

## **UC Irvine**

### **SSOE Research Symposium Dean's Awards**

#### **Title**

Anteater Racing AR8 "Savage" 2015 FSAE Vehicle

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# Anteater Racing AR8

## "Savage" 2015 FSAE Vehicle

Chassis Design: Dean Baggs, Ting Hung Yu, Bret Haley, Benny Chiang, Natalie Chau, Jimmy Wu, Esau Sanchez,  
 Suspension Design: Aldrich To, Bryant Min, Anthony Hummel, Dong Lin, Justin Kennedy, Matt Miller, Christopher Pratti  
 Driveline Design: Steve Lin, Jesus Ramos, Toby Zhang, Lucas Huynh, Chris Ji, George Khoury, Zoe Chao, Chun Yen Liu  
 Advisors: Michael McCarthy, Robert "Smitty" Smith  
<http://ucracecar.weebly.com/>

Goal: To build the highest performing race car possible while adhering to the FSAE Guidelines

Progress: Initial designs complete  
 FEA analysis of components under way

This year, we are designing and building a race car for the 2015 FSAE competition in Lincoln, Nebraska.

We have two different design teams to analyze two different strategies. The first is a superlight design carbon fiber and steel chassis coupled with a minimalist suspension package, and powered by a light yet powerful dirtbike engine. The second is a traditional steel tube chassis, providing superior manufacturability, driven by a high-power sportbike engine, and leveled by a robust 4-bar anti roll suspension. These designs both have their advantages and drawbacks, but the final goal of highest power to weight will be the main influence in our decision. Overall, we have a 300lb dryweight goal without the driver, which when combined with the driver and fuel will keep the overall weight low enough to help us achieve a 3.7 second finish time in the 75m acceleration test. We have aggressive goals, but we also have the experience and leadership of our two advisors Robert "Smitty" Smith and Professor Michael McCarthy to keep us racing in the right direction.

### Schedule

Chassis Complete	3/14/2014
Driveline Complete	3/14/2014
Suspension Complete	3/14/2014
Human Interface Complete	3/14/2014
Vehicle Assembled	3/30/2014
Begin Testing	4/15/2014

### Savage Red

A traditional and durable steel tube chassis will be constructed to provide optimal rigidity, cost effectiveness and manufacturability.



The inherently heavier design requires the use of a more potent powerplant. In this case, it comes in the form of the Yamaha R6 engine from the world renowned sportbike. Power delivery will be handled by a limited slip differential and independent rear suspension



Yamaha R6 engine



Differential mount and axles



We will be using a 4-bar linkage to control the roll characteristics of the vehicle, and negate any under or oversteer that the vehicle may exhibit. 4-way adjustable Oil and Gas shocks will dampen bumps and chassis roll

### Chassis

We will utilize complex manufacturing techniques to create a carbon fiber composite cockpit. A chromolly steel rear frame will handle the dynamic loads intense heat that is produced by the engine.



### Drivetrain

We will be using the Yamaha YZ450F engine and transmission unit to provide the power for our vehicle. It will also integrate with a custom tuning setup to allow for adjustment of the fuel and ignition input in order to compensate for the 20 mm restrictor that the rules require. This power will be fed to a sub 8lb carbon fiber rear axle, providing aggressive acceleration.



Yamaha YZ450F Engine



Solid rear axle and suspension assembly

### Suspension

Since the suspension setup is being designed to ultra lightweight, the use of urethane bushings will be incorporated into the design instead of steel springs. The A-arms will be made of aluminum to save weight

