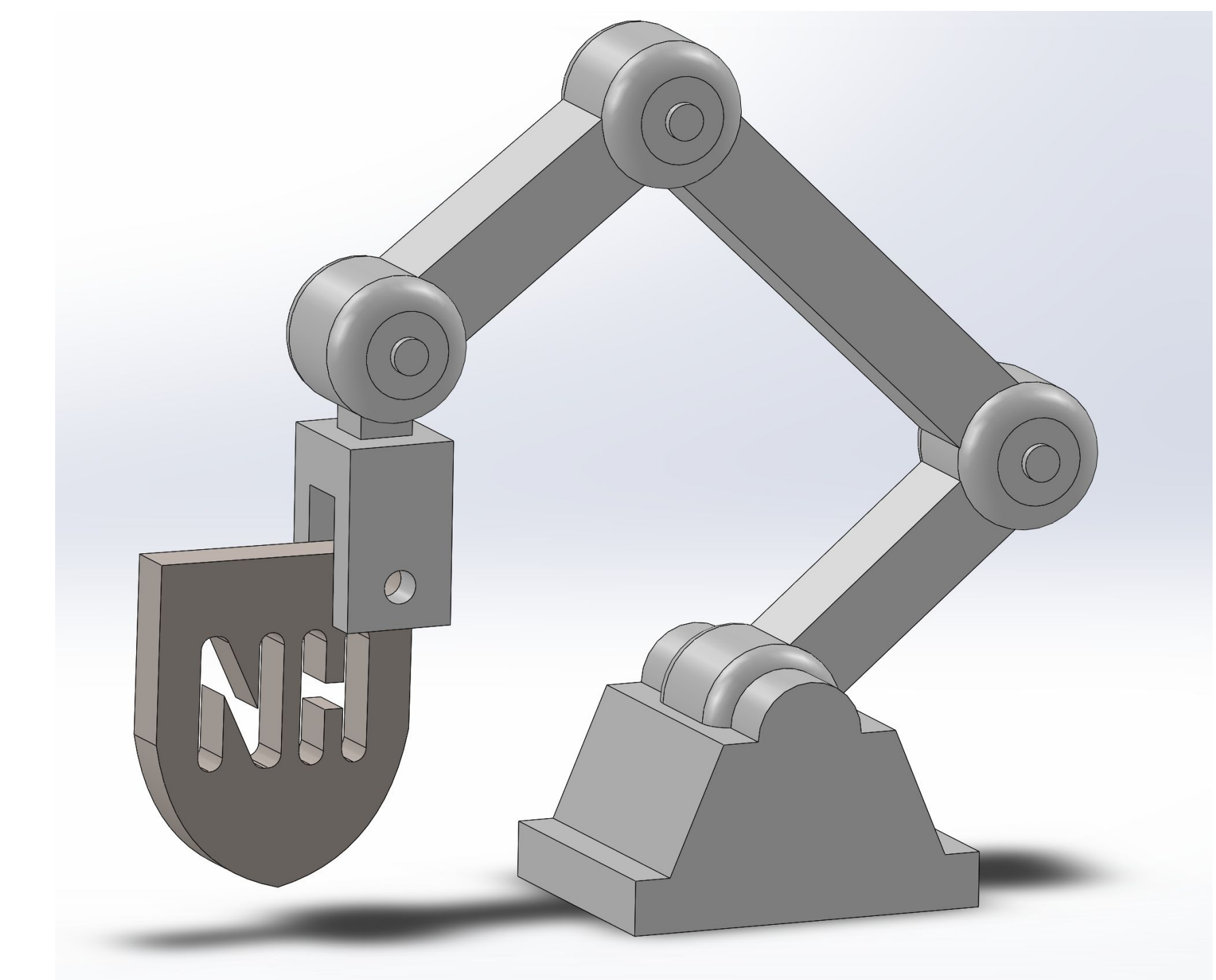


Stress Analysis with a 1.3 N force applied to the gripper section and the base of the arm as the fixture

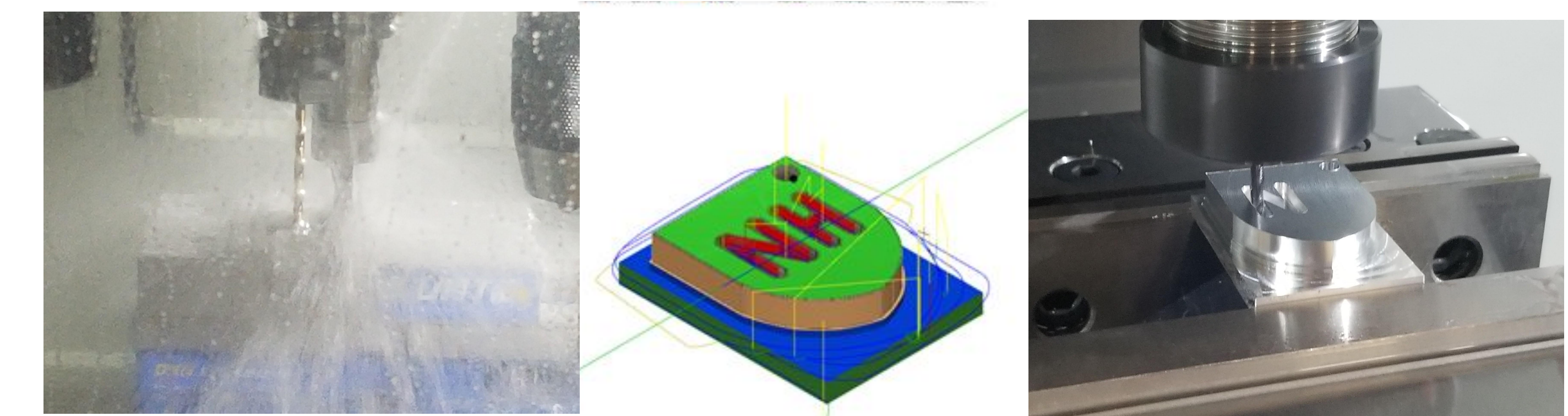


Displacement of the arm from the force applied to the gripper section

Final Assembly



Manufacturing



We used a CNC machine to machine the aluminum that was used for the shield, because this material is light, inexpensive, and can be easily machined. The minimum time that this could be made in a manufacturing process is estimated to one minute



Onyx was used to 3D print the robot arm so that it would be strong and light while also being easily printed. This process took about eight hours to print.

Acknowledgements

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