What is FSAE?

Formula SAE® is an international student design competition organized by SAE International (formerly Society of Automotive Engineers). The concept behind Formula SAE is that a fictional manufacturing company has contracted a design team to develop a small Formula-style race car. The prototype race car is to be evaluated for its potential as a production item. The target marketing group for the race car is the non-professional weekend autocross racer. Each student team designs, builds and tests a prototype based on a series of rules whose purpose is both to ensure onsite event operations and promote clever problem solving. The race car is scored on the basis of its cost effectiveness and display of sound engineering practices. Its real world performance is also evaluated by various racing events consisting of endurance, autocross, acceleration, and skid-pad.

Formula SAE promotes careers and excellence in engineering as it encompasses all aspects of the automotive industry including research, design, manufacturing, testing, developing, marketing, management and finances. Formula SAE takes students out of the classroom and allows them to apply textbook theories to real work experiences.
Rutgers Formula Racing (RFR) is a high-demanding, high outputting, illustrious academic organization that serves as a platform for engineering students to gain invaluable knowledge and skills that reach far beyond the realms of the classroom and curriculum. Every year, we participate in the Formula SAE (FSAE) Collegiate Design Series. It consists of two competitions for which we engineer, manufacture, test, and tune a small formula style racecar governed by FSAE rules.

The team consists of 20-30 dedicated members who design, build and analyze data from real world testing of a formula style racecar. The students range in age and vary between several majors within the undergraduate and graduate programs at Rutgers University. Being a part of the team requires an enormous amount of time, effort and persistence that is unmatched by any other organization at the university. The organization helps members become immersed in a “real world” scenario, providing them experience and knowledge that would otherwise be impossible in the classroom.

At Rutgers Formula Racing, the team strives to exist and thrive as if it were a professional engineering team. We use advanced analysis and modeling techniques and software,
as well as testing the physical car in order to make future design decisions. The team is broken up into executive positions such as the President, Vice President, Treasurer, and Chief Engineer. To further manage projects and vehicle subsystems, positions such as Design Lead, Manufacturing Coordinator, Aerodynamics Lead, Chassis Lead, Powertrain/Drivetrain Lead, Suspension Lead, Composites Lead, Electronics Lead, Brakes Lead, Ergonomics Lead, Business Lead, and Website/Social Media Coordinator are delegated. These positions are filled by the most exceptional team members and are chosen by team vote at the start of each year. Team members outside of the design leadership are also essential to the completion of the car, aiding in machining projects throughout the year and final assembly. The team is welcoming, teaching members everything they need to know to be a valuable asset.

We strive to be one of the top teams at competition each year. Each year brings new challenges and new innovations. The team has established itself as a very successful FSAE team in years past, and we plan to continue years to come as well. RFR has won several awards since its establishment in 1989, which are elaborated upon in the team history section. (Page 4)

The task of designing, building, and racing a formula style racecar is not feasible without proper funding. While the team receives money from Rutgers University and fundraising, we would be unable to compete if it weren’t for our sponsors. The team receives various sponsorships in a variety of ways that help us grow, learn, and compete in these competitions. For this, we thank you for considering to sponsor RFR.
1989
Rutgers Formula Racing was founded

1990
Major design and fabrication work on the first vehicle is completed

1991
Won the “Best Suspension Award”

1994
RFR’s first carbon fiber monocoque at the Pontiac Solver-dome ranks 9th overall and wins “Best Prototype Fabrication Award”

2001
Car #56 ranks 15th place in the competition

2006
Car #48 ranks 9th place in Endurance

2009
VIR Car #14 ranks 3rd in acceleration and 9th in design. MIS Car #26 ranks 3rd place in design

2011
Formula West car #73 finishes in all events and places 14th place overall

2012
Michigan car #58 places 18th overall

2015
Michigan car #61 introduces RFRs first full aerodynamics package

2017
RFR17 places 18th in design at MIS and 6th overall at Formula North
Technical Specifications

General Dimensions

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Weight:</td>
<td>411 lbs</td>
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<tr>
<td>Wheelbase:</td>
<td>62”</td>
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<td>Front Track Width:</td>
<td>50”</td>
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<tr>
<td>Rear Track Width:</td>
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Powertrain

Yamaha YFZ450F single cylinder engine producing 45 horsepower. Lightweight and great low end torque.

Partially centrifugal clutch eliminates need for clutch lever under normal circumstances

Custom stainless steel exhaust manifold optimized for top end power

Student designed, built, and tuned electronic fuel injection and digital ignition systems

Dry sump lubrication system with external reservoir with built-in air-oil separation

Aerodynamics

Front wing made from carbon fiber skins and aluminum inserts mounted to chassis via composite rods

Rear wing made from carbon fiber reinforced with a composite core material mounted via swan neck z-bar system.

Body work molds CNC machined and hand finished. Made entirely from carbon fiber resulting in a significant weight reduction from fiberglass and impeccable finish.

Custom close-ratio 5-speed sequential manual transmission with electro-pneumatic shifting system with steering wheel mounted shift paddles

Custom carbon fiber intake made from a sacrificial wax mold with bonded aluminum runner and throttle body.

Custom radiator cooling system plumbed in series housed in flow optimized side ducts

Student designed vented rotors with integrated trigger wheel for vehicle speed sensing
Chassis

Student designed and manufactured 4130 Chromoly TIG-welded steel space frame

Superior torsional rigidity achieved and verified through Finite Element Analysis and Physical Testing

Efficient packaging allows for low center of gravity height and low polar moment of inertia

Ergonomics

Pneumatic shifting system can change gears as quickly as 200 milliseconds

One-piece, driver molded, carbon fiber seat

Fully Functional LED Display dashboard, includes: RPMS, current driven gear, gear shift indicator and driver alarms.

Fully adjustable pedal system

Suspension

Hoosier LC0 18x6-10 FSAE tires

1 piece magnesium wheels

Custom machined aluminum hubs with integrated rear tripod housing.

High performance deep groove bearings to minimize rolling friction

Custom machined aluminum uprights with adjustable camber plates

Integrated spherical bearings in the A Arms

Pushrod actuated adjustable spring and damper system

Custom machined aluminum rockers with 1:1.39 motion ratio with anti-roll bar attachment. Adjustable front and rear toe.
Rutgers Formula Racing is a sponsor-based organization that could not exist without your help. Sponsoring us is a unique way to help support technology and science education in New Jersey. Sponsors for Rutgers Formula Racing can provide financial support to help buy materials and equipment, fund operating expenses and competition fees, and donate material, parts, and labor.

In return for joining our team, we will help your company gain exposure and recognition in the international engineering community. We meet many industry professionals at multiple local and international competitions and events. In addition, the car and your branding is seen by thousands of faculty members, students, and members of the general public. When we are invited to display our vehicle at an event, we also publicize our sponsors' contributions. Past events have included perennial appearances at the New York International Auto Show, Rutgers Day, races at New Jersey Motorsports Park, American Le Mans Series at Lime Rock Park, CT,
Historic F1 Races at Lime Rock Park, CT, the Rutgers Alumni Parade, and the NJ Tool and Manufacturing Association Dinner. We have also been featured in magazines, such as Popular Science, YouTube videos, and newspaper articles from the Star Ledger.

Your support will also be featured on various social media platforms in addition to a bimonthly newsletter received by our extensive alumni network.

Your business will gain access to top-graduating engineering students seeking employment and your support leaves lasting impressions on team members who, when entering the industry, are more likely to return to sponsors for goods and services.

Rutgers University is a 501(c)(3) organization and all donations are tax deductible.
**Sponsorship Levels**

**Platinum ($7000+)**
- Gold Rewards +
- Company logo placed on nose
- RFR customary gift package +

**Gold ($3500-$7000)**
- Silver Rewards +
- Company logo placed on wing endplates
- RFR customary gift package +

**Silver ($1500-$3500)**
- Bronze Rewards +
- Large sized company logo on competition car
- RFR Hats (max. 10)

**Bronze ($500-$1500)**
- Signature Rewards +
- Invitation to Team Drive Day
- Small sized company logo on competition car

**Signature (< $500)**
- Recognition on Team Website
- Company featured in newsletter
- Company name advertised on team apparel