

# Christina Alexandrov

## Thorlabs Internship Portfolio

### Contact Information

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### Internship Overview

**Position:** Mechanical Engineering Intern

**Company:** Thorlabs

**Duration:** 05/26/2025 – 8/15/2025

**Location:** Newton, NJ

## Summary

During my internship at Thorlabs, I contributed to several projects focusing on optical systems design, mechanical prototyping, and experimental testing. I applied skills in CAD modeling, thermal and structural analysis, and data acquisition, collaborating cross-functionally with engineering teams to optimize product performance and manufacturing processes.

## Projects

### 1. Pull Test for BT-FSSMA

**Objective:** The task is creating a holder to test the strength of gorilla glue versus epoxy as a connector for Thorlabs BT-FSSMA part. The device used to test will be a DS2-44 handheld force measurement tool. The solution should fit around the cog-like part of the FSSMA.

**Tools Used:** SolidWorks, 3D printer, drill press

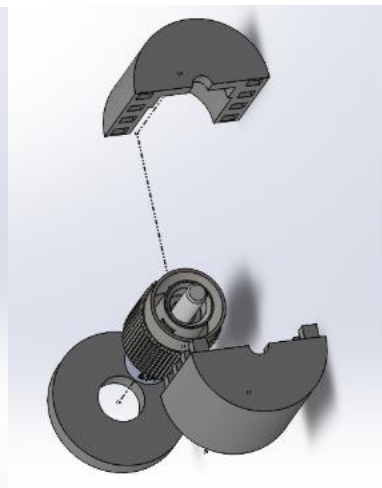
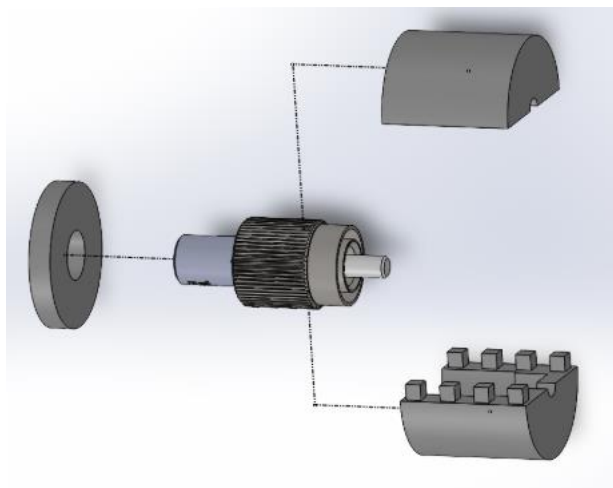
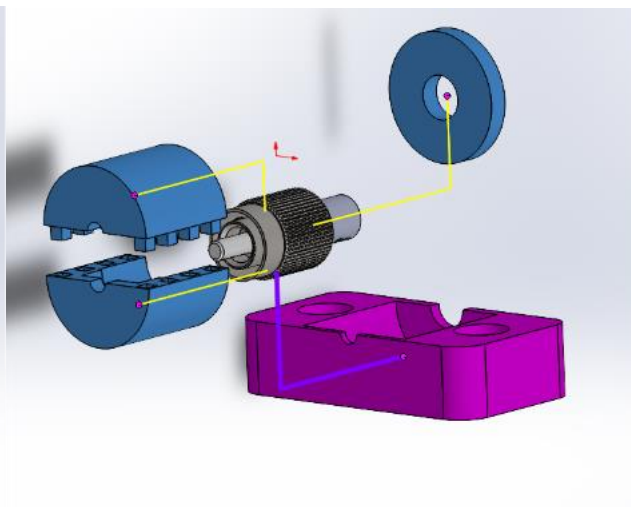
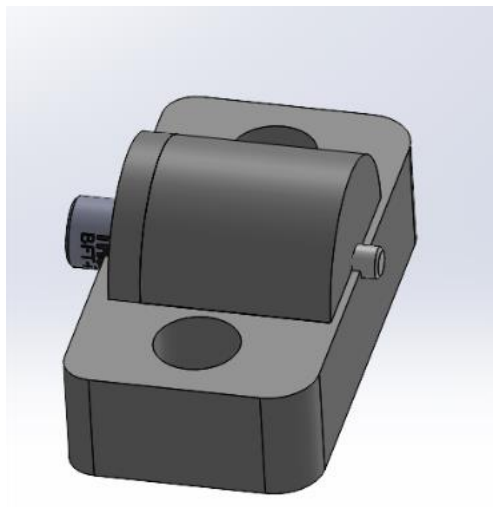
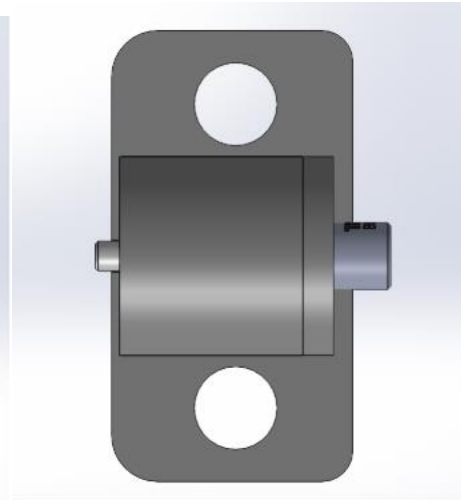
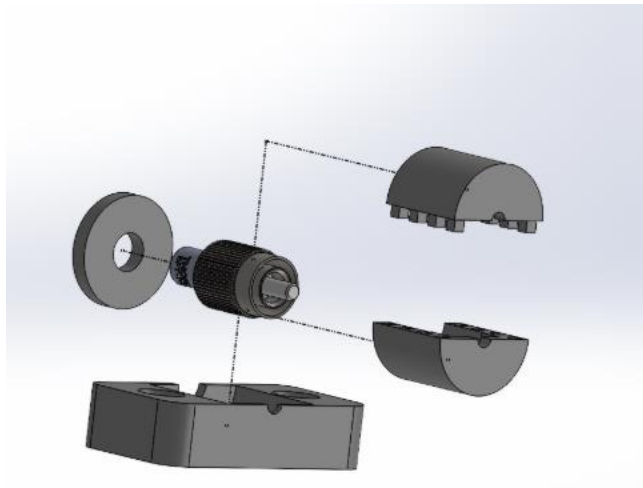
**Method:** I created 2 versions for testing. The 1<sup>st</sup> failed under 3D printing tolerance and the 2<sup>nd</sup> one is shown below. I drilled the side of the BT-FSSMA side using a drill press and threaded a quick tie in between to pull it on the force measurement.

**Responsibilities:**

- Create a jig
- Test the strength of the BT-FSSMA assembly
- Create a testing document, documenting the testing process and results

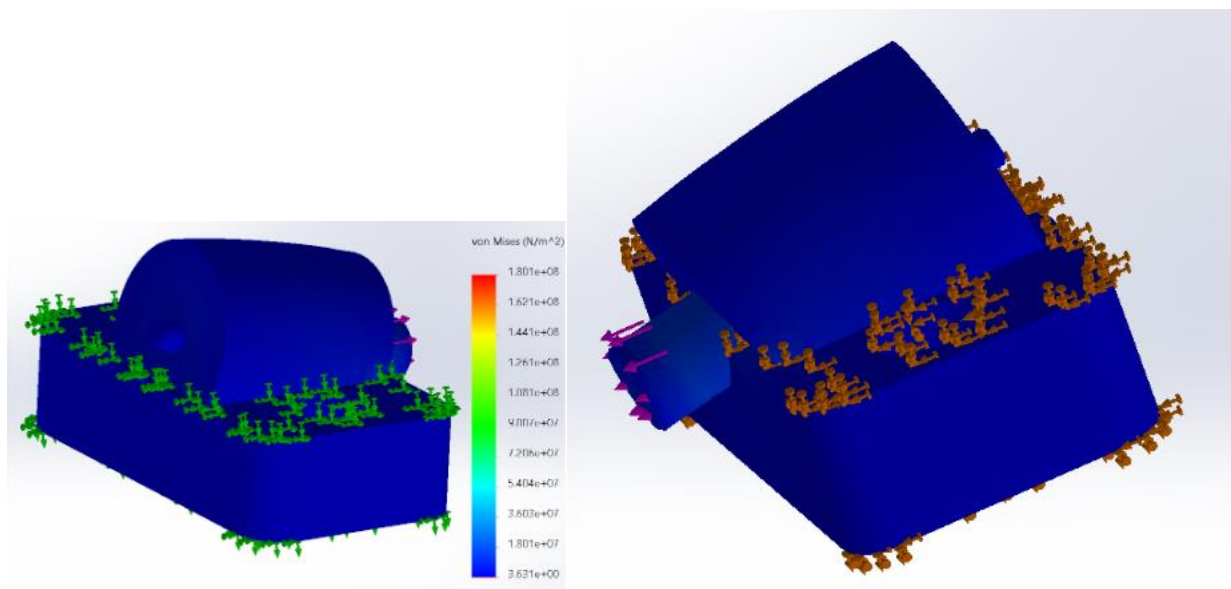
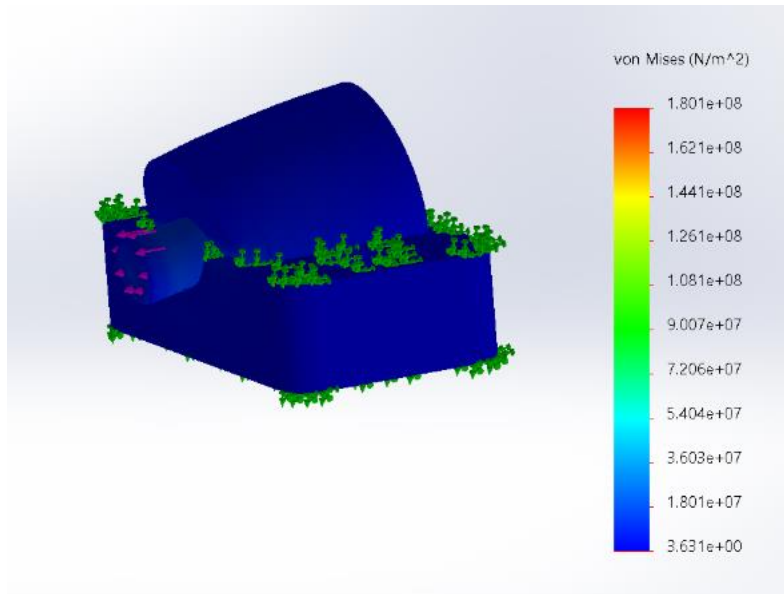
**Solution:**

Assembly



This idea has four 3D printed parts: 2 holders that encapsulate the BT-FSSMA, end piece to isolate the grey cap and a holder that allows the solution to be bolted down to the table.

Simulation:



**Outcome:** The jig successfully held under 44 lbf load and we were able to successfully replace the CA epoxy glue with the gorilla glue

## 2. Vacuum Feedthrough Jig

**Objective:** Create a holder for testing for optical assurance of a fiber optic cable that will be under high heat loads and vacuum pressure

**Tools Used:** SolidWorks, Wet Saw

### Responsibilities:

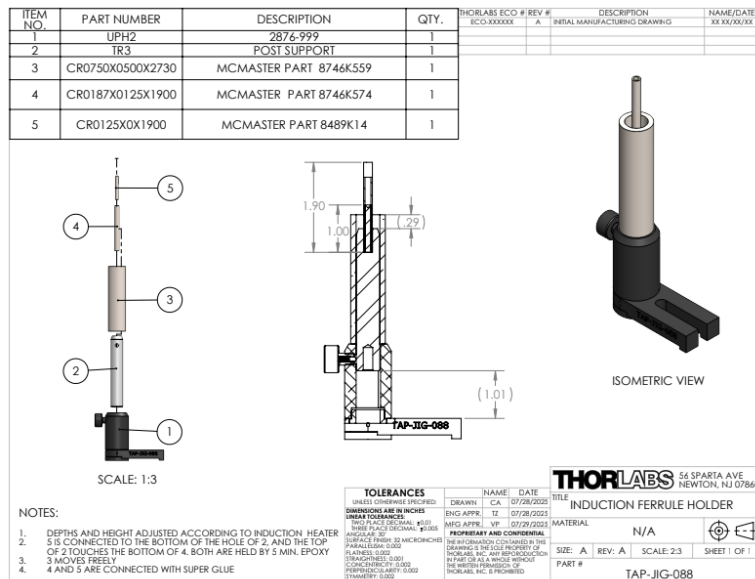
- Model the vacuum feedthrough jig accurately in SolidWorks
- Build the vacuum feedthrough to be in use for testing
- Create a GD&T compliant drawing for internal use for future jig builds

### Solution:

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**Outcome:** Successfully built a functional vacuum feedthrough jig and a company compliant drawing



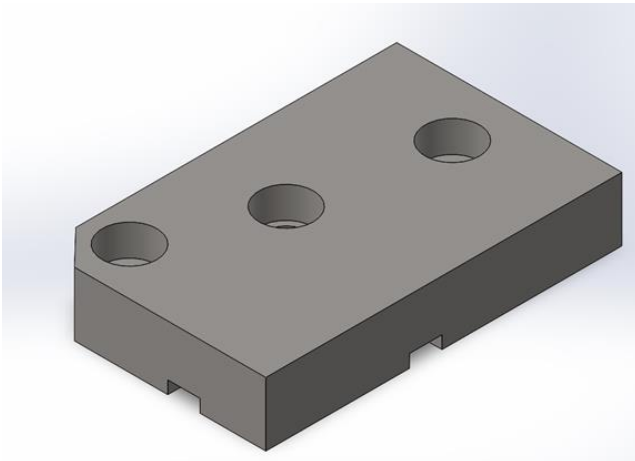
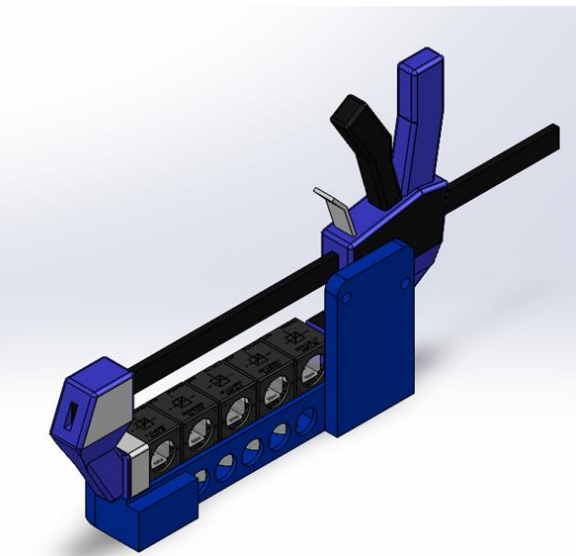
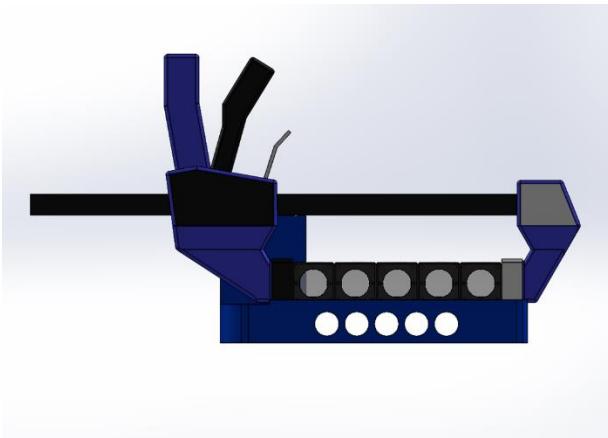
### 3. CCM\* Assembly Process

**Objective:** Test the screw feeder and fix the problem, create a POU workstation to ensure set up and train assembly team on the new tools and layout

**Tools Used:** SolidWorks, Automatic Screw feeder,

**Responsibilities:**

- Troubleshooted the screw feeder
- Printed a solution and ran gap testing for 2.75-2 mm increments
- Authored Work instructions to train workers
- Designed POU station for lean manufacturing
- Reduced assembly time by 20%
- **Outcome:** Successfully identified the problem and created solution in SolidWorks, Authored Work instructions to train workers, Designed POU station for lean manufacturing, Reduced assembly time by 20%



## 4. CAPSM-1 Jig

**Objective:** Recreate a CAPSM-1 jig that is used to transport vacuum ferrule holder between facilities

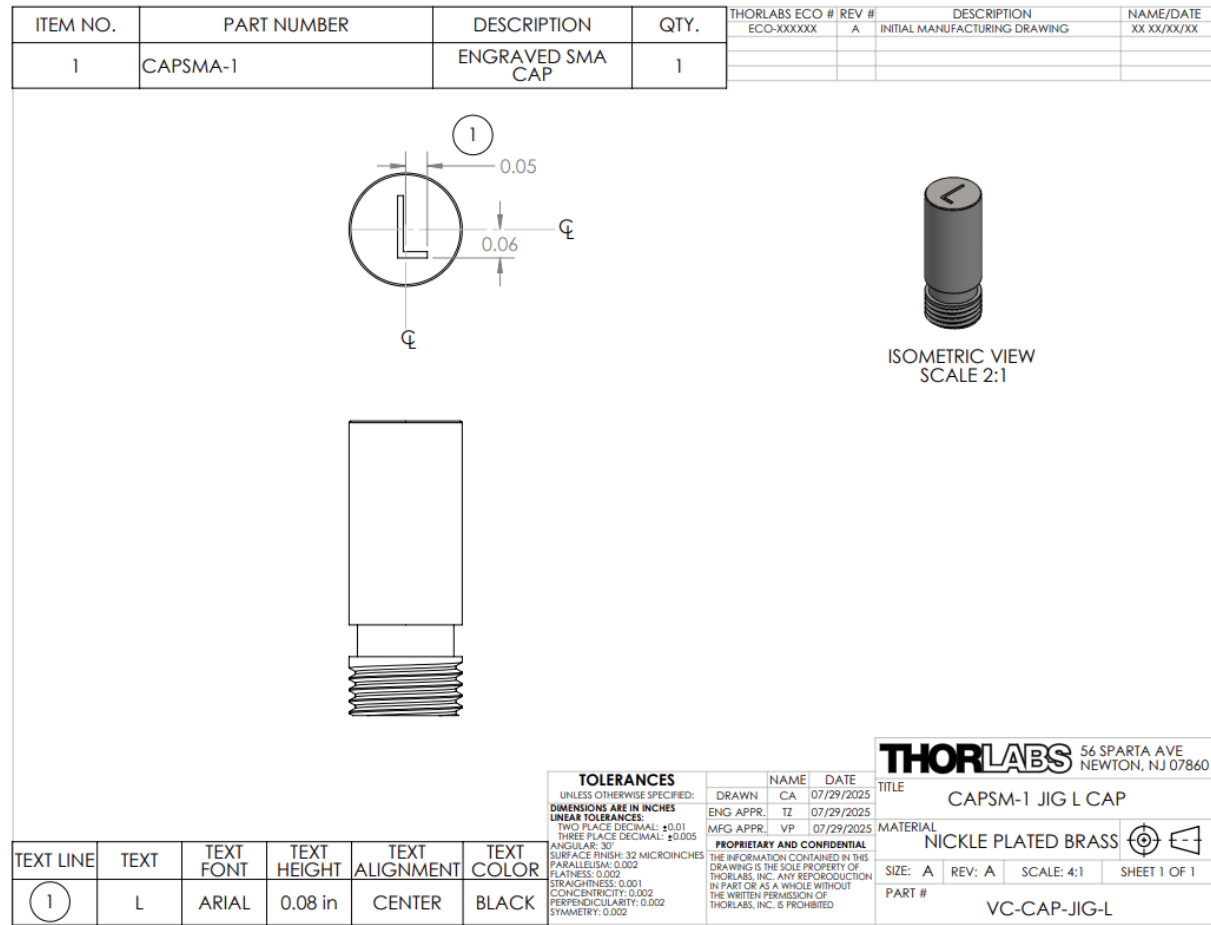
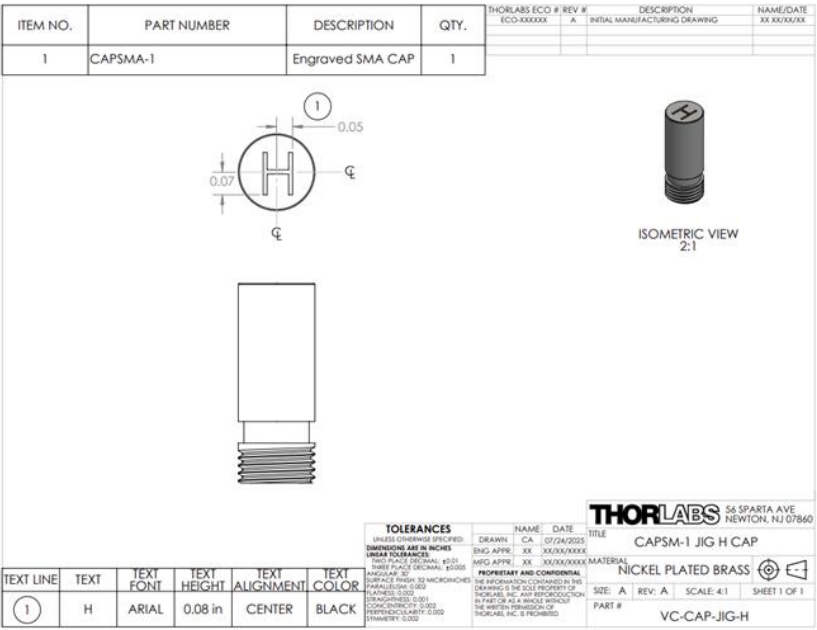
**Tools Used:** SolidWorks

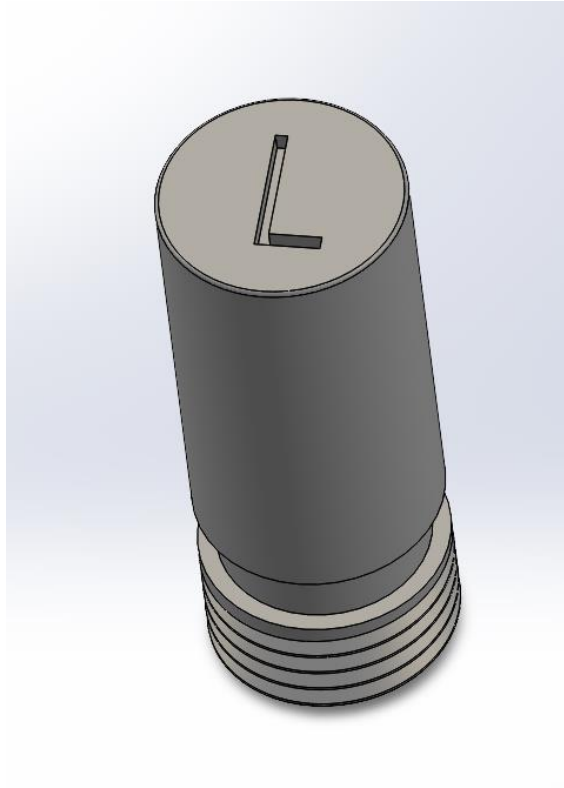
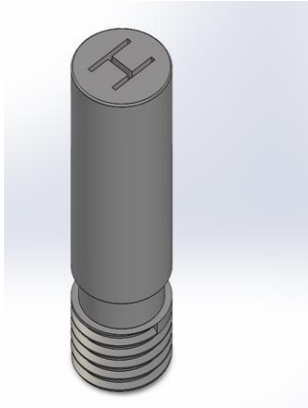
**Responsibilities:**

- Remodel the CAPSM-1 Jig in SolidWorks
- Created a GD&T complaint drawing up to company standards
- Tested cap compatibility

**Outcome:** Successfully created a drawing to ensure compatibility and reproduction for future products and transport







## Skills Developed

- CAD Modeling (SolidWorks, AutoCAD)
- Thermal and Structural Simulation
- Prototyping and Testing
- Cross-functional Collaboration