



## **2011 Sponsorship Information Package**

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# Introduction

Thank you for your interest in the University of Kentucky's Formula SAE team. This booklet aims to paint a broad picture of Formula SAE, UK Racing, the team's goals and achievements, and how sponsoring our team could benefit your company.

# What is Formula SAE?

Formula SAE (FSAE) is a student based engineering design competition held by the Society of Automotive Engineers (SAE). It began in the U.S. over 25 years ago with just a handful universities competing. Since then, this event has grown to host over 140 teams from all round the world and led to the creation of additional competitions in Europe, Asia, South America, and Australia. Teams spend months designing, manufacturing, and testing their cars to produce a new car for every competition year.



# FSAE Concept

- The Scenario**

One driving factor of the competition is the scenario. The teams are to focus on the task of building a prototype to attract a manufacturer that will produce the car for non-professional weekend autocross racers at a volume of 1000 units per year.

- The Concept**

The competition concept is for students to design, manufacture, and race a small formula style prototype racing car. There are technical regulations for design that encourage innovation and originality.

- The Competitions**

The competitions are broken up into two main parts. First students are tested on the design and their engineering knowledge of the car they have produced. After the static events come the dynamic events. In this range of events the cars are pitted against the clock to test the capabilities for its desired market.

- The Business Side**

In addition to the engineering aspects, students must include a business portion of the production in their presentation. These facets of the competition aim to build business and administrative experiences while the design and manufacturing processes build practical engineering skills.

## Scoring

The competition is broken down into dynamic and static events from which teams score points based on either times or judges' scores. The events are scored as follows:

### Static Events:

• Technical Inspection	----
• Engineering Design	150
• Cost Analysis Business	75
• Presentation	100

### Dynamic Events:

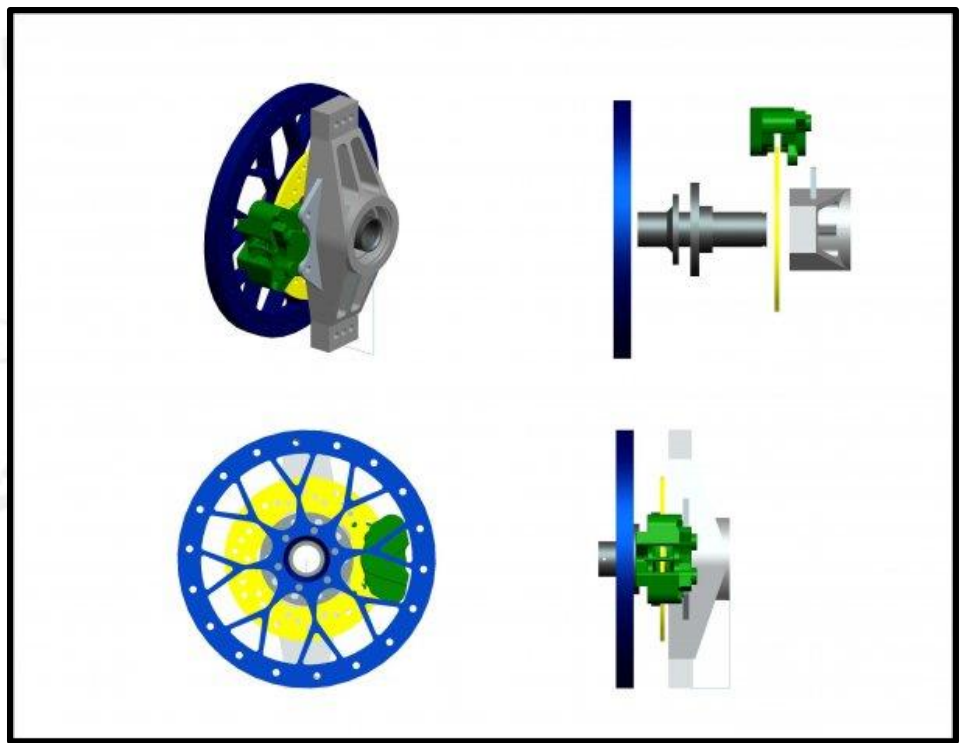
• Acceleration	75
• Skid Pad (Figure 8)	50
• Autocross (Lap Dash)	150
• Endurance (13.66 Miles with driver change)	300
• Fuel Economy (Included in Endurance)	100

**Total:** 1000

# Competition Regulations

Regulations for the competition are quite open with regards to design and construction. This encourages students to be original in their designs and produces a varied array of sizes, shapes, and dynamics in the vehicles from different universities. The basic guidelines are as follows:

- Open wheeled/open cockpit
- Max 610cc four stroke engine
- 20mm intake restrictor
- Wheel size of 8in or greater
- Must be able to brake all 4 wheels
- Suspension travel at least 50.8mm
- Extensive safety and structural guidelines
- Limit \$25,000 to produce



# University of Kentucky in Formula SAE



First Generation



Second Generation

# Sponsorship Benefits

Sponsorship of the 2010 UK FSAE team can provide many benefits for your organization.

## *Corporate Citizenship*

Through supporting the UK team in this exciting student challenge, your company can be seen as a supporter of the community and its future leaders. The key skills learned through this competition; teamwork, self-management, communication, planning and creativity, are vital skills for future engineers in the working world. Your company will be seen as a contributor to the development of these skills in the students of UK FSAE.

## *Company Promotion*

The UK FSAE team strives to provide its supporters with as much exposure as possible. It does this through attending events throughout the year and displaying the signage of all the team's supporters. Your company logo would be displayed on team merchandise, promotional posters, and the 2010 car at the FSAE competition in Detroit, as well as any other competitions that may be entered.

*- SAE International is a non profit organization*

# Sponsorship Packages

- *Silver Package*

*\$500*

- Plaque
- Small monotone logo on race car
- Receive monthly newsletter

- *Gold Package*

*\$1000*

- Plaque
- Medium monotone logo on race car
- Receive monthly newsletter
- Small logo in news letter
- Two UK Racing T-shirts

- *Platinum Package*

*\$2000*

- Plaque
- Large multicolor logo on race car and T-shirts
- Receive monthly newsletter
- Large logo in newsletter
- Race car present at company events
- Large logo on all display boards and presentations
- Two UK Racing polo shirts

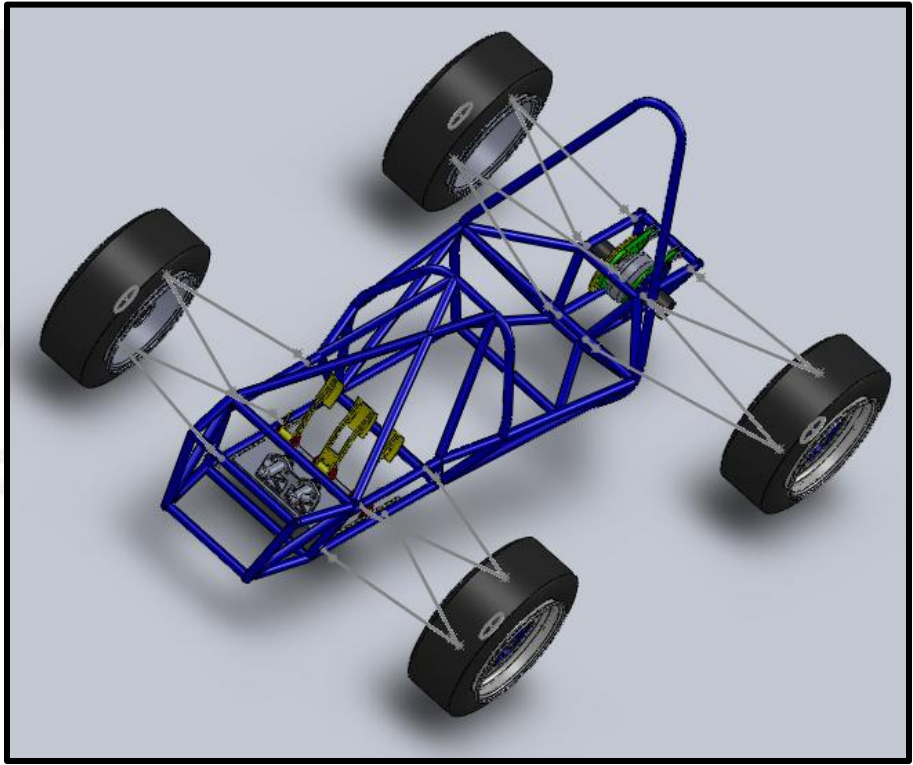
- *Contact us for more details and other sponsorship opportunities.*

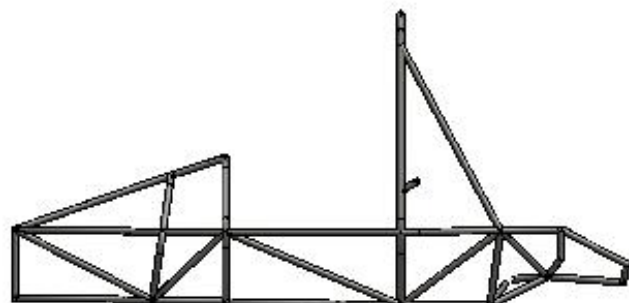
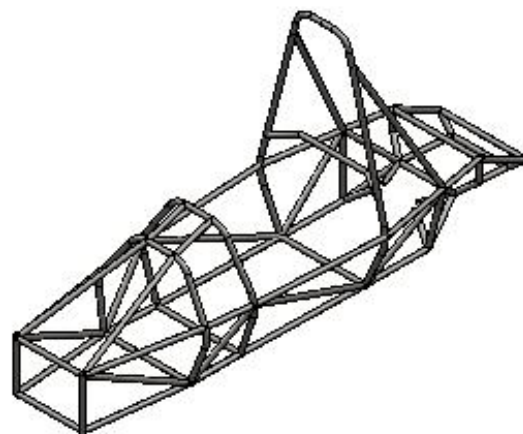
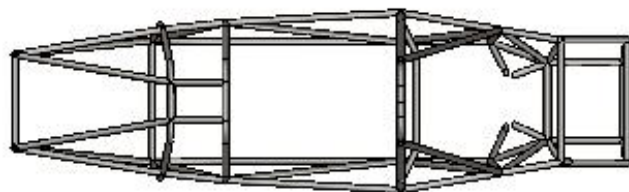
# Design Highlights and Focus

## *Third Generation Formula Racer (Gen-3)*

The design of a formula race car incorporates multiple design systems. The following highlights are the focus of our design.

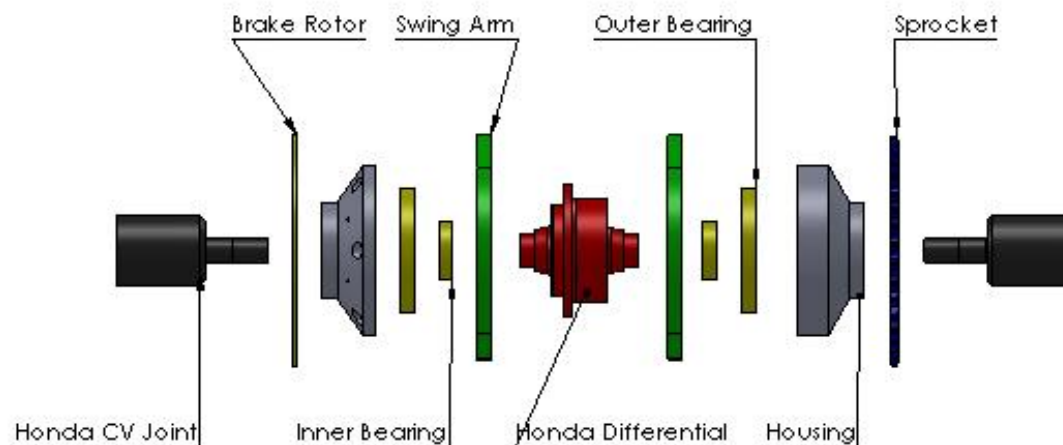
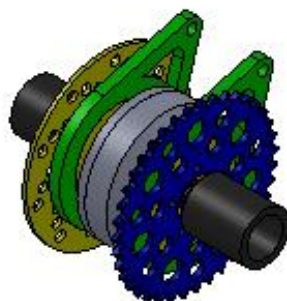
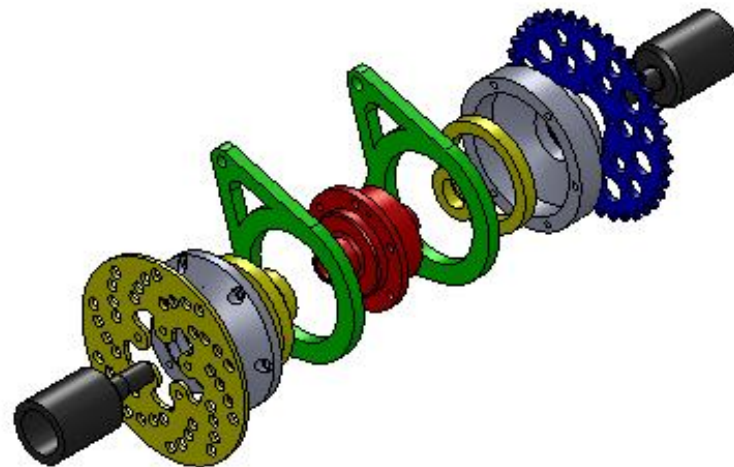
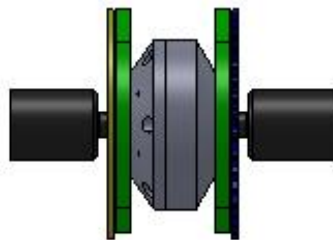
- Frame
- Differential and Final Drive
- Suspension
- Brakes and Pedal Assembly





# Frame

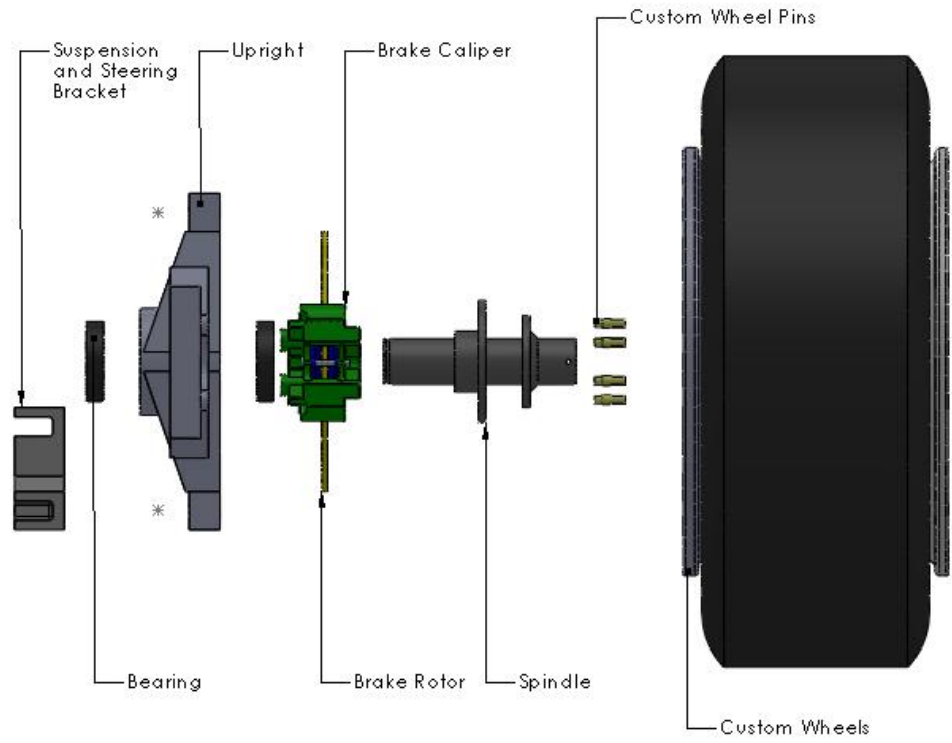
- Type: Tube Frame
- Material Type: Mild Steel or Chromoly 4130
- Manufacturing Details:
  - Specialty Cut Tubes: Laser or Water Jet Cutting
  - Tube Profiles: 1.0 inch x 0.095 inch  
1.0 inch x 0.065 inch
  - Manufacturing Process: Jigging and Welding  
Tig or Mig based on material choice
- Design Criteria:
  - Suspension Geometry: Calculated mounts and components for the suspension
  - Formula SAE Rules: Cockpit Opening  
Driver Leg Space Cross Section  
Main Roll Hoop- Front Hoop Relations  
Side Impact Structure Minimum Height  
Various Safety Requirements
  - Driver Ergonomics: Creating a safe and comfortable cockpit
  - Packaging Requirements: Engine Mounts and Clearance  
Final Drive/Differential Mounts and Clearance  
Pedal Assembly Mounts and Clearance



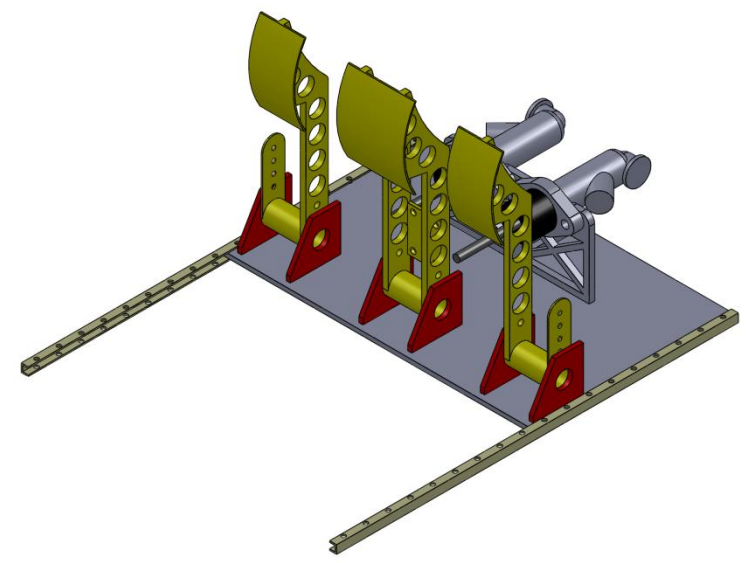
# Final Drive and Differential

- Type: Limited Slip Differential
- Parts:
  - Honda Fourtrax Front Differential
  - Honda Fourtrax Front CV Joints and Axles
  - Honda Fourtrax Front Drive Hubs
  - Custom Differential Housing
  - Custom Swing Arm Tensioning Mount
  - Custom Drive Sprocket
  - Differential and Housing Bearings
- Manufacturing Details:
  - Differential Housing: Custom Housing cut from 6160 Aluminum using lathe process
  - Swing Arm Housing: Custom Cut from 6160 Aluminum
  - Drive Sprocket: Custom Cut from Mild or Alloy Steel
  - Honda Axles: Cut and respline to be compatible with Hubs
- Design Criteria:
  - Housing:
    - Mount and house Honda differential and fluid
    - Allow for drive sprocket mounts
    - Allow for single inboard rear rotor mounts
  - Swing Arm
    - Mount to frame and hold differential housing
    - Allow for single inboard brake caliper mount
    - Allow for chain tensioning
  - Drive Sprocket
    - Be in accordance to engine sprocket distance and chain size
  - Honda Axles
    - Reduce length for track width and respline after cuts
  - Honda Hubs
    - Integrate with rear spindle system and axles

Front Wheel and Upright

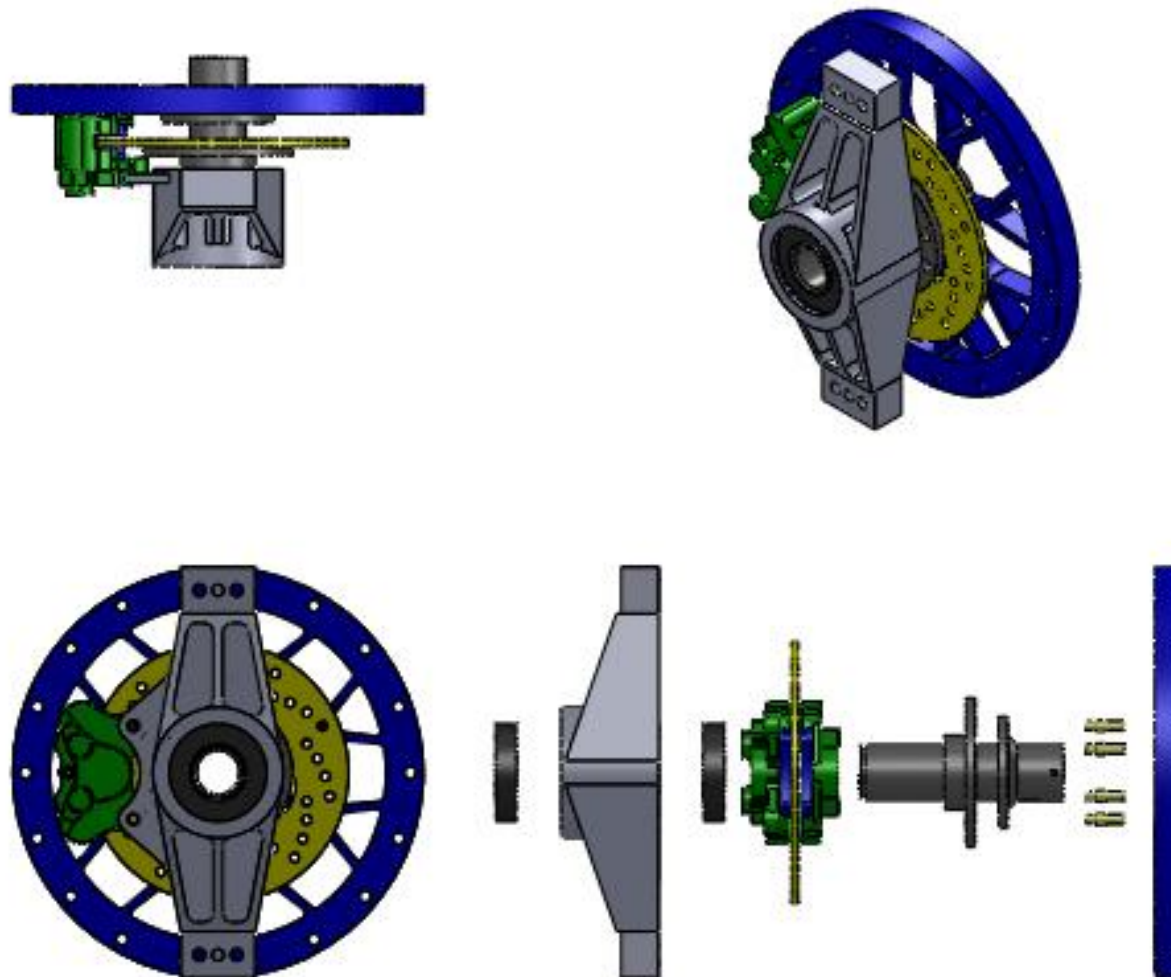


Brake Pedal Assembly



# Brakes and Pedal Assembly

- Type:
  - Dual Front Disc Brakes
  - Single Inboard Rear Brake
  - Custom Gas, Brake, Clutch Pedal Assembly
  - Dual Master Cylinder Setup
  - Adjustable Pedal Position
  
- Parts:
  - Wilwood Master Cylinders and Brake line components
  - Custom manufactured Pedals
  - Custom mount plate and runners for adjustable pedal position
  - Wilwood PS-1 and Dynalite Single Calipers
  - Custom Cut Rotors
  
- Manufacturing Details:
  - Pedals: Cut from Mild Steel and Cross-drilled to reduce weight
  - Mount Plate: Aluminum mount plate cut and designed to mount all components
  - Rotors: Steel or Iron cut using water jet cutting to custom pattern/size
  
- Design Criteria:
  - Pedal Assembly: Adjustable Pedal Position of whole assembly  
Mount all components on single base plate
  - Rotor: Mount to custom front spindle and differential  
Diameter based on braking calculations
  - Master Cylinder: Independent front and rear cylinders dictated by SAE rules



# Uprights

- Type: Custom Upright for Independent Wishbone Suspension
  
- Parts: Custom Upright  
Custom Control Arm Mount bracket  
Custom Caliper Mount (Front)  
Custom Single Lug Hub/Spindle
  
- Manufacturing Details:
  - Upright: Milled Aluminum Billet
  - Control Arm Mount: Milled from Aluminum
  - Caliper Mount: Custom caliper mount, laser cut, and welded to Upright
  - Hub/Spindle: Lathe cut steel, standard iso or ansi thread cut
  
- Design Criteria:
  - Upright: Conform with Suspension geometry design
  - Control Arm Mounts: Be adjustable (shimming) for post production tuning  
Mount to Upright  
Mount spherical bearings of control arms within.
  - Single Lug Hub/Spindle: Mount with custom wheel design  
Mount with Sub-prongs to ensure stability  
Mount with Custom lug to secure wheel

# Contact Information

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# Thank You

We would again like to thank you for your interest in the University of Kentucky's Formula SAE team. Here at UK Racing we hope to continue to be involved with your company as we reach our team's goal.

