ME 254: Compliant Mechanisms		
Assigned: Feb. 21, 2023	Homework 3	Due: Mar. 2, 2023

Submit paper copies of your solution and email the codes to the instructor and TA.

Question 1 (10 points)

Using folded-beam suspension "elastic pair" and Displacement-amplifying compliant mechanism, design a single-axis compliant mechanism for microfabrication using silicon for the following specifications:
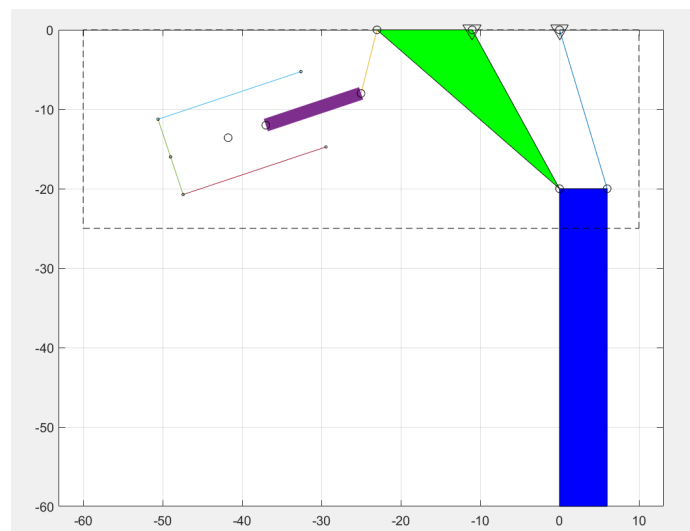
- Should fit an area of 3 mm × 3 mm including fixed supports.
- Design such that the displacement due to 1 g (i.e., 9.81 m/s2) acceleration is as large as possible.
- The in-plane width of beams cannot be less than 5 μm and the out-of-plane thickness is 25 μm.
- Young's modulus is 150 GPa.

Analyze your design using beam FEA code and COMSOL Multiphysics software. Submit the details of your design and results of analysis.

Extra 5 points for 3D-printing a scaled-up prototype.

Question 2 (10 points)

The dimensions of a door-hinge are given to you in a Matlab file. Write the analysis code and animate the mechanism. Adjust the dimensions such that the "door" rotates by 90° as closely as possible. Ensure that the entire mechanism except the four-bar portion stays within the dashed rectangle throughout the motion. See figure below.

All dimensions are in mm.