

Senior design goes off road, literally

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Baja SAE is a relatively young program on the University of Colorado Boulder campus. Now in its third year, the program has built a strong foundation for future teams to stand upon.

What do we do? Baja SAE is an [annual tournament hosted by the Society of Automotive Engineers \(SAE\)](#) where aspiring engineers across the country design, build, test, and race off-road vehicles. At CU Boulder, the program is offered on campus as a senior capstone project for undergraduate mechanical engineers.

Before you start thinking about the Baja 1000 or Ken Block, know that the teams are limited by a 10-HP motor. So rather than trophy trucks and rally cars, think more along the lines of single-seat buggies.

Because of this limitation the students must put focus on good engineering design practices to optimize the weight, handling characteristics, and efficiency of the vehicle. Teams are scored based on dynamic events, including:

- 4-hour endurance race
- Sled-pull
- Suspension course
- Maneuverability course

Beyond the racing, there are also static design events including a design and sales presentation where the team must prove the vehicle's profitability and design intent to a panel of judges.

The team's inaugural year was successful with a 39th place finish out of 100 at the 2016 competition in California. The vehicle survived all the dynamic race events, which is more than most teams can say. The grueling conditions of the courses tear most vehicles apart, even those of veteran teams. Around 70% don't even finish the four-hour endurance event due to mechanical failures.

In the program's second year, the team traveled to Kansas for competition and placed 34th. They improved over the first year despite a mechanical failure that forced them to end the endurance event 30 minutes early. The second year made large design improvements from the first year, including reducing the vehicle weight by 100 lbs.



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Our current team is in the process of manufacturing the 2018 vehicle, and I couldn’t have asked for a better team. All 15 of us have put in vast amounts of work late into the evening and early in the morning to achieve our goals. This year, focus was put on vehicle durability, maintainability, and well-researched engineering design. We are hopeful that our hard work will pay off at the competition in May.

Not only have we designed a vehicle that we are proud of, but we have formed a family that extends beyond the 15 currently on the team, to the growing group of Baja SAE alumni. I hope that the team continues to grow as a program and as a community.

[For more information about the team visit our website](#), and feel free to reach out to me if you are interested in getting involved.

Blake Arellano
Project Manager
CU Boulder Baja 2018
blake.arellano@colorado.edu