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PRINCETON RACING ELECTRIC
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Princeton Racing Electric: Electric Formula Racing Team

Princeton Racing Electric (PRE) is a 100% student organization dedicated to advancing sustainable energy drive systems and efficient, high-performance vehicle designs. We do this by designing, building, and racing a high-performance electric vehicle at the Formula Hybrid competition organized by SAE (Society of Automotive Engineers) and endorsed by IEEE (Institute of Electrical and Electronics Engineers). In doing so, we seek to impart hands-on engineering experience on our members as well as exciting both our members and our community about sustainable transportation and energy. We embody the Princeton University philosophy of cross-disciplinary teamwork and innovation as we strive to produce electric vehicles that can outperform traditional fuel vehicles, forge ahead on the frontier of alternative-energy automotive research and contribute to the transfer of this technology into industry.

With a set of fresh faces in the officer corps and design team, PRE has decided to recalibrate its team structure and mission as we mature as an organization. From 2019 to 2021, we are embarking on an ambitious 2-year project cycle that will focus on establishing a new team dynamic that emphasizing skill-building, learning, and teamwork. We will accomplish this through designing a new four-wheel-drive electric race car capable of accelerating from 0 to 60 mph in under 2 seconds, while devoting significant time to collaborative learning and gaining the technical experience and skills necessary both for work in PRE and in industry. Our goal is to compete in the spring of 2021 with a full crew of trained engineers with the engineering acumen to tackle any and all challenges that arise.

To accelerate the genesis of sustainable power and build a cleaner and stronger future, both in the garage and on the track - this is what drives us.

Leadership:

Michael Hauge – Co-President, Powertrain Team Lead
Kevin Tong – Co-President, Chassis Team Lead
Vincent Yang – Treasurer, Electrical Team Lead
Benji Freeman – Publicity Chair
The Formula Hybrid competition is an interdisciplinary design and engineering challenge for university students, bringing together teams and their race cars from universities around the world. Participants design and build a single-seat formula-style electric or hybrid race car and compete in a series of rigorous inspections and static and dynamic events. The competition takes place each spring at the New Hampshire Motor Speedway.

Teams’ race cars must pass long, rigorous inspections in which every aspect of the car, mechanical and electrical, is examined to ensure it meets the technical rules and safety standards. The teams are then evaluated by industry experts in both static and dynamic events, challenges designed to test both the students’ engineering and business skills as well as the vehicle’s performance and safety.

**Static Events**

**Design**
Teams are judged based on the creativity and quality of the design behind their race car. Judges review the team’s test data and analyses, as well as the aesthetics of the car, to evaluate the team’s material and design decisions.

**Project Management**
Teams are evaluated on how the team is structured and managed, and its impact on overall efficiency and organization. The team submits progress plans and reports throughout the year which are reviewed by judges. These are followed by a formal presentation given by team leaders at competition.

**Dynamic Events**

**Acceleration**
A test of raw power and speed, teams race their cars at full throttle down a 75-meter drag strip.

**Autocross**
This event challenges drivers to a one-lap sprint around a tightly wound course designed to test the agility and handling of the car.

**Endurance**
Teams are allotted a set amount of power in their accumulators and challenged to complete as many laps possible (each totaling 27 miles) in the least amount of time. Due to how scoring is based on both distances travelled as well as speed, drivers must find a balance between fast driving and energy conservation in order to score well.
History

Founded in 2013, by three driven engineering students and supportive Princeton University faculty, Princeton Racing Electric was founded to fill a void and sate a desire for engineering design competitions. At the time, no such student organization participated in such competitions. As such, Princeton Racing Electric became the first engineering-application student organization at Princeton University, a traditionally theory-focused university.

In the years since then, we have built five different electric vehicles on only two unique chassis. Despite our short history, we have achieved three second-place finishes (’17, ’18, ’19) and two IEEE Excellence in EV Engineering Awards (’18, ’19) at the Formula Hybrid Competition.

Our team has also grown in both size and diversity. Since our founding by three mechanical and aerospace engineers from the class of 2015, we have since grown to more than twenty members distributed between all four attending graduating classes and six different majors, both inside and outside of the engineering department.
2019-2021 Vehicle Specs

**Powertrain**
- Quad independent 15/30kW front/rear SMPM motors
- 6.7 kWh Lithium-ion accumulator
- In-wheel hub motor design
- Regenerative braking

**Suspension**
- Four-wheel independent suspension
- Bonded carbon-fiber A-arms
- SLA suspension geometry

**Chassis**
- Fully redesigned spaceframe
- Chromoly steel tubing

**Aerodynamics**
- Full body aerodynamic kit
- CNC-milled foam core with carbon fiber shell
Princeton Racing Electric relies heavily on donations from both individual and businesses to sustain our work. Monetary donations are used to purchase materials and components, maintain and replace garage equipment, and cover competition and travel expenses. Support can also take the form of material or equipment donations, discounts, fabrication services, and more.

By supporting Princeton Racing Electric, donors support future business and engineering leaders by providing valuable practical experience, help prepare them for their future careers, and inspire their passion for motorsport and innovation.

Princeton Racing Electric is a 501(c)(3) non-profit organization. As such, all monetary donations made towards Princeton Racing Electric are fully tax-deductible.

Donor Packages:

**TITLE DONOR - $15,000:**
*Platinum Donor Benefits and…*
- Highest priority logo placement on vehicle and team apparel
- Largest logo on team website
- Off-campus vehicle demonstration*
- Custom benefits on request

**PLATINUM DONOR - $10,000:**
*Gold Donor Benefits and…*
- High priority logo placement on vehicle and team apparel
- Large sized logo on team website
- Access to team members for off-campus promotional visits*

**GOLD DONOR - $5,000:**
*Silver Donor Benefits and…*
- Medium priority logo placement on vehicle and team apparel
- Medium sized logo on team website

**SILVER DONOR - $2,000:**
*Bronze Donor Benefits and…*
- Recognition on team apparel
- Access to team resume book system

**BRONZE DONOR - $1,000:**
*Supporter Benefits and…*
- Company name and logo on competition vehicle

**SUPPORTER - $500:**
- Company name and logo on website
- Newsletters containing team info, and updates

* For these benefits, we kindly request additional funding for shipping and travel costs to avoid placing a financial burden on our members and our team.

We also welcome individual donations. To do so, please visit our website at PrincetonRacingElectric.com
PRINCETON RACING ELECTRIC
would like to thank you for your generous support!

Princeton Racing Electric
D214 E-Quad, Olden Street
Princeton University, MAE Dept
Princeton, NJ 08544

PrincetonRacingElectric.com