



# THE SPARTAN RACER

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DECEMBER 2020

## Team Updates

### *Latest Michigan COVID-19 Order Pushes Manufacturing Further Down the Line*

Team leadership had a meeting with the College of Engineering's administration last month to discuss student activities moving forward. After some deliberation, they remained firm on blocking shop access, but mentioned that they would work with the college's Manufacturing Technology Lab (MTL) to see if there was room for student training. This training would include the CNC-mill machines which are used to create virtually every aerodynamics mold.



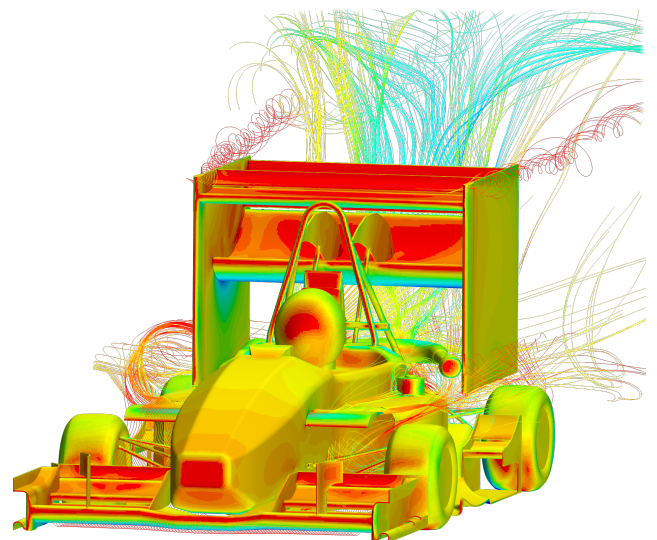
*A throwback to SR-19's aerodynamics manufacturing*

With aerodynamics being the last major vehicle system required for SR-20's completion, any

CNC time available would be incredibly beneficial to the team. Unfortunately, the latest Michigan restrictions were put into place the day after talks of training, which, in-turn suspended all student activities. With the latest round of restrictions due to be up mid-December, the team remains hopeful that resuming work is just around the corner.

### *System Spotlight: Aerodynamics*

New to the newsletter is *System Spotlight*, a section where system leaders explain what their system has been up to during the extended period away. In a typical year, the team would share progress updates regarding the manufacturing of the upcoming car. This is no replacement, but it hopefully allows for an insider look into monthly team operations.



*A nice view of some of last year's aerodynamics CFD*



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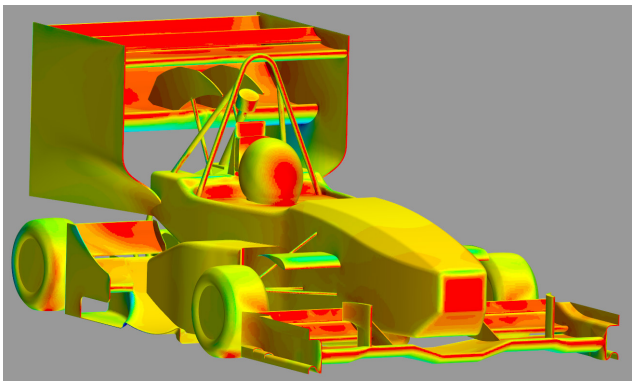


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## System Spotlight Continued

“One of the biggest changes this year in terms of the aerodynamics system was the change in track width and wheelbase,” explained Jimmy Provax, the team’s aerodynamics lead. “Earlier this year, we ran a packaging study to determine how aero is impacted when different vehicle components are moved off the side of the car. Without modifying any of the aerodynamic components, we were able to see an 11% increase in vehicle downforce alone.”

Widening the vehicle and repackaging components has allowed for an extension of the vehicle’s side-wing, which has significantly improved undertray downforce.

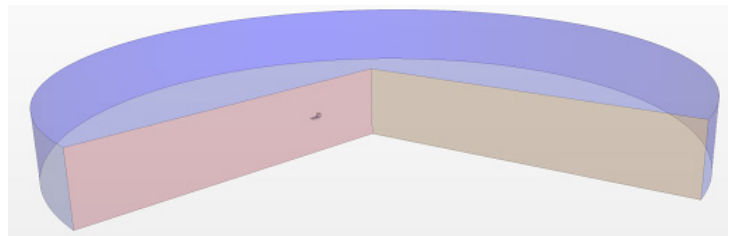


*The latest aerodynamics geometry*

“Something that’s been really challenging is trying to prevent side-wing and undertray airflow from interfering with the rear wing. We spent a lot of time last year optimizing the rear wing, so mitigating any interference is crucial,”

explains Provax. “Also, since we plan to switch back to a vertical engine intake, we’ve been trying to minimize the wake created by the intake and the driver’s helmet that travels downstream to the rear wing. One of our new members, Cole Nelson, has been working on a headrest device to minimize that.”

Since aerodynamics are primarily utilized when the vehicle is cornering, it’s important to model the complicated airflow around the car as accurately as possible. The team’s Dynamic Aero Simulations Lead, John Burroughs, has been working to adapt the team’s CFD wind-tunnel to be more realistic during cornering simulations.



*The newly curved CFD wind tunnel*

Burroughs mentions that “the newly curved tunnel represents a cornering event more accurately, since in real life, the air does not travel linearly towards the car—it actually curves. I was able to parameterize the updated physics model so we can easily change aspects of the simulation, such as cornering radius.”

With these aero changes, SR-22 will undoubtedly be State Racing’s fastest vehicle to date.



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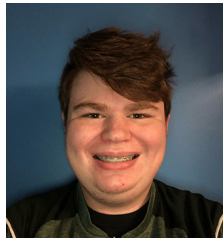
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## Featured Team Members

**Name:** Sammy Cohen  
**Role:** Wire Harness Lead  
**Hometown:** Huntington Woods, MI  
**Major:** Electrical Engineering  
**Class Standing:** Sophomore  
**Year on the Team:** 2nd



### *What does your role of Wire Harness Lead entail?*

As Wire Harness Lead, I design the electrical harness, which is a bit like the nervous system of the car. I map the harness out in CAD to make sure all the sensors and modules have the correct connections and routing, as well as to get an overall estimate of the required wire length. When I'm finished with design, the whole electrical team comes together to build the harness.

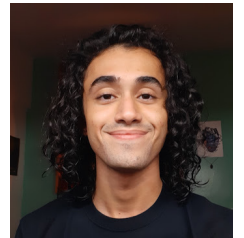
### *What is your favorite memory from your time on the team so far?*

My favorite memory from my time on the team so far was the trip to Florida last year to test our car. During this time, I got to know the team better, see the car drive for the first time, and much more. While in Florida, the team not only worked on the car, but we spent time together, went go-karting together, and even watched a SpaceX Falcon launch! The whole trip was such a fun experience and it really made me feel like I was a part of the team.

### *Do you have any professional work experience?*

I do not have any professional work experience yet, but I believe that Formula SAE is preparing me well for my professional career.

**Name:** Bashhar Byrouthy  
**Role:** Powertrain R&D Lead  
**Hometown:** Accra, Ghana  
**Major:** Mechanical Engineering  
**Class Standing:** Junior  
**Year on the Team:** 2nd



### *What does your role of Powertrain R&D Lead entail?*

Being a newly created role this year, the Powertrain R&D Lead aims to expand the team's current capabilities by looking into new powertrain technologies, ultimately selecting and pursuing one based on cost-benefit analysis. This year, I am working closely with the electrical team to design, test, and implement an electronic throttle control (ETC) slated to be installed in 2022.

### *What is your favorite memory from your time on the team so far?*

Working with the team on the car late at night in a lake house in Florida remains one of my best memories in college to date.

### *Do you have any professional work experience?*

I am currently on a co-op at BorgWarner, working in the Corporate Advance Engineering team as well as the simulations team. Along with a fellow intern, I am leading the thermal modeling of a battery electric vehicle's powertrain cooling system, built in GT Suite, to determine whether the vehicle necessitates a chiller circuit. Thankfully, this experience and newfound interest in GT Suite ultimately led to our team's recent acquisition of a GT Suite sponsorship.



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## Featured Team Alumni

**Name:** John Lankes  
**Hometown:** Farmington Hills, MI  
**Degree:** BS Mechanical Engineering (2006)  
**Years on the Team:** 2002-2006  
**Roles:** General Member & Chassis Member

### *How did you contribute to the advancement of MSU Formula Racing?*

I helped fabricate seven spaceframes and several other metal things. While still on the team, I helped ramp up FEA via classic Ansys for chassis simulations and eventually workbench for other parts. I still enjoy helping the team in any way that I can, and usually contribute to discussions on the team forum. I've been an advisor for three MSU FSAE capstone projects, and an FSAE Michigan design judge several times.

### *What is your favorite memory from the team?*

There are too many to list. Most notably: post-Silverdome FSAE competition parties at Big Buck with 700+ other FSAE students, placing second in the Motor Trend Fontana Shootout, going to the Toronto Shootout every year, as well as spring break testing down in Florida. One year, we attempted to run a 24-hour test with headlights mounted to the roll hoop and only two drivers.

### *What is your current professional role?*

Currently, I'm the race engineer for #3 Pratt & Miller C8R with Antonio Garcia, Jordan Taylor and Nicky Catsburg. We run predominantly in IMSA GTLM, but also do three races a year in WEC which includes Le Mans. Prior to my current role I worked as an assistant engineer on the #4 Corvette C7R, and a race engineer on the #3 Cadillac ATSR and CTSVR

### *How did your experience as a member of Michigan State Formula Racing help shape your future?*

I went into FSAE thinking that would be a cool place to learn how to machine, fabricate, and play with racecars. I quickly realized that you can just keep doing that for a career, and



you don't have to do real work. I got an internship at Pratt & Miller as a junior, largely on my FSAE and CAD experience, and got offered a job shortly after graduation. I spent four years in their design office doing CAD and FEA on Corvette and Cadillac racecars, then moved into the RaceOps office where I've been doing mostly trackside engineering on the same cars for the last ten years. In the pro motorsports industry, I would guess that 80-90% of engineers have FSAE experience, so in a lot of ways it's become a convenient stepping-stone into an industry where it can be hard to get a foot in the door. I'm still good friends with a lot of MSU FSAE alumni, lived with a bunch of them, been to a lot of their weddings, and it's always convenient to know a network of FSAE grads from several schools that you can bounce ideas off.



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## Featured Sponsors



**Name:** Haviland Enterprises  
**Location:** Grand Rapids, MI

Founded in 1934, Haviland Enterprises has been safely managing chemical distribution, manufacturing and packaging excellence for more than 80 years.

The MSU Formula Racing Team uses many commodity chemicals through the manufacturing process, but last-minute Home Depot runs to purchase a gallon of acetone or isopropyl alcohol eat away at the team's miniscule budget. That's why we're incredibly grateful to have Haviland onboard as a new sponsor of our team! With their donation of several bulk-chemicals, everything from material prep, surface finishing, and even electronics prototyping will be made possible with. Thank you, Haviland!



**Name:** Associated Students of MSU  
**Location:** East Lansing, MI

ASMSU has previously been a tremendous supporter of the MSU Formula Racing Team, and we're extremely happy to welcome them back as a sponsor for the 2020-2021 season!

Often overlooked, tires present a huge financial responsibility. A successful season of testing and competition can use as many as 10 sets of tires, and at roughly \$800 per set, they can be a major financial setback for any FSAE team. Luckily, ASMSU understands how important FSAE is to the students that are involved. With their monetary donation, the team will be able to purchase several new sets of tires for the 2021 competition season. Thank you, ASMSU!



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