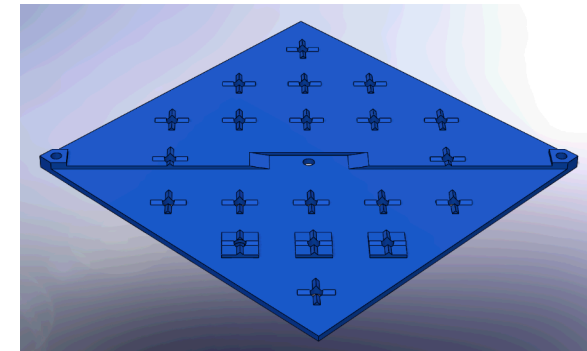
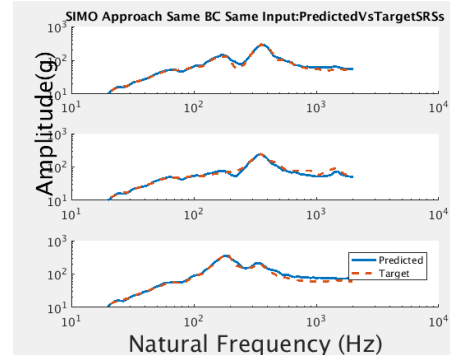
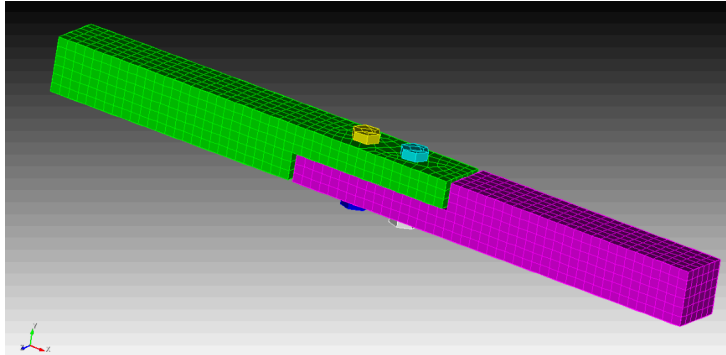


*Exceptional service in the national interest*



Dylan Murphy

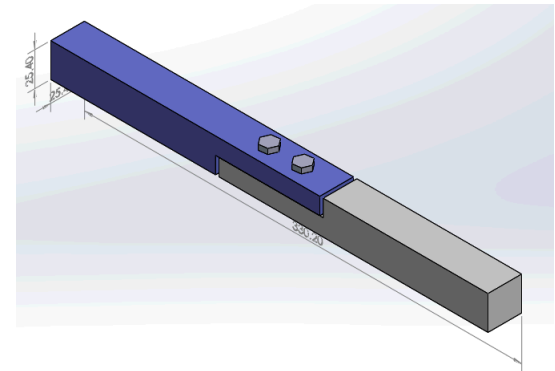
1557/Scott Klenke/Vit Babuska

# Background

- University of Georgia
- B.S. Mechanical Engineering (almost)
- Vibrations and Dynamics
- Why Sandia? Why not?
- Outdoors activities

# Joint Shock Dissipation

- Objective:
  - Reproduce NASA experiments using simulations to allow for more accurate joint design
- Results:
  - As of now: working simulation, honing in on how value changes effect the joint attenuation
  - Before I leave: Have the Brake-Ruess beam attenuation well modeled
- Most interesting fact/data you learned
  - How properties of seemingly rigid elements (like joints) can effect a structure's responses.



# SIMO Shock

- Objective:

- Adapt existing graflab function to better generate Shock Response Spectra (SRS) by optimizing sine tones.

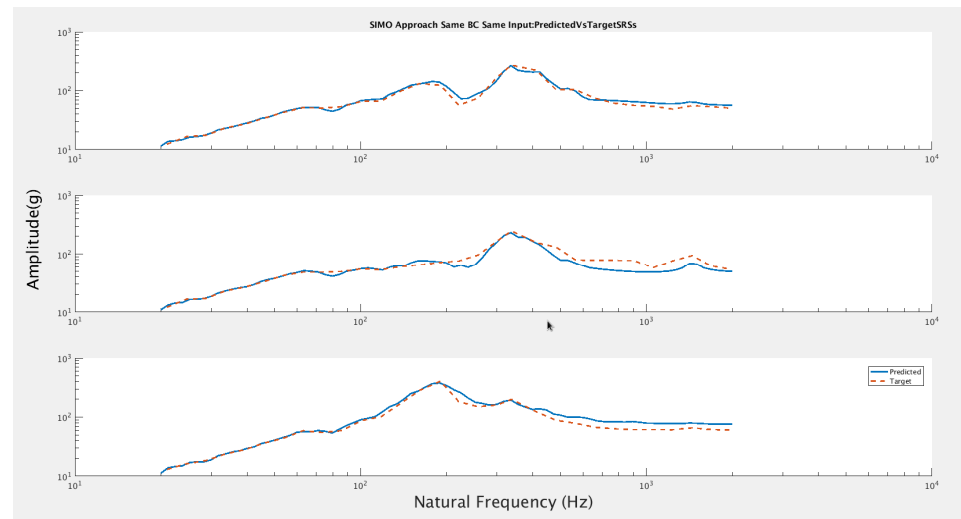
$$A(t) = \sum_{i=1}^N A_i e^{-\lambda_i w_i t} \sin(w_i t + \varphi_i)$$

- Results:

- More accurate predictions of SRS inputs to produce a desired response based on input accelerometer data.

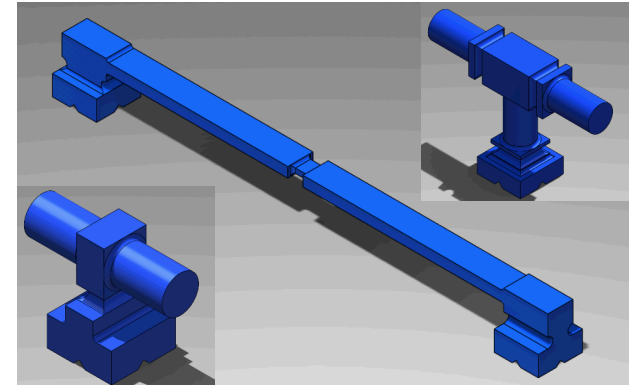
- Takeaway:

- Simple problems are not always easy problems.



# 2D Plate Test

- Objective:
  - Gain a better understanding of existing energy methods through increasingly complex experimentation.
- Results:
  - Stepped test up from cantilever beams to a board with components.
- Interesting Fact:
  - Printed material properties heavily depend on print orientation.
  - Material properties relatively consistent within each orientation.



# What was my experience like?

- Biggest take away:
  - I have a lot to learn
- Best activity
  - Thunder Range
  - My exceptional service in the national interest
- Lessons Learned
  - Backwards compatibility is important
  - If at first you don't succeed, try again, fail again, then ask for help
  - Everything is a spring, mass, damper system
- The one thing I will most remember about my Sandia experience is....
  - The people