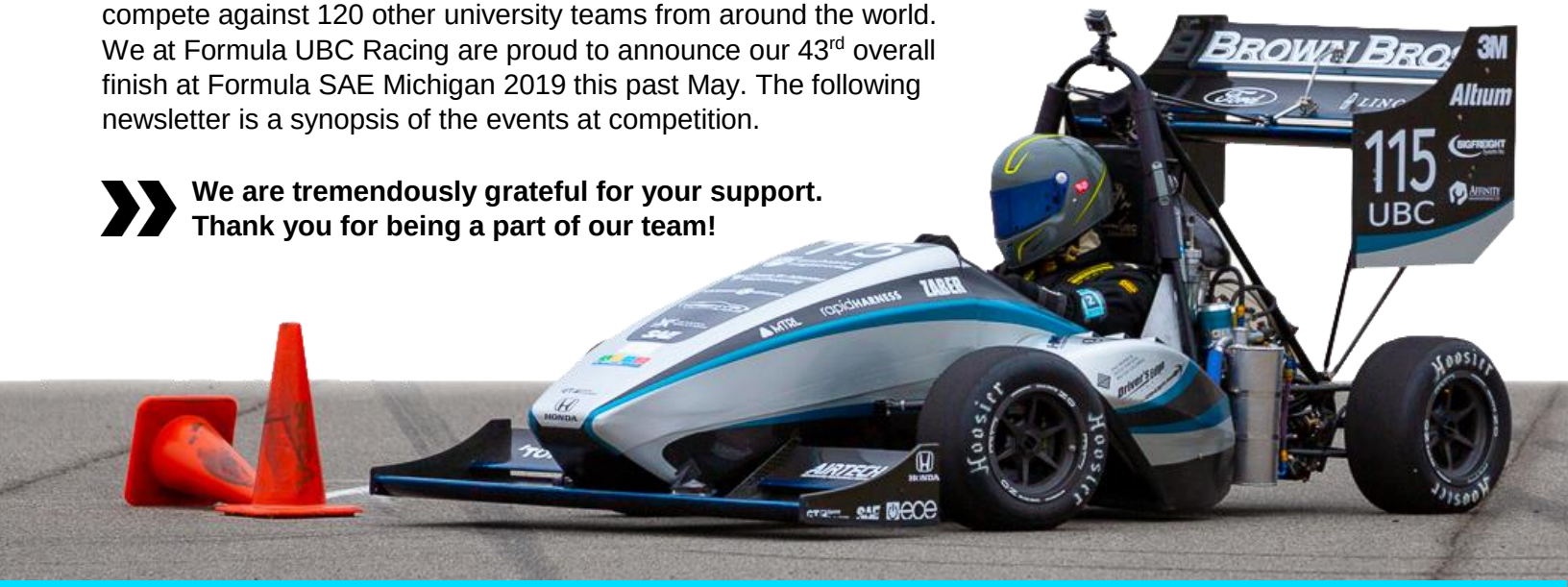
FORMULA UBC RACING
MICHIGAN 2019

In September of 2018 a team of 52 engineering students from the University of British Columbia set out to design and build a racecar to compete against 120 other university teams from around the world. We at Formula UBC Racing are proud to announce our 43rd overall finish at Formula SAE Michigan 2019 this past May. The following newsletter is a synopsis of the events at competition.

We are tremendously grateful for your support. Thank you for being a part of our team!



STATIC EVENTS

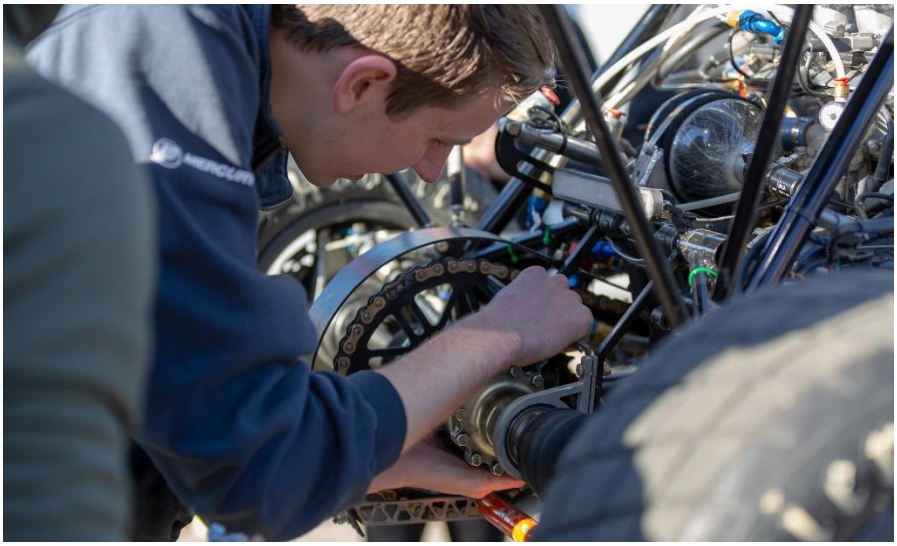
Design		8th
Business		31st
Cost		92nd

The first day of competition was dedicated to passing technical inspection. As a result of our hard work in the lead up to the competition to get the car prepared, we passed the rigorous inspection on the first attempt, which is no small feat.

On the second day, the team faced adversity getting through dynamic technical inspection. Dynamic tech is composed of sound, tilt, and brake checks. Initially, the car was too loud and had a small fuel leak in the tilt test. With some quick fixes and small adjustments, we successfully reduced the noise and sealed the leak. Day two also included all the Static events, where we placed 31st in our Business Presentation and 92nd in the Cost event. The Design event, the most prestigious Static event, went extremely well and we finished tied for 8th.

The team received great overall feedback from the design judges. Our Aerodynamics, Engine and Suspension teams were praised for their simulations and physically testing of their components. In general, the judges were impressed with the engineering design work demonstrated by the entire team and acknowledged that, with some refinement work, our team could be contenders for the design finals. We are proud to add that our Suspension team were awarded rare and highly coveted creativity points for the design of our front anti-roll bar. Creativity points are only awarded for new and unique designs never previously seen at competition.

On the third day, we finally saw the car on the track in the Dynamic events. Due to delays getting new tires mounted early, the team used the time to prep the car for the Acceleration event. Both of our drivers, Andy Chung and Can Ozdemir, put up fast times with a respectable 4.42s placing us 16th in the event.



DYNAMIC EVENTS

Accel.	16th
Skidpad	31st
Autocross	43rd
Endurance	DNF
Efficiency	39th

We quickly reconfigured some of the sub-systems of the car to set it up better for cornering before rushing to the practice pad to scrub the rubber on the new tires. At the Skidpad event, drivers Collin Seib and Daniel Jardine ripped through the cones to put together a best time of 5.411s, finishing 31st in the event.

The Autocross event was the final test of the day. This time-attack event is not only the most valuable event of the day (in terms of points), but it also dictates starting position for the Endurance race. Our lead driver, Jerry Xiao, took to the track and almost immediately we learned that our car was not as well prepared as we had anticipated. The car was displaying strange cornering characteristics on the grippy speedway surface. Jerry was fighting the car throughout his two attempts and was never able to put together a clean lap. Our second driver Andy Chung was similarly unable to maintain control of the car as it would oversteer wildly in every high-speed corner. In the end our drivers ran a best time of 58.377 placing us 43rd in the event.

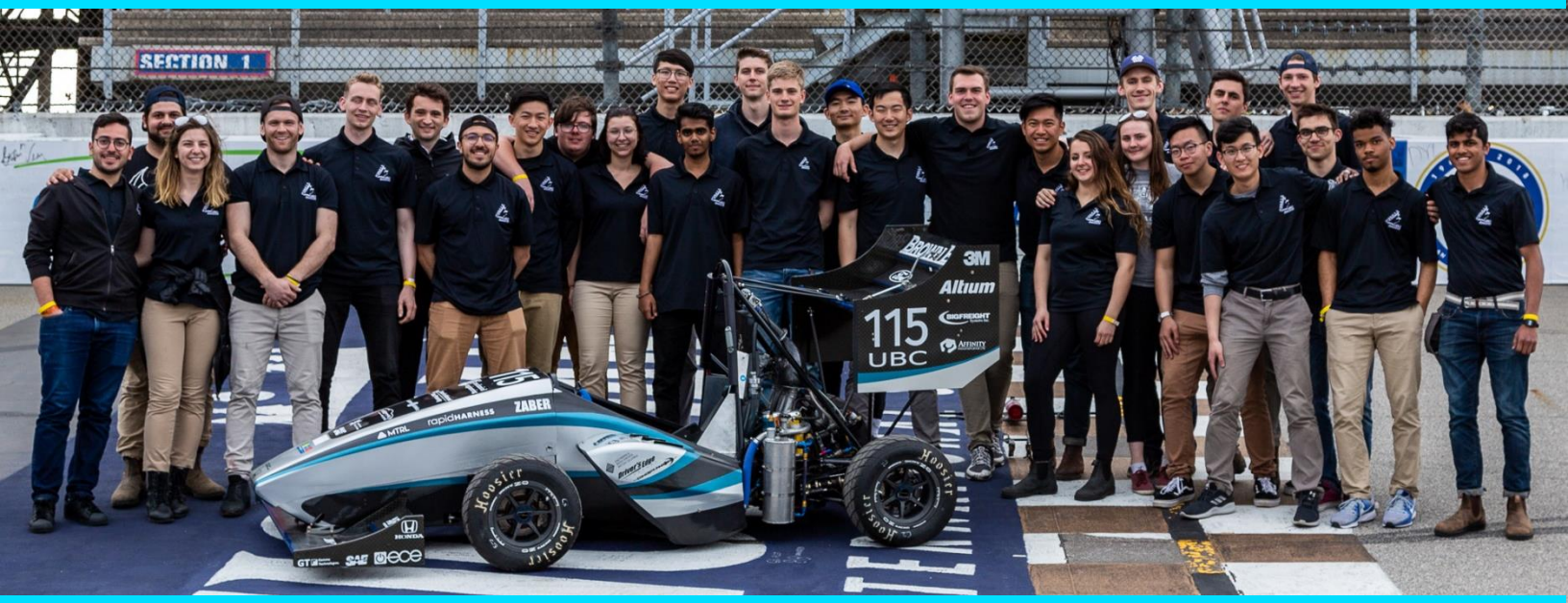
We knew our car was capable of performing better, it was time to get to work and get ready for endurance the next morning.

With nervous anticipation, we looked forward to the most valuable and critical portion of the competition. The strange handling issues seemed to be caused by a worn rear anti-roll bar bushing and poorly set-up brake bias. We spent the evening tweaking what we hoped would result in a car ready to take on the big race. The next morning, we took the car to the practice pad in order to do some last-minute adjustments. After a lengthy test session, we pushed the car into the staging grid for Endurance. The team looked on with excitement as the car approached the start line. As our first driver, Collin, took to the track and completed his first few laps, we were proud to see him race the car we had painstakingly prepared. The car handled smoothly and all systems were performing as designed. Collin brought the car back into the driver change area where Jerry took over the controls and hit the track. Once in the hot seat, he unleashed the throttle and put down competitive times, lap after lap.

Suddenly, as Jerry approached his final lap, the car coasted to a halt. The chain driving the rear wheels had broken and fallen off, leaving the car powerless. Our Endurance race ended with a DNF.

While this was not the result we were hoping for, the team put together a great car with the potential to win. The DNF in Endurance served as a reminder about the importance of testing every system thoroughly. The demands of racing can cause a failure anywhere; therefore, every component must be evaluated with rigor. The team is excited to learn from these experiences and return next year with an improved 2020 racecar. We know we can break into the top 20 for 2020!

Thank you to all our sponsors, and supporters for giving us the opportunity to succeed, grow, and learn together. We would not be able to do so without your generous support. Thank you!

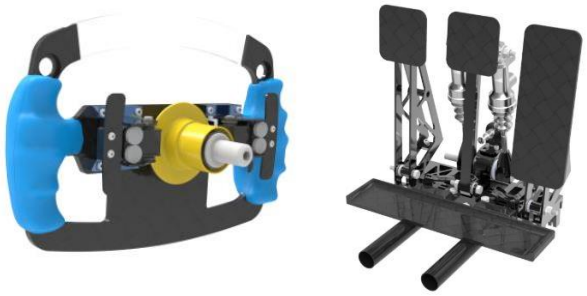


FORMULA UBC RACING
VEHICLE DESIGN

Our focus during the 2018-19 season was on improving reliability and refining subsystems through testing and validation, with an emphasis on addressing specific areas of weakness from the 2017-18 season.

The space frame chassis featured a carbon sandwich panel floor which increased torsional rigidity and provided convenient mounting for a new seat and our new front anti-roll bar. Using a clever linkage system along with a torsion bar design, the front anti-roll bar eliminated compliances and resulted in greater stability over bumps. Redesigned rear suspension packaging reduced compliance and weight by eliminating extra mounting hardware. In 2018 the team experienced an electrical failure which ended our endurance race early, the electrical team made certain this season would not be a repeat. The entire electrical system was much improved this year with a custom solid state power distribution board and a high quality, simplified wiring harness.

Many of the driver controls were freshly redesigned this year including a carbon fiber seat bucket and new steering wheel with contoured grips that were molded by hand, scanned using an LCMM and printed using fused deposition modeling. Replaceable paddle shifter modules were manufactured out of carbon fiber and mounted on the back of the steering wheel. An all new pedal box design reduced weight and allowed for much faster, tool-less adjustment for different sized drivers.



The engine team designed and built a new intake system using carbon fiber for the plenum which resulted in a substantial increase of low speed torque. Effort to reduce compliances was made by designing a new jigging fixture to support the exhaust system during the welding processes. The aerodynamics team manufactured molds for sidepods and next years front wing using a 5-axis CNC robotic arm. Carbon fiber radiator ducting with gilled sidepods fairings where then made to cover and protect critical Engine components.

Team structure changed for the 2018-19 season including the addition of two new sub teams. The Business Strategy & Marketing team grew out of a demand for greater focus and time spent on the business presentation of the competition as well as growing the overall team marketing presence. The Software team was formed for the purpose of developing better methods for analyzing vehicle testing data as our car is equipped with a complete data acquisition system which provides an enormous range of ways to improve vehicle set up and design.

In many ways the car we built for Michigan 2019 was an improvement over the previous year. Our focus on reliability and testing proved successful, right up until we entered the last lap of the season. On the positive side, our team put in a huge effort over the past year and we are extremely proud of the result.