Overview
Kern Liebers is responsible for producing a stamping plate and spring pack system that they send to their customers. The spring pack system undergoes a riveting process to attach the springs to the two plates. Currently Kern-Liebers is experiencing failure in a percentage of their products, where the springs are not correctly attaching to the plates. The company is looking to find an improvement to their riveting process to ensure better fastness and reliability.

Objective
1. Analyze current process to identify problems
2. Use results to discover different areas where improvements could be made
3. Evaluate different process parameters to improve riveting process
4. Make recommendations based off analysis to improve the riveting process

Approach
- Engaged in conversation with the sponsor and a team in China (SJTU) to gather customer needs
- A CAD model provided by the sponsor was simplified to conduct analysis
- Simulations were run in both ANSYS and COMSOL performing 3D and 2D analysis respectively
- A Design of Experiments was conducted to find optimal design parameters
- 3D printed parts were printed for better visualization of the component of interest
- All analysis was compared to hand calculations ran for a validation of magnitude

Outcomes
- The sponsor will receive regression equations relating the process parameters tested to the stress, strain, and deformation that will occur
- The sponsor will receive outcomes from dynamic simulations of their riveting process.
- By increasing fastness the customer will see a reduced failure rate when the component arrives to their destination