

THE SPARTAN RACER

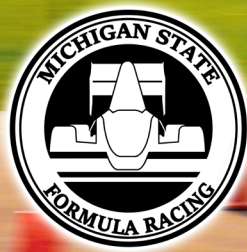
APRIL 2022

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System Updates

The team has been making great progress in these past couple of weeks. Chassis just got the tooling molds back from Pratt & Whitney, and they turned out beautifully. Thank you Pratt & Whitney for the quick turnaround time, and amazing help throughout this process!

During the curing of the tooling molds, the Chassis Lead and Chief Engineer, Garrett Colasinski, has been hard at work making more sets of SES panels trying to diagnose the material that isn't performing to standards.

Tooling monocoque mold reveal after the initial cure from Pratt & Whitney

Though the team was nervous about running low on material because of the tests, Gator Motorsports, a Formula SAE team from the University of Florida, generously donated their carbon to the team. Thank you, Gator MotorSport, for your generosity!

As we continue on through the systems, the suspension sub-system has completed the outboard assembly for this year and are ready to bolt everything to the chassis.

The powertrain system has also been making great strides in its manufacturing this year. Having completed all the CNC components for the powertrain system, the

system is now making progress with fabrication for this year. All the prep work for the powertrain system is completed, and it is ready to be welded by the Rear Box and Fabrication Lead, Calum Walton.

Since the Powertrain and Electronics teams are nearing completion, the team has decided to prep the dyno to test the competition engine, and hook up the wiring harness. This allows them to test all the components together and ensure there are no issues before the team places it on car.



Matthew Ajlouney's new outboard assemblies featuring freshly powder coated components

Lastly, aero manufacturing is underway with the assistance of many people from different systems. Last year, a big portion of the aero manufacturing and time was pushed towards CNCing the wing cores and molds. Since the team no longer has 24-hour access to the university's CNC, the team was nervous as to how the team would manufacture these pieces, given the programs typically last a couple of days. Luckily, part of this burden has been taken off the team's shoulders thanks to Mohr Composites, a CNC shop that specializes in wing core manufacturing. Thank you Mohr Composites for your assistance.

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Carbon Layup Manufacturing

One of the greatest parts of being on the team is the carbon fiber layups. Thanks to the university's Composite Vehical Research Center (CVRC), Pratt Miller, and the team's past alumni, the team has a solid foundation when making carbon fiber components. This knowledge base in carbon layups is critical in ensuring the team makes strutrally sound components that perform well.

The main type of carbon layup the team utilizes is a wet layup. To put it simply, unlike prepregated carbon, which has resin infused into the fibers, wet layups involve carbon without resin already infused. Wet layups can be cured without the use of an oven or an autoclave, allowing the team to manufacture many components swiftly. There is a weight trade off when using dry carbon, but the ability to manufacture more componenets efficiently allows the team to complete parts quicker and more efficiently.

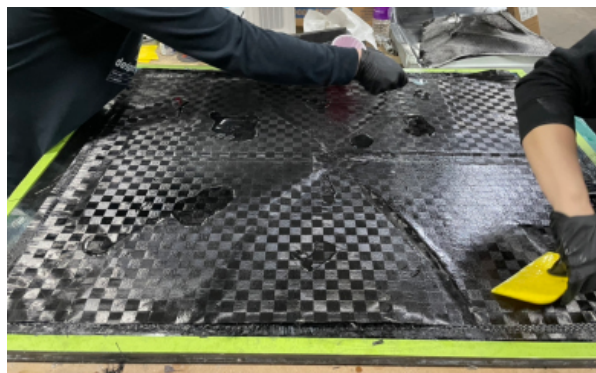


Suspension Lead, Nicholas Coubard, laying up the steering rack cover



Calum Walton, the Rear Box and Manufacturing lead, assisting in popping the seat out of the mold

Many systems utilize wet layups to create components around the car. These systems include Ergonomics with the seat, Suspension with their covers, and the entire aerodynamic package.



Side wing endplates being laid up for the aerodynamics package.

Our biggest carbon wet layup is the team's undertray. This year, the team went to Pratt Miller and worked side by side with their composites technician, and gained some incredible hands-on skills. Many of the team's processes were re-evaluated and changed because of this experience. Thank you again, Pratt Miller, for this amazing experience!



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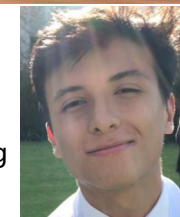
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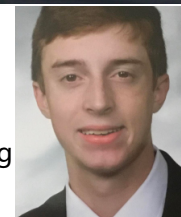
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Name: Mikel Riffrani Baquero
System: Powertrain
Hometown: Quito, Ecuador
Major: Mechanical Engineering
Class Standing: Sophmore



Name: Nick Mercer
System: Aerodynamics
Hometown: Woburn, MA
Major: Mechanical Engineering
Class Standing: Freshman



Why did you choose to join Michigan State Formula Racing?

My family introduced me to cars and racing at a young age and my passion for them runs to this day. In high school, my best friend and I talked about joining a formula team at the university we were enrolled at. The promise I made to my friend and my own passion is what led me to join the Michigan State Formula Racing Team. Having the opportunity to be on this team is certainly a privilege and has allowed me to gain hands-on experience with real-life problems and work with materials professionals use in their occupations.

What do you find most challenging about being a member of the team?

By far the most challenging aspect of being a member is time management. Being on the team requires a lot of your day, and as a college student balancing your studies, formula, and social life is difficult. As the semester progresses more time is needed from members to complete the car in time. Even though it is seen as a challenge, it is all worth it in the long run.

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

Taking part in the carbon fiber layup for the radiators was my favorite memory thus far because of the knowledge I gained through this experience and the fun I had while doing it. This opportunity was the moment I also realized how much I don't know about other systems outside powertrain, and what goes into other aspects of manufacturing.

Why did you choose to enroll at Michigan State University?

I chose to enroll at Michigan State University because of the formula team. I heard of Formula SAE my freshmen year of high school and knew this was something I wanted to be a part of. When I narrowed down my choices in my college search, it was a matter of if they have a formula team or not when I was deciding to go there.

What are some of the accomplishments you are most proud of since joining the team?

I would say my biggest accomplishment was making the Dailey Pump Mount for the powertrain system. This was a part that I was working on for multiple days and it brought me so much relief when I finished it. It has been the toughest part I have made to date. Another big accomplishment is being able to handle the time requirement while getting good grades in school. At first it was tough, but I found a good routine that maximized my time at the shop while not affecting my grades. Finally, learning how to machine was probably my most important accomplishment. I had zero experience with machining prior to join the team and now I have not only learned how to machine but I'm also getting pretty decent at it.

What are some of your favorite hobbies or activities outside of the racing team?

For me, activities outside the racing team include going to the gym, schoolwork, golfing, hockey, and my own racing in karting that lasts throughout the summer.



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Name: Nicholas Kopec
Hometown: Freeland, Michigan
Degree: B.S. Computer Engineering (2021)
Years on the team: 2017-2021
Roles: Electronics Team Leader (2018-2021), Chief Engineer (2020-2021)

How did you contribute to the advancement of Michigan State Formula Racing?

During my first year on the team, I remember always being nervous when we would go to start the car, as there would often be an electrical issue that we would have to spend hours diagnosing and repairing. I spent my three years as electrical team lead focused on improving the reliability of the electrical system. This included identifying possibly system failures to design fail safes into the system, particularly in the manufacturing of the electrical harness, to prevent mechanical failures.



Nicholas Kopec pictured with Mitch Egan at Member Drive, the day where all the members get an opportunity to drive the car they built

Other advancements I made while on the team include improvement of the vehicle's control systems, data acquisition systems, and telemetry systems. This allowed the team to add a sensor to the vehicle to help with validation and streamlined the data collection/analysis process.

What is your favorite memory from the team?

It is very difficult to narrow down my time on the team to a single favorite memory. There were many amazing memories from all the

testing in Florida, and competitions, but I would say one of my favorite memories was the Michigan competition my last year on the team. Most of my last year was spent virtually due to COVID-19. After over a year of losing shop access, we finally regained access with



Nicholas Kopec and Justin Yan practice driving before trying out the car

less than two months to finish building and testing the car. It was amazing to see how the team came together, with many leads doing whatever they could to make sure the car was complete. Even with all the challenges the team faced that year, we were able to make it to competition and I finally was able to see the car finish an endurance!



Nicholas Kopec installing Car 38's wire harness

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Name: Cameron Tooling Corp.
Location: Lansing, Michigan

Cameron Tooling Corp started with 3-employees in a 2,400 sq. ft. building that excelled in the die building and die repair, production machining, and stamping industry. They have grown into a 92,000 sq. ft. facility with over 90 employees.

Their services have expanded to include progressive, transfer and line die designing, build, repair and/or engineering change requests of existing problem, servicing all tool and die machine shops and customer with production CNC machining, EDM wire burning/hole and sinker services, and production stamping.

Cameron Tooling has been a huge help to the team this year. As a result of limited CNC access, the team has to heavily rely on outsourcing many more components that would typically be completed in-house. From the rear wing mainplane, seat mold, and suspension cover, Cameron Tooling Corp has been willing to take on these tasks for the team. Thank you so much Cameron Tooling for your generous support.

Name: Alro
Location: Lansing, Michigan

Founded in 1948 by two brothers named Alvin and Robert, Alro Steel has been around for generations supplying high quality services through 70 different locations in 13 different states.

Their vast supply includes stocks in metals, industrial supplies, and plastics. They also offer processing including waterjet, laser cutting, precision sawing, and so much more.

Alro also has many different outlets that they supply from, including an online store that makes purchasing material quick and easy. Additionally, deliveries usually arrive the next day..

Alro has been a supporter of the Michigan State Formula Racing Team for years, supplying all of our necessary aluminum stock every year. They also offered their cutting services to the team, and cut blocks that were too big for the team to cut. The team truly appreciates the unwavering generosity and support from Alro.



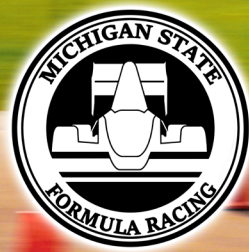
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