



# SMA PASSIVE SHOCK ABSORBER

## PROBLEM STATEMENT

To design a passive shock absorber that incorporates Nitinol™ as damping material to effectively attenuate and dissipate a range of mechanical vibrations by means of thermal control.

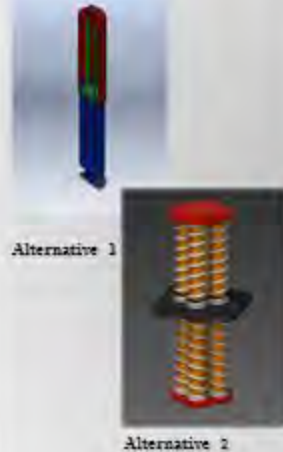
## MOTIVATION

- The need of a suspension system for Florida International University Formula Society of Automotive Engineers (SAE)

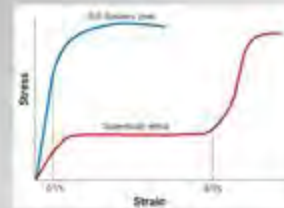
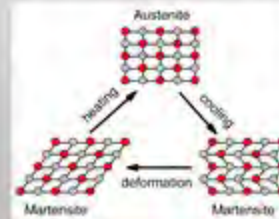
## OBJECTIVES

- Prototype a shock absorber with variable damping ratios.
- Implement a thermal delivery system to regulate the temperature.
- Effectively attenuate high amplitude vibrations.

## CONCEPTUAL GEOMETRY



## MATERIAL BEHAVIOR

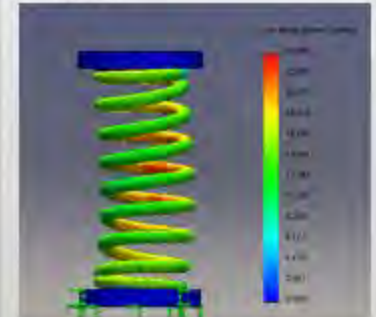


## PROPOSED DESIGN

- A shock absorber constructed with Nitinol springs that undergo phase transformation at controlled temperatures in order to change the system's characteristics.

## ANALYSIS

- FEA simulation in Solidworks™ using the built-in SMA material model:



- To construct and conduct assessments of a working prototype for measuring its transmissibility over different input frequency.
- To test for fatigue using Solidworks™ simulation tool.

## TIMELINE

	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Concept Development																	
Design Optimization																	
Prototype Design																	
Build/Verify & Testing																	
Build/Verify & Analysis																	
Finalize Design																	
Finalize Design & Analysis																	
Prototype Construction																	
Prototype Testing																	
Team Poster																	
Prototype Construction																	
Report Preparation																	
Final Presentation																	

## TEAM MEMBERS

Harold Hastings



Alexander Zuleta



Advisor: Dr. Munroe