

Welcome , and thank you for taking the time to view my portfolio. The goal of this portfolio is to give you a deeper insight into my experiences and skills i have gained over my recent history

## **Project: Suspension Design and Manufacturing for SAE Supra Competition**

As a university team captain for the SAE Supra competition, I led the design and manufacturing of our vehicle's suspension system, aiming to meet stringent standards while optimizing weight and cost. This project exemplifies my proficiency in engineering design, kinematic analysis, and manufacturing processes.



### **Suspension Redesign**

In response to the demanding requirements of the SAE Supra competition, I spearheaded a comprehensive redesign of our vehicle's suspension system. Our key achievements in this endeavor include:

**Weight Reduction** : By implementing an updated design, we successfully reduced the weight of the suspension assembly by an impressive 6 kg, enhancing the overall vehicle performance.

**Cost Efficiency**: Through careful design and material selection, we managed to trim down the manufacturing cost by \$900, a substantial achievement that contributed to our project's overall success.

### **Design Approach**

Informed by the need for a high-speed vehicle, we opted for a double-wishbone suspension system. The following steps summarize our design process:

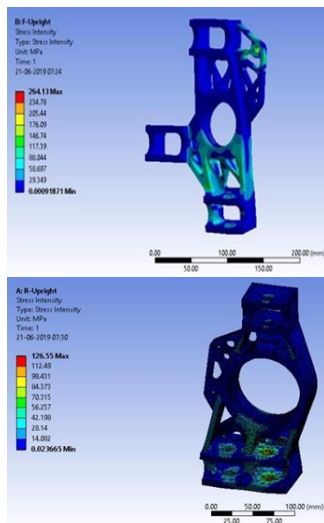
**Parameters Determination**: We meticulously defined essential parameters such as wheelbase, track width, kingpin, and caster to tailor our suspension to the competition's requirements.

**Hardpoint Specification**: Our choice of an unequal length double wishbone suspension enabled greater flexibility in camber adjustment, vital for optimal performance.

**Kinematic Analysis**: We utilized Solidworks and LOTUS Shark for kinematic analysis, ensuring the suspension system's wheel travels aligned with damper positions during jounce and rebound. These findings were later incorporated into dynamic analyses to establish travel limitations.

## Analysis and Validation

We placed significant emphasis on the accuracy and reliability of our design:



**Uprights Design:** Our meticulously designed front and rear uprights underwent multiple iterations, analyzed in ANSYS under various loading conditions. This comprehensive approach addressed all possible static and dynamic loading scenarios.

**Material Selection:** We chose Al-7075 T6 for the uprights due to its exceptional strength-to-density ratio. This material's remarkable mechanical properties and low weight played a pivotal role in our design's success.

## Manufacturing Precision

Our commitment to precision manufacturing ensured the realization of our suspension system's potential:

**CNC Machining:** Both the main upright body and an incorporated kingpin inclination module were precision-machined using CNC milling. This strategy not only optimized performance but also reduced fabrication and material costs.

**Modular Design:** Our innovative inclusion of a modular kingpin inclination component allowed for flexibility in adjusting this critical parameter without necessitating a complete upright body replacement.

This project showcases my ability to lead a multidisciplinary team through the design and manufacturing process, ultimately resulting in a lightweight, cost-efficient suspension system primed for the rigors of the SAE Supra competition.

