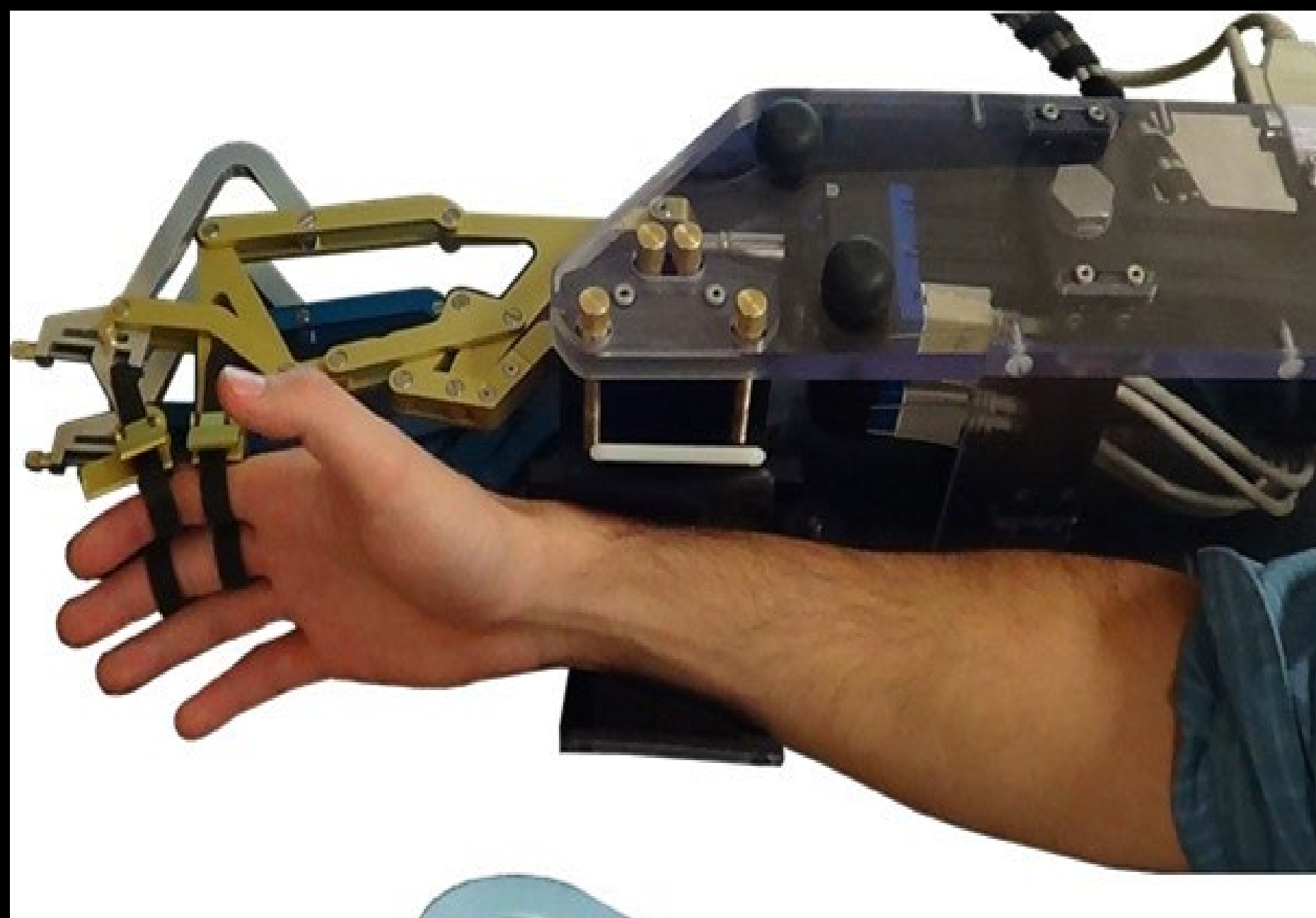


BACKGROUND

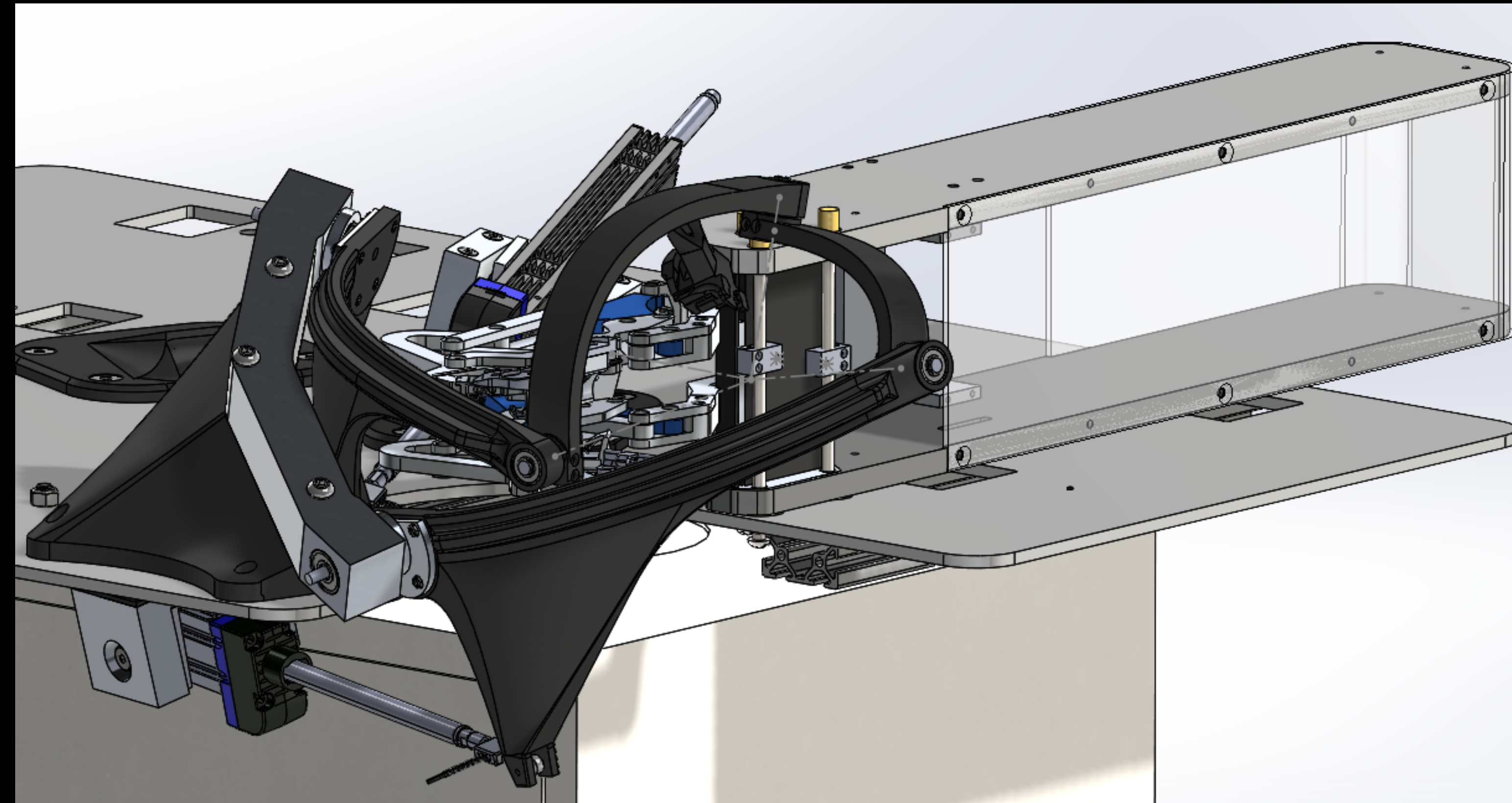
- I Thumb attachment for FINGER 1.0
 - Joint venture between The University of California Irvine and University of Idaho
 - Serves to regain finger dexterity and muscle memory in stroke victims
- I Finger 1.0 sought to maximize controller fidelity and minimize the mechanical impedance
- I Robotic therapy can serve as a scientific instrument for quantifying the recovery process by providing insight that is commonly unavailable with conventional therapy



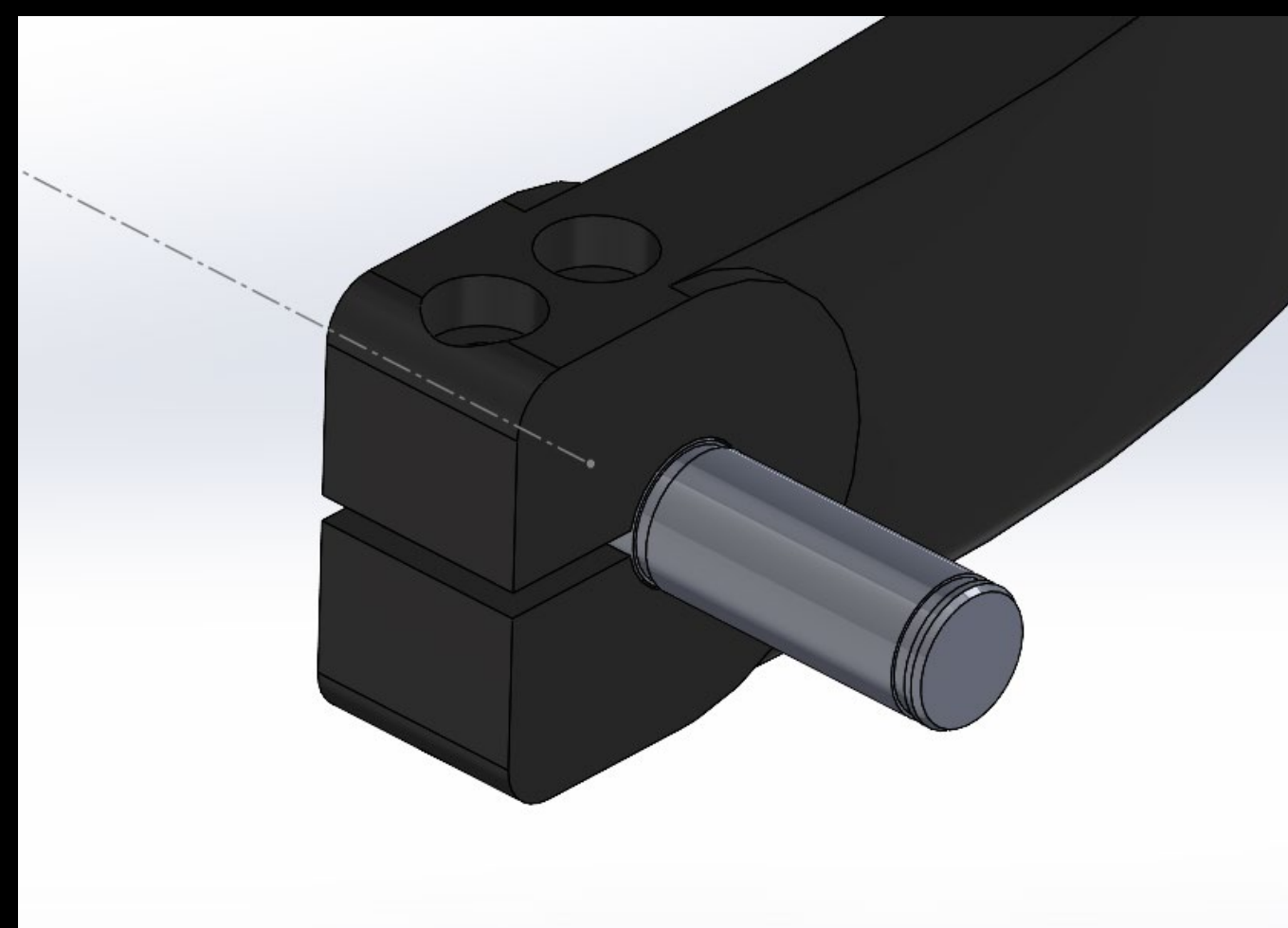
KEY OBJECTIVES

- I Improve upon and build a thumb module for the FINGER 1.0 rehabilitation robot
- I Capture design elements of previous prototype, while decreasing joint slop and increasing user comfort and usability
- I Prepare prototype for quick switching from left to right to be to cut down on costs and bulkiness of having two separate modules

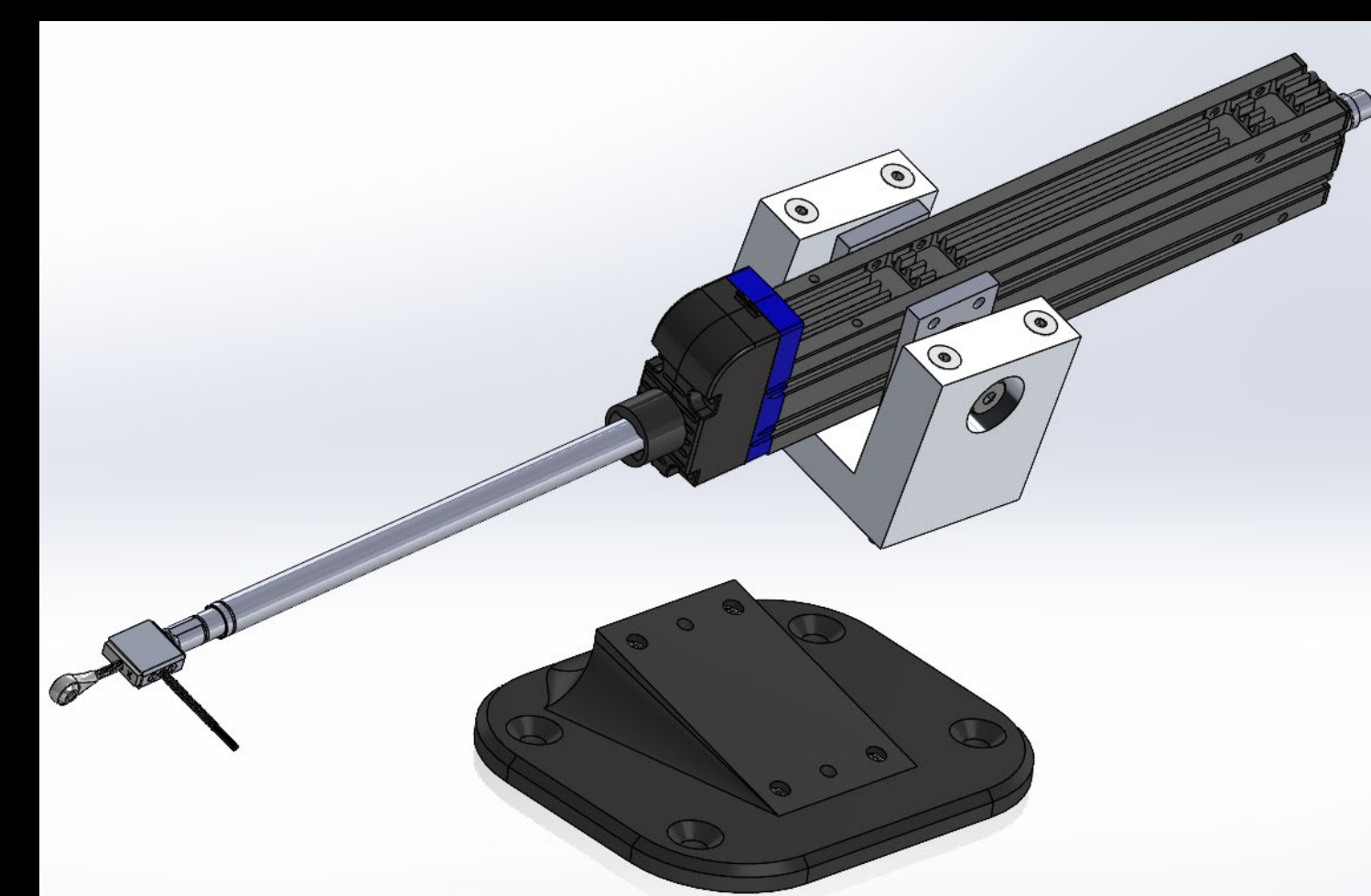
FINAL DESIGN



FINGER 2.0 Final Assembly



Inner Joint Connections

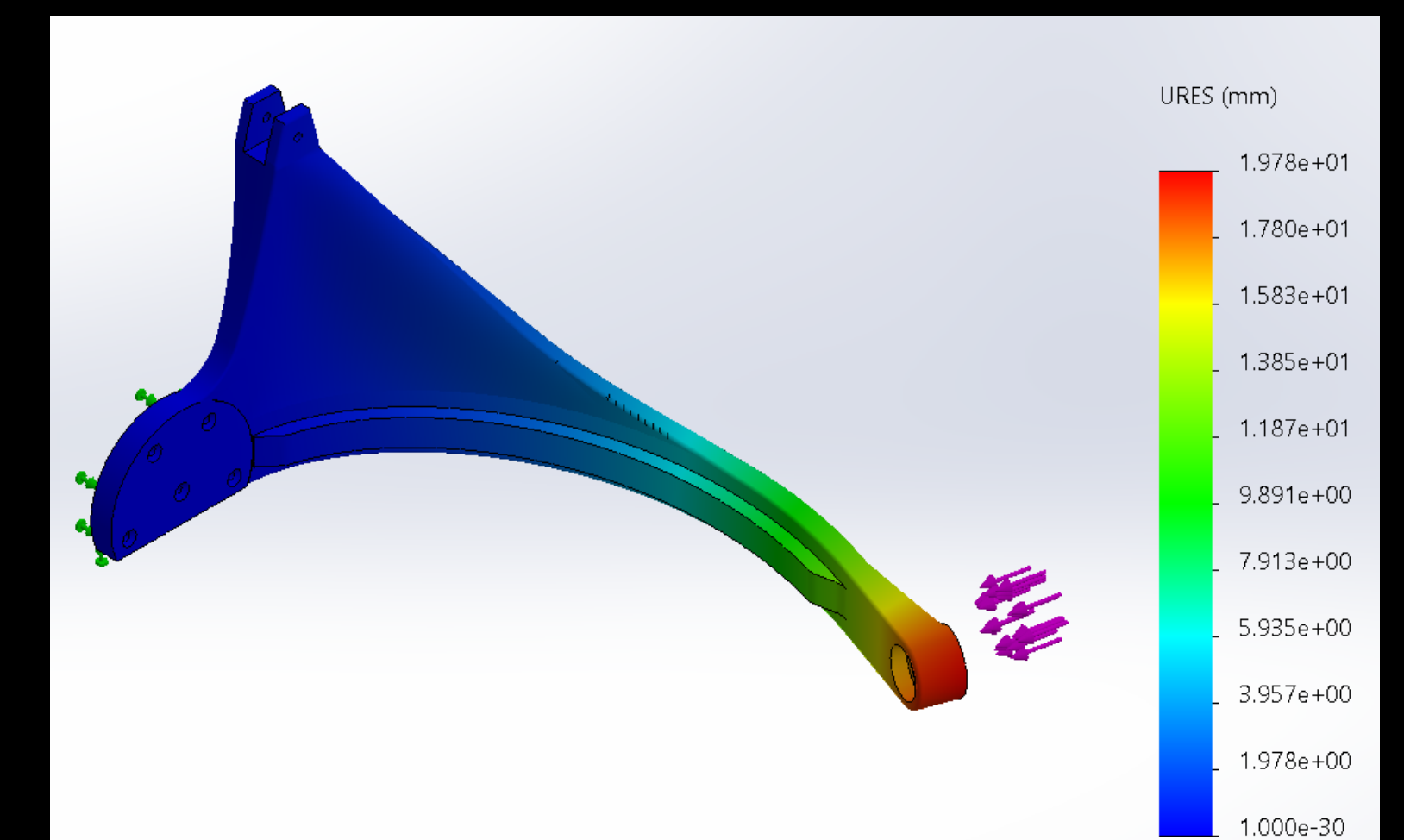


Switching Actuator Mount

- I All link ends were redesigned from the original shoulder bolt through bearings
 - Outer Joints: Face Mount with connected solid shaft
 - Inner Joints: Custom shafts where one link clamps to shaft and bearings are trapped by retaining rings
- I The fixed link was machined to flip from left to right in case of failure of one side
- I Mounts for the actuators were designed and machined to easily change the robot from right-handed use to left-handed use

VALIDATION

- I A SolidWorks assembly was created to validate that no links would interfere with each other and that bolt hole patterns were retained
- I Finite Element Analysis was conducted on specific links with and without ribs to assess deflection reduction



NEXT STEPS AND CONCLUSIONS

- I Finishing the controls to account for friction values obtained from each of the new link connections
- I Finger 2.0 Prototype One will be going to UC Irvine for trials and testing with stroke victims
- I The University of Idaho will be building a second prototype for use in-house so we can conduct our own testing

ACKNOWLEDGEMENTS

- I Funded by The National Center for Medical Rehabilitation Research at the National Institute of Child Health and Human Development
- I Dr. Eric Wolbrecht – Client
 - University of Idaho Mechanical Engineering
- I Dr. Joel Perry – Faculty Advisor
 - University of Idaho Mechanical Engineering
- I Vishwanath Ketkar – Student Mentor
- I Cobi Brower – Student Mentor

