

THE SPARTAN RACER

JANUARY 2023

GO GREEN
GO WHITE
GO FAST

U
P
D
A
T
E
S



@MSUFORMULARACING
MSUFORMULARACING.COM



Team Update: Test Day

Back in December, the team went to the Fowlerville Proving Grounds to test SR-22 for the final time in 2022. While cold, the testing day was a massive success as the data and driver development the team received is crucial in getting the car ready for spring competitions.

This time was essential for getting new members acquainted with testing practices and procedures that they will use for the rest of their time on the team. Testing days in the fall are typically reserved for the team leads, so this experience was a luxury for the new members of the team!



Showing new members post-drive data collection

The team was very lucky to be able to test the car this late into the year so thank you to Fowlerville Proving Grounds for letting us use their facilities!

SES Submission & Tilt Test

As the team moves into the new year, members have made significant over winter break. With SES submission complete, various suspension tests, and lots

of manufacturing, the team is officially in full-swing working to complete SR-23. SES is the structural equivalency spreadsheet provided by SAE, the governing body of Formula SAE. This spreadsheet is what teams that use a carbon fiber monocoque (such as MSU Formula Racing) use to prove the safety and equivalency to a steel tube frame chassis.



3 Point bend test sample

Throughout this time, the team also decided to use SR-22 to learn more information about the car's center of gravity through a unique test.

The car is fully assembled and placed on a flat plate where it is tilted on one side until the balancing point is found, which was around 70 degrees for SR-22. The team used this value to calculate the height of the center of gravity for the car.

This information is invaluable to the development of the next vehicle - SR-24. Inclusion of validated metrics like the center of gravity test ensures more valid metrics for simulations

THE SPARTAN RACER

JANUARY 2023

GO GREEN
GO WHITE
GO FAST

U
P
D
A
T
E
S



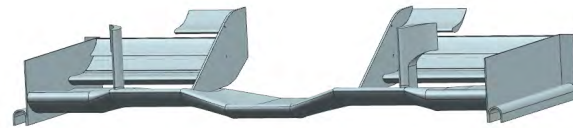
@MSUFORMULARACING
MSUFORMULARACING.COM



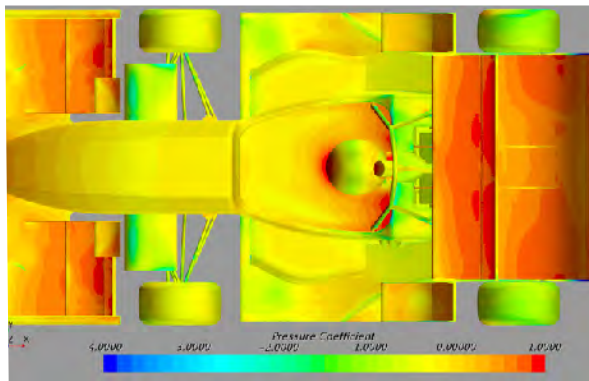
System Spotlight: Aerodynamics

Here is a showcase of one of the most influential and eye catching systems in all of FSAE, aerodynamics! With these components on the car, the team sees large performance by increasing overall grip.

This year for MSU Formula Racing's Aerodynamics system, the focus has been on analyzing where the current aerodynamic package could be improved.

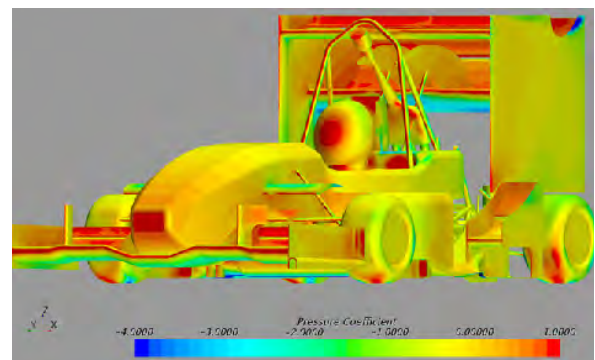


In the manufacturing process of last year's car the team chose to make the components lighter, which caused a loss in stiffness. With these changes, the aerodynamic components lost 40% of the overall weight, even though everything was two inches wider than SR-20's aerodynamic package!



Although these changes came with a positive response, other issues appeared. Multiple testing days have shown the consequences of making components lighter.

The team then focused on ways to improve both manufacturing and mounting.



The front wing was made simpler so that manufacturing time and complexity could be reduced. The flat endplates simplify the manufacturing process, making it easier to assemble with the other components that make up the front wing. This allows the team dedicate more time towards testing and fine tuning, all in efforts to have everyone well prepared for the season ahead.

Only spending time on refinements that were deemed absolutely necessary allows the team to dedicate more time to on-track testing and fine-tuning so SR-23 and the team are fully prepared for the season to come. This also allows the team to look into the future towards SR-24's aerodynamic package.

THE SPARTAN RACER

JANUARY 2023

GO GREEN
GO WHITE
GO FAST

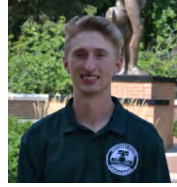
M
E
M
B
E
R
S



@MSUFOMULARACING
MSUFOMULARACING.COM



Name: Nicholas Coubard
Role: Simulation Lead, Head Driver
Hometown: Armada, MI
Major: Mechanical Engineering
Class Standing: Senior



Why did you choose to join Michigan State Formula Racing?

Initially I joined because I just wanted to have a hand in building a cool looking racecar, but before I knew it I was bit by the bug and spending immense amounts of time working with the team. Since then my passion for the team has grown so much, and there is almost nothing I would trade this experience for.

What is your favorite memory from the team so far?

My favorite memory is seeing car 38 (SR-20) complete in endurance at MIS 2021. We'd had a great result across all the static competitions (4th place!) and I'd had a fantastic skidpad drive (3rd place!) so we were on the edge of our seats to see the car come across the finish line. It was such a great feeling to complete all events even given the circumstances of not being able to work in the shop for a long period of the COVID pandemic, and we proved to ourselves that nothing could stop us.

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

I like to go to MSU sports events, hang out/play video games with my friends, and spend way too much time watching Love Island and Naruto with my roommate.

Name: Calum Walton
Role: Chief Engineer
Hometown: Birmingham, MI
Major: Mechanical Engineering
Class Standing: Senior



Why did you choose to join Michigan State Formula Racing?

I joined the MSU Formula Racing team to supplement my education. Being a part of the MSU Formula Racing team allows for a unique experience where you are exposed to many complex technical problems which you would otherwise not see in school. In many ways I have learned more from being on the team than what I have learned from classes alone, problem solving and fabrication are examples of two critical skills I have gained.

What has been your favorite project that you've contributed to so far?

I designed and built the tubular subframe for our 2022 car, which was the first design project I had the opportunity to lead. It was extremely rewarding to see the project from start to finish.

What is your dream job?

The most rewarding career would be a place where I can be exposed to a variety of engineering problems and where I can directly apply my hands on interests. A career in automotive or aerospace interests me the most, but I am open to anything.

THE SPARTAN RACER

JANUARY 2023

GO GREEN
GO WHITE
GO FAST

A
L
U
M
N
I



@MSUFOMULARACING
MSUFOMULARACING.COM



Name: Chad Christensen

Hometown: New Hudson, MI

Degree: BSME, 2000

Years on the team: 1996 - 2000

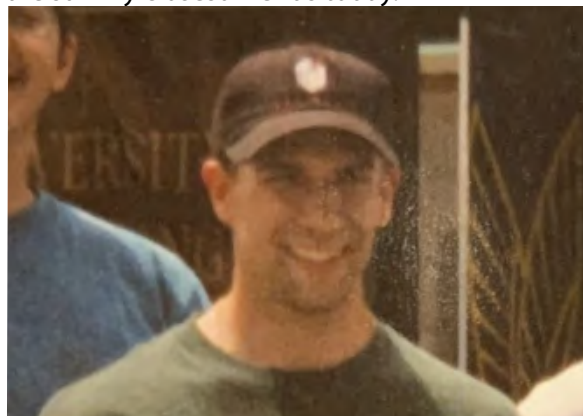
Roles: Powertrain Team Member, 1996-1998 /
Powertrain Team Leader, 1998 - 2000

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

One of the major advancements during my time was the evolution of carbureted air/fuel control on the engine to fuel injection with a controller. Our first systems were open-loop control, meaning we had to spend hours on the engine dyno dialing in both fuel and spark control across the entire range of engine rpm, torque, and throttle position. I developed a love / hate relationship with that dyno, but it allowed us to better optimize the engine to work with our own intake and exhaust systems for power and efficiency vs the traditional carburetor setup.

What is your favorite memory from the team?

The memories are countless, but what I value most is the time spent with other members of the team in the shop working to get those cars ready for Comp Day in Michigan. It wasn't always easy, it didn't always go as planned, but it was certainly memorable and rewarding to see the cars come together and experience those milestones such as firing the engine for the first time, seeing the car roll on its own, or the first drive with other members of the team that put so much into it. Some of those team members are still my closest friends today.



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

FSAE was a very significant part of my college career at MSU. Through my involvement with the team, not only did I grow technically through design and tuning work on the engine, but the hands-on nature also allowed me to become much more familiar with automo-



otive and racecar design and dynamics, working with tools and machinery and root causing and solving problems. Looking back, perhaps the greatest lesson it taught me was how to work as a member of a team and with others towards a common goal. I've carried all those lessons with me and believe my experience with MSU FSAE has made me a better engineer and team member. In addition, the FSAE network is strong! FSAE alums are everywhere, especially in the automotive field and it's always great to work alongside others that have shared interests and experiences that FSAE brings.

What is your current professional role?

I am currently an Engineering Group Manager for Noise & Vibration in Virtual Engineering for General Motors. The team that I am a part of is responsible for full vehicle noise & vibration performance design, development and validation utilizing CAE based tools & methods.

THE SPARTAN RACER

JANUARY 2023

GO GREEN
GO WHITE
GO FAST

S
P
O
N
S
O
R
S



@MSUFORMULARACING
MSUFORMULARACING.COM



Name: Michigan State Police

Location: Dimondale, MI

Founded in 1917 as the Michigan Troops Permanent Force, domestic security during WW1. The Michigan State Police is mainly involved in criminal and traffic statutes violations. The MSP employs 3,000 people and provides services for residents all across Michigan in conjunction with other law enforcement.

Michigan State Police provides MSU Formula Racing with access to their dynamic training pad. With this access, the team can test new designs and gather valuable data in order to properly assess what to change, improve, and keep in the car.

The team appreciates the Michigan State Police's continued support year in and year out. Alongside the partnership with the MSP and access to the training pad, the team also appreciate everything they do for the community. Thank you MSP!

Name: Henkel

Location: Düsseldorf, Germany

Henkel, founded in 1876, marketed sodium silicate as its first product before diversifying into multiple products like adhesives to laundry and home care. Ever since its founding, Henkel has been family owned, and went into their fifth generation of operation in the early 2000's. Through the 20th century, Henkel acquired a variety of companies that allowed the company to expand. These acquisitions included buying shares of the Clorox Company, buying The Dial Corporation, and Loctite.

Henkel supports the team by providing the team with Loctite adhesives, which is a vital part for the production of our car. Their contribution also ensures that, as a team, we are getting the best available products on the market that specifically fit our needs. We thank Henkel for their continued benefaction to the team, as well as in future endeavors.

THE SPARTAN RACER

JANUARY 2023

GO GREEN
GO WHITE
GO FAST

S
P
O
N
S
O
R
S



@MSUFORMULARACING
MSUFORMULARACING.COM



THANK YOU!

