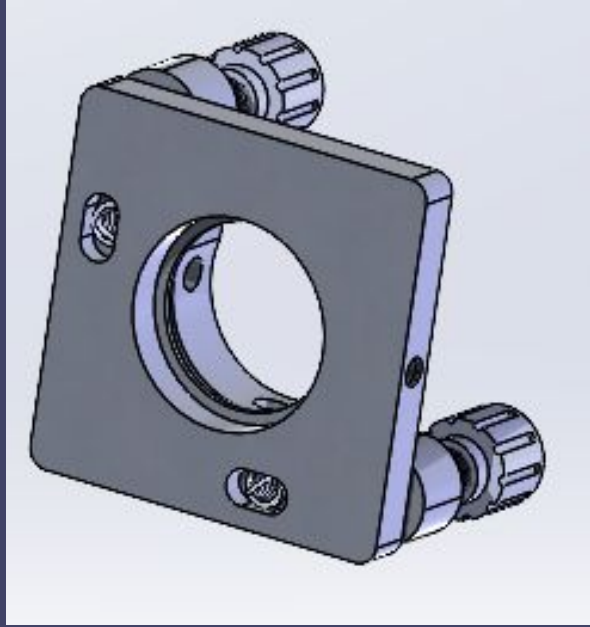
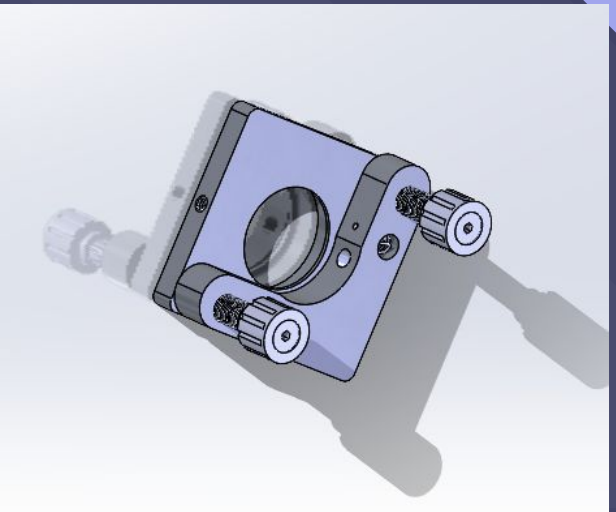
Kinematic Optical Mount

Cassidy Bliss

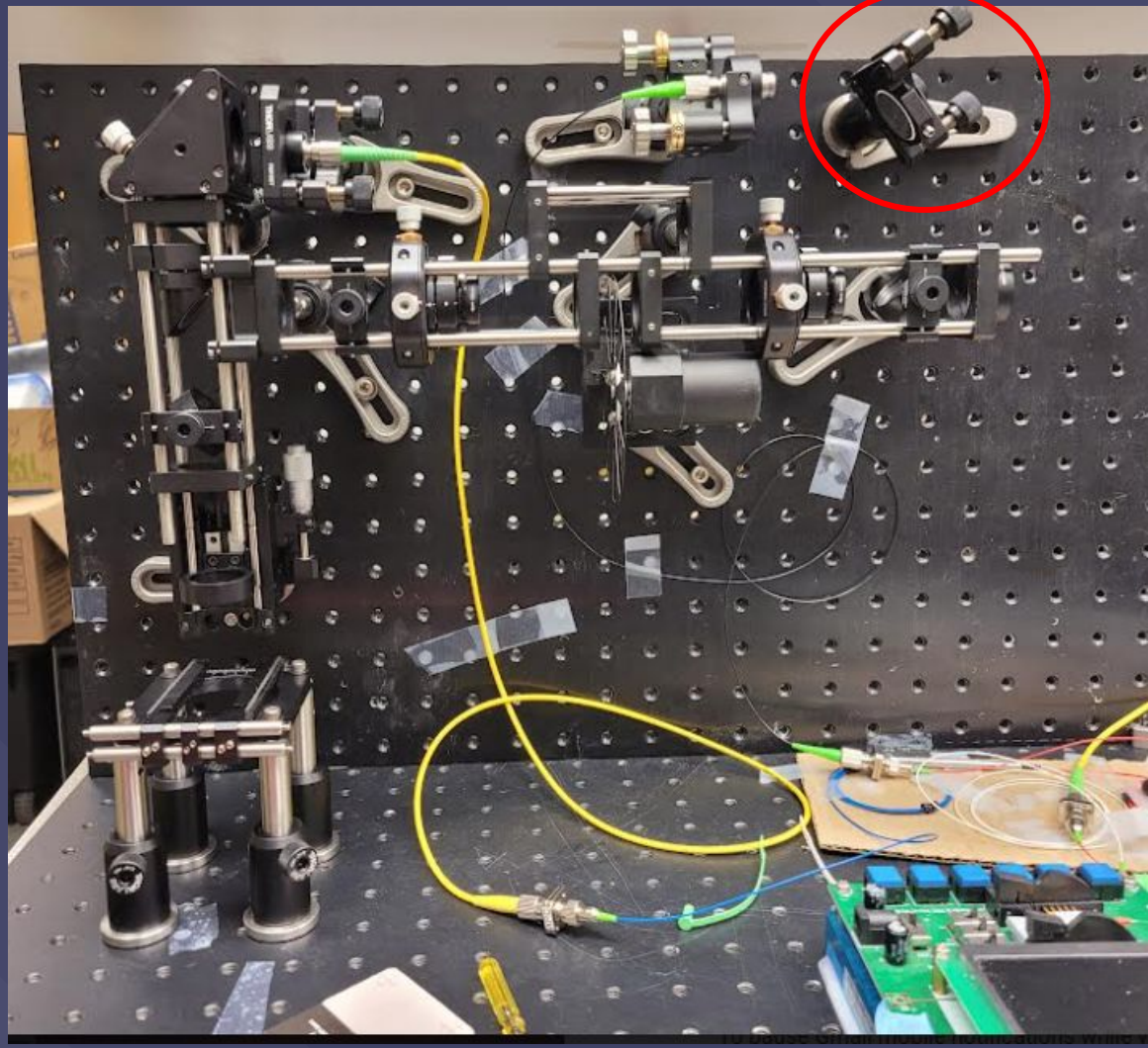




The Inspiration

What is an Optical Kinematic Mount?

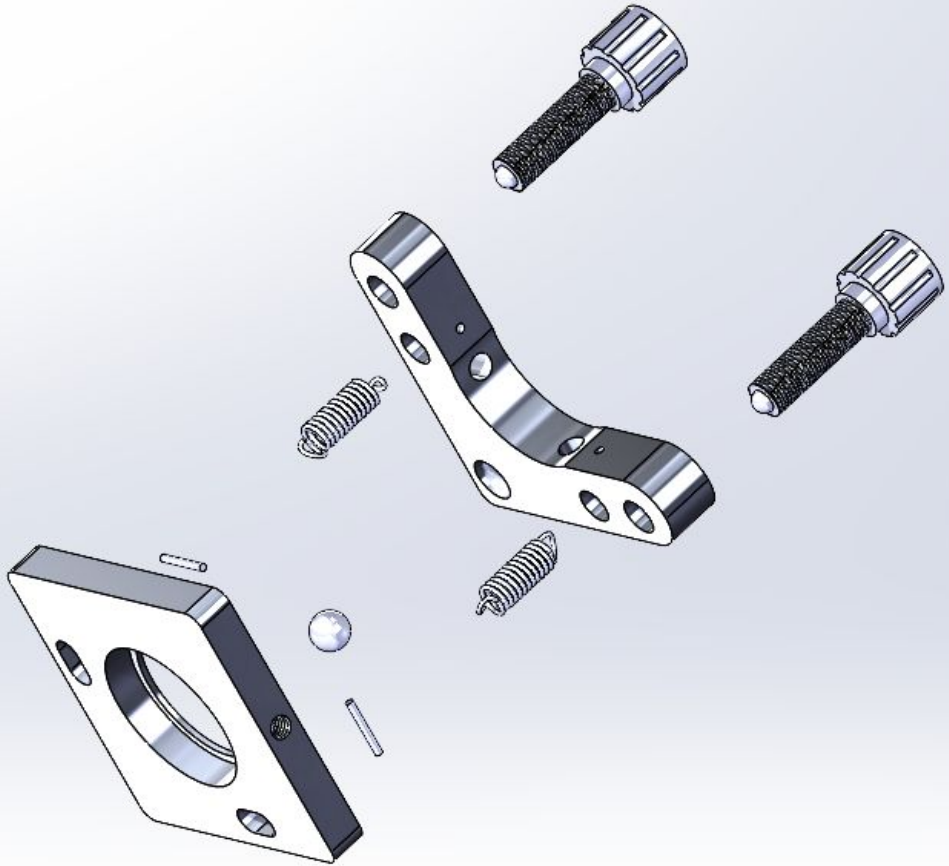
- Used to hold mirrors and filters for photonic/optical laser systems
- Designed to allow fine tuning of angle
- Designed to modularly interface with different optical stands to vary height/position
- One of the most important mechanical pieces at my internship, key in alignment



The Assembly Components and Functionality

- Front face for mirror
- Back face to interface adjustment screws
- 2 adjustment screws
- 2 hook springs
- One ball joint
- 4 pins (two shown here)

Springs keep tension between front and back plate. Ball joint allows stability of corner during angle adjustments. Pins hold the springs in place. Adjustment screws push front plate at desired angle



Challenging Parts

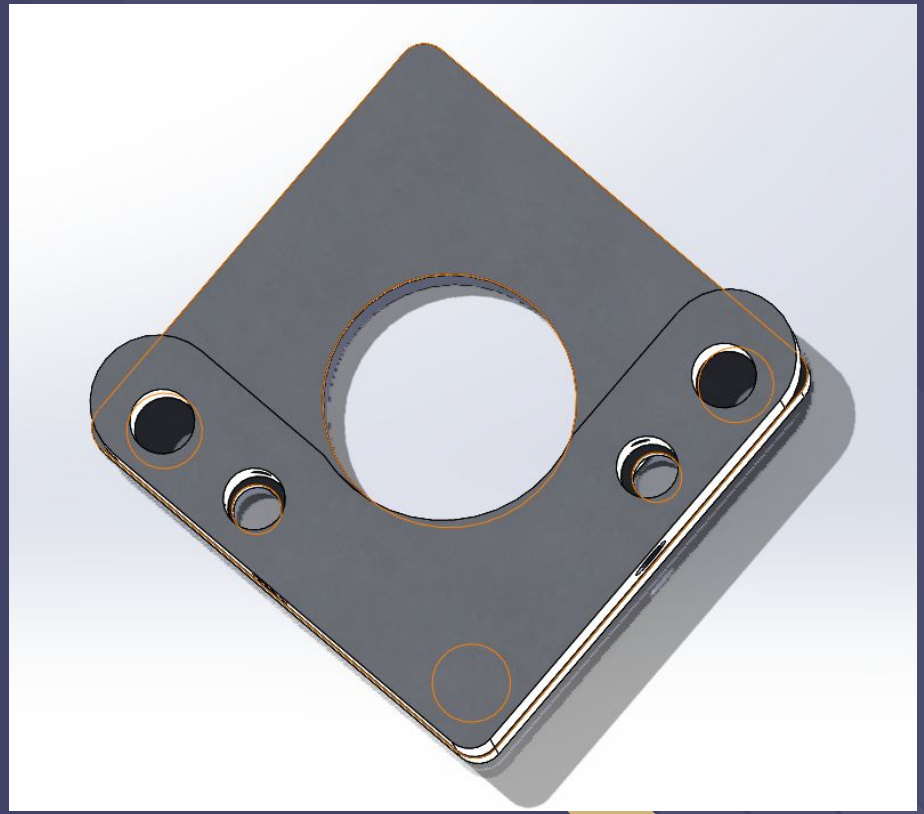
The hook spring was especially challenging to build dynamically and to get to the right length for the assembly

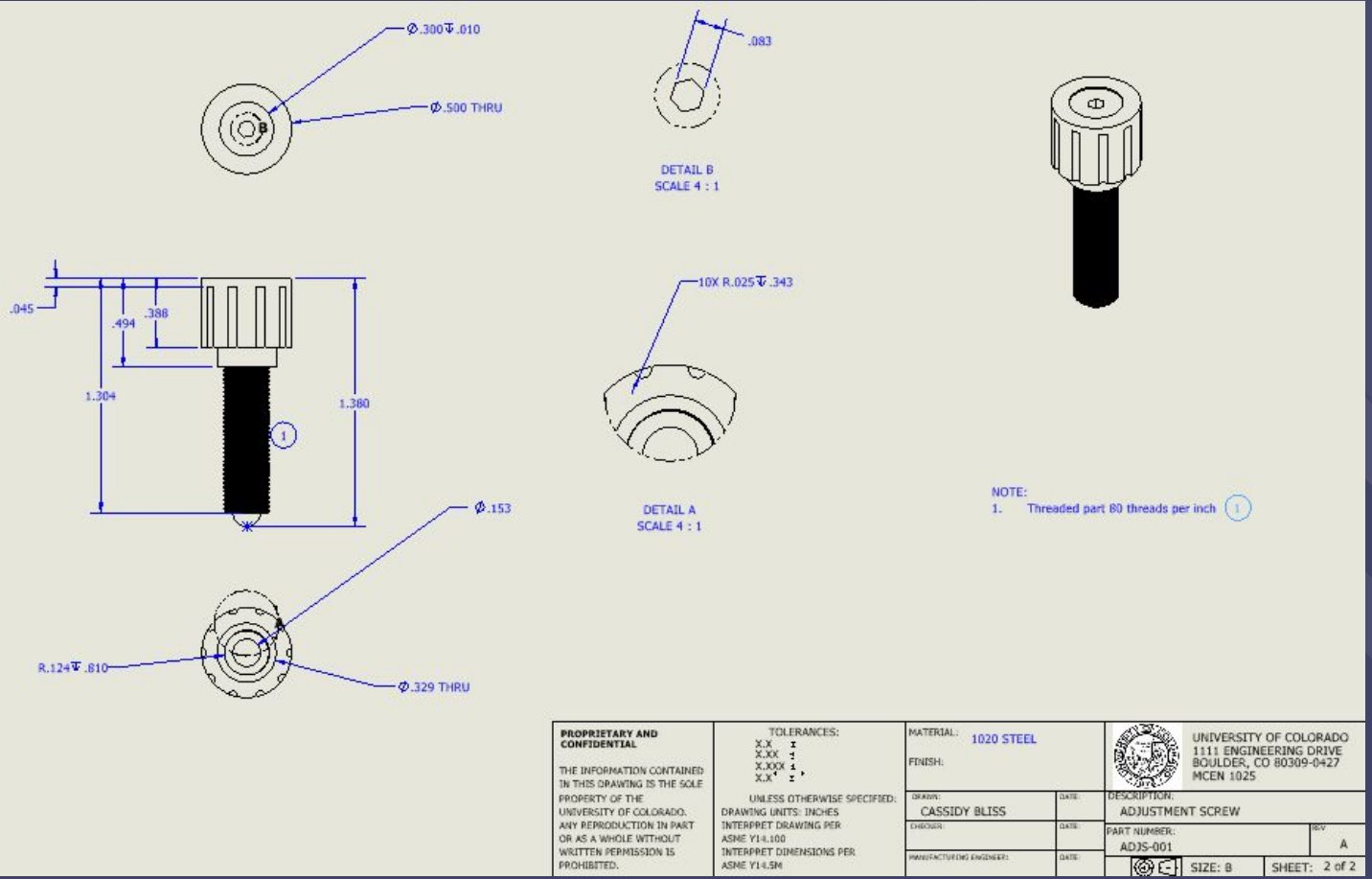
Finding mates that would allow the pin to “hold” the spring through the “hooks” is still something I am trying to figure out

Sweep boss was my best friend at the end of the day once I got the hang of the 3D spline

Challenging Parts

- Because of design, holes were not the same size. This allowed the spring to stretch at an angle with the mount and the tip of the adjustment screw to “roll” around the inset pad on the front piece
- Note that the front an the back are also slightly different widths
- This made not only getting the holes to line up difficult, but also nearly impossible to find the correct mates to place the parts





- Adjustment Screw most challenging because of multiple detailed parts
- Not easy to know which measurements would have been repeated
- Threads so fine that it was not clear they were threads in drawing so created note to describe

Most Difficult Drawing

SUMMARY

- Kinematic Mounts one of most important and commonly used parts in an optics/photonics Lab/Facility
- Even though it was a small device, it was incredibly detailed and challenging to create both in parts and assembly
- Designed for a “controlled” amount of angle freedom of the front face which made it more difficult to assemble than to build the individual parts
- Holes were difficult to line up because of the offset nature of the default “settings” of the adjustment procedure.
- Hooked spring was difficult to create dynamically and to get the right length for the assembly. This part took the most time
- Overall fun and underestimated the difficulty of a seemingly simple device I use everyday. Look forward to getting better at this process