

# **STUDENT HANDBOOK**

**FORMULA SAE MICHIGAN  
BROOKLYN, MICHIGAN  
MAY 10-13, 2017**

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## ONSITE CONTACT INFORMATION

G1 will be staffed with volunteers and the Official Announcer will be in the Main Tent at all times that the competition is in progress.

For all other communication, stewards and event crew should find the nearest event official or Paddock Patrol/Spectator Marshal volunteer with a mobile radio.

### **STUDENTS MAY CONTACT:**

Kaley Zundel 412-719-2865

Sara Guffey 724-591-2324

## FIRST AID INFORMATION

There will **NOT** be a First Aid Station on site. All incidences will be covered by EMS or one of the two supporting fire trucks.

To expedite matters in case of accident or injury after-hours, simply call 911.

### **STORM SHELTER:**

In the event of severe weather, we have been instructed by MIS management to gather inside the Pedestrian Tunnels.

### **Local Emergency Contact Information for MIS Area**

MedPlus – After Hours Clinic

212 South Main Street

Brooklyn, MI 49230

(517) 592-6047

Mon.-Fri.: 5 p.m. – 10 p.m.

Sat.-Sun. 10 a.m. – 6 p.m.

## EVENT SITE REVIEW

**ASK QUESTIONS:** If you have a question – ask! If you have any questions about any part of the competition, the schedule, the procedures, the rules or anything else, just ask one of the officials. The first place to bring questions is to the staff in the registration area. Rules questions may be presented to the technical inspectors.

**ANNOUNCEMENTS:** Announcements requesting parts, tools or assistance can be made by the announcer in the Main Tent. In addition, the sound system will be FM Broadcasted. We will announce at the Honda Welcome Ceremony and remind teams at Drivers' meetings of what the frequency is.

**ARRIVAL:** In order to prevent traffic backlogs onto U.S. 12, please plan to arrive at MIS no earlier than 7:30 a.m. Wednesday, May 10.

**BE ON TIME:** The schedule is included in the Student Handbook and posted online. It is your responsibility to be on time.

**BRING YOUR DOCUMENTATION:** When you come to tech inspection bring all the documentation and correspondence connected to your (1) SEF submission, (2) Impact Attenuator Data Report and (3) any Rules Questions you submitted. The inspectors do not have immediate access to this material and you may need it to answer questions about your vehicles design and construction. The inspectors want you to pass tech and pass it easily, but they need your help to make that happen.

**DO NOT RUN:** Running tells people there's an emergency. Do not run unless life or limb is in danger.

**DRIVER MEETINGS:** Attending ALL drivers' meetings is mandatory if you are planning to drive. Attendance may be taken.

**DYNAMIC/TECH AREA PASSES:** Each team is issued 4 dynamic area passes. You must have a pass to gain access to the dynamic events areas. This pass is also used for tech inspection as we limit the number of team members with the car in tech to 4.

**ENTERING AND EXITING THE SITE:** Trucks cannot fit in through the General Entrance (Gate 21) tunnel off Brooklyn Highway. All team member cars are to park outside oval in MIS Fan Zone located near Gate 21. The formula car transportation trucks must enter in and out through the US 12 (Gate 12) entrance. You will be driving across the track, so on Friday and Saturday the truck entrance will be closed when dynamic events are running. On those days before the events start, at lunch and after they end, you will be able to take trucks in and out by crossing at Gate 12 on the south end of the back straight. (That's on your right if you're in the paddocks and looking toward the back straight.)

**EVENT CLOSING TIMES:** New this year, Friday dynamic event times will be expanded and consist of a staggered opening. All events will close at 5 p.m. Your car must have crossed the starting line by that time or you can't run.

## EVENT SITE REVIEW CONT.

**PARKING:** All students will need to park outside of track in MIS Fan Zone. Paddocks can only contain FSAE Vehicle transporter.

**PHOTOGRAPHY:** For 2017 Students will have a separate controlled area on the opposite end of where cars enter the Dynamic Gate. This controlled area will allow your photographers to have an unblocked view of the Autocross and Endurance. Acceleration can be photographed from the top of the suite area. There will be no photography areas available for Skid Pad. Photographers are still required to check in at gate and must have a spotter with them.

**NOTE:** Photographers can only be in the controlled area when their teams are running. On Endurance Day teams are permitted to be in the controlled area only during the time their car is on track.

**PUSH BAR:** You can only move your car if you use the push bar. Please Note: Push Bar Competition will NOT be operating this year.

**REMOVING CARS OVERNIGHT:** Removing your car from MIS overnight is entirely your decision. If you want to take your car off site you must take it to tech inspection and have an inspector remove part one of the tech sticker. When you return you'll need to have the items you've worked on re-inspected. Re-inspection shouldn't take long.

**RESTRICTED AREAS:** At MIS, we are only authorized to use the infield, back straight, Pit Lane, garages and certain surrounding facilities. We are not permitted on the other parts of the main oval or the buildings immediately adjacent to the main oval. Please respect these restrictions.

**SECURITY:** Keep your equipment locked up. This is a large site and security can't be everywhere. Don't leave your tools, computers and other equipment lying around where they could be stolen.

**SOCIAL MEDIA:** #FSAEMICHIGAN

<https://www.facebook.com/FormulaSAE>

<https://twitter.com/formulasae>

**SPECTATORS:** Spectators are welcome to attend FSAE. If you have friends or family who want to see the competition, tell them to park in MIS Fan Zone near gate on Brooklyn Highway and walk through pedestrian tunnels. Spectators must go to Registration to sign the SAE waiver and receive their wristband. Please note to all spectators closed toed shoes are preferred. No pets allowed; except guide dogs.

**TRANSLATORS:** If you have a driver who isn't fluent in English, you must have a translator. Translators must be in the dynamic events area and available to the officials when that driver is on the course. Translators will be issued an additional dynamic area pass. If you need a dynamic area pass for your translator - ask at the registration area.

**WEATHER:** In May, the local weather can be unpredictable. We encourage you to be prepared for all weather types from sun to rain. Pack long and short sleeve apparel, sun block, coats and comfortable; closed-toe shoes.

# PHOTOGRAPHER RULES

## RULES FOR ALL PHOTOGRAPHERS IN THE CONTROLLED DYNAMIC AREA

\*Opposite of the Main Dynamic Gate (see map)

**DYNAMIC EVENTS AREA:** For 2017 Students will have a separate controlled area on the opposite end of where cars enter the Dynamic Gate. This controlled area will allow your photographers to have an unblocked view of the Autocross and Endurance. Acceleration can be photographed from the top of the suite area. There will be no photography areas available for Skid Pad.

NOTE: Photographers can only be in the controlled area when their teams are running. On Endurance Day teams are permitted to be in the controlled area only during the time their car is on track.

**AUTHORIZATION:** SAE staff is solely responsible for authorizing professional photographers/spotters, such as media, to enter the dynamic event area. Photographers/spotters must (1) be registered for the competition, (2) sign all required waivers, (3) read any required material, (4) agree that they understand and have no questions regarding the policies and procedures for photographers, and (5) agree to abide by these policies and procedures at the risk of being escorted from the dynamic area.

Videographers are classified as photographers.

Photographers must have photographic equipment – cell phones are not cameras.

**LIMIT:** Each university is limited to one (1) photographer and one (1) spotter within the dynamic event area at the same time. Additional photographers must remain outside the dynamic event area.

**ACCESS POLICY:** Properly credentialed photographers/spotters representing universities may only access the dynamic events area while their teams are actually running in an event. University photographers/spotters will not be granted dynamic area access independent of their team.

**SPOTTERS:** Photographers in the dynamic events area must be accompanied by a spotter at all times. Photographers are responsible for providing their own spotters. Spotters may not have cameras or take pictures - they are there to spot only.

**ACCESS PERIOD:** Photographers/spotters are only to be in the controlled area when their team is running.

**AREA CONTROL:** At all times photographers/spotters are under the control of the Photographer Access Captain and the Director of Operations. Instructions and commands from Captain, Director or nearest Course Marshal must be followed immediately and without question.

## PHOTOGRAPHER RULES CONT.

**AREA CONTROL:** At all times photographers/spotters are under the control of the Photographer Access Captain and the Director of Operations. Instructions and commands from Captain, Director or nearest Course Marshal must be followed immediately and without question.

**CHECK-IN:** Photographers/spotters must check-in and check-out with controlled area gate control.

**CONSEQUENCES:** Failure to follow these rules will result in ejection and revocation of the team's photographer credentials.

**REMINDER: You are responsible for your own safety at all times!**



# PADDOCKS RULES

## PADDOCKS SPONSORED BY: TOYOTA

**ENGINE RUNNING IN THE PADDOCK:** Engines may be run in the paddock provided the car has passed parts 1 and 2 of technical inspection and the following conditions are satisfied (Rule S2.7): (A) The car is on an adequate stand, and (B) The drive wheels are at least 10.2 cm (4 in) off the ground, or the driver wheels have been removed. Note – People may not be underneath the vehicles while engines are running.

**DRIVER'S EQUIPMENT:** Anytime the driver is in the cockpit with the engine running, the following approved safety equipment must be worn: helmet, driver's suit, racing gloves, goggles/face shields, racing shoes, and hair covering, if necessary (Rule T14.1 "Driver's Equipment").

**VEHICLE MOVEMENT:** Vehicles may not move under their own power anywhere but on the practice or competition tracks. Off track vehicles must be pushed at a normal walking pace by means of a "Push Bar" (D12.2), with all four (4) wheels on the ground, a team member sitting in the cockpit to steer and brake and with another team member walking beside the car (Rule D12.1.3).

**JACKING:** When supporting cars off the ground, use strong, sturdy stands which support the vehicle in a stable and secure way. Do not use milk crates, piles of wood, four of the strongest team members, etc.

**FIRES:** No open fires in the paddock including BBQ grills, oxy-acetylene torches, heaters, cigarettes, etc. Electric hot plates and MIG or TIG welding (with gas bottles safely secured) are allowed in your stall. Propane BBQ grills ONLY may be used only in the designated area, which is also the smoking area.

**FUEL AND OIL:** No open fuel containers. All fuel containers must be DOT approved. Waste oil, etc., is to be taken to the fuel station for disposal. Once at the race site, the FSAE race cars cannot be fueled except by the Formula SAE provided fuel at the fuel station. Note: waste fuel/oil may be disposed of at the fuel station.

**FIRE EXTINGUISHERS:** Fire extinguishers should be close by the vehicle and readily accessible and all team members must be knowledgeable in their use. A fire extinguisher must accompany the car wherever it is in the paddock or moved to any part of the site. A team member must hold a fire extinguisher ready whenever the car is running in your stall.

**VEHICLE MODIFICATIONS:** No unapproved modification to the vehicle after it has been through tech inspection. (Rule T1.2)

**BEHAVIOR:** Alcohol, illegal drugs, weapons or other illegal material are prohibited on the event site during the competition. Use of motorcycles, quads, bicycles, skateboards, rollerblades, scooters, or similar person-carrying devices in any part of the competition area (including the paddocks) are prohibited, as are self-propelled pit carts, tool boxes, tire carriers, etc.. (Rules D10.5, D11.6, D11.7)

**DRIVING PRACTICE:** Practice is only to take place in the designated areas during designated hours.

**TOOL USE:** Tools are expected to be used safely. Wear safety glasses when cutting, grinding, etc. Wear appropriate eye protection while welding.

**TRASH:** It is the team's responsibility to keep their Paddocks clean throughout the event. There are trash compactors in the paddock and near the suites. No trash (including broken parts, old furniture, worn out tires or other materials) may be left behind at the end of the event. (Rule D10.7)

**2017 FSAE RESTRICTED AREAS:** Please reference the Restricted Areas document.

**UNDER NO CIRCUMSTANCES ARE PASSENGER VEHICLES TO BE DRIVEN ON THE TRACK.**

Exception – crossing the track upon arrival to and departure from MIS is permitted under supervision.

**A special note for drivers:** All drivers should perform a check of critical fasteners and components on their vehicles to assure complete control during the driving events. Fasteners do come loose, parts do fatigue, and occasionally someone forgets to torque a nut – you will be intimately involved if this happens. It is OK to use the kill switch in the event of engine or brake malfunction.

## RESTRICTED AREAS & ACCESS

**ALUMNI ACTIVITIES**– Some teams invite alumni, parents and sponsors to the competition. These visitors are welcome but must comply with the rules that apply to all spectators and sign the liability waivers and be wrist banded. Any formally organized alumni activities, e.g. meetings, rallies, cook outs, must take place within the relevant team’s paddock and under the same rules that apply to the team.

**DYNAMIC AREA & DYNAMIC AREA ACCESS:** At Formula SAE the “dynamic area” is one of the “restricted areas” and is defined as any part of the competition site where cars are running under power. The “dynamic area” includes the following parts of the site:

- Brake test area
- Courses
- Event queues and surrounding areas
- Noise test area
- Practice track

The dynamic area is considered highly restricted and may only be accessed by individuals with the proper credentials: (1) dynamic area pass and (2) a wristband as follows:

- **COMPETITOR:** Access limited to times the dynamic area gate is open – Must have a dynamic area pass
- **EVENT CREW WITH DYNAMIC AREA PASS:** Access limited to times the dynamic area gate is open -- Must have a dynamic area pass AND be assigned to work the dynamic area.
- **Note:** Scorekeeping crew may access the dynamic event site at any time to install timing/scoring equipment.
- **FACULTY:** Access limited to times the dynamic area gate is open – Must have a dynamic area pass. Faculty must use one of their team’s passes.
- **JUDGES:** Judges have very limited access to the dynamic area. Only 6 judges allowed at a time.
- **MEDIA:** Access limited to times the dynamic area gate is open. Notes (1) Photographers and video crews must have a spotter. (2) Media, photographers, video crews and spotters must have dynamic area passes. (SAE staff are responsible for all media access.)
- **OFFICIAL/ORGANIZER:** All area access at all times
- **VIP/SPONSORS:** VIPS/Sponsors are not permitted in the dynamic area unless escorted by SAE staff and will not be issued dynamic passes.

**DYNAMIC AREA PASSES:** Access to the dynamic event area is limited to 4 people per team, including drivers and faculty, and each team is issued four (4) dynamic area passes. To gain access to the dynamic event area team members, including drivers, must wear and display (1) a dynamic area pass, and (2) a plastic wrist band. Team dynamic area passes may be shared with faculty advisors.

Faculty advisors are not issued separate dynamic area passes, but may use one of the 4 passes issued to their team.

Official Translators are issued separate dynamic event passes.

Dynamic area passes are also issued to organizers, event crew working that area, staff and other people needing access to the area.

**Dynamic area passes are not issued to spectators and may not be loaned to spectators.**

## RESTRICTED AREAS & ACCESS CONT.

**Paddock** – The “paddock” is the section of the event site where the teams set up their work site and park their transporters. Individual paddock spaces will be assigned by the organizers.

If you are in the paddock, keep in mind that teams may be pushing their vehicles through the aisle ways and power tools may be in use. Be aware of what is going on around you and use common sense.

**PARTICIPANTS** – To be classified as a “participant” an individual must (1) be at least 18 years of age and affiliated to university, (2) have signed the FSAE liability waiver and (3) have been issued a wrist band.

Only “participants” have access to the restricted events areas.

**RESTRICTED AREA**– The “restricted area” is any part of the competition site where teams are likely to be running their vehicle engines.

The dynamic event areas, including the noise test site, the brake test site and the practice area are restricted,

Entry into any restricted area is limited to individuals with the proper wrist band.

Dynamic area entry - The dynamic events area is considered highly restricted and may only be accessed by people with all of the following: (1) FSAE issued I.D. badge, (2) dynamic area pass and (3) a plastic wrist band.

Restricted areas must be separated from the remaining parts of the competition site by a fence or tape /rope area designators.

**SPECTATORS** – Registration staff will make every effort to have all spectators sign the MIS liability waiver. There is no minimum age for spectators, but as a matter of operational policy any spectator under 18 years of age must be accompanied by an adult at all times.

Spectators over 18 years of age who sign the waiver will be issued wrist bands.

Spectators less than 18 years of age will not be issued wrist bands.

Spectators must remain in the parts of the site open to the public.

Spectators are not considered “participants” and may not enter the dynamic events area.

**WRISTBANDS** – Wristbands are required to enter any of the FSAE restricted areas.

To receive a wrist band a person must (1) be at least 18 years of age and (2) sign the liability waiver.

Individuals under 18 years of age may not be issued a wrist band and may not enter any restricted area. Minors will receive a hand-stamp indicating their parent/legal guardian has signed the minor waiver on their behalf.

### **WRISTBAND TYPES:**

- PLASTIC: Student, faculty, official, volunteer, sponsor, media, and VIP
- PAPER: Spectators

# HOSPITALITY

## **PARKING:**

Located outside Gate 21 in MIS Fan Zone. Individuals will be directed to the FSAE Parking Area. Access to competition site will be through pedestrian tunnels.

## **REGISTRATION PROCEDURES ONSITE:**

1. A Team Captain and/or Faculty Advisor will proceed to the SAE International Registration Area bringing the printed out completed list of team information and signatures with you.
2. The Team Captain and/or Faculty Advisor are required to sign the list of signatures IN FRONT OF the Registration Staff to confirm and be accountable for the correctness of all signatures' information.
3. The Team Captain and/or Faculty Advisor will receive all wristbands for only those who have signed. Again these individuals are accountable for issuing wristbands to affiliated team members with signatures.
4. Any important registration information (dynamic passes/student handbooks/schedules) will be given to the Team Captain and/or Faculty Advisor.
5. Student Registration will only be open days 1 & 2 of the event.

## **CONCESSIONS:**

Anyone who is interested may purchase food from the concessions area under the suites (south of G1, see site layout). The concession stand prices will range for breakfast: \$3.00-\$4.00. Lunch will be from: \$3.00-\$6.00 per item. Snacks are \$1.00-5.00. Beverages are \$3.00-\$4.00. The hours are:

Wednesday, May 10-Saturday May 13

8:00 a.m. - ~6:00 p.m.\*

\*If business dictates, concessions may close earlier.

# DAILY SCHEDULE

SUBJECT TO CHANGE:

DAILY OPERATIONS	
<b>MIS Site Open:</b>	Tue. 3:00 p.m. - 7:00 p.m. (Registration and Vehicle Drop Off ONLY) Wed. 7:30 a.m. - 7:30 p.m. Th. 7:30 a.m. - 7:30 p.m. Fri. 7:30 a.m. - 8:30 p.m. Sat. 7:00 a.m. - 10:30 p.m.
<b>Student Registration (Garage 1):</b>	Tue. 3:00 p.m. - 7:00 p.m. Wed. 8:00 a.m. - 4:00 p.m. Thu. - Sat. All students will be registered as spectators
<b>Information &amp; Volunteer Registration (Garage 1):</b>	Wed. 9:00 a.m. - 6:00 p.m. Thu. 6:30 am. - 6:00 p.m.
<b>Tech Inspection Sponsored by Cummins, Inc. (Garage 2):</b>	Wed. 10:00 a.m. Gear Check Opens Wed. Noon - 7 p.m. (no new cars after 6 p.m.) Th. 9:00 a.m. - 5:00 p.m. Fri. By appointment 9:00 a.m. until 5:30 p.m. Sat. By appointment 9:00 a.m. until 1:00 p.m. (Re-tech only)
<b>Scales (Garage 1 drive thru):</b>	Wed. 3:00 p.m. - 7:00 p.m. Th. 8:00 a.m. - 4:00 p.m.
<b>Tilt/Noise/Brake Sponsored by Akebono:</b>	Th. 9:00 a.m.-5:00 p.m.(Staggered opening times by 30min per event) Fri. 8:00 a.m. - 5:30 p.m.
<b>Fuel Station:</b>	Th. 8:30 a.m. - 5:00 p.m. Fri. 8:00 a.m. - 5:00 p.m Sat. 7:30 a.m. - 5:00 p.m.
<b>Practice Area Sponsored by Mahle (Turn 2; use Gate 12):</b>	Th Noon - 5:00 p.m. Fri. 8:00 a.m. - 5:30 p.m. Sat. 8:00 a.m. - 3:00 p.m.

- NOTE: Cars must complete all 4 parts of tech by 5:30 p.m. Friday to qualify for Endurance.
- 30 minutes' notice is required for all appointments, which can be booked through the announcer in Main Tent.

# DETAILED SCHEDULE

SUBJECT TO CHANGE:

TUESDAY, MAY 9, 2017		LOCATION
3:00 p.m. - 7:00 p.m.	Early Registration (Teams MUST drop trucks/trailers in Paddock)	Garage 1
WEDNESDAY, MAY 10, 2017		LOCATION
9:00 a.m. - 9:30 a.m.	Welcome Ceremony - Sponsored by Honda (student breakfast included)	Main Tent
	Immediately Following Welcome Ceremony Captain and Advisors Meeting	Main Tent
10:00 a.m.	Tech Inspection Gear Check opens	Garage 2
5:00 p.m. - 6:00 p.m.	Design Judge Training	Garage 3
6:30 p.m. - 8:30 p.m.	Invitation-Only Reception	Champions' Club
7:30 p.m.	Official Closing of the Site - EVERYONE MUST BE OFF SITE	
THURSDAY, MAY 11, 2017		LOCATION
8:00 a.m.	Drivers Meeting (Brake & Practice) - MANDATORY	Main Tent
8:30 a.m. - 5:30 p.m.	Design Event - Sponsored by Bosch - 1st Round Judging Open	Garage 3
9:00 a.m. - 5:00 p.m.	Cost Judging Open	Main Tent
9:00 a.m. - 5:00 p.m.	Presentation Judging Open	MIS Suites
Noon - 1:00 p.m.	Lunch Break	Main Tent
~2:00 p.m. - 3:30 p.m.	Autocross Sponsored by Magna Course Walk (weather permitting)	Backstretch by Gate 50
5:30 p.m. - 8:30 p.m.	<i>Design Judges Meeting - Judges only</i>	<i>Off Site</i>
6:00 p.m.	Staging for Panoramic Photo (weather permitting)	Oval behind Suites
6:00 p.m.	Drivers Meeting (All Dynamic Events) - MANDATORY	Main Tent
7:30 p.m.	Official Closing of the Site - EVERYONE MUST BE OFF-SITE	
~9:00 p.m.	Design Finalists announced online	<a href="http://www.sae.org">www.sae.org</a>

\*TIMES ARE APPROXIMATE

## DETAILED SCHEDULE CONT.

SUBJECT TO CHANGE:

FRIDAY, MAY 12, 2017		LOCATION
7:30 a.m. - 8:30 a.m.	Autocross Walk Open	Backstretch via Gate 50
8:30 a.m.	<i>Course Crew Safety Briefing – Skid Pad</i>	<i>Backstretch via Gate 50</i>
9:00 a.m.	<i>Course Crew Safety Briefing - Autocross</i>	<i>Backstretch via Gate 50</i>
9:30 a.m.	<i>Course Crew Safety Briefing - Acceleration</i>	<i>Pit Lane</i>
9:00 a.m. - 4:00 p.m.	Design Feedback for Non-finalists (by appt only)	Garage 3
9:00 a.m. - 5:00 p.m.	Skid Pad Event Open (open during lunch)	Backstretch via Gate 50
9:30 a.m. - 5:00 p.m.	Autocross Event Sponsored by Magna Event Open (closed 1.5 hours for lunch)	Backstretch via Gate 50
9:30 a.m.	Presentation Seminar	Main Tent
10:00 a.m. - 5:00 p.m.	Acceleration Event Sponsored by Roush Open (closed 1 hours for lunch)	Pit Lane
12:00 p.m. - 2:00 p.m.	Lunch Break (staggered)	Main Tent
~5:00 p.m.	Staging for Panoramic Photo (weather make up date ONLY)	Backstretch via Gate 50
~5:30 p.m. - 8:30 p.m.	Design Finals - Sponsored by Bosch	Garage 3
~7:00 p.m.	Award Ceremony 1 - Sponsored by General Motors	Main Tent
9:00 p.m.	Official Closing of the Site - EVERYONE MUST BE OFF SITE IMMEDIATELY FOLLOWING AWARD CEREMONY	

\*TIMES ARE APPROXIMATE

## DETAILED SCHEDULE CONT.

SUBJECT TO CHANGE:

SATURDAY, MAY 13, 2017		LOCATION
7:00 - 8:00 a.m.	Endurance Sponsored by Ford Course Walk	Backstretch via Gate 50
8:15 a.m.	<i>Course Crew Safety Briefings</i>	<i>Backstretch via Gate 50</i>
~8:30 am	Top 3 Teams Design Finalists Announced	
~9:00 a.m. - 2:00 p.m.	Design Feedback for Finalists not Top 3, by appointment	Garage 3
9:00 a.m.	Endurance/Fuel Efficiency Event Sponsored by Ford Open - Group 1 Only	Backstretch via Gate 50
~12:00 p.m.	Endurance/Fuel Efficiency Gate Sponsored by Ford Closes for Group 1	Backstretch via Gate 50
~12:30 p.m. - 1:00 p.m.	Ford Endurance Course Walk	Backstretch via Gate 50
~12:30 p.m.	Lunch Break	Main Tent
1:30 p.m.	<i>Course Crew back on track</i>	<i>Backstretch via Gate 50</i>
~1:35 p.m.	Endurance/Fuel Efficiency Event Sponsored by Ford Open - Group 2 Only	Backstretch via Gate 50
~4:00 p.m.	Endurance/Fuel Efficiency Gate Sponsored by Ford Closes for Group 2	Backstretch via Gate 50
~5:30 p.m.	Public Viewing of Top 3 Design Finalists	Main Tent
~6:00 p.m.	Public Design Review of Top 3 Finalists	Main Tent
~7:00 p.m.	Presentation Highlights	Main Tent
~ 8:00 p.m.	Final Awards Ceremony Sponsored by General Motors	Main Tent
10:30 p.m.	Official Closing of the Site - All Teams and Transporters Must Exit IMMEDIATELY FOLLOWING AWARD CEREMONY	
SUNDAY, MAY 14, 2017		
9:00 a.m. - 2:00 p.m.	Site Open ONLY for Pick-Up of Transporters	



## DETAILED SCHEDULE CONT.

### Notes

1. Gate 21 open 6:00 a.m. – 1 hour after site closing Wednesday-Saturday. After hours, you must use Gate 12.
2. Teams who participate in early registration **MUST** drop off their trucks/trailers in the paddock. No unpacking may be done on Tuesday. All teams may participate. **Please use Gate 12.**
3. Site closed to teams May 15, 2017. Teams not shipping cars must remove them by 2 p.m. May 14, 2017.
4. No Access During Dynamic Events - Teams may enter site with rigs/trailers/panel trucks **ONLY** when there are **no** Dynamic Events running.
5. Medical Services - There is no First Aid Station on site. EMS will provide any/all medical attention.
6. Overnight Removal of FSAE cars - Removal is allowed, but tech will pull Part 1 of your tech sticker.
7. Shipping Cars - Teams shipping cars **must** have them removed from MIS by **10 a.m. May 15, 2017.**
8. FM Audio - Announcements can be heard via FM radio (Frequency will be posted in G1 at event).
9. Thursday 6pm – Panoramic Photo Staging will start. Watch Formula SAE FB
10. Event Closing Times - Acceleration, Skid-Pad & Autocross close exactly at the scheduled time. Your car must cross the starting line **before** the event closing time to be allowed to complete that run.
11. Sponsor Skillshops Wed. 10:15 a.m. – 6:00 p.m. and Thurs. 8:30 a.m. – 4:15 p.m. Location: Suites 17 & 18.
12. Student Breakfast Sponsored by Honda on Wednesday, May 10. Served in Main Tent during Welcome Ceremony.
13. ZF Photo Booth hours will be Wednesday and Thursday 9:00 a.m. - 5:00 p.m.
14. Lost and Found - The Announcer in the Main Tent will be the drop-off/pick-up point for any found/lost items. After hours, check with HQ in Garage 1.
15. Teams must have their trailers packed and be ready to leave the site immediately following the Award Ceremony Saturday.

\*TIMES ARE APPROXIMATE

# SUPPORT SERVICES

Support Services	
<b>GM Machine Trailer:</b>	<b>GM Internet Cafe (GM Recruitment Tent)</b>
Wed.-Fri. 9 a.m. - 5 p.m.	Wed. 9:30 a.m. - 5:30 p.m. Th. 7:30 a.m. – 5:30 p.m. Fri. 8:30 a.m. – 5:30 p.m. Sat. 8:00 p.m. - 4:00 p.m.
<b>Lincoln Electric Welding:</b>	<b>Hoosier:</b>
Wed.: Noon - 5 p.m. Th.-Fri. 8 a.m. - 5 p.m. Sat. 8 a.m. - Noon	Wed.-Fri. 7 a.m. - 5 p.m. Sat. 7 a.m. - 3 p.m.
<b>Sponsor SkillShops</b>	<b>Human Solutions</b>
Wed.: 10:15 a.m. - 6:00 p.m. Th.: 8:30 a.m. - 4:00 p.m.	Wed.-Fri. 9:00 a.m. - 6:00 p.m.
<b>Ambulance on site:</b>	<b>Concessions:</b>
Wed. - Sat. 7 a.m. - ~8 p.m.	Wed.-Sat 8 a.m. - 6 p.m.* <i>* As business dictates. May close earlier if deemed appropriate</i>
<b>MIS Fire trucks on site:</b>	
Wed. - Sat. 7 a.m. - ~8 p.m.	

# STATIC SCHEDULES

CAR #	School Name	Design Bay	Design Time	Cost Bay	Cost Time	Presentation Bay	Presentation Time
1	Universitat Stuttgart	J	8:30 AM	G	10:30 AM	C	2:30 PM
2	Graz Technical Univ	D	9:30 AM	D	1:30 PM	D	11:30 AM
3	U A S Graz	O	8:30 AM	H	11:30 AM	H	4:00 PM
4	Oregon State Univ	G	9:30 AM	G	1:30 PM	G	11:30 AM
5	Michigan State Univ	H	8:30 AM	E	10:30 AM	A	2:30 PM
6	Univ of Wisconsin - Madison	A	9:30 AM	A	1:30 PM	A	11:30 AM
7	Missouri University of Science and Tech	I	8:30 AM	F	10:30 AM	B	2:30 PM
8	Univ of Michigan - Dearborn	B	8:30 AM	B	1:00 PM	B	3:00 PM
9	Univ of Florida	M	8:30 AM	C	3:30 PM	A	10:30 AM
11	Universidade de Sao Paulo	E	3:30 PM	E	9:30 AM	E	11:00 AM
13	Technical Univ of Munich	N	9:30 AM	J	1:30 PM	G	11:00 AM
14	Florida Atlantic Univ	F	3:30 PM	F	9:30 AM	F	11:00 AM
15	Univ of Alabama - Tuscaloosa	F	1:30 PM	F	3:00 PM	F	9:30 AM
16	San Jose State University	K	9:30 AM	E	11:30 AM	F	1:30 PM
17	Auburn Univ	O	9:30 AM	I	11:30 AM	I	1:30 PM
18	Univ of Illinois - Chicago	L	12:30 PM	H	2:30 PM	H	9:00 AM
19	Mississippi State Univ	K	4:30 PM	I	11:00 AM	G	9:00 AM
20	Minnesota State University - Mankato	A	2:30 PM	A	9:00 AM	A	11:00 AM
21	Brown Univ	J	3:30 PM	G	11:00 AM	C	10:00 AM
22	Villanova Univ	D	1:30 PM	D	3:00 PM	D	9:30 AM
23	Univ of Missouri	E	12:30 PM	E	2:30 PM	E	9:00 AM
24	Purdue Univ - Northwest	G	10:30 AM	G	2:00 PM	G	3:30 PM
25	Michigan Tech Univ	E	2:30 PM	E	9:00 AM	C	10:30 AM
26	Columbia Univ	M	4:30 PM	I	10:00 AM	I	2:00 PM
27	South Dakota School of Mines & Tech	F	2:30 PM	F	9:00 AM	D	10:30 AM
29	Washington Univ - St Louis	A	10:30 AM	A	2:00 PM	E	1:00 PM
30	Lehigh Univ	B	3:30 PM	B	9:30 AM	B	1:00 PM
31	Univ of Louisiana - Lafayette	B	10:30 AM	B	2:00 PM	B	3:30 PM
32	Louisiana State Univ	O	12:30 PM	A	11:00 AM	G	2:30 PM
33	Univ of Maryland - College Park	N	12:30 PM	J	2:30 PM	A	4:00 PM
34	Grand Valley State Univ	G	3:30 PM	G	9:30 AM	G	1:00 PM
35	York College of Pennsylvania	L	3:30 PM	H	9:30 AM	H	11:30 AM
36	Colorado Mesa University	E	4:30 PM	E	10:00 AM	E	2:00 PM
37	Univ of British Columbia	D	2:30 PM	D	9:00 AM	B	10:30 AM
38	Rensselaer Polytechnic Inst	B	2:30 PM	B	9:00 AM	B	11:00 AM
39	Western Michigan Univ	B	12:30 PM	E	3:30 PM	B	9:00 AM
40	Univ of North Florida	J	2:30 PM	I	1:00 PM	F	10:30 AM

## STATIC SCHEDULES CONT.

CAR #	School Name	Design Bay	Design Time	Cost Bay	Cost Time	Presentation Bay	Presentation Time
41	Lawrence Technological Univ	I	3:30 PM	F	11:00 AM	B	10:00 AM
42	Western University	D	8:30 AM	D	1:00 PM	D	3:00 PM
43	Georgia Institute of Technology	N	8:30 AM	J	1:00 PM	B	4:00 PM
44	Univ of Guelph	N	3:30 PM	J	9:30 AM	C	4:30 PM
45	St Cloud State Univ	J	1:30 PM	C	10:30 AM	G	4:00 PM
46	US Naval Academy	E	8:30 AM	E	1:00 PM	E	3:00 PM
47	National Univ of Singapore	L	8:30 AM	H	1:00 PM	H	2:30 PM
48	Univ of Connecticut	C	10:30 AM	C	2:00 PM	C	3:30 PM
49	Univ of Illinois - Urbana Champaign	E	1:30 PM	E	3:00 PM	E	9:30 AM
50	Rutgers Univ	H	2:30 PM	F	11:30 AM	H	10:30 AM
51	Carleton Univ	C	3:30 PM	C	9:30 AM	C	1:00 PM
52	Univ of Minnesota-Duluth	H	12:30 PM	J	11:00 AM	H	3:30 PM
53	Univ of Toledo	O	2:30 PM	J	11:30 AM	G	1:30 PM
54	Univ of Kansas - Lawrence	J	9:30 AM	D	11:30 AM	E	1:30 PM
55	Tennessee Tech Univ	H	3:30 PM	E	11:00 AM	A	10:00 AM
56	Univ of South Florida	M	12:30 PM	I	2:30 PM	I	9:00 AM
57	Univ of Victoria	I	12:30 PM	G	3:30 PM	I	10:00 AM
58	Universite de Sherbrooke	G	12:30 PM	G	2:30 PM	G	10:30 AM
59	Purdue Univ - W Lafayette	L	2:30 PM	H	9:00 AM	H	11:00 AM
60	The Ohio State University	K	8:30 AM	A	11:30 AM	D	2:30 PM
61	Northwestern Univ	F	10:30 AM	F	2:00 PM	F	1:00 PM
62	Cooper Union	O	3:30 PM	H	11:00 AM	H	10:00 AM
63	McGill Univ	C	8:30 AM	C	1:00 PM	C	3:00 PM
64	Penn State Univ - Harrisburg	A	1:30 PM	A	3:00 PM	A	9:30 AM
65	Univ of Akron	E	9:30 AM	E	1:30 PM	E	11:30 AM
66	Dalhousie Univ	A	12:30 PM	A	2:30 PM	A	9:00 AM
67	Rochester Institute of Technology	H	9:30 AM	B	11:30 AM	E	2:30 PM
69	Univ of Pittsburgh - Pittsburgh	G	8:30 AM	G	1:00 PM	G	3:00 PM
70	Universidad Metropolitana	C	4:30 PM	C	10:00 AM	C	2:00 PM
71	Temple Univ	G	4:30 PM	G	10:00 AM	G	2:00 PM
72	Saginaw Valley State Univ	N	2:30 PM	J	9:00 AM	D	4:00 PM
73	Embry-Riddle Aero Univ - Daytona Beach	H	1:30 PM	A	10:30 AM	H	3:00 PM
75	Univ of New Brunswick	L	4:30 PM	H	10:00 AM	H	2:00 PM
76	Univ of Hartford	C	12:30 PM	B	11:00 AM	F	4:00 PM
77	Rose Hulman Inst of Tech	L	9:30 AM	H	1:30 PM	I	11:30 AM
78	Polytechnique Montréal	D	10:30 AM	D	2:00 PM	D	3:30 PM
79	Univ of New Hampshire	D	4:30 PM	D	10:00 AM	D	2:00 PM
80	Ryerson Univ	D	3:30 PM	D	9:30 AM	D	11:00 AM
81	Virginia Tech	F	8:30 AM	F	1:00 PM	F	3:00 PM

# STATIC SCHEDULES CONT.

CAR #	School Name	Design Bay	Design Time	Cost Bay	Cost Time	Presentation Bay	Presentation Time
82	Univ of Cincinnati	K	12:30 PM	B	3:30 PM	B	4:30 PM
83	Kookmin Univ	A	8:30 AM	A	1:00 PM	A	3:00 PM
84	Univ of Toronto	N	4:30 PM	J	10:00 AM	H	1:30 PM
85	Univ of Kentucky	I	4:30 PM	D	2:30 PM	F	10:00 AM
86	Indiana Univ Purdue Univ Indianapolis	N	1:30 PM	J	3:00 PM	C	4:00 PM
87	West Virginia Univ	M	10:30 AM	I	2:00 PM	I	3:00 PM
88	Ecole De Technologie Superieure	F	9:30 AM	F	1:30 PM	F	11:30 AM
89	Lakehead Univ	J	4:30 PM	B	2:30 PM	G	10:00 AM
90	Univ of Massachusetts - Lowell	K	10:30 AM	D	3:30 PM	D	1:30 PM
91	Saint Louis Univ	L	1:30 PM	H	3:00 PM	H	9:30 AM
92	Kansas State Univ	H	10:30 AM	F	3:30 PM	A	1:30 PM
93	US Air Force Academy	K	3:30 PM	D	11:00 AM	D	10:00 AM
94	Stevens Inst of Tech	N	10:30 AM	J	2:00 PM	E	4:00 PM
96	Universite Du Quebec a Trois-Rivieres	L	10:30 AM	H	2:00 PM	I	4:00 PM
97	Kettering Univ	I	9:30 AM	C	11:30 AM	F	2:30 PM
98	Univ of Puerto Rico-Mayaquez	B	4:30 PM	B	10:00 AM	B	2:00 PM
99	Cornell Univ	M	9:30 AM	I	1:30 PM	I	3:30 PM
100	Univ of British Columbia - Okangan	M	3:30 PM	I	9:30 AM	I	1:00 PM
101	North Dakota State Univ	G	2:30 PM	G	9:00 AM	E	10:30 AM
102	Duke Univ	G	1:30 PM	G	3:00 PM	G	9:30 AM
103	Univ of Central Florida	J	10:30 AM	I	3:30 PM	C	1:30 PM
104	Univ of Evansville	O	1:30 PM	H	10:30 AM	C	9:00 AM
105	Univ of Minnesota - Twin Cities	C	9:30 AM	C	1:30 PM	C	11:30 AM
106	Universidad Autonoma Estado Mexico	H	4:30 PM	C	2:30 PM	E	10:00 AM
107	Universidad Central de Venezuela	A	4:30 PM	A	10:00 AM	A	2:00 PM
108	Washington State Univ	B	1:30 PM	B	3:00 PM	B	9:30 AM
109	Clemson Univ	D	12:30 PM	C	11:00 AM	D	9:00 AM
110	Univ of Manitoba	I	1:30 PM	B	10:30 AM	F	3:30 PM
111	Univ of Michigan - Ann Arbor	B	9:30 AM	B	1:30 PM	B	11:30 AM
112	Ferris State University	A	3:30 PM	A	9:30 AM	A	1:00 PM
113	Central Michigan Univ	I	2:30 PM	G	11:30 AM	I	10:30 AM
114	Florida Inst of Tech	I	10:30 AM	J	3:30 PM	B	1:30 PM
115	Universidad Simon Bolivar	C	1:30 PM	C	3:00 PM	C	9:30 AM
116	South Dakota State Univ	F	4:30 PM	F	10:00 AM	F	2:00 PM
117	Texas Tech Univ	M	1:30 PM	I	3:00 PM	I	9:30 AM
118	Bradley Univ	O	4:30 PM	I	10:30 AM	I	2:30 PM

## STATIC SCHEDULES CONT.

CAR #	School Name	Design Bay	Design Time	Cost Bay	Cost Time	Presentation Bay	Presentation Time
120	Oakland University	F	12:30 PM	F	2:30 PM	F	9:00 AM
121	Texas State University-San Marcos	K	1:30 PM	D	10:30 AM	A	3:30 PM
122	Penn State Univ - University Park	E	10:30 AM	E	2:00 PM	E	3:30 PM
123	Queen's Univ - Ontario Canada	M	2:30 PM	I	9:00 AM	I	11:00 AM
124	North Carolina State Univ - Raleigh	K	2:30 PM	J	10:30 AM	D	1:00 PM
125	Univ of Nebraska - Lincoln	J	12:30 PM	A	3:30 PM	H	1:00 PM
126	Univ of Waterloo	C	2:30 PM	C	9:00 AM	C	11:00 AM
128	Cegep du Vieux - Montreal	O	10:30 AM	H	3:30 PM	D	4:30 PM

# COST EVENT SCHEDULE

	A	B	C	D	E	F	G	H	I	J
<b>TRAINING 8-8:30 AM</b>										
<b>9:00 AM</b>	020 - Minnesota State University - Mankato	038 - Rensselaer Polytechnic Inst	126 - Univ of Waterloo	037 - Univ of British Columbia	025 - Michigan Tech Univ	027 - South Dakota School of Mines & Tech	101 - North Dakota State Univ	059 - Purdue Univ - W Lafayette	123 - Queen's Univ - Ontario Canada	072 - Saginaw Valley State Univ
<b>9:30 AM</b>	112 - Ferris State University	030 - Lehigh Univ	051 - Carleton Univ	080 - Ryerson Univ	011 - Universidade de Sao Paulo	014 - Florida Atlantic Univ	034 - Grand Valley State Univ	035 - York College of Pennsylvania	100 - Univ of British Columbia - Okangan	044 - Univ of Guelph
<b>10:00 AM</b>	107 - Universidad Central de Venezuela	098 - Univ of Puerto Rico- Mayaquez	070 - Universidad Metropolitana	079 - Univ of New Hampshire	036 - Colorado Mesa University	116 - South Dakota State Univ	071 - Temple Univ	075 - Univ of New Brunswick	026 - Columbia Univ	084 - Univ of Toronto
<b>10:30 AM</b>	073 - Embry-Riddle Aero Univ - Daytona Beach	110 - Univ of Manitoba	045 - St Cloud State Univ	121 - Texas State University-San Marcos	005 - Michigan State Univ	007 - Missouri University of Science and Tech	001 - Universitat Stuttgart	104 - Univ of Evansville	118 - Bradley Univ	124 - North Carolina State Univ - Raleigh
<b>11:00 AM</b>	032 - Louisiana State Univ	076 - Univ of Hartford	109 - Clemson Univ	093 - US Air Force Academy	055 - Tennessee Tech Univ	041 - Lawrence Technological Univ	021 - Brown Univ	062 - Cooper Union	019 - Mississippi State Univ	052 - Univ of Minnesota-Duluth
<b>11:30 AM</b>	060 - The Ohio State University	067 - RIT	097 - Kettering Univ	054 - Univ of Kansas - Lawrence	016 - San Jose State University	050 - Rutgers Univ	113 - Central Michigan Univ	003 - U A S Graz	017 - Auburn Univ	053 - Univ of Toledo
<b>LUNCH 12-12:30 PM</b>										
<b>1:00 PM</b>	083 - Kookmin Univ	008 - Univ of Michigan - Dearborn	063 - McGill Univ	042 - Western University	046 - US Naval Academy	081 - Virginia Tech	069 - Univ of Pittsburgh - Pittsburgh	047 - National Univ of Singapore	040 - Univ of North Florida	043 - Georgia Institute of Technology
<b>1:30 PM</b>	006 - Univ of Wisconsin - Madison	111 - Univ of Michigan - Ann Arbor	105 - Univ of Minnesota - Twin Cities	002 - Graz Technical Univ	065 - Univ of Akron	088 - Ecole De Technologie Superieure	004 - Oregon State Univ	077 - Rose Hulman Inst of Tech	099 - Cornell Univ	013 - Technical Univ of Munich
<b>2:00 PM</b>	029 - Washington Univ - St Louis	031 - Univ of Louisiana - Lafayette	048 - Univ of Connecticut	078 - Polytechnique Montréal	122 - Penn State Univ - University Park	061 - Northwestern Univ	024 - Purdue Univ - Northwest	096 - Universite Du Quebec a Trois-Rivieres	087 - West Virginia Univ	094 - Stevens Inst of Tech
<b>2:30 PM</b>	066 - Dalhousie Univ	089 - Lakehead Univ	106 - Universidad Autonoma Estado Mexico	085 - Univ of Kentucky	023 - Univ of Missouri	120 - Oakland University	058 - Universite de Sherbrooke	018 - Univ of Illinois - Chicago	056 - Univ of South Florida	033 - Univ of Maryland - College Park
<b>3:00 PM</b>	064 - Penn State Univ - Harrisburg	108 - Washington State Univ	115 - Universidad Simon Bolivar	022 - Villanova Univ	049 - Univ of Illinois - Urbana Champaign	015 - Univ of Alabama - Tuscaloosa	102 - Duke Univ	091 - Saint Louis Univ	117 - Texas Tech Univ	086 - Indiana Univ Purdue Univ Indianapolis
<b>3:30 PM</b>	125 - Univ of Nebraska - Lincoln	082 - Univ of Cincinnati	009 - Univ of Florida	090 - Univ of Massachusetts - Lowell	039 - Western Michigan Univ	092 - Kansas State Univ	057 - Univ of Victoria	128 - Cegep du Vieux - Montreal	103 - Univ of Central Florida	114 - Florida Inst of Tech

\*Cost Event - 10 Bays, each appointment is 1/2 hour long

# PRESENTATION EVENT SCHEDULE

	A	B	C	D	E	F	G	H	I
<b>TRAINING 8-8:30 AM</b>									
<b>9:00 AM</b>	066 - Dalhousie Univ	039 - Western Michigan Univ	104 - Univ of Evansville	109 - Clemson Univ	023 - Univ of Missouri	120 - Oakland University	019 - Mississippi State Univ	018 - Univ of Illinois - Chicago	056 - Univ of South Florida
<b>9:30 AM</b>	064 - Penn State Univ - Harrisburg	108 - Washington State Univ	115 - Universidad Simon Bolivar	022 - Villanova Univ	049 - Univ of Illinois - Urbana Champaign	015 - Univ of Alabama - Tuscaloosa	102 - Duke Univ	091 - Saint Louis Univ	117 - Texas Tech Univ
<b>10:00 AM</b>	055 - Tennessee Tech Univ	041 - Lawrence Technological Univ	021 - Brown Univ	093 - US Air Force Academy	106 - Universidad Autonoma Estado Mexico	085 - Univ of Kentucky	089 - Lakehead Univ	062 - Cooper Union	057 - Univ of Victoria
<b>10:30 AM</b>	009 - Univ of Florida	037 - Univ of British Columbia	025 - Michigan Tech Univ	027 - South Dakota School of Mines & Tech	101 - North Dakota State Univ	040 - Univ of North Florida	058 - Universite de Sherbrooke	050 - Rutgers Univ	113 - Central Michigan Univ
<b>11:00 AM</b>	020 - Minnesota State University - Mankato	038 - Rensselaer Polytechnic Inst	126 - Univ of Waterloo	080 - Ryerson Univ	011 - Universidade de Sao Paulo	014 - Florida Atlantic Univ	013 - Technical Univ of Munich	059 - Purdue Univ - W Lafayette	123 - Queen's Univ - Ontario Canada
<b>11:30 AM</b>	006 - Univ of Wisconsin - Madison	111 - Univ of Michigan - Ann Arbor	105 - Univ of Minnesota - Twin Cities	002 - Graz Technical Univ	065 - Univ of Akron	088 - Ecole De Technologie Superieure	004 - Oregon State Univ	035 - York College of Pennsylvania	077 - Rose Hulman Inst of Tech
<b>LUNCH 12-12:30 PM</b>									
<b>1:00 PM</b>	112 - Ferris State University	030 - Lehigh Univ	051 - Carleton Univ	124 - North Carolina State Univ - Raleigh	029 - Washington Univ - St Louis	061 - Northwestern Univ	034 - Grand Valley State Univ	125 - Univ of Nebraska - Lincoln	100 - Univ of British Columbia - Okangan
<b>1:30 PM</b>	092 - Kansas State Univ	114 - Florida Inst of Tech	103 - Univ of Central Florida	090 - Univ of Massachusetts - Lowell	054 - Univ of Kansas - Lawrence	016 - San Jose State University	053 - Univ of Toledo	084 - Univ of Toronto	017 - Auburn Univ
<b>2:00 PM</b>	107 - Universidad Central de Venezuela	098 - Univ of Puerto Rico- Mayaguez	070 - Universidad Metropolitana	079 - Univ of New Hampshire	036 - Colorado Mesa University	116 - South Dakota State Univ	071 - Temple Univ	075 - Univ of New Brunswick	026 - Columbia Univ
<b>2:30 PM</b>	005 - Michigan State Univ	007 - Missouri University of Science and Tech	001 - Universitat Stuttgart	060 - The Ohio State University	067 - Rochester Institute of Technology	097 - Kettering Univ	032 - Louisiana State Univ	047 - National Univ of Singapore	118 - Bradley Univ
<b>3:00 PM</b>	083 - Kookmin Univ	008 - Univ of Michigan - Dearborn	063 - McGill Univ	042 - Western University	046 - US Naval Academy	081 - Virginia Tech	069 - Univ of Pittsburgh - Pittsburgh	073 - Embry-Riddle Aero Univ - Daytona Beach	087 - West Virginia Univ
<b>3:30 PM</b>	121 - Texas State University-San Marcos	031 - Univ of Louisiana - Lafayette	048 - Univ of Connecticut	078 - Polytechnique Montréal	122 - Penn State Univ - University Park	110 - Univ of Manitoba	024 - Purdue Univ - Northwest	052 - Univ of Minnesota-Duluth	099 - Cornell Univ
<b>4:00 PM</b>	033 - Univ of Maryland - College Park	043 - Georgia Institute of Technology	086 - Indiana Univ Purdue Univ Indianapolis	072 - Saginaw Valley State Univ	094 - Stevens Inst of Tech	076 - Univ of Hartford	045 - St Cloud State Univ	003 - U A S Graz	096 - Universite Du Quebec a Trois-Rivieres
<b>4:30 PM</b>		082 - Univ of Cincinnati	044 - Univ of Guelph	128 - Cegep du Vieux - Montreal					

\* Event - 9 conf. rooms/suites, each appointment is 1/2 hour long



# DESIGN EVENT SCHEDULE

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
<b>8:30 AM</b>	083 - Kookmin Univ	008 - Univ of Michigan - Dearborn	063 - McGill Univ	042 - Western University	046 - US Naval Academy	081 - Virginia Tech	069 - Univ of Pittsburgh - Pittsburgh	005 - Michigan State Univ	007 - Missouri University of Science and Tech	001 - Universitat Stuttgart	060 - The Ohio State University	047 - National Univ of Singapore	009 - Univ of Florida	043 - Georgia Institute of Technology	003 - U A S Graz
<b>9:30 AM</b>	006 - Univ of Wisconsin - Madison	111 - Univ of Michigan - Ann Arbor	105 - Univ of Minnesota - Twin Cities	002 - Graz Technical Univ	065 - Univ of Akron	088 - Ecole De Technologie Superieure	004 - Oregon State Univ	067 - RIT	097 - Kettering Univ	054 - Univ of Kansas - Lawrence	016 - San Jose State University	077 - Rose Hulman Inst of Tech	099 - Cornell Univ	013 - Technical Univ of Munich	017 - Auburn Univ
<b>10:30 AM</b>	029 - Washington Univ - St Louis	031 - Univ of Louisiana - Lafayette	048 - Univ of Connecticut	078 - Polytechnique Montréal	122 - Penn State Univ - University Park	061 - Northwestern Univ	024 - Purdue Univ - Northwest	092 - Kansas State Univ	114 - Florida Inst of Tech	103 - Univ of Central Florida	090 - Univ of Massachusetts - Lowell	096 - Universite Du Quebec a Trois-Rivieres	087 - West Virginia Univ	094 - Stevens Inst of Tech	128 - Cegep du Vieux - Montreal
<b>LUNCH 11:30 AM - 12:30 PM</b>															
<b>12:30 PM</b>	066 - Dalhousie Univ	039 - Western Michigan Univ	076 - Univ of Hartford	109 - Clemson Univ	023 - Univ of Missouri	120 - Oakland Univ	058 - Universite de Sherbrooke	052 - Univ of Minnesota - Duluth	057 - Univ of Victoria	125 - Univ of Nebraska - Lincoln	082 - Univ of Cincinnati	018 - Univ of Illinois - Chicago	056 - Univ of South Florida	033 - Univ of Maryland - College Park	032 - Louisiana State Univ
<b>1:30 PM</b>	064 - Penn State Univ - Harrisburg	108 - Washington State Univ	115 - Universidad Simon Bolivar	022 - Villanova Univ	049 - Univ of Illinois - Urbana Champaign	015 - Univ of Alabama - Tusc.	102 - Duke Univ	073 - Embry-Riddle Aero Univ - Daytona Beach	110 - Univ of Manitoba	045 - St Cloud State Univ	121 - Texas State University - San Marcos	091 - Saint Louis Univ	117 - Texas Tech Univ	086 - Indiana Univ Purdue Univ Indianapolis	104 - Univ of Evansville
<b>2:30 PM</b>	020 - Minnesota State University - Mankato	038 - Rensselaer Polytechnic Inst	126 - Univ of Waterloo	037 - Univ of British Columbia	025 - Michigan Tech Univ	027 - South Dakota School of Mines & Tech	101 - North Dakota State Univ	050 - Rutgers Univ	113 - Central Michigan Univ	040 - Univ of North Florida	124 - North Carolina State Univ - Raleigh	059 - Purdue Univ - W Lafayette	123 - Queen's Univ - Ontario Canada	072 - Saginaw Valley State Univ	053 - Univ of Toledo
<b>3:30 PM</b>	112 - Ferris State University	030 - Lehigh Univ	051 - Carleton Univ	080 - Ryerson Univ	011 - Universidade de Sao Paulo	014 - Florida Atlantic Univ	034 - Grand Valley State Univ	055 - Tennessee Tech Univ	041 - Lawrence Technological Univ	021 - Brown Univ	093 - US Air Force Academy	035 - York College of Pennsylvania	100 - Univ of British Columbia - Okangan	044 - Univ of Guelph	062 - Cooper Union
<b>4:30 PM</b>	107 - Universidad Central de Venezuela	098 - Univ of Puerto Rico - Mayaguez	070 - Universidad Metropolitana	079 - Univ of New Hampshire	036 - Colorado Mesa Univ	116 - South Dakota State Univ	071 - Temple Univ	106 - Universidad Autonoma Estado Mexico	085 - Univ of Kentucky	089 - Lakehead Univ	019 - Mississippi State Univ	075 - Univ of New Brunswick	026 - Columbia Univ	084 - Univ of Toronto	118 - Bradley Univ

\*Design Event - 15 bays - Each time slot is ONE hour long

# SPONSOR SKILLSHOPS SCHEDULE

**SPONSORED BY: PURE MICHIGAN TALENT CONNECT**

**Wednesday and Thursday, May 10-11, 2017**

SAE International and sponsors are invested in Formula SAE student's education. At Formula SAE Michigan in 2017, 14 Sponsor Skillsshops will be offered to Formula SAE students on Wednesday and Thursday, May 10th and 11th. These workshops will provide students opportunities to gain expertise on a variety of topics presented by the sponsor's staff. The Sponsor Skillsshops will be held in Suite 217 and 218 and there are 60 seats available for each Skillsshop. Spots are first come first serve. To sign up visit:

<http://students.sae.org/cds/formulaseries/fsae/skillsshops/>

WEDNESDAY, MAY 10, 2017		
TIME	COMPANY	SKILLSHOP TOPIC
10:15 AM - 11:45 AM	Altair Engineering	Optimization: Driving your Winning Design
10:15 AM -11:45 AM	Human Solutions	Designing Vehicle Around the Driver
1:00 PM - 2:30 PM	Bosch	Calibration Fundamentals that Create Competitive Advantage
1:00 PM - 2:30 PM	Cooper Tire & Rubber Company	Vehicle Dynamic Testing – Use of Testing for Vehicle Design
2:45 PM - 4:15 PM	DS SolidWorks	SolidWorks and SolidWorks Simulation
2:45 PM - 4:15 PM	MacLean-Fogg	Engineering Basics of Threaded Fastener Design and Analysis
4:30 PM - 6:00 PM	Siemens PLM	How to Find Better Designs, Faster
4:30 PM - 6:00 PM	MathWorks, Inc.	How to Win Using Modeling and Simulation in FSAE
THURSDAY, MAY 11, 2017		
8:30 AM - 10:00 AM	ZF TRW	Are Electronic Stability Control Systems Viable for Race Vehicles?
8:30 AM - 10:00 AM	DS SolidWorks	SolidWorks Electrical
10:15 AM - 11:45 AM	MAHLE Industries, Inc.	Intake Manifolds for the Internal Combustion Engine
10:15 AM - 11:45 AM	Magna International, Inc.	Become a Heavyweight Champ in Lightweighting, and Accelerate your Knowledge of Aerodynamics
1:00 PM - 2:30 PM	ROUSH	Calibration of Performance Engines Race Car vs. Road Car
1:00 PM - 2:30 PM	Cummins Inc.	An Overview of Turbocharging the Internal Combustion Engine

# REGISTERED TEAM LIST

TEAM #	UNIVERSITY	TEAM NAME	COUNTRY
1	Universitat Stuttgart	Rennteam Uni Stuttgart e.V.	Germany
2	Graz Technical Univ	TUG Racing Team	Austria
3	U A S Graz	joanneum racing graz	Austria
4	Oregon State Univ	Global-Formula-Racing	United States
5	Michigan State Univ	MSU Formula Racing Team	United States
6	Univ of Wisconsin - Madison	Wisconsin Racing	United States
7	Missouri University of Science and Tech	S&T Racing	United States
8	Univ of Michigan - Dearborn	UMD Racing	United States
9	Univ of Florida	University of Florida Gator Motorsports	United States
11	Universidade de Sao Paulo	EESC USP	Brazil
13	Technical Univ of Munich	TUfast	Germany
14	Florida Atlantic Univ	Owls Racing	United States
15	Univ of Alabama - Tuscaloosa	Crimson Racing	United States
16	San Jose State University	Spartan Racing	United States
17	Auburn Univ	War Eagle Motorsports	United States
18	Univ of Illinois - Chicago	UIC Motorsports	United States
19	Mississippi State Univ	Mspeed	United States
20	Minnesota State University - Mankato	MNSU Motorsports	United States
21	Brown Univ	Brown Formula Racing	United States
22	Villanova Univ	Villanova Formula SAE	United States
23	Univ of Missouri	Mizzou Racing	United States
24	Purdue Univ - Northwest	PNW Motorsports	United States
25	Michigan Tech Univ	Michigan Tech Formula SAE	United States
26	Columbia Univ	Knickerbocker Motorsports	United States
27	South Dakota School of Mines & Tech	Formula HardRocker Racing	United States
29	Washington Univ - St Louis	WashU Racing	United States
30	Lehigh Univ	Lehigh Formula SAE	United States
31	Univ of Louisiana - Lafayette	Ragin' Cajun Racing	United States
32	Louisiana State Univ	TigerRacing	United States
33	Univ of Maryland - College Park	Terps Racing	United States
34	Grand Valley State Univ	GVSU Laker Racing	United States
35	York College of Pennsylvania	Spartan Racing	United States
36	Colorado Mesa University	Mesa Motorsports	United States
37	Univ of British Columbia	Formula UBC	Canada
38	Rensselaer Polytechnic Inst	Rensselaer Motorsport	United States
39	Western Michigan Univ	Bronco Racing	United States

## REGISTERED TEAM LIST CONT.

TEAM #	UNIVERSITY	TEAM NAME	COUNTRY
40	Univ of North Florida	Osprey Racing	United States
41	Lawrence Technological Univ	Blue Devil Motorsports	United States
42	Western University	WFR	Canada
43	Georgia Institute of Technology	Georgia Tech Motorsports	United States
44	Univ of Guelph	Gryphon Racing	Canada
45	St Cloud State Univ	Husky Formula Racing	United States
46	US Naval Academy	Navy Motorsports	United States
47	National Univ of Singapore	NUS Formula SAE	Singapore
48	Univ of Connecticut	UConn Formula SAE	United States
49	Univ of Illinois - Urbana Champaign	Illini Motorsports	United States
50	Rutgers Univ	Rutgers Formula Racing	United States
51	Carleton Univ	Ravens Racing	Canada
52	Univ of Minnesota-Duluth	Bulldog Racing	United States
53	Univ of Toledo	Rocket Motorsports	United States
54	Univ of Kansas - Lawrence	Jayhawk Motorsports	United States
55	Tennessee Tech Univ	TTU Motorsports	United States
56	Univ of South Florida	USF Racing	United States
57	Univ of Victoria	UVic Formula Motorsport	Canada
58	Universite de Sherbrooke	FSS Racing	Canada
59	Purdue Univ - W Lafayette	Purdue Formula SAE	United States
60	The Ohio State University	Formula Buckeyes	United States
61	Northwestern Univ	Northwestern Formula Racing	United States
62	Cooper Union	Cooper Motorsports	United States
63	McGill Univ	McGill Racing Team	Canada
64	Penn State Univ - Harrisburg	Capital College Racing	United States
65	Univ of Akron	Zips Racing	United States
66	Dalhousie Univ	Dalhousie Univ	Canada
67	Rochester Institute of Technology	RIT Racing	United States
69	Univ of Pittsburgh - Pittsburgh	Panther Racing	United States
70	Universidad Metropolitana	UNIMET Motorsports	Venezuela
71	Temple Univ	Temple Formula Racing	United States
72	Saginaw Valley State Univ	Cardinal Formula Racing	United States
73	Embry-Riddle Aero Univ - Daytona Beach	ERAU Motorsports	United States
75	Univ of New Brunswick	Firecats	Canada
76	Univ of Hartford	Hartford Racing	United States
77	Rose Hulman Inst of Tech	Rose GPE	United States
78	Polytechnique Montréal	Formule Polytechnique	Canada
79	Univ of New Hampshire	UNH Precision Racing	United States
80	Ryerson Univ	Ryerson Formula Racing	Canada

## REGISTERED TEAM LIST CONT.

TEAM #	UNIVERSITY	TEAM NAME	COUNTRY
81	Virginia Tech	VTMc	United States
82	Univ of Cincinnati	Bearcat Motorsports	United States
83	Kookmin Univ	KOOKMIN RACING	South Korea
84	Univ of Toronto	University of Toronto Formula Racing	Canada
85	Univ of Kentucky	Formula Kentucky	United States
86	Indiana Univ Purdue Univ Indianapolis	IUPUI Jaguars	United States
87	West Virginia Univ	Mountaineer Racing	United States
88	Ecole De Technologie Superieure	Formule ETS	Canada
89	Lakehead Univ	Thunder Wolf Racing	Canada
90	Univ of Massachusetts - Lowell	River Hawk Racing	United States
91	Saint Louis Univ	Parks Racing	United States
92	Kansas State Univ	Powercat Motorsports	United States
93	US Air Force Academy	US Air Force Racing	United States
94	Stevens Inst of Tech	Stevens FSAE	United States
96	Universite Du Quebec a Trois-Rivieres	UQTR Racing	Canada
97	Kettering Univ	Kettering University Motorsports	United States
98	Univ of Puerto Rico-Mayaquez	Colegio Racing Engineering	United States
99	Cornell Univ	Cornell FSAE Racing	United States
100	Univ of British Columbia - Okangan	UBCO Motorsports	Canada
101	North Dakota State Univ	Bison Motorsports	United States
102	Duke Univ	Duke	United States
103	Univ of Central Florida	Knights Racing	United States
104	Univ of Evansville	Aces Racing	United States
105	Univ of Minnesota - Twin Cities	Gopher Motorsports	United States
106	Universidad Autonoma Estado Mexico	UAEMex Racing Team	Mexico
107	Universidad Central de Venezuela	Team Formula SAE-UCV	Venezuela
108	Washington State Univ	Wazzu Racing	United States
109	Clemson Univ	Clemson Formula SAE	United States
110	Univ of Manitoba	Polar Bear Racing	Canada
111	Univ of Michigan - Ann Arbor	MRacing	United States
112	Ferris State University	Ferris Formula SAE	United States
113	Central Michigan Univ	Chippewa Racing	United States
114	Florida Inst of Tech	Florida Institute of Technology	United States
115	Universidad Simon Bolivar	F-SAEUSB	Venezuela
116	South Dakota State Univ	Wild Hare Racing	United States
117	Texas Tech Univ	Red Raider Racing	United States
118	Bradley Univ	Bradley Motorsports	United States
120	Oakland University	Grizzles Racing	United States
121	Texas State University-San Marcos	Bobcat racing	United States

## REGISTERED TEAM LIST CONT.

TEAM #	UNIVERSITY	TEAM NAME	COUNTRY
122	Penn State Univ - University Park	Penn State Racing	United States
123	Queen's Univ - Ontario Canada	Queen's Formula	Canada
124	North Carolina State Univ - Raleigh	Wolfpack Motorsports	United States
125	Univ of Nebraska - Lincoln	Husker Motorsports	United States
126	Univ of Waterloo	University of Waterloo Formula Motorsports	Canada
128	Cegep du Vieux - Montreal	CVM motorsports	Canada

# 2017 FSAE AWARDS

## **SPIRIT OF EXCELLENCE AWARD:**

This award recognizes the Top 10 finishers with overall highest accumulative scores.

### STATIC EVENTS

## **COST AWARD**

This award recognizes the Top 3 finishers with overall highest accumulative scores in Cost.

## **BOSCH ENGINEERING DESIGN AWARD**

This award recognizes the Top 3 finishers with overall highest accumulative scores in Design.

## **PRESENTATION AWARD**

This award recognizes the Top 3 finishers with overall highest accumulative scores in Presentation.

### DYNAMIC EVENTS

## **ROUSH ACCELERATION AWARD**

This award recognizes Top 3 finishers with fastest speeds/highest accumulative scores in Acceleration.

## **MAGNA INTERNATIONAL AUTOCROSS AWARD**

This award recognizes Top 3 finishers with fastest speeds/highest accumulative scores in Autocross with a trophy.

## **FORD ENDURANCE AWARD**

This award recognizes Top 3 finishers with fastest speeds/highest accumulative scores in Endurance.

## **FORD FUEL EFFICIENCY AWARD**

This award recognizes Top 3 finishers who receive highest scores accumulated on best fuel efficiency.

## **SKID PAD AWARD**

This award recognizes Top 3 finishers with fastest speeds/highest accumulative scores in Skid Pad.

## 2017 FSAE AWARDS CONT.

SPECIALTY AWARDS (Some may require application process)

### **Akebono Brake Corporation Brake Design Award**

Awarded to first place team for their vehicle Brake Design.

### **Altair Engineering's William R. Adam Engineering Award**

Altair Engineering's William R. Adam Engineering Award Development of new and innovative design concepts for FSAE racing competition - \$1000, \$500

### **Cummins Inc. Applied Technology Award**

"Applied Technology" Award for the team that applies technology the most innovatively \$1,000, \$750, \$500

### **The FEV Powertrain Development Award**

Top 3 teams with overall excellence in Powertrain Development - \$2000, \$1000, \$500

### **Three View Drawing Excellence Award**

Awarded to the top ten Formula SAE teams who submit the best executed three view drawings, per the Formula SAE Rule S6.4.

### **MacLean-Fogg Fastening Challenge Award**

This award is intended to reward team with the best solution to a fastening challenge at Formula SAE Michigan. - \$1,000, \$750, \$500

### **Toyota Perseverance Award**

\$1,000 This award will recognize the team which demonstrates determined perseverance through the process of their car's design and build. Look for Toyota in the Paddock if you would like to nominate your team for this award.

**Note:** Although not guaranteed, some awards will include a cash award dependent on sponsorship. These and other awards will be detailed in the event program available at the on-site competition registration booth.



# AWARD CEREMONIES

## AWARD CEREMONIES SPONSORED BY GENERAL MOTORS – Main Tent

There will be two award ceremonies in 2017

### 1<sup>ST</sup> AWARD CEREMONY: FRIDAY 7:00PM

The following Awards will be given:

- Akebono Brake Corporation Brake Design Award
- Altair Systems Engineering Awards
- Cost Awards
- Cummins Applied Technology Award
- MacLean-Fogg Fastening Challenge Award
- Toyota Perseverance Award
- Presentation Awards
- Three View Drawing Awards
- Roush Acceleration Awards

There will also be a few prize drawings for the teams, must be present to win.

### 2<sup>ND</sup> AWARD CEREMONY: SATURDAY 8:00PM

The following Awards will be given:

- FEV Powertrain Development Award
- Bosch Design Awards
- Magna International Autocross Awards
- Ford Endurance Awards
- Ford Fuel Efficiency Awards
- SAE Spirit of Excellence Awards
- Skid Pad Awards

**EZ-PASS PRIZE:** This year General Motors is sponsoring the “EZ-Pass” prize drawing for a free 2018 FSAE Registration (teams must be present to win). Official results will be posted to SAE’s website ~May 16, 2017. Unofficial results will be available online through the mobile scoring website.

# TECHNICAL INSPECTION

## TECHNICAL INSPECTION SPONSORED BY: CUMMINS

### EVENT DESCRIPTION

#### Officials:

Chief Technical Inspectors: Mark Muddiman, Jeff Lovell

#### Overall Procedure:

Technical Inspection will be broken down into three (3) parts:

1. Checks of the all the drivers' safety gear, "rain" tires, fire extinguishers.
2. Vehicle Checks.
3. Driver Checks: helmet clearance, head restraint, seat belts and egress.

#### When:

1. Safety gear and rain tire checks:

- Wednesday, 11th May From 10:00 a.m. – 12:00 pm
- Teams should NOT line up earlier than 9:45 a.m.

2. The Vehicle Checks portion of Tech Inspection will be open:

- Wednesday, 11th May From 12:00 p.m. until 7:00 p.m.  
(No new cars after 6:00 pm)
- Thursday, 12th May From 9:00 a.m. until 5:00 p.m.
- Friday, 13th May By appointment\*
- Saturday, 14th May By appointment\*

\* Come to G2 for an appointment. If no one is present at G2, then please see the announcer.

3. Driver Checks:

One driver only per team may be checked Wednesday. Additional Driver Checks will begin on Thursday. If a driver is not at the track by Thursday, contact the Chief of Tech to arrange for an appointment prior to their dynamic event.

#### Where: Garage G2

- For the Safety Gear checks, enter at the southwest corner.
- For the Vehicle Checks, enter at the southwest corner.
- Beginning Thursday, the checks of the additional drivers will be at the east end.

#### Procedures:

##### 1. Pre-assigned Tech Numbers

-All teams will be assigned a vehicle inspection Tech Number, **according to their SES/SRCF approval date**. Teams with the first approvals will be first in line, so please submit your structural documentation in a timely and accurate manner.

-Teams will be informed of their Tech Number at competition, and can confirm their number during the Safety Gear check (below).

# TECHNICAL INSPECTION

## 2. Safety gear, rain tires (no Tech Number required):

-Enter garage G2 at the southeast corner.

With you, you must have:

-The FSAE Inspection Sheet ("**Tech Form**") which you were given at registration. Fill in the information in the top section.

-All items shown in page 1 section "DRIVER'S EQUIPMENT" of the FSAE Inspection Sheet.

-Rain tires (per T6.4.1.b).

(If you miss the 12:00 closing time, we may withhold your Tech sticker and request that you come back Thursday for this part of the inspection.)

## 3. Vehicle Checks (teams admitted according to Tech Number, lowest number first):

-When your number is next, bring your car to the entrance of Technical Inspection. Enter garage G2 at the southwest corner.

-Note: It is the team's responsibility to keep track of how quickly cars are going into Tech Inspection. We recommend you designate a team member to monitor the entrance of the Tech building, where they may simply ask the event staff "which number is next?" The lowest number present will be admitted; if you are not present when called, teams with higher numbers will be permitted to enter before you.

With you, you must have:

-The car.

-The FSAE Inspection Sheet (Tech Form). Fill in the information in the top section.

-The push bar and fire extinguisher.

-Copies of your Structural Equivalency document submissions.

-Copies of any relevant Rules Inquiry responses from the year.

-One driver with his/her full set of safety gear.

-The Driver Cockpit Checks form. Fill in the drivers' names.

-The car on your "dry" tires. Per Rule T2.1, your dry tires are the ones on the car during Tech Inspection.

-A printed copy of your Impact Attenuator Report.

-The Impact Attenuator that you tested (Rule T3.22.4) (if you are not using the standard attenuator).

-Monocoque laminate test specimens (T3.30.1), if applicable.

-Alternative tubing test specimens (T3.6.1), if applicable.

Egress and clearance checks for one driver will typically be conducted during Vehicle Checks, depending on overall progress in the Technical Inspection garage.

Note that one driver (who may be checked on Wednesday) is sufficient to receive an inspection sticker and continue through Fuel, Tilt, Brake, and Noise. Other drivers may be certified later.

### Time Limit:

All teams will be seen for at least 45 minutes during their first visit to vehicle inspection. If multiple technical issues are found that require changes to the vehicle, on Wednesday only, we may ask that the inspection be interrupted and that the team leave to fix their issues, so that the other teams can have a chance to be seen on Wednesday.

# TECHNICAL INSPECTION

## 4. Re-inspection

If a vehicle did not receive a Tech sticker, the event staff will mark your Tech Form with the issues that must be fixed, and then the form will be returned to you.

After you have fixed the issues, on Wednesday, vehicles ready for re-inspection will be required to wait until no more teams are in need of first-time inspection. Event staff will designate a separate line for vehicles needing re-inspection to wait in. Keep the Tech Form with the vehicle when you return for re-inspection.

## 5. Additional Driver Checks: (not available Wednesday)

Enter the east end of garage G2.

With you, you must have:

- The car, the push bar and fire extinguisher.
- The driver's safety gear: helmet, arm restraints, gloves, long pants, long-sleeved shirt, and close-toed shoes must be worn for the egress, harness, and clearance checks. Driving suits, balaclavas, and race shoes are not required.

### Notes:

Only four (4) team members will be allowed into the actual Tech Inspection area. All other team members, the Faculty Advisor, and other spectators will be required to watch from outside the inspection area. The Dynamic Passes will be used as the "pass" into the inspection area. Team members may rotate in and out of the inspection area as required, as long as there are no more than four in the inspection area at any one time.

When you pass Tech, the first part of the Tech Form will be retained by the event staff, and you will be given the first of four (4) parts of the competition sticker. You should then proceed to the Fuel Station, and then Tilt Table. The second, third and fourth parts of the sticker will be given at the Tilt Table, the Brake Test and the Noise Test respectively. Only when you have all four parts of the competition sticker will you be allowed to compete in the dynamic events or run on the practice track.

If there are issues found that must be rectified, the Tech Form will be returned to you (the team,) and you will not receive a sticker. You must then correct the issues and present your car at Tech again for re-inspection.

No car will be allowed to run on the chassis dynamometer (if one is available) until it has passed all parts of Technical Inspection, and has been issued all four parts of the competition sticker.

If you (a team) expect to have a time conflict with a Static Event (Design, Cost, or Presentation,) please be aware that the Static Event has priority. If your vehicle is currently undergoing Technical Inspection, but you need to leave to attend a Static Event, simply inform your Inspector. You will be allowed to remove your vehicle from the Technical Inspection area, and can resume Technical Inspection later.

Wait times in Technical Inspection are shortest on Thursday afternoon.

Best Regards from your Tech Inspection Team

# COST

**EVENT CAPTAIN:** Susan Zukowski

**CHIEF COST JUDGE:** Rick Maynard

**DATE:** Thursday, May 11, 2017

**LOCATION:** MIS (Michigan International Speedway), Brooklyn, MI, Main Tent

## OVERVIEW:

Each team will prepare a report of their car's cost to be evaluated by the cost judges. The concept of the cost event is to obtain an accurate estimate of cost of the car in a limited production. The report is in effect your cost proposal to the senior management of a company to get them to invest in your product line. The more information that you can supply to them, the more professional the look of your materials, the more likely the company may be willing to look at the product itself. This is the goal of the cost report itself. Additionally, the teams will also prepare an electronic Bill of Materials using a shared database with standard materials and processes and a detailed process description. This evaluates not only the cost of the car, but also the team's ability to prepare an accurate engineering cost estimate and know exactly how the vehicle would be built. The car with the lowest corrected cost and the best report will win the event. The event can be divided in to three separate sections - the cost report itself, visual inspection, and 'real case scenario' discussion.

## THE COST REPORT:

The actual cost report is due into the judges approximately six to seven weeks prior to the event at the venue. Books must be mailed before the post mark deadline or the book will incur a penalty of 10 points per day after that date. The cost report is judged on the basis of the cost of the car and quality of the cost report. The cost of the car is determined by the cost of the parts and fabrication using established manufacturing practices and the application of "Lean Manufacturing" principles. The report will follow the guidelines set forth in the published rules. From this analysis, the judges (in 9 distinct areas of expertise) will determine if all parts and processes were included and if unreasonably low (determined by the experience of the judges) - the judges will add penalties if there are errors, items omitted, or have costs below reasonable estimates - at either standard point(s) deduction or at a rate equal to twice the cost error, whichever is greater. We have eight teams that review each and every book based on their expertise. The costs and penalties will then determine the cost score. The report score will be given based on the quality of the report and its overall presentation. The report score ranges from 0 to 40 points. The price score will be awarded based on the following formula:

$$\text{PRICE SCORE} = \frac{40 * (\text{PMax}) / (\text{Pyour}) - 1}{(\text{PMax}) / (\text{PMin}) - 1}$$

**TOTAL COST SCORE =**

<b>Price Score (max 40)</b> [Generated by formula above]	+	<b>Report Score (max 40)</b> [ Accuracy, Format, Part Content ]	+	<b>Visual Inspection and "Real Case" Discussion Score (max 20)</b>
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(NOTE: Pyour is the adjusted cost of your team's car with penalties, Pmin is the adjusted cost of the lowest cost car in the competition, PMax is the adjusted cost of the highest cost car in the competition)

## THE VISUAL INSPECTION AND "REAL CASE" EVALUATION:

On the day of the event, the cost event judges will man ten bays with appointments in each bay every half-hour in order to see every competing car. This is to make sure that the parts that are on the vehicle are reported in the cost report and that nothing has been added since the cost report's publication.

## COST CONT.

The focus of the cost event centers on the cost of the vehicle and the process of building the vehicle and the components contained therein. At the time of check-in at our event, the designated team representative will randomly draw to determine which of the nine random "real case" scenarios the team will be discussing in detail. These cases will encompass real issues that the team may encounter and how they would handle them in reference to their own team vehicle, systems or parts. The cost judges will also question the students regarding the report, process, and "real case". This is a critical step in the cost event process. This discussion of the 'real case' and the visual inspection on the event day can only help the student's team. If this appointment is missed the team will sacrifice the twenty points for this portion of the event. If the team feels that for some reason their appointment time needs to be changed they will need to contact the event captain to make necessary arrangements.

The time allotted for the appointment on event day is ½ hour per team at the designated time for that school. That time can then be broken down as follows.

<b>Check-in:</b>	1 or 2 minutes
<b>Visual Inspection:</b>	4 to 5 minutes
<b>Real Case Scenario Discussion:</b>	20 Minutes

Addenda to the report can be taken into consideration to cover any necessary changes made in the car. These addenda will only be accepted at the time of registration at the event and must be in the format proscribed by the rules (Appendix C-5).

In addition to the above, the cars with the lowest costs will be subject to a physical audit to make sure that they included all processes and materials on their vehicle in the cost report. The audits will be held on the same event day but by a separate team of auditors some time after their initial appointment with the cost area. The adjustments that this team of auditor makes will be included in the final scores as well.

The final scores are tabulated and presented at the end of the judging day to the statisticians and are posted the next morning for the students viewing. Once posted, the scores may be protested for only 30 minutes, after which the scores become final.

### Tips for a Good Cost Report:

- Follow the rules - put the items and processes where the guidelines tell you to put them
- Include an eBOM (Electronic Bill of Material) on CD in MS Excel that follows the format of the 2016 FSAE Rules.
- Create the eBOM using the on-line FSAE Cost Event Database utilizing standard materials, processes and tools.
- No receipts necessary any more
- Include any photographs, pictures, drawings, blue prints, etc. in the appropriate sections of the book to help us understand the design processes used in manufacturing the parts
- If you must - err on the high side rather than cut yourself short
- Detail any processes or materials not already specified in the standard tables and submit AIR (add item request) to have them added to the standards table if needed.
- Be careful to postmark by deadline, no need to throw away good points by slack timing.
- Carefully consider Make/Buy decisions – these often result in dollars being spent more wisely.

# REAL CASE COST SCENARIO

## 2017 FORMULA SAE MICHIGAN

Rule C.3.3.3 states that the third part of the Cost Event will be a “real case” scenario where students will have to respond to a challenge related to cost or manufacturing of the student vehicle.”

### The real case scenario for this event will be one of the following:

The Cost Judges have reviewed the Cost Report that you have submitted and they have determined that the cost of the \_\_\_\_\_ on your car is substantially higher than expected.

Your task at the event is to present the Cost Judges with your proposals to reduce the cost of the \_\_\_\_\_ on your car by 15%.

### The presentation must fulfill the following requirements:

- No longer than 5 minutes
- Flip chart pages (optional !)
- No handouts or use of electronic devices.
- Must be based on the system on your car.

### Your presentation will be evaluated on:

- The process or methodology(ies) used to develop the proposal(s)
- The alternatives presented
- The credibility of the proposals

The team’s presentation skills will **NOT** be scored.

Teams competing at both events will discuss a different random choice at each event.

The blanks above will be randomly drawn choices of the following:

**Wire Harness**

**Seats and Restraints**

OR

**Impact Attenuator**

Rules Committee,  
FSAE.

# DESIGN

## DESIGN SPONSORED BY: BOSCH

**Chief Design Judges:** Anthony Lyscio, Steve Fox, Bill Riley

**Event Captains:** Anthony Lyscio, Steve Fox, Bill Riley

**Judges:** More than 100 Top Automotive, Aerospace & Motorsports Engineers from around the World

**Date:** Thursday, May 11<sup>th</sup>, 2017

**Location:** Garage G3, Michigan International Speedway, Brooklyn, MI

## Design Judging Procedure:

Student competitors must submit a Design Report (DR), Design Spec Sheet (DSS), and Business Logic Case (BLC) prior to the competition. The DR and DSS will be used to group the teams as well as provide judges a 'sneak peak' at the designs. Teams that do not submit all documents will be disqualified from the Design event and receive zero points. As per the official FSAE rules, the DR cannot contain more than four text pages, must include three pages of vehicle drawings, and may include one page of optional content material for a total of eight pages. The DR will not be judged based on length. Content of the DR should highlight design goals, processes, and details in engineering terms. The intended audience is that of experienced engineers and while concise, the content should be technical and cover all major vehicle systems highlighting notable features. The DSS is based on a fixed template located on the official FSAE website and contains detailed system and component level specifications. The BLC is also based on a fixed template and is intended to define the team's overall (including marketing and finance) goals for their design.

It is the student competitor's responsibility to prove to the judges that their vehicle is a first year car. Second year cars are not allowed at FSAE - Michigan. If the structure of the frame is not obviously a completely new design from previous years, then thorough photo documentation should be provided to prove that the car is new as defined by the rules. The judges may deduct up to 30 points if photographic documentation shows that the remaining parts of the vehicle have not been significantly altered or if sufficient new design work has not taken place.

Design judging will start promptly at 8:30am on Thursday (see schedule). Each time slot will be exactly one hour long with approximately 45 minutes for the judges to review the vehicle with the team members and the remaining time used by the judges to write notes and score the car. At the conclusion of First Round Design Judging, approximately 8-12 cars will be selected to advance to Design Finals.

Teams will need to arrive early in order to be weighed before Design judging. Cars must be weighed before Design Judging. It is recommended that you be weighed at least 30 minutes prior to your design judging time slot. Teams who are late or who miss their slots will receive less time with judges, and thus less opportunity to score points, and risk not being judged at all. Separate volunteers will be in charge of timing for the event and assisting with queueing of teams. In fairness to other student competitors, vehicles will be rolled in and out on schedule.

Design judging will consist of 15 groups (queues) of judges, each having six to nine design judges. This means 15 cars are being judged simultaneously. The judges in each queue will evaluate the following areas: Suspension; Frame / Body / Aero; Powertrain; Cockpit / Controls / Brakes / Safety; Systems Management / Integration; Manufacturability / Serviceability; Aesthetics / Style; & Creativity. Teams should make a point of reviewing the Design Judging Score Sheet on the official FSAE website. The score sheet gives the competitors insight into

how they will be judged, as well as giving them a detailed breakdown of each judging category. Each judge has a different area of niche expertise, and will seek out the student team member responsible for that particular area of the car. There will also be roving judges whom will be briefly assessing cars across judging groups while also making note of particularly interesting vehicle features and/or flaws.



## DESIGN CONT.

Expanded definitions of each area have been provided on the Design Score Sheet, along with space for comments. A design judge from your queue will seek you out on Friday and/or Saturday, in order to return your score sheet, explain how you received the score you did, as well as provide feedback on your car's design. Since the form is used as a tool by the judges, the values written on the form will possibly not add up to the team's Official Score. The judges are strongly encouraged to make lots of notes and provide written feedback to the student competitors. Students are encouraged to approach Design Judges on the days following the Design Event to request additional feedback on their designs.

Teams may also call and request a specific design judge for feedback. There will be a phone number posted and announced which student competitors can call in order to schedule an appointment for a debrief session with your Design Judges. The post-event debrief sessions can be very informative and all teams are encouraged to participate. Note: Not all Design Judges can be available all days so it is best to make arrangements to meet with judges early. Further, ensure that your team provides your judges with a contact cell number.

Each student team should have at least one representative who is prepared to discuss each major system individually. This means five or more students should be prepared. If the judges have to split their time between a single student (ie. one team member holds ALL the answers), lower scores could result based on total amount of information received. Students should bring any and all information they feel is relevant (charts, graphs, parts, photos, video, etc.) to support their design efforts. Data, data, data. A simple well organized binder can work wonders. The judges will give higher Design scores to well documented engineering, than to word of mouth. Simply showing up with a great car is not good enough. A high emphasis is placed on the student team's ability to Design, Build, Refine & Validate, and Understand your car.

At the conclusion of First Round Design Judging, each queue will pick, approximately one car to send on to Design Finals. The Chief Design Judges, Design Event Captains, and roving judges help assure consistency in this selection. The Design Finalists will be announced later that night. Scores and teams selected for the final Design review will be posted the following day, Friday, around mid-day. The scores and rank order of the top placing (Finalist) teams in Design shall be revealed during the Design Review.

Design Finals will take place Friday evening in Garage G3. (see schedule) Design Finalists shall assemble and be ready to be judged by the start time indicated on the schedule. Only four team members are allowed to be with the vehicle at any time to talk with the judges. Any remaining team members must be outside the immediate judging area. Teams with more than four team members that remain in the judging area will be penalized. Team members may switch places (tag in, tag out) to have the proper systems represented.

The overall Design Event Winner will be announced on Saturday while judges briefly review the designs of the top three Design Finalists for the audience. All student competitors are invited and encouraged to come and watch. This public design review clearly identifies what the Design Judges like (and dislike) about a FSAE car. Students, especially the less experienced teams, typically find the Design Review informative and very useful for improving next year's Formula SAE efforts.

# SALES PRESENTATION

<b>Event Captain:</b>	Adam Zemke
<b>Co-Captain:</b>	David Roberts
<b>Assistant Captain:</b>	Reed Greenwood
<b>Date:</b>	Thursday, May 11, 2017
<b>Location:</b>	MIS Suites

**Presentation Seminar:** Friday, May 12, 2017 at 9:30 AM in Main Tent

**Presentation Highlights:** Saturday, May 13, 2017 at ~7:00 PM in Main Tent

## Overview:

After a year of planning, fabricating, and testing a new, prototype vehicle, each team aspires to sell their vehicle design to a make-believe corporation. The competitors in this event will be judged on their ability to create and deliver a business case that convinces the judges that the team's design best meets the demands of the amateur, weekend competition market, and that it can be profitably manufactured and marketed (see A1.2 in the 2017 Formula SAE rules for notes on Vehicle Design Objectives). The team that makes the best presentation will win the event and score 75 points.

## The Presentation:

Competitors are to make a presentation to upper level executives of an imaginary corporation. The presentation should tie together all factors that would influence the marketability, manufacturing feasibility and profitability of their design. It should include an understanding of the marketplace and target customer, and show how their team's design meets the requirements for each.

## The Event:

Each competitor will be assigned a 30 minute window and location. This includes the time the judges need to score. Judges may allow a team to begin early, but the completion time (30 minutes) should be strictly enforced. The presentation itself is not to last any longer than ten minutes, at which point the judges will stop any presentations continuing. A question and answer period of up to five minutes will immediately follow, wherein only judges may ask questions and only presenters may answer. The audience (usually team members) may not ask questions or make comments. It is allowable for a presenter to only participate in the question and answer section, however he/she must be a member of the 'presentation group,' as defined by S5.3.2 of the 2017 Formula SAE rules.

A team of two to four judges will grade the competitors. The judges will use the form in Appendix S-6 of the Formula SAE rules for event scoring: "Presentation Judging". This form breaks the scoring down into five equally weighted categories: Content, Organization, Visual Aids, Delivery, and Questions. A perfect score on the judges' form will be 50 points. The judges' combined score may be adjusted because some judging teams may grade, on an average, higher or lower than other judging teams. The competitor's final score will be calculated using the equation defined in the PRESENTATION SCORE section.

## SALES PRESENTATION CONT.

In an attempt to encourage commonality amongst static events, the 2017 Formula SAE Rules contain Section S, Article 3; the Business Logic Case. Presentation Event Judges are asked to use the Business Logic Case to judge whether the given presentation is appropriate for the market and business strategy that the team has identified. See Article 3, Sections S3.1 through S3.3 for a detailed description of the Business Logic Case.

### **Presentation Highlights:**

The three top-scoring teams will be required to publicly reprise their presentations. For 2017, the Presentation Highlights remain a non-scored event, and will be held at ~7:00 PM before the Saturday Awards Ceremony. The expansion of this event is an effort on behalf of the organizers to inspire creativity amongst competitors in subject matter that is typically not engineering curriculum-inclusive.

$$\text{PRESENTATION SCORE} = 75 * P_{\text{team}} / P_{\text{max}}$$

If a team misses their allocated period, the team will receive zero (0) Presentation points.

### **Presentation Tips from Previous Experience:**

1. Spell-check all visual aids, presentation tools, etc.
2. There is no dress code; however, bad first impressions are difficult to remedy.
3. Remember that equipment has been known to fail; copies can be ruined in transit, etc. Consider alternatives in case something should go wrong. Each team is responsible for bringing their own equipment. Remember, extension cords can be important and laptop speakers may not project sound very well.
4. Have a team member record your presentation and the judges' commentary for your team's future FSAE efforts. Teams are allowed to have as many spectators that will reasonably fit into the presentation room. People not associated with the presenting team are allowed to view presentations only if the presenting school gives their permission before the start of the presentation. This includes news reporters and photographers.
5. The most technically knowledgeable person on the team may not be the best person to lead the presentation team. A team may want to choose someone who is a charismatic public speaker.

# FUEL & TILT TABLE EVENT

## Event Captains:

**Fuel** - Herb Seubert, Rob Egenolf & Mike Thodoroff

**Tilt** – Alba Colon, Vince Bandurski & Mark Scott

**Fuel Efficiency** – Alba Colon & Mark Scott

<b>Dates/Times:</b>	Fuel Station:	Thurs.	8:30 a.m. until 5:00 p.m.
		Fri.	8:00 a.m. until 5:00 p.m.
		Sat.	7:30 a.m. until 5:00 p.m.
	Tilt Table:	Thurs.	9:00 a.m. until 5:00 p.m.
		Friday	9:00 a.m. to 5:30 p.m.
<b>Location:</b>	Fuel Station:	Next to Tilt across from G3	
	Tilt Table:	In between Fuel and Noise.	

## Description:

For the FSAE Michigan competition the fuel station will provide unleaded racing gasoline (93 octane and 100 octane) or E85 (ethanol). No other fuel or additives are permitted. All vehicles must indicate with a sticker, the type of fuel on or near the fill pipe (This sticker can be obtained at tech). Note: no vehicle will be provided with fuel until it has passed tech inspection. The first portion of a four-part sticker will be applied in a location near the front of the vehicle upon passing tech.

## Follow specific safety guidelines while in the fueling area:

1. Engines must be off; cars are to be pushed to and from fueling.
2. Only the vehicle push crew and the driver are allowed to enter the fueling station. All must have dynamic passes at each visit.
3. Only the driver, in the complete driving gear, with a full and completely functional fire extinguisher in hand, is permitted in the area as fuel is dispensed.
4. A Permanent line mark must be used to indicate the "full" level. NO TAPE
5. Tank is to be filled to this level each time fuel is received.
6. Fuel station must update the tech sheet before vehicle proceeds to tilt. Tilt will not accept vehicles with a tech sheet lacking fuel information.

## FUEL & TILT TABLE CONT.

The first time a vehicle is fueled, it must proceed directly (with engine off) to the tilt table. The vehicle will be placed on the table with the tallest driver aboard fully suited, helmet buckled, gloves and all safety restraints secured. The vehicle should be oriented on the tilt table where the fuel fill side is placed against the guard of the tilt table and is most likely to create spillage. The table will then be titled to an angle of 45 degrees. There must be no fuel (or any fluid) leakage at this angle. If the vehicle passes this test, the angle is increased to 60 degrees. This angle represents a cornering force of 1.5 G's. If the upper wheels remain on the table, the vehicle passes. (Some vehicles may lift one wheel, the Event Captain(s) must be consulted if this occurs). The person in charge at the tilt table must sign off an inspection form, which travels with the car. A second sticker is applied (on the car) next to the first to indicate passing the tilt table test. The vehicle is now free to proceed to the Brake & Noise area. Should the vehicle fail at either of the two angles, the car must be repaired & re-tested.

Vehicles may be forced to return to tech inspection for re-certification at the discretion of the fuel station officials. This may be due to inability to provide a consistent fuel fill, or due to a safety concern with the functional operation of the fuel system.

### Safety guidelines for the tilt area

1. Engines off; push car on & off table. Take care to avoid damage to vehicle when pushed on and off tilt table.
2. Affix the safety strap to prevent vehicle from excessive lift while on table. Allow a little slack.
3. Be sure table is clear before raising and especially when lowering. Inform people in area when raising or lowering (e.g. "Coming Down").
4. Use absorbent material to soak up leaks. (May be obtained at fuel station).
5. Keep a full and completely functional fire extinguisher handy.

# BRAKE & NOISE TEST EVENT

## BRAKE & NOISE SPONSORED BY: AKEBONO

### Event Captains:

Noise - Gary Newton & Greg McConville

Brake - Alba Colon & Mark Scott

<b>Dates/Times:</b>	Thursday Noise -	9:30 a.m. to 5 p.m.
	Thursday Brake -	10:00 a.m. to 5 p.m.
	Friday Noise & Brake -	8 a.m. to 5:30 pm Sharp

**Location:** The Noise will be located next to gate 50 and Tilt. The brake will be located out Gate 50 and to the left. (See the site map in the Steward's Manual and Registration Package)

### DESCRIPTION:

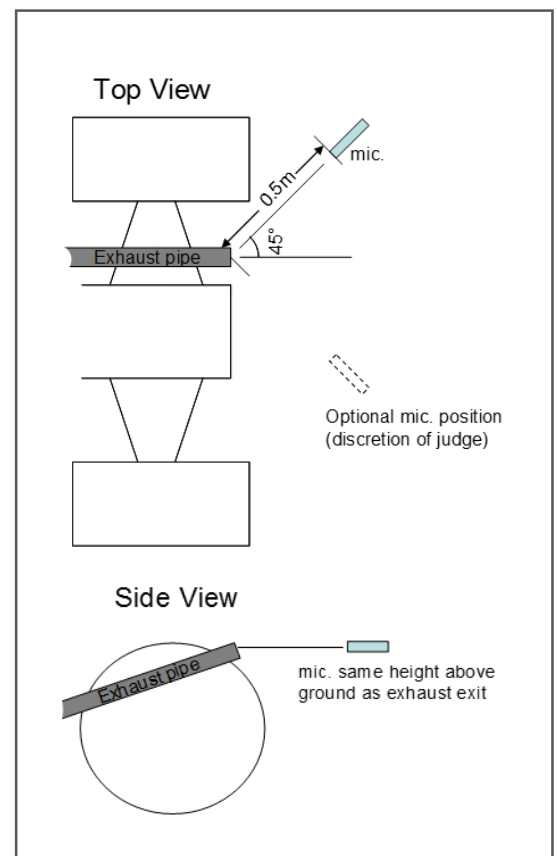
No vehicle is permitted to perform Noise and/or Brake testing until it has: a) passed Tech Inspection and, b) passed the Tilt Table Test. Proof of this is the two "tech" stickers, which must be applied to the car. Then teams can proceed to Noise where the noise level will be tested, if passed, a 3rd sticker will be applied to indicate Noise Compliancy. Then teams can proceed to the Brake test for the 4th and final tech sticker. Once all 4 stickers are completed then a vehicle is approved to compete in all dynamic events.

### Noise Test Event Description

The static sound level test shall occur at a designated test station on a warmed-up vehicle. The vehicle will be placed in the station with the engine running and the transmission in neutral. The sound level meter will be positioned 0.5m from, and level with, each exhaust outlet. The microphone will be positioned at an angle of 45 degrees from the outlet in the horizontal plane (see drawings) and be un-obstructed.

There are two steps to the noise test. 1) With the engine idling, the measurement must not exceed 103 dBC. If the team passes this test, the run up test will be run. If a team fails idle they must exit the area. 2) With the engine at the designated test speed, the measurement must not exceed 110 dBC. The designated test speed is approximately  $\frac{3}{4}$  of the maximum engine speed as calculated by the SAE published formula.

In the case of dual exhausts, both exhausts will be tested with the loudest one being the basis for judgment. Meters are calibrated and will be checked and verified on-site on a regular basis! The reading of the meter by the official is final and not open for debate/protest.



## BRAKE & NOISE TEST EVENT CONT.

**PLEASE NOTE** – If your vehicle does not have a working tachometer, it is the teams' responsibility to come to the noise area prepared with ALL necessary tools ready for a tachometer reading (laptops, gauges, etc...). The target test speed is set by SAE and is published in advance. Test speeds will be rounded to the nearest 500. It is calculated by taking 2X stroke in mm and dividing it into 914.4X1000. If you have a rev-limiter that interferes with you being able to reach the target test speed you must disengage it or set it higher.

**ALL TEAMS MUST HIT THE TARGET TEST SPEED – NO EXCEPTIONS!**

### Brake Test Event Description

When the vehicle passes noise it may go to the Brake Event and it is there the final tech sticker will be awarded if the vehicle meets the brake requirements. Provided no changes have been made to the muffler or exhaust system, teams that pass noise but do not pass brake don't have to go through noise again if they work on the vehicle.

At the Brake Test Area, each driver WILL be instructed on the proper procedure. With the car at the start line of the station a green flag (or similar signal) should be used to signal the start of each run. The driver must accelerate to race speeds (typically getting into 2nd gear) until reaching the braking area, which is a box defined by water barriers. Once inside this box, the driver must apply the brakes with enough force to demonstrate full lock-up of all four wheels, the engine must remain running during the complete test. We are looking for the vehicle to brake from race speeds with all 4 wheels locking up and remain locked until the vehicle comes to a complete stop with the engine running.

If the vehicle passes, the person in charge will sign-off the approval form and provide the team with the final "tech" sticker. The vehicle is now free to proceed to the practice track or on to the dynamic events. (The approval forms shall be retained by the brake crew and turned in at the tech garage periodically.)

If the vehicle is unable to pass the brake tests in three attempts, the car must be repaired and then brought back for retest. The vehicle will not be allowed to compete without passing all tests. Note: The vehicle will not be permitted on the practice track without all 4 tech stickers; no exceptions. .

Noise level can be measured at any time during the dynamic events. Penalties may be assessed if the sound level exceeds the mandated maximum, and noise sticker can be removed by officials.

**PLEASE NOTE** – An official will conduct a functional test of the External Master Kill Switch with engine running up and under power as part of the Noise Test Event and / or Brake Test Event.

Also, Operation of Noise Event Area and Brake Testing Event Area in DAMP conditions is at the discretion of the Captain of the specific area. See FSAE rules for tire use at specific conditions, Rule #B6.4.1 Also see Part D "Dynamic Event Regulations" Article 2 Weather Conditions and Article 3 Running in Rain for further clarifications.

**Vehicles may be forced to return to this station for re-certification should the officials deem it necessary. Re-certification may be required if work is performed on the vehicle's braking system or exhaust system, or if the vehicle is involved in an incident that results in vehicle damage.**

**\*\*At all times, drivers must be wearing complete and proper safety equipment and proper safety rules must be maintained in both areas.\*\***

## BRAKE & NOISE TEST EVENT CONT.

### Safety guidelines for the Brake & Noise areas:

1. Only one car at a time in Brake or Noise area. Do not allow a second car into the area until the last one has completed its exit.
2. Only the vehicle push crew and the driver are allowed to enter the Noise and Brake areas. All must have dynamic passes at each visit.
3. Do not attempt certification of any vehicle without enough workers. Three (3) workers minimum, four (4) preferred at the Brake station. Three (3) workers recommended at Noise station.
4. Never place yourself in the line of travel of any car. Stay well away from the "hot" area.
5. Use hay bales for protection of workers and equipment.
6. Fire extinguisher must be with the car and crew at all times.
7. Use brooms and oil-dry as needed to keep braking area clean and dry.
8. Any vehicle damage or contact must be reported to the station manager(s).
9. No work will be allowed on the car inside the Brake or Noise areas. Car repairs and work must be performed outside of testing area. Specially marked areas will be set-up for this. Cars can then return to the test area at the discretion of the station manager.



# PRACTICE TRACK

## PRACTICE TRACK SPONSORED BY: MAHLE

<b>Event Captains:</b>	Frank Putman & Gary Godula	
<b>Dates/Times:</b>	Thursday	Noon until 5:00 p.m.
	Friday	9:00 a.m. until 5:30 p.m.
	Saturday	8:00 a.m. until 3:00 p.m.

**Location:** The Dynamic Practice Track is adjacent to the Dynamic Autocross/Endurance Area just to the right at gate 12 (See site map in the Steward's Manual and Registration Package)

### Description:

The practice track is a relatively large (500' x 180' defined by water barriers and orange cones) open test area designated by the event organizers to provide teams with an opportunity to conduct brief dynamic tests of their vehicle during the available hours of the competition. The practice area will contain a 75 meter acceleration run with a 75 meter shut down area, a single 15 meter skid pad, elements of an autocross course which can be integrated with a slalom section, and an open track area which will be available for use at the driver's discretion. No vehicle will be permitted to enter the Practice Track unless it has a) passed Tech Inspection, b) passed the Tilt Table Test, c) passed the Brake Test, and d) passed the Noise Test. The vehicle will not be permitted on the practice track without all four tech stickers; no exceptions.

Drivers and team members must adhere to all safety rules. Each driver must understand and follow proper driving procedures at this facility. In addition, it must be understood that the Practice Track volunteers and SCCA officials are in control of the facility and adherence to their direction is mandatory.

Only one car at a time will be allowed to enter the Practice Track. At all times, drivers must be wearing complete and proper safety equipment. Engines may only be started and warmed up in the designated "hot area" prior to entering the Practice Track. The officials will use green, red, and checkered flags to communicate session status with the on-track driver and team. Once signaled to begin testing (green flag), the driver is free to perform any test maneuvers he or she feels necessary to safely evaluate the vehicle (within the limits of the track surface conditions and within the limits of the practice area boundaries). In the event that a red flag is shown to a driver, that driver will immediately bring the vehicle to a complete stop and wait for further instructions from an official or course worker. The checkered flag shown to a driver indicates the test session is complete and the vehicle must be driven to the exit area. At least one SCCA-designated Practice Track Event Captain and one SCCA-licensed corner worker shall be present at all times to direct the activities of the assigned volunteers and to maintain the operation of the practice area in a safe and controlled manner in accordance with the Steward's Manual and SCCA safety practices. Teams will be given an approximate 5-minute time period to conduct a practice session. Teams will be allowed to practice on a first come, first served basis. Multiple practice sessions are allowed, with teams returning to the back of the line to establish subsequent run order. Practice area officials reserve the right to adjust the allotted practice time for teams, based on a number of factors including the number of teams awaiting usage of the area.

A vehicle staging and repair area will be located next to the practice area within the boundary of the designated "dynamics" area. The "dynamics" area is defined by the track access gate at Gate 12 separating the infield from the MIS oval track surface. Teams are encouraged to stage their vehicles within the staging and repair area to minimize the number of teams and team members located on the access road due to the high vehicular/truck traffic utilizing the access road.

If during the course of dynamic testing the vehicle sustains damage or significant mechanical breakdown, the vehicle will be required to exit the track and make the necessary repairs. The Tech inspection sticker may be removed from the vehicle by a Practice Area Official thus requiring an additional Tech Inspection prior to participating in additional dynamic tests or events.

## PRACTICE TRACK CONT.

**PLEASE NOTE** – Operation of the Practice Event Area in DAMP conditions is at the discretion of the Captain of the specific area. See FSAE rules for tire use at specific conditions, Rule #B6.4.1. Also see Part D “Dynamic Event Regulations” Article 2 “Weather Conditions” and Article 3 “Running in Rain” for further clarifications.

### PRACTICE TRACKS SAFETY GUIDELINES:

1. Only one car at a time in the Practice Track area. The next car will not be permitted to enter the area until the last one has completely exited. Vehicle engines may only be started in the “hot area” prior to entering the Practice Track and must be shut down immediately after exiting the Practice Track.
2. Three (3) volunteers (preferably four (4)) will be on hand to manage the operation of the Practice Track.
3. Never place yourself in the line of travel of any car. Stay well away from the “hot” areas, always at a safe distance behind the designated barriers.
4. Have fire extinguishers, brooms, and oil-dry handy.
5. Use brooms and oil-dry as needed to keep the Practice Track clean and dry.
6. Power sweep Practice Track at beginning of each day’s operation and during lunch break if necessary.
7. Use chalk/flour markers to designate the acceleration and braking lane, skid-pad, and autox sections as needed to easily identify the areas for the drivers.
8. Any vehicle damage or contact must be reported to the Dynamic Events Safety Steward. Additionally, remove the 1st tech sticker and report vehicle number to tech inspection so that it can be re-evaluated after repair. Tech Event Captain is to be notified, preferably by radio, of any vehicles/teams where the tech sticker has been removed for re-evaluation.
9. Do not permit spectators to sit or lean on the bike rack/barriers surrounding the practice track.
10. Radio communications with Emergency Response Team, Safety Stewards, and Event Control will be maintained at all times.

# ACCELERATION

## ACCELERATION SPONSORED BY: ROUSH

<b>Event Captains:</b>	Bob Goppold, Steve Balanecki & Reid Collins
<b>Date:</b>	Friday, May 12, 2017
<b>Time:</b>	10:00 a.m. – 5:00 p.m. (1 hour lunch break)
<b>Location:</b>	FSAE Dynamic Area – Pit Road

### Event Concept:

The objective of the Acceleration Event is to evaluate the vehicle's demonstrated acceleration capability by measuring the elapsed time required for the vehicle to travel a distance of 75 m (246 ft) from a standing start. The event is designed to focus on engine performance and on the suspension's ability to maximize tire grip.

### Event Format:

Up to four Acceleration Runs are permitted for each car. Two drivers are allowed per car. Each driver is permitted two Acceleration Runs. Elapsed Time will be recorded for each Acceleration Run. Any penalties will be assessed to the Acceleration Run during which the penalty occurred. The fastest corrected elapsed time (including penalties) of the completed Acceleration Runs will be used to calculate the score for each car.

- All Acceleration runs must be completed by 5:00 p.m. However, the Event Captain may adjust the schedule based on event conditions
- NO tools and/or spare parts are permitted in the staging lanes.
- NO "traction enhancing" agents are permitted to be used on the tires or track surface.
- NO "burnouts" are permitted.

### Event Procedure:

Stage your car in the appropriate Staging Line for either Driver 1 or Driver 2. Cars in the Driver 1 Staging Line will be given priority. Drivers must be properly belted into the car with all required safety equipment properly installed, as directed by the Event Workers, before the car is first in line to start an Acceleration Run. An Event Worker will direct the driver to approach the Start Line. Cars will be staged approximately 0.3m (1 ft) behind the Start Line.

The driver is permitted to start an Acceleration Run only when the Event Worker waves the green flag. Timing will start when any part of the vehicle crosses the Start Line. The Acceleration Run is counted (one of the permitted Acceleration Runs) when any portion of the car crosses the Start Line.

Timing will end when the vehicle crosses the Finish Line located 75 m (246 ft) from the Start Line. The Finish Line is marked with a Checkered Flag.

After a driver's first run, the driver will have the option to immediately take a second run, or leave the staging area to complete his/her second run later during the event. Each car must exit the staging area before changing drivers.

### Penalties:

- A two second penalty will be assessed to the Acceleration Run per cone knocked down or out of position.
- A DNF (Did Not Finish) penalty will be assessed to the Acceleration Run for cars that go off course.
- A DNF penalty (forfeit of a permitted Acceleration run) may be assessed to the team for infractions committed in the staging area, start line or return lane.

# SKID PAD

<b>Event Captain:</b>	Seth Goslawski
<b>Assistant Captain:</b>	Avery Snyder
<b>Date:</b>	Friday, May 12, 2017
<b>Time:</b>	9:00 a.m. until 5:00 p.m.
<b>Location:</b>	FSAE Dynamic Area – Turn 3

## Event Concept:

The goal of the Skid Pad event is to measure the vehicle's maximum cornering capability by measuring the total time required for the vehicle to complete one left hand and one right hand circle. The event is designed to focus on the vehicles suspension design characteristics and tune-ability for maximum lateral grip, and minimize the effect of driver reflexes during transitional maneuvers.

## Event Format:

Two drivers allowed per car; two runs per driver. Each run consists of a driver completing 2 Right-hand laps immediately followed by 2 Left-hand laps of the course. Lap times will be recorded for the 2nd lap of each the Right-hand and the Left-hand circle (the 1st lap of each is not timed).

## Scoring:

Lap times will be recorded for the 2nd lap of each circle for a given run on the Skid Pad. These times will be averaged together and added to any penalties and used to calculate lateral acceleration for each run. The fastest average time (including penalties) from either driver during any of the 4 runs will be used to calculate a score for that vehicle.

## Staging:

Stage your car in the appropriate Staging Line for either Driver 1 or Driver 2. Cars in the Driver 1 Staging Line will be given priority. The first 3 cars in line are permitted to run their engines provided the driver is wearing a helmet and securely fastened. A person holding a Green Flag will motion a car to approach the starting line, which is located approximately 20 m (65.62 feet) from the timing line used for scoring. When the starter waves the green flag, the driver will approach the Skid Pad and proceed onto the RIGHT-HAND circle. After completing 2 laps, the driver must continue onto the LEFT-HAND circle and complete 2 more laps. After completing the second Left-hand lap (the fourth lap in total) the driver will exit the Skid Pad. After a driver's first run, they have the option of immediately taking a second run, or leaving the staging area and running later in the day. In order to keep the event running in a timely manner, other teams can run Skid Pad in between a team's first and immediately second run. Each car must exit the staging area before changing drivers.

## Penalties:

- 0.25-second penalty per cone knocked down or out of position.
- DNF penalty for cars that go off course.
- DNF for cars that run an incorrect number of laps.

**No toolboxes and/or spare parts will be allowed in the queue area or staging lanes unless deemed necessary for starting the vehicle's engine.**

# AUTOCROSS

## AUTOCROSS SPONSORED BY: MAGNA

<b>Event Captain:</b>	Matt Kalmus
<b>Event Co-Captain:</b>	Corry Johnson
<b>Event Assistant Capt.:</b>	Costi Shami
<b>Date:</b>	Friday, May 12th 9:30 AM - 5:00 PM.
<b>Location:</b>	Dynamic Area – Back Straight
<b>Track Length:</b>	Approx. 800 m (2600 ft)

**The Event:** The Autocross event is designed to test the car's handling qualities without the hindrance of competing cars. The event has two heats. Each heat has a different driver. A heat is composed of one driver making two runs of the course. The fastest of the runs completed, including penalties, will be used to calculate the team score. Cars that are unable to complete the course with a time within 145% of the fastest car will only be awarded 7.5 points.

### Penalties:

- 1) A 2-second penalty for each cone knocked down or out of position (indicated by a chalk square at the base of the cone).
- 2) A 20-second penalty for going off course and not re-entering at a point prior to the missed gate. Missing one or more gates of a given slalom counts as a single off-course penalty.

All cones in the dynamic area can be scored as penalties. This includes cones before the start line and after the finish line.

### Staging:

Following the announcement of the start of the event, all cars should begin staging in the first heat line on a first come first served basis. Upon completion of the first heat driver's two runs, a car may either go to the second heat line or back to the paddock for repair and/ or adjustments.

- When there are no cars in the first heat line, cars in the second heat line will be allowed to run. Cars that have not run a first heat have precedence over second heat cars. The event may be cancelled or cut short due to weather or time, so it is important to be on time for the first heat. It is encouraged for teams to join the second heat line immediately after completing the first heat.
- At 5:00 PM the Autocross Event is scheduled to close, and no additional runs may be made after the closing. Cars in line will not be allowed to run the course after 5:00. If there are delays in starting the event, rain delays, or extended track closures, the event captain has the discretion to extend the closing time if conditions permit. Please see the event captain or listen for announcements for any extensions.

A safety inspection (helmet, belts, kill switch) will be performed before entering the final staging area; each car will be staged 6.0 m (19.7 feet) behind the start timing lights and will accelerate from a standing start.

## AUTOCROSS CONT.

After a driver's first run, the driver has the option of taking the second run immediately, or leaving the staging area and running later in the heat. A shortcut-turn, immediately following the finish line, will allow the driver to proceed directly to the start for a second run. This is called the re-run line. If a driver chooses to not take a re-run, he/she should proceed through the exit.

It is intended that the race be conducted without the hindrance of competing cars. If there is a stopped or slow vehicle ahead, the driver should proceed at a safe distance (3m) around the incident and/or follow the direction of the course workers, and then reenter the track to finish the run. Once past the finish line, the shortcut should be taken to go directly to the start line. At this time, the driver will be notified if another run will be allowed. If a slow or stopped vehicle ahead is judged by the track officials to not be a hindrance, a re-run will not be allowed.

A driver's run may be stopped by a track official (indicated by a waving red flag or hand gesture), your car may be directed to complete the track or directed to follow a straight route back to the starting line (with caution). This is common when a red flag is shown in the first half of the course. Caution – course workers may also signal your car due to a malfunction (broken suspension, muffler, leaking oil, etc.). If this occurs, the car should be driven off course and brought to a controlled stop as soon as possible. Avoid stopping directly on the course. This prevents potential incidents with following cars and limits the amount of oil/water spilled on to the racing surface, preventing long delays.

If a car fails during a driver's first run, vehicle repairs can be made to the car, and the driver can return to complete the second run.

### Notes:

-Once the car passes the start timing line, the run has been officially attempted and cannot be re-started. If the car stalls before triggering the timing lights, it can be pushed back for a re-start. This is only allowed once. If the car demonstrates difficulty in launching it will need to be pulled away and repaired.

**-Timing beginning in 2017 will rely on a combination of timing lights and an RFID tag to identify vehicles. Properly affixing assigned RFID tags will be required to register times.**

-Please be aware that several cars may be running the course at the same time. Once past the finish line, slow the vehicle and exit in a controlled manner. Do not park the car at the exit of the course; this can create an unsafe situation and will cause traffic to back up.

-If time allows, drivers will be allowed to walk the course – please check the schedule and listen for announcements regarding the timing of walks. Walking will be allowed time and weather permitting on both Thursday afternoon and Friday before the course opens.

# ENDURANCE & FUEL EFFICIENCY

## ENDURANCE AND FUEL EFFICIENCY SPONSORED BY: FORD

<b>Event Captains:</b>	Laura Klauser & Matt Kalmus
<b>Date:</b>	Saturday, May 13, 2017
<b>Time:</b>	9:00 am
<b>Location:</b>	Dynamic Area – Back Straight

### Purpose:

The goals of the endurance and fuel efficiency event are to test the durability and fuel efficiency of the vehicles. The dual nature of the event can lead to compromises in designing for its 22 km length. **Note: No repairs or work may be performed on the vehicle during the event (with the exception of tire changes due to weather conditions and to accommodate the second driver).**

### Description:

The event is approximately 22 km, with two drivers completing 11 km segments each. A completely filled Fuel Tank is required to be eligible to run this event. No refueling is allowed during the event. Each team is given three minutes to complete the driver change.

The run order for the event will be based primarily on the **Autocross** event. The run order will be slowest to fastest autocross times. If a team did NOT score in the Autocross event, the vehicle will run at the beginning of the Endurance event, with the order based first on the finishing order of the Acceleration event, and then on the finishing order of the Skid Pad event. Teams without a score in any event used to determine the run order will run in the order established by the event captains. Teams must run within the 20 cars after them in the run order. For example, the team with run order position 10 must run before the team with run order position 30. The out of order penalty will be applied to teams that are not able to run in their designated run order position. The last 20 teams scheduled must run before the last car is called. All teams will be provided a minimum 15-minute window to enter the track. If the last scheduled team of the heat is not able to run when called, they will receive the "out of order" penalty and will be given 15 minutes to enter the track before they are disqualified. Any team that does not comply with the run order rules as listed here will be disqualified.

The event captains reserve the right to adjust the run order as necessary during the event to maintain safe operations and the flow of the event.

If the weather conditions of the prior dynamic events have been variable, a team's **Skid Pad** or **Acceleration** result may be used as a substitute or supplement to the team's finish order in the Autocross event.

### Endurance Procedures:

In order to compete in the Endurance event, teams must have their four-part tech sticker by 5:30 PM on Friday. Teams who have not successfully passed all parts of tech by 5:30 PM Friday will not be eligible to participate in Endurance on Saturday. Teams who have a sticker pulled have the opportunity to re-visit technical inspection on Saturday to regain the sticker; however, cars are only eligible to run Endurance at their scheduled slot (within 20 cars, or 15 minutes) in the run order.

## ENDURANCE & FUEL EFFICIENCY CONT.

### Endurance Procedures Continued:

The team must have their **fully fueled** (see Fuel Efficiency Procedures) vehicle in the staging/prep area at the appointed time. Only two crewmembers **and the two drivers assigned to the endurance event** are allowed in the staging area for the vehicles. When the car is called to the staging line (consisting of the next three cars to go on track), the team must push the "race ready" car with driver completely belted in to the staging line. Once the car is pushed to the staging line it cannot be touched by any team member except the driver in the car. The only tools allowed in the possession of the team members at the staging line are those needed for driver seating adjustment during driver change. No laptops, pressure gauges, baffles, tire wraps, etc. will be allowed at the staging line. Nothing can be brought to the starting line that is not intended to stay on the car.

When there is a space for the vehicle on the course and the timing/scoring system is set, the first driver will be motioned to the starting line. The person staging the vehicles is not obligated to give teams any advance notice prior to entering the track. An official will perform a safety check of the vehicle and the driver restraint system. The starter will stage the vehicle's front tires at the beginning of the entrance to the track. When there is an opening on the track, the course marshal (starter) will wave the green flag, signaling the go-ahead for the driver to start. If the vehicle stalls, the driver **must wait for another green flag** before being allowed on the course. **Note: If the vehicle cannot be restarted, the team members must move the car away from the staging area. The team will then have until 20 cars have attempted to start or 15 the minutes following in the run order to attempt to start endurance again (an out of order penalty will be incurred). If a team running out of order has a vehicle that stalls and cannot be restarted at the entrance to the track, the car will be deemed disabled and will be disqualified from the event.**

On the last lap of the first driver, a checkered flag will be displayed directing the vehicle to exit to the driver change area. **It is the Driver's responsibility to correctly exit the track; any person directing the car off the course is an additional aid only.** Only three team members (including drivers) are allowed in the driver change area at once. After the vehicle arrives in the driver change area, the team has three minutes to get the second driver belted in, and driving out of the driver change area. Only adjustments to fit the second driver (or weather related tire changes) may be performed on the vehicle. **No other work is allowed.**

When the second driver is ready, the vehicle should be slowly driven to the starting line queue. An official will perform a safety check of the vehicle and the driver restraint system. The course marshal will stage the vehicle's front tires at the beginning of the entrance to the track. When there is an opening on the track the course marshal will wave a green flag signaling the go-ahead for the driver to start. If the vehicle stalls, the driver **must wait for another green flag** before being allowed on the course. **Note: If the vehicle cannot be restarted without external assistance, the car will be deemed disabled and will be disqualified from the event.**

Upon completing the last lap with the second driver, the checkered flag will be displayed and the vehicle will exit the course and will be directed to the fueling station. **It is the Driver's responsibility to exit the track, any person directing the car off the course is an additional aid only.** The vehicle must go directly to the fuel station after completing endurance in order to receive a fuel score.

If either first or second driver is shown a red flag during their driving session, they must come to a controlled stop within viewing distance of the nearest flagging station and turn off their vehicle. (If they see the red flag just before the driver change exit, they may coast into the driver change area and turn off their vehicle.) All cars on track during a red flag event will be towed to the driver change area where they will wait, with driver belted in vehicle, until the track is clear. The lap in which the red flag was shown will not count in time or fuel economy calculations. When the track is clear, the drivers will be told to start their vehicle and will be released on track to finish their laps. Teams involved with a red flagged track will not be **permitted** to add any fuel to their vehicle.



## ENDURANCE & FUEL EFFICIENCY CONT.

### Weather Conditions:

Teams must fit rain tires to their vehicle if the course is declared Wet.

Teams have the option of dry or rain tires if the course is declared Damp.

Teams may change tires at any time while their car is in the staging area inside the "hot" area.

All tire changes after a car has received the green flag to start the event will take place in the driver change area.

Teams may not perform any work on the vehicle other than the tire change in the driver change area.

Teams are allowed 10 minutes to change their tires in the driver change area if a Dry track is declared Damp, or if a Dry or Damp track is declared Wet. If the tire change is happening at the same time as a scheduled driver change, the 10 minutes are in addition to the 3 minutes allowed for the driver change.

**If a track is damp, teams are allowed to pit to change their tires from dry tires to rain tires at any time (following notification of track marshal) and will be allotted 10 minutes to complete. If the team chooses to come in for a tire change mid-run, the car must be turned off for the change and restarted per driver change restart rules.**

Teams are allowed to change their rain tires to dry tires at **any time** if the course is Dry or Damp. However, this change is not permitted during the driver change, and the time taken to change the tires is included in the team's total time for the event.

The following chart summarizes the possible track condition changes, the team's options, and the time allotted for changes:

TRACK CONDITION	TEAM'S CURRENT TIRE CHOICE	TRACK DECLARED	TIRE CHANGE?	TIME HELP	ALLOWED AT DRIVER CHANGE?
DRY	DRY	DAMP	OPTIONAL	10 MIN.	Y
DRY	DRY	WET	MANDATORY	10 MIN.	Y
DAMP	DRY	WET	MANDATORY	10 MIN.	Y
DAMP	RAIN	WET	---	---	---
DAMP	DRY	DRY	---	---	---
DAMP	RAIN	DRY	OPTIONAL	0	N
WET	RAIN	DAMP	OPTIONAL	0	N
WET	RAIN	DRY	OPTIONAL	0	N

**Example:** The track is Dry, and the team is competing on dry tires. If the track is declared Damp, a tire change is optional to the team, 10 minutes is allowed to make the change, and it can be done during the driver change.

## ENDURANCE & FUEL EFFICIENCY CONT.

### General Notes:

- The vehicle will be expected to be ready for competition with the first driver at the team's run order position. If the endurance event is running late, the vehicle is still expected to be ready when its run order position is reached. If the vehicle is not ready when the official starter motions the vehicle to the starting line a two minute "out of order" penalty will be assessed and the team will lose their time slot to run the event. Teams are only allowed to run within the 20 cars after them in the run order in their heat. For example, the team with run order position 10 must run before the team with run order position 30. The last 20 teams scheduled must run before the last car is called. All teams will be provided a minimum 15 minute window. If the last scheduled team of the heat is not able to run when called, they will receive the "out of order" penalty and will be given 15 minutes to enter the track before they are disqualified. Teams cannot run earlier than their scheduled run order.

- The driver change will be scored as an extra-long lap. It will be assumed by scoring that the change was completed in the required time (less than 3 minutes) unless notified otherwise. An official will be in the driver change area timing each vehicle and monitoring that no work is done to the vehicle other than the driver change. The official will keep track of each team's time and will notify scoring if a team has exceeded the three minute limit (from time vehicle arrives in driver change area to time vehicle leaves area). There is no competitive advantage to changing drivers in less than three minutes.

- Tire changes from dry to rain tires will be scored as an extra-long lap. It will be assumed by scoring that the change was completed in the required time (less than 10 minutes) unless notified otherwise. An official will be in the driver change area timing each vehicle and monitoring that no work is done to the vehicle other than the tire change. The official will keep track of each team's time and will notify scoring if a team has exceeded the ten minute limit (from time vehicle arrives in driver change area to time vehicle leaves area). There is no competitive advantage to changing tires in less than ten minutes.

- Tire changes from rain to dry tires will have the time required to change tires added to the team's total time. The time taken to get to, and out of, the driver change area will NOT be added. An official will be in the driver change area timing each vehicle and monitoring that no work is done to the vehicle other than the tire change. The official will keep track of each team's time and will notify scoring of the time required to change tires (from time vehicle arrives in driver change area to time vehicle leaves area).

- No toolboxes will be allowed in the staging lanes or driver change area. (It is assumed only hand tools would be required to adjust the vehicle for the second driver.) In the event of tire changes due to weather conditions, tire changing equipment will also be allowed in the driver change area. Toolboxes will be allowed in the dynamic area along the wall separating the practice area. Teams may work on the car in this area only. Any work done on the vehicle must be approved by a tech inspector before the team will be allowed on the endurance course.

- If the vehicle leaves the course because of a mechanical/electrical problem of any type, the event is considered over for that vehicle and scoring will be notified and record the team as DNF. The vehicle will NOT be allowed to return to the track.

## ENDURANCE & FUEL EFFICIENCY CONT.

- The vehicle may be restarted if it stalls on the track, but external assistance is not allowed.
- The driver may pull in the driver change area to have belts re-tightened if necessary, though the additional time for this procedure will be counted.
- The driver may also pull the vehicle off course to remove any cones that may become trapped; though the additional time will count against the team.
- The lap times for the vehicle will be monitored. If the vehicle is not running within 145% of the fastest lap time run on the course (by the fastest car) the vehicle may be black-flagged and removed from the event. If this occurs with the first driver, the second driver will NOT be allowed to run, as the event will be considered over.

### **Course Preparation:**

Course walking times (weather permitting) for the teams will be listed on the schedule.

**NO MOTORIZED VEHICLES ARE ALLOWED ON THE COURSE WALK. VIOLATORS OF THIS POLICY MAY BE DISQUALIFIED FROM THE EVENT.**

### **Fuel Efficiency Procedures:**

Calculation of fuel consumption will be made by the fueling officials and will be based upon the weight of the fuel consumed.

The vehicle starts the endurance event after being fueled to the 'full' mark. After completing the event, the vehicle returns to fuel station and is refueled. The weight of the fuel consumed is determined by weighing a fuel container, filling the vehicle to the 'full' mark, and weighing the fuel container again. The weight of the fuel consumed is the difference of the two measurements. The driver will be required to observe the entire fuel scoring process and initial the results.

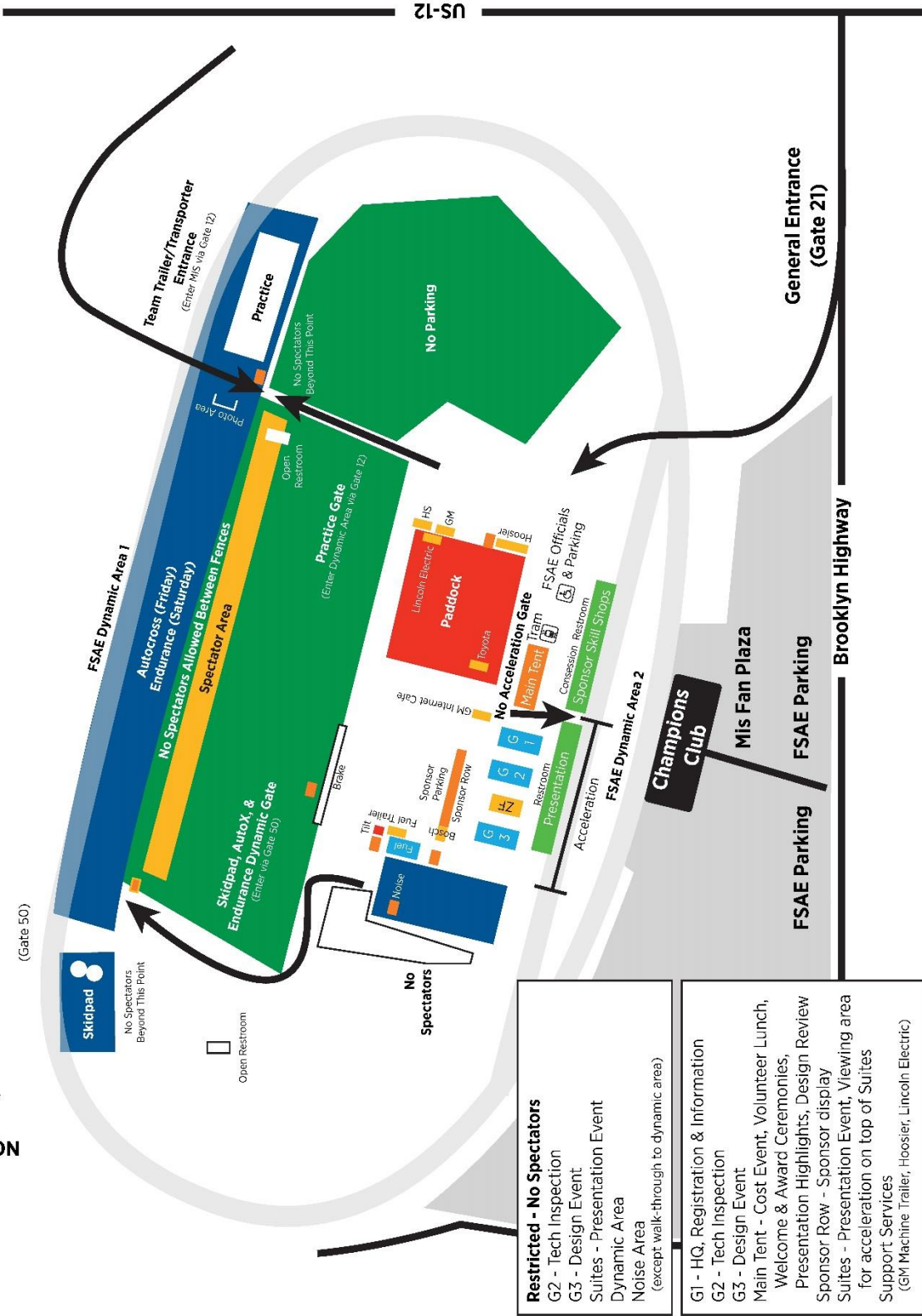
The 'full' mark is a clearly defined scribe line in the filler neck or sight tube as defined by Rule IC2.6.6. The vehicle will be filled to this mark before starting the heat and again upon completion of the endurance event heat.

At the fueling station it is critical that visibility of the scribe line in the fuel filler neck is very clear.

Also, no shaking of the vehicle will be permitted at any time.

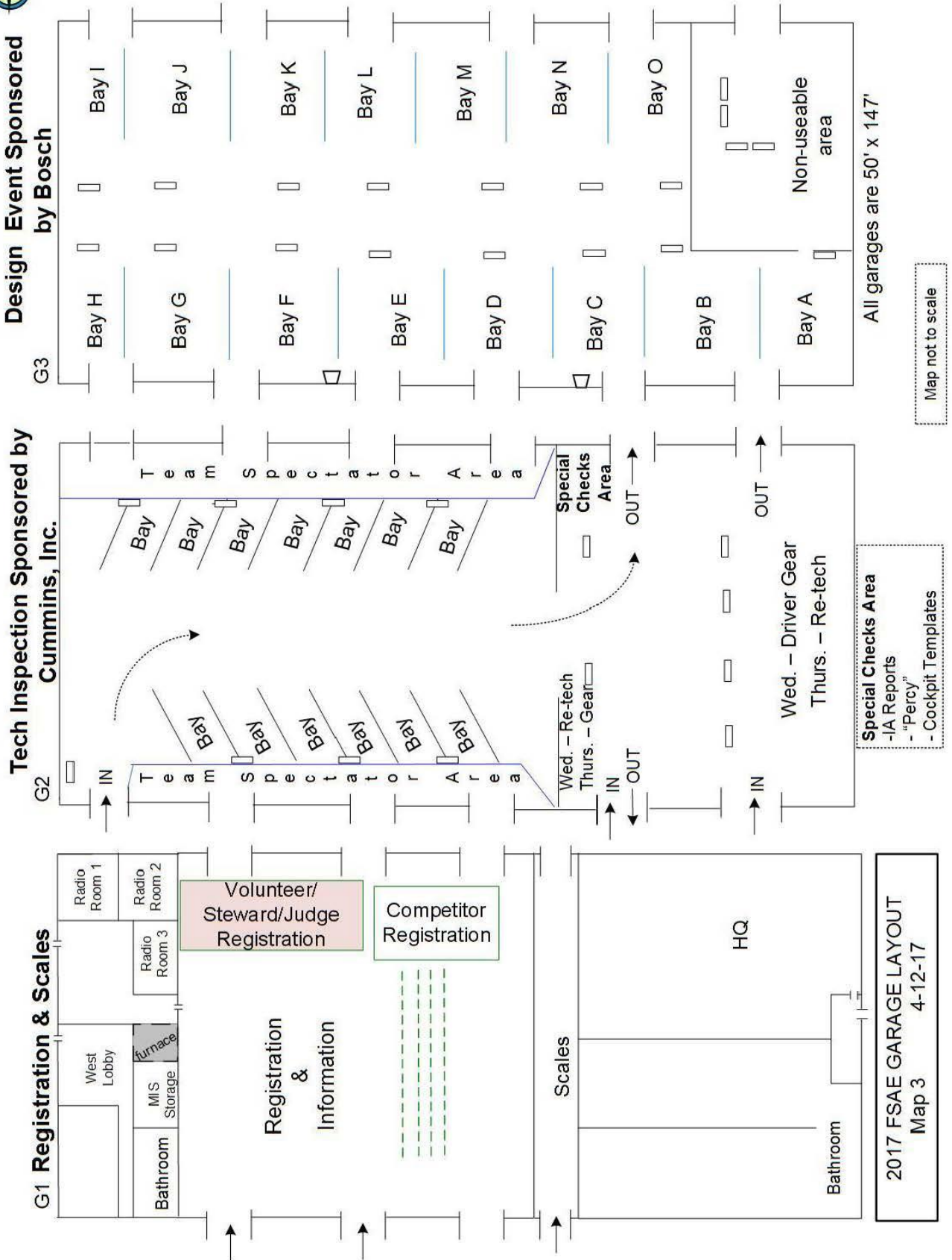
**Note: All Vehicles must return for re-fueling to enable the calculation of the efficiency score.**

# EVENT MAP



- |   |   |
|---|---|
| <p><b>Restricted - No Spectators</b></p> <ul style="list-style-type: none"> <li>G2 - Tech Inspection</li> <li>G3 - Design Event</li> <li>Suites - Presentation Event</li> <li>Dynamic Area</li> <li>Noise Area (except walk-through to dynamic area)</li> </ul> | <ul style="list-style-type: none"> <li>G1 - HQ, Registration &amp; Information</li> <li>G2 - Tech Inspection</li> <li>G3 - Design Event</li> <li>Main Tent - Cost Event, Volunteer Lunch, Welcome &amp; Award Ceremonies, Presentation Highlights, Design Review</li> <li>Sponsor Row - Sponsor display</li> <li>Suites - Presentation Event, Viewing area for acceleration on top of Suites</li> <li>Support Services (GM Machine Trailer, Hoosier, Lincoln Electric)</li> </ul> |
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# GARAGE LAYOUT



2017 FSAE GARAGE LAYOUT  
Map 3 4-12-17

# 2017 PADDOCK MAP

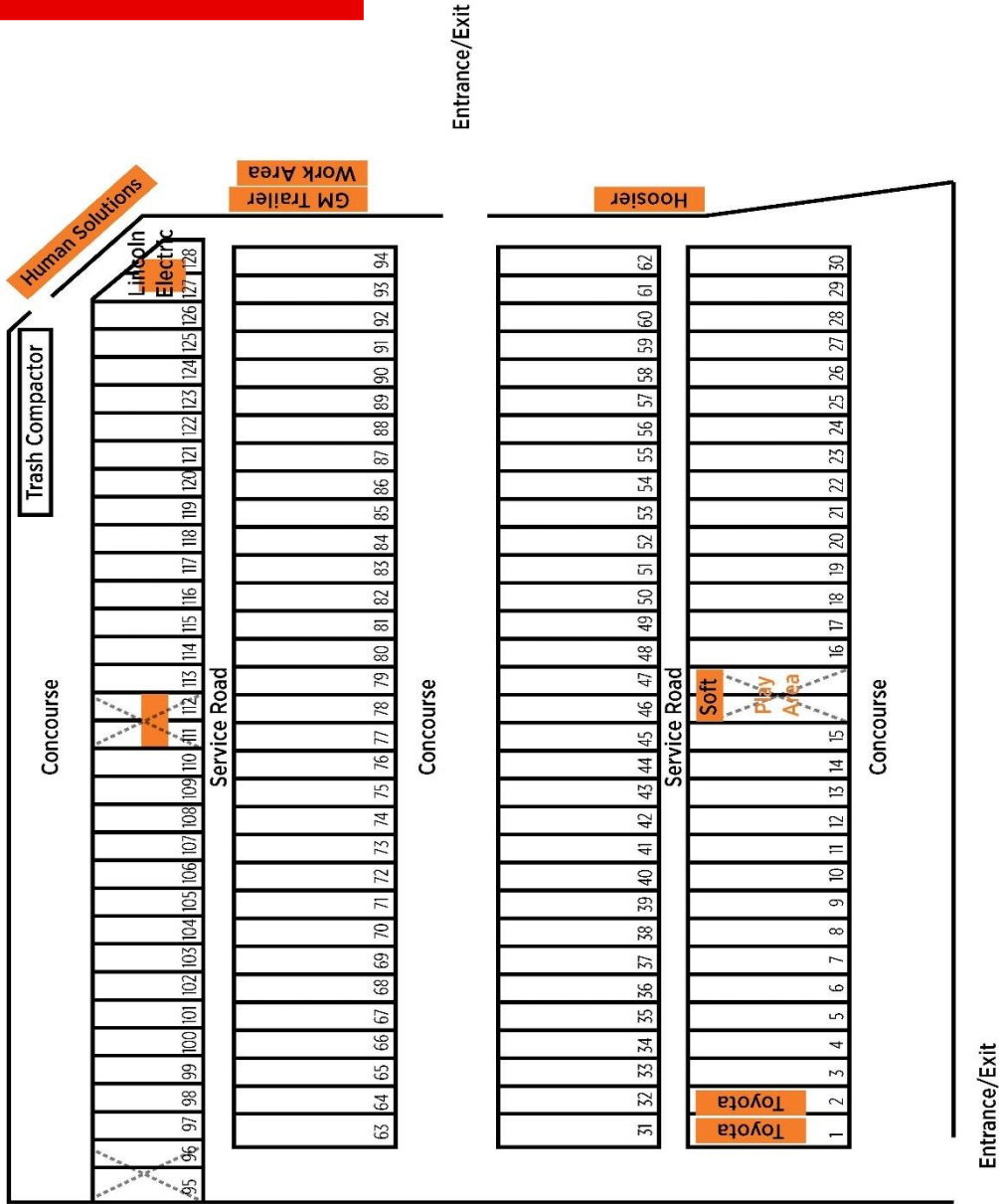
SPONSORED BY



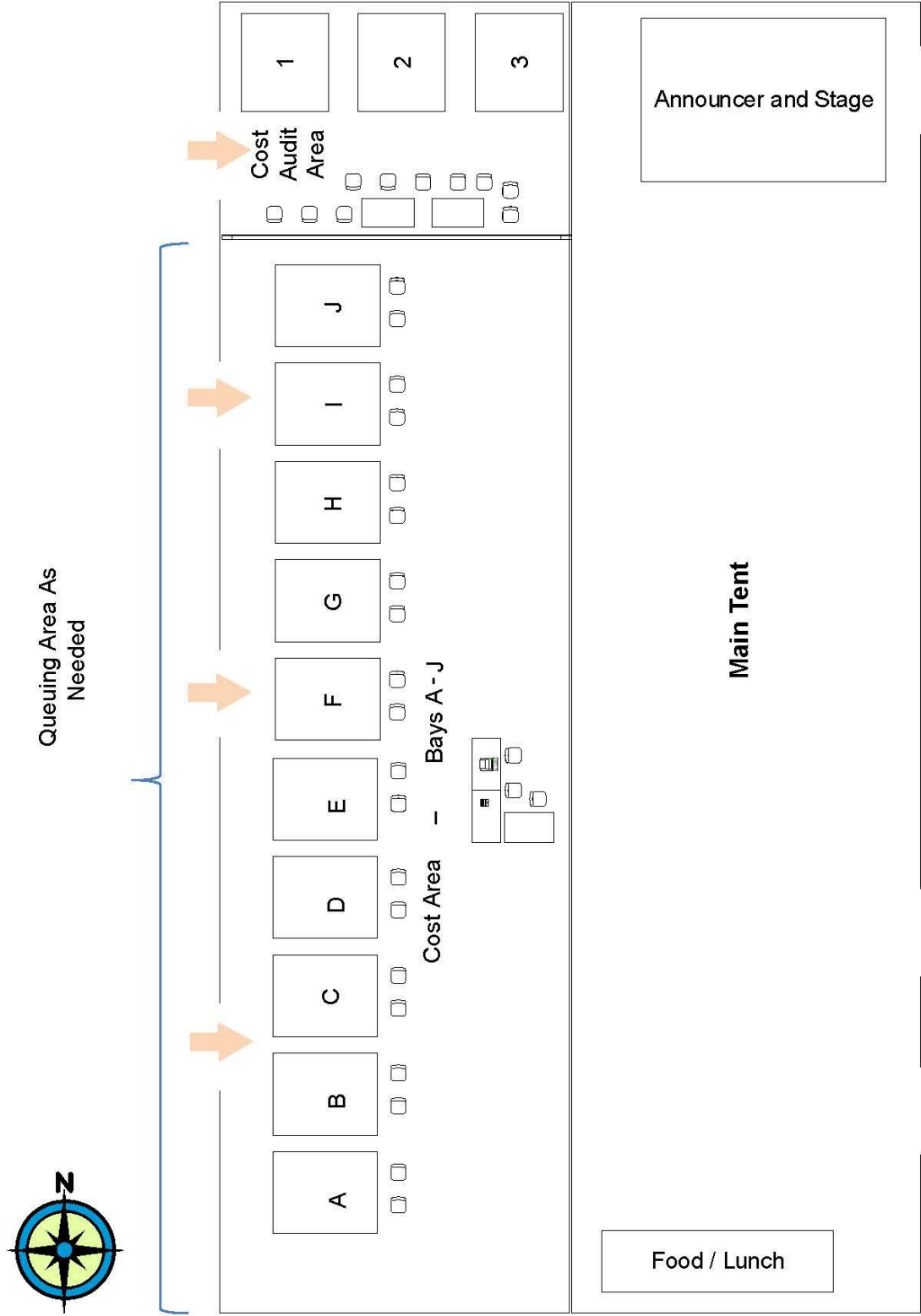
Let's Go Places

TOYOTA

toyota.com/careers

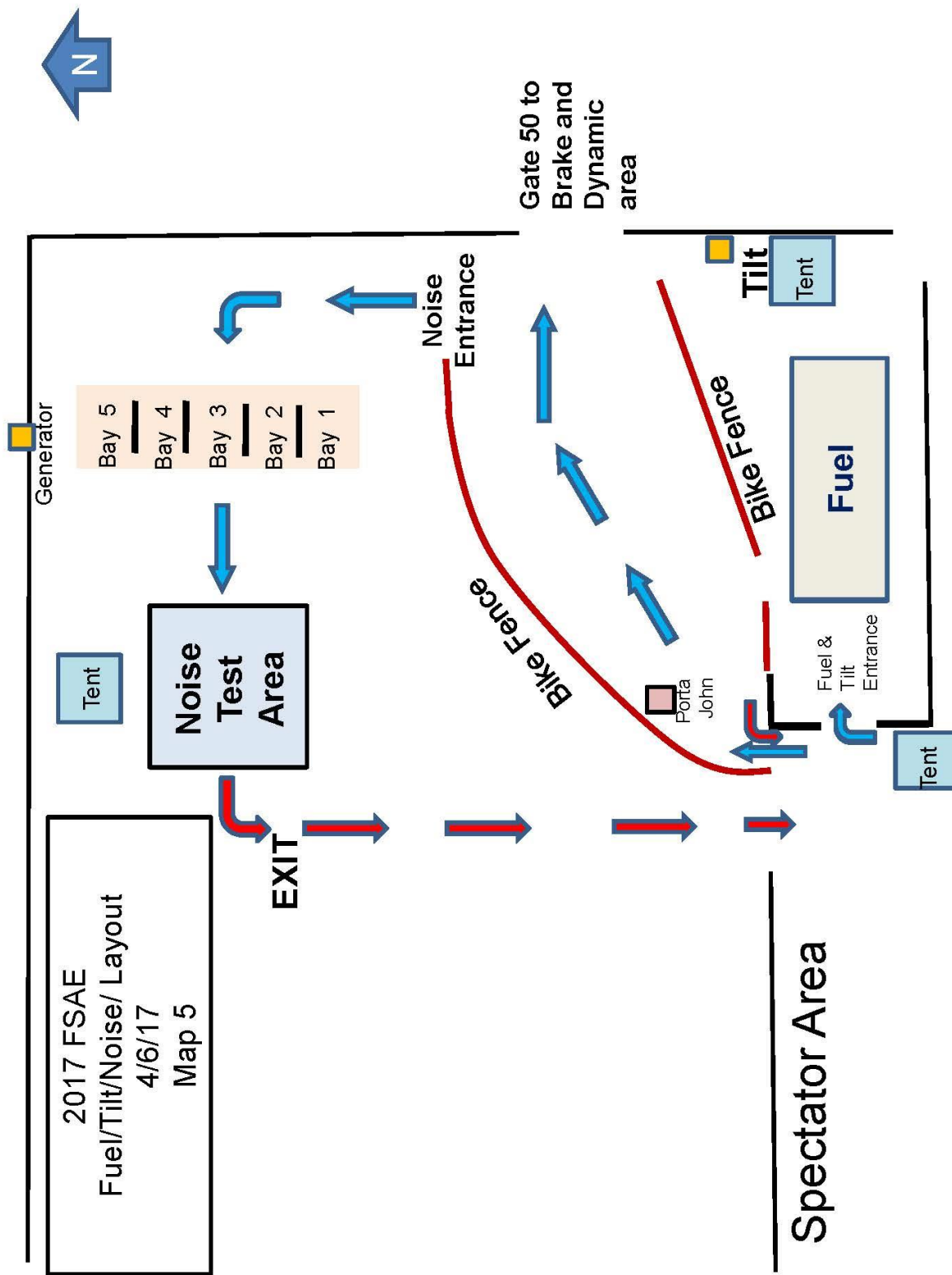


# COST LOCATION



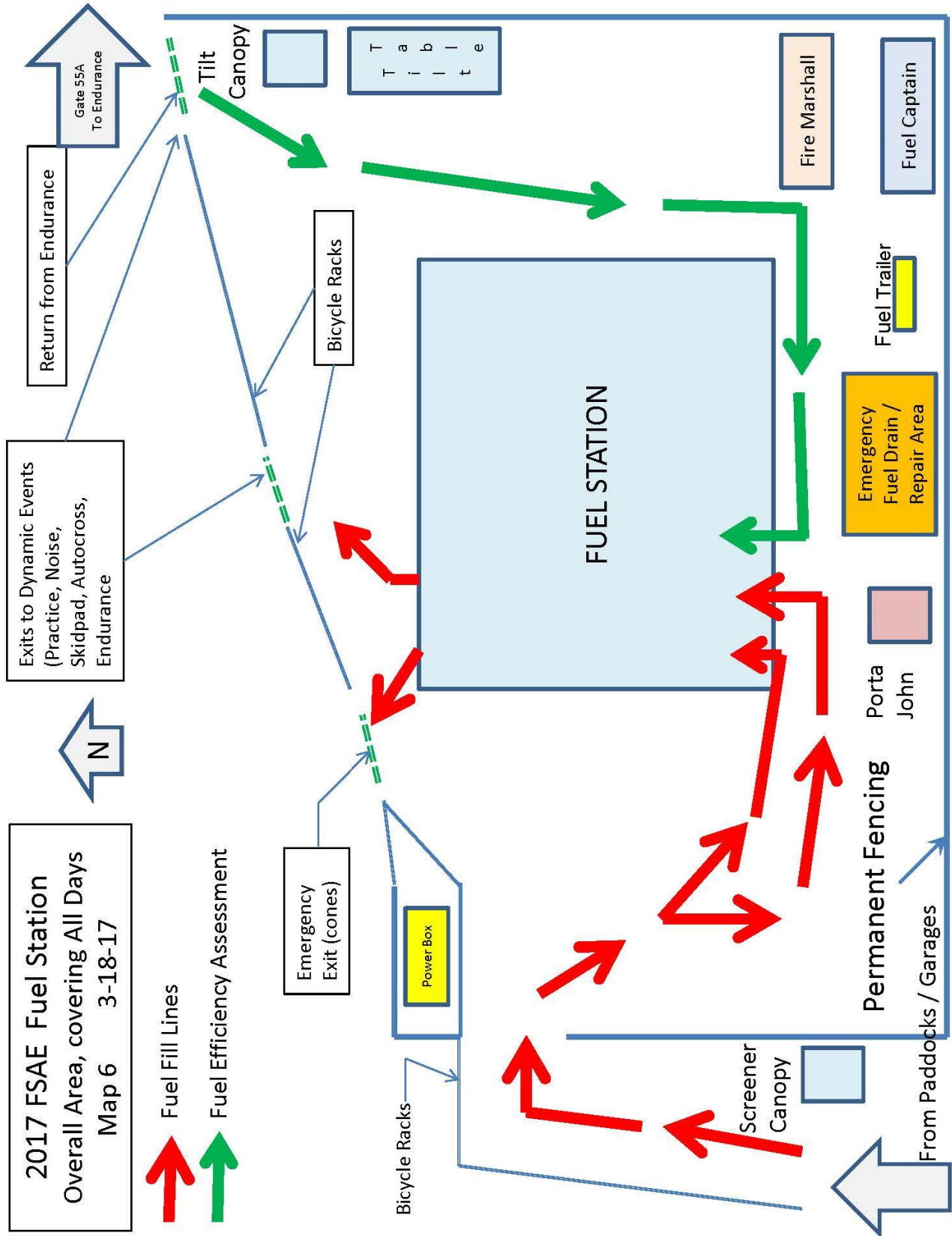
2017 FSAE Main Tent  
Map 4 3/18/17

# FUEL/TILT/NOISE LAYOUT

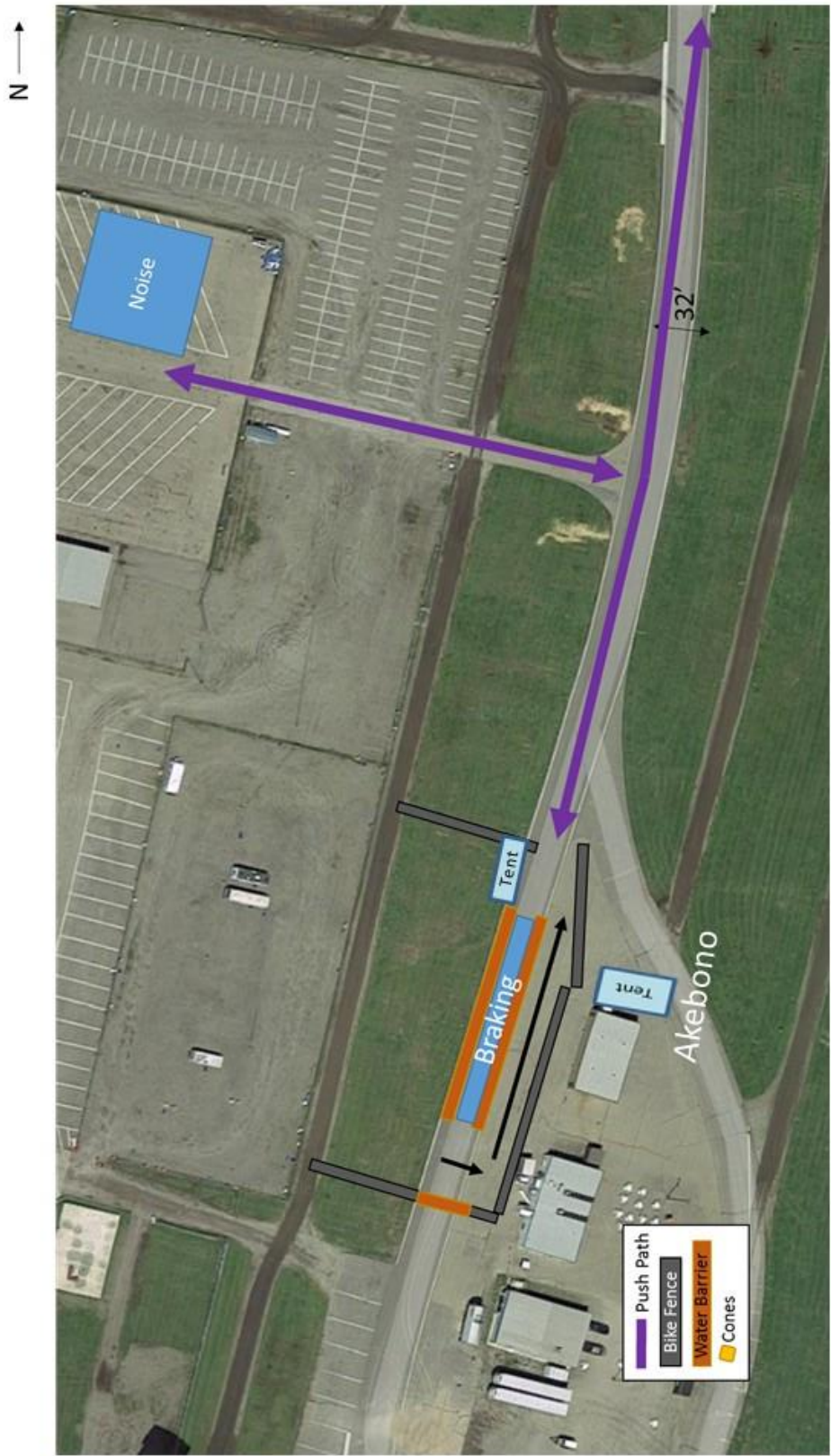




# FUEL STATION LAYOUT

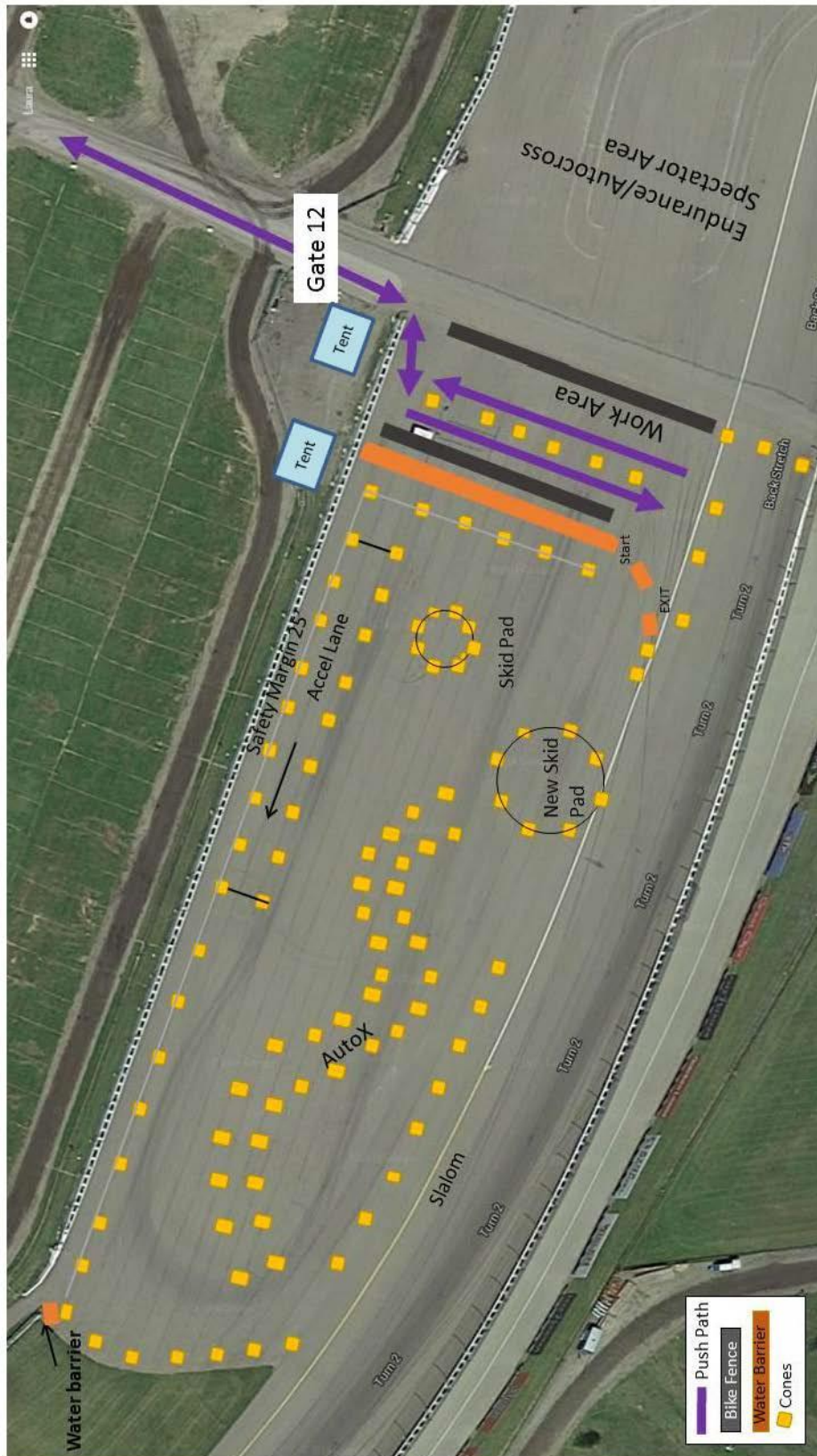


# BRAKE LAYOUT



2017 FSAE  
Brake Layout  
Map 8 3/18/2017

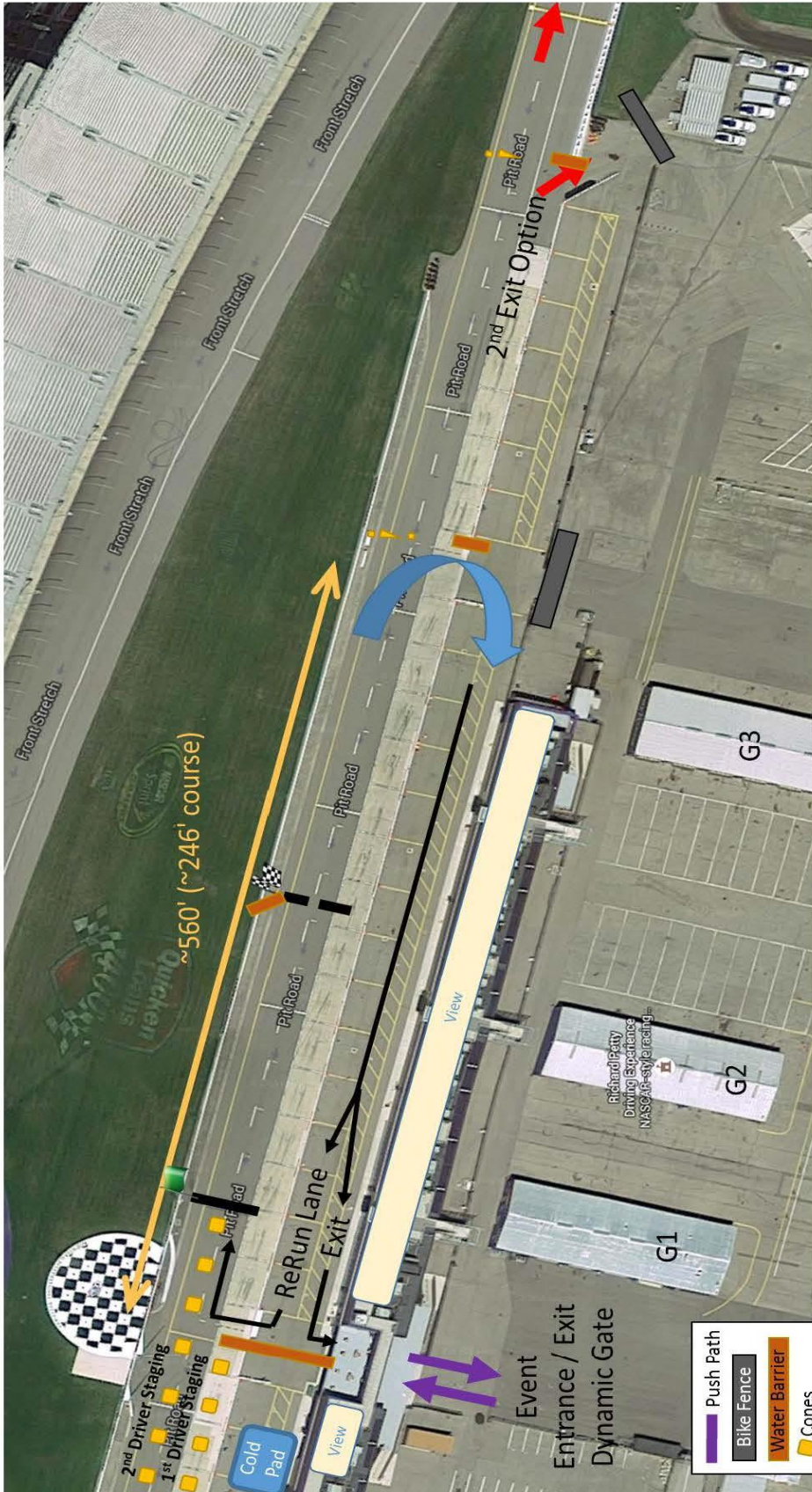
# PRACTICE TRACK



2017 FSAE  
Practice Layout  
Map 9 4/17/2017

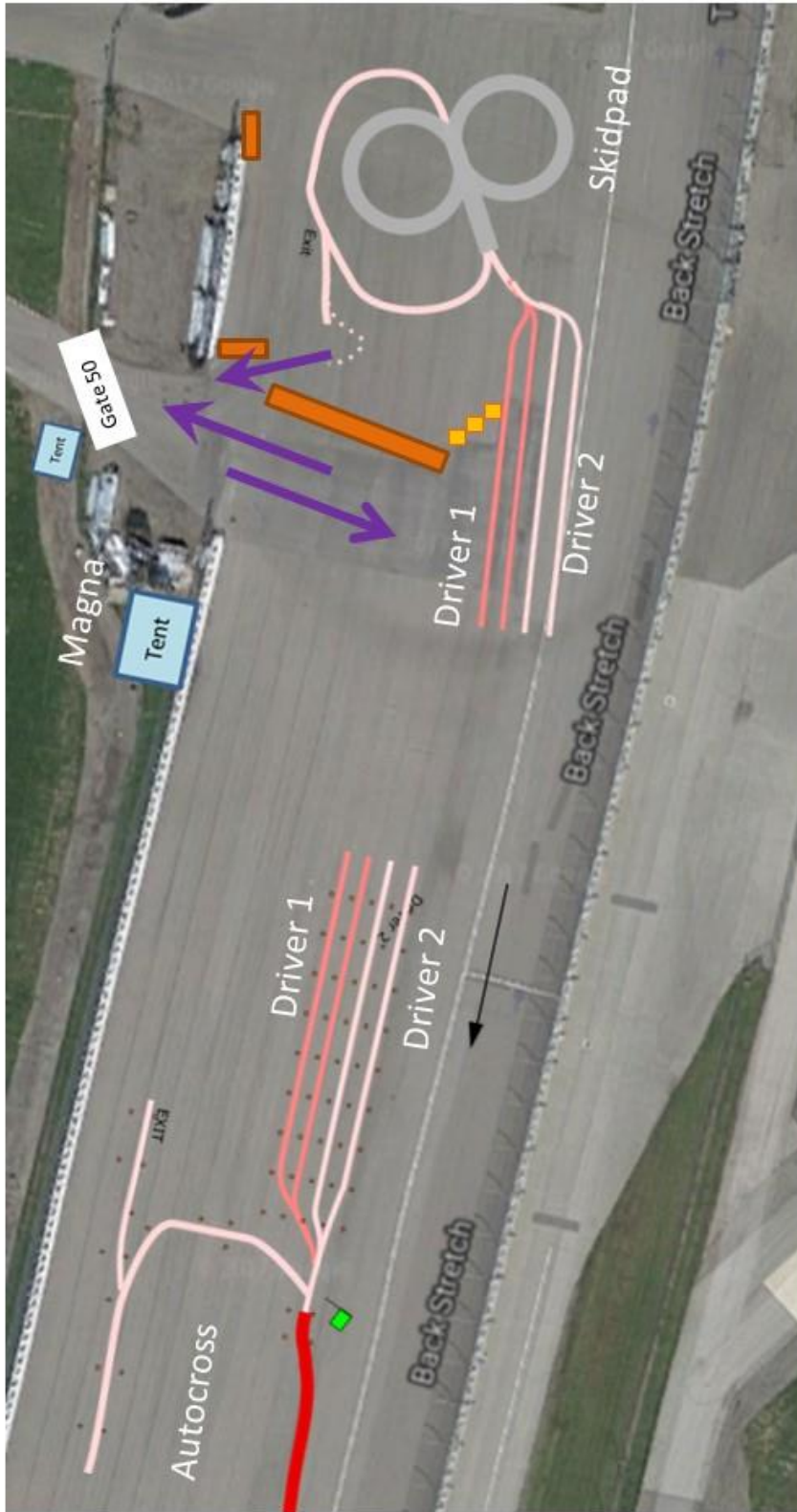
Map not to scale

# ACCELERATION LAYOUT

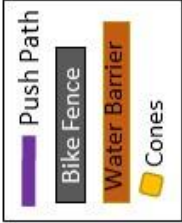


2017 FSAE  
Acceleration Layout  
Map 10 3/18/2017

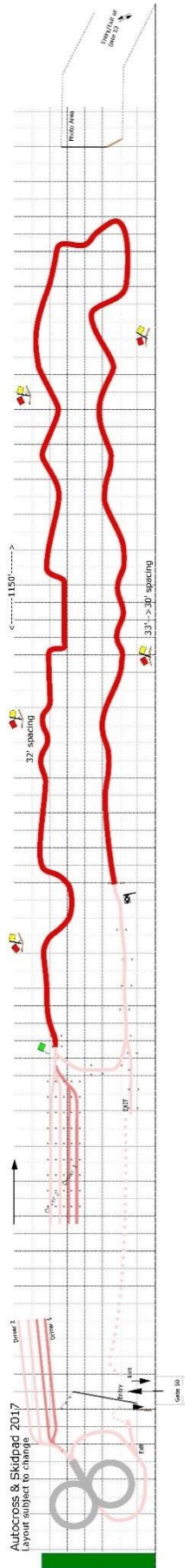
# SKID PAD & AUTOX LAYOUT



2017 FSAE  
 Skidpad & AutoX  
 Map 11 4/24/2017

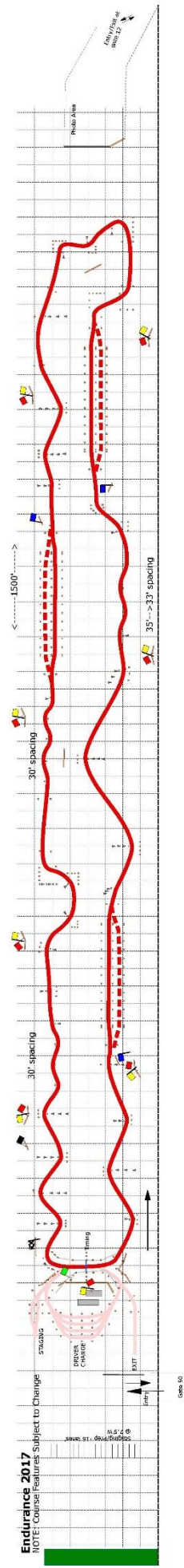
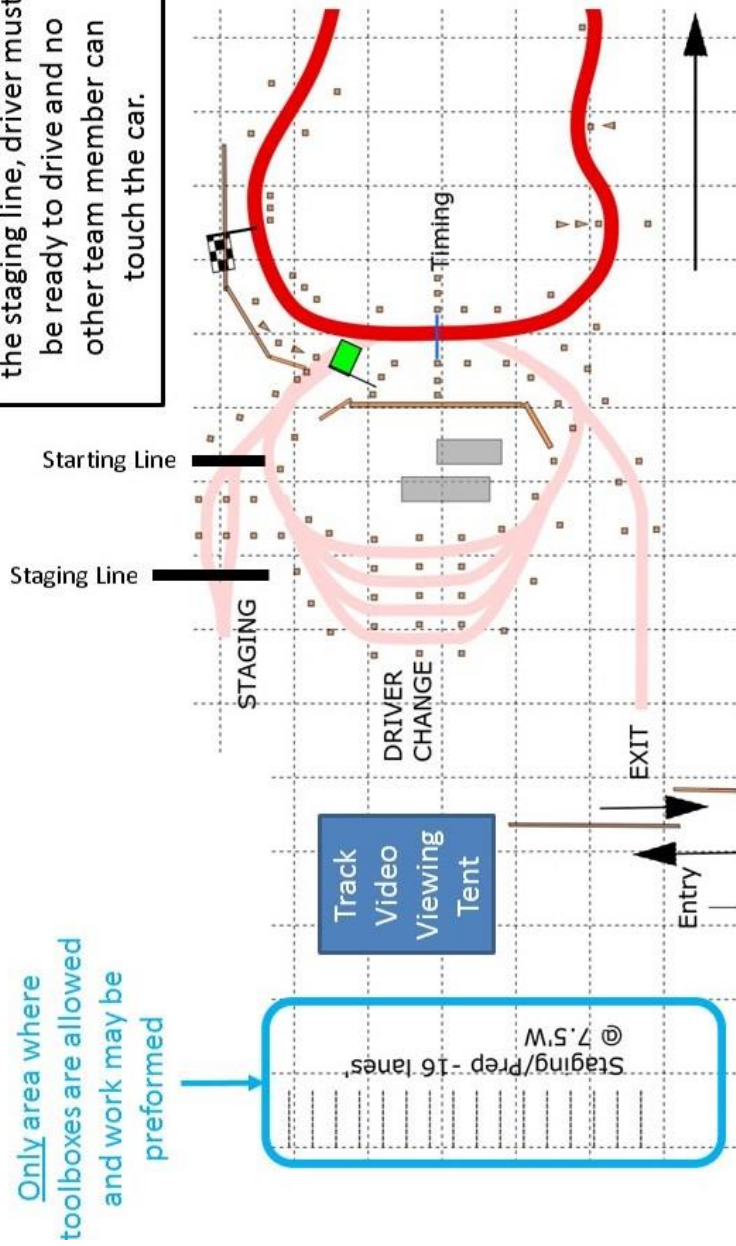


# AUTOCROSS LAYOUT



# ENDURANCE & FUEL EFFICIENCY LAYOUT

Once car has been pushed to the staging line, driver must be ready to drive and no other team member can touch the car.



## PLACES TO EAT

### Adrian

Alpha Koney Island, 422 N. Main St., 49221	(517) 266-2526
Applebee's Grill, 1396 S. Main Street, 49221	(517) 263-3344
Big Boy Restaurant, 126 N. Broad Street, 49221	(517) 265-2000
Brass Lantern, 4366 Evergreen Dr., 49221	(517) 263-0411
Ed Chapulin Restaurant, 118 S. Winter Street, 49221	(517) 265-6670
Ed's Main Street Station, 149 N. Main Street, 49221	(517) 263-2365
Joe Cool's L.A. Cafe, 4460 Maumee Street, 49221	(517) 263-8788
McDonald's 1377 S. Main Street, 49221	(517) 265-2370
McDonald's 1235 N. Main Street, 49221	(517) 263-5121
Red Lobster, 1420 S. Main Street, 49221	(517) 263-3811
Triple D Coffeehouse, 136 E. Maumee St., 49221	(517) 265-9997

### Ann Arbor

Bennigan's Restaurant, 575 Briarwood Circle, 48108	(734) 996-0996
Chop House, 322 S Main Street, 48104	(734) 669-8826
Gandy Dancer, 401 Depot, 48108	(734) 769-0592
Graham's Restaurant, 610 Hilton Blvd, 48108	(734) 761-7800
Olive Garden, 445 E. Eisenhower Pkwy, 48108	(734) 663-6875
Weber's Inn & Restaurant 3050 Jackson Road, 48108	(734) 665-3636

### Blissfield

Mystery Dinner Train, Us 223 Depot Street, 48228	(888) 467-2451
Hathaway House, 424 W. Adrian St (US 223), 48228	(517) 486-2141
Lena's Italian Restaurant, 517 E. US 223, 49228	(517) 486-4385
Main Street Stable & Tavern, 424 W. Adrian St (US223), 48228 (behind Hathaway House)	(517) 486-2144
McDonald's 511 E. Adrian Street, 48228	(517) 486-4177
Subway Sandwiches & Salads, 620 W. Adrian, 48228	(517) 486-2060

### Brooklyn

Big Boy Restaurants, 329 S. Main Street, 49230	(517) 592-3212
Hometown Pizza, 193 S. Main St., 49230	(517) 592-3266
Marco 's Pizza & Subs, 145 Wamplers Lake Road, 49230	(517) 592-4444
McDonald's 306 S. Main Street, 49230	(517) 592-6134
Old Town, 109 S. Main Street, 49230	(517) 592-8007
Poppa's Place, 208 S. Main Street, 49230	(517) 592-4625
Subway Sandwiches & Salads, 311 S. Main Street, 49230	(517) 592-5994
Village Creamery, 140 N. Main, 49230	(517) 592-8284

### Cement City

Artesian Wells Sports Bar 18711 U.S. 12 49233	(517) 547-8777
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### Chelsea

The Common Grill, 112 S. Main Street, 48118	(313) 475-0470
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### Clark Lake

The Beach Bar, 3505 Ocean Beach, 49234	(517) 529-4211
Eagles Nest, 1200 Eagle Point, 49234	(517) 529-9121
In Good Company, 9039 Meridian Rd, Clark Lake MI 49234	(517) 529-9150
Nite Crawlers, 6258 Jefferson Rd, Clark Lake MI 49234	(517) 592-2008



## PLACES TO EAT CONT.

### Clinton

McDonald's 480 W. Michigan Ave, 49236 (517) 456-8700  
Subway, 104 E. Michigan Ave, 49236 (517) 456-7576

### Hudson

McDonald's 503 S. Meridian, 49247 (517) 488-8440  
Ole Kountry Kettle, 389 S. Meridian Rd. (US-127), 49247 (517) 448-8240

### Irish Hills

Golden Nugget, 7305 Us Hwy. 12, Onsted, 49265 (517) 467-2190  
Harold's Place, 10625 U.S. 12, Brooklyn, 49230 (517) 467-2064  
Jerry's Pub, 650 Eagan Hwy, Brooklyn, 49230 (517) 467-4700

### Jackson

Applebee's Grill, 1706 W. Michigan Ave, 49202 (517) 783-5700  
Daryl's Downtown 151 W. Michigan Ave., 49201 (517) 782-1895  
Bella Notte Ristorante, 137 W. Michigan Ave., 49201 (517) 782-5727  
Big Boy Restaurants, 1213 N. West Ave, 49202 (517) 787-5566  
Bullinger's 501 Longfellow @ Wildwood, 49202 (517) 783-3768  
Cracker Barrel, 2494 Airport Road, 49202 (517) 783-5300  
Steak Eatery, 4243 Oaklane, 49203 (517) 783-1766  
Finley's 1602 W. Michigan Ave, 49202 (517) 787-7440  
Giglio's Italian Restaurant, 2241 Brooklyn Road, 49203 (517) 787-5025  
Ground Round, Jackson Crossing Mall, 49202 (517) 782-3330  
Hudson's Grill, 2900 Springport Road, 49201 (517) 784-4773  
Hunt Club, 1514 Daniel Street, 49202 (517) 782-0375  
Knight's Steak House, 2125 Horton Rd, 49201 (517) 783-2777  
Lone Star Steakhouse, 3510 O' Neil Drive, 49202 (517) 768-0884  
Old Country Buffet, 1230 Jackson Crossings Blvd, 49202 (517) 789-1083  
Olive Garden, 3500 O' Neil Drive, 49202 (517) 787-2388  
Outback Steak House, 1501 Boardman Road, 49202 (517) 784-7700  
Red Lobster, 2400 Clinton Rd, 49202 (517) 787-7820  
Steak & Shake, 2655 Airport Road, 49202 (517) 841-9390  
Todoroff's Original Coney Island, 1200 W. Parnall Rd. 49201 (517) 841-1000  
Whirligig Restaurant, 2000 Holiday Inn Drive, 49202 (517) 783-0693  
Yenking Chinese Restaurant, 2100 Holiday Inn Drive, 49202 (517) 787-8701

### Lansing

Damon's Grill, 1601 W Lake Lansing Rd, 48823 (517) 337-4680  
Harper's Restaurant & Brew Pub, 131 Albert St., 48823 (517) 333-4040  
Finley's American Grill, 6300 S. Cedar St., 48911 (517) 882-7530  
Finley's American Grill, 5615 W. Saginaw, 48917 (517) 323-4309  
P.F. Chang's China Bistro, 2425 Lake Lansing Rd., 48912 (517) 267-3383  
The English Inn, 677 S. Michigan Ave, 48827 (800) 858-0598

### Saline

Ruby Tuesday, 1375 E. Michigan Ave, 48176 (734) 429-3873  
Subway, 703 W. Michigan, 48176 (734) 429-3267

## PLACES TO EAT CONT.

### Tecumseh

The British Pantry & Tea Garden Cafe, 112 E. Chicago Blvd., (M-50), 49286	(517) 423-7873
Daily Grind, 139 E. Chicago Blvd., 49286	(517) 424-7463
Doby's Smokehouse, 111 W. Chicago Blvd., (M-50), 49286	(517) 423-7777
Evans Street Station, 110 S. Evans St, 49286	(517) 424-5555
McDonald's 1206 W. Chicago Blvd., 49286	(517) 423-2826
Subway, 900 W. Chicago Blvd., 49286	(517) 423-3290

### Tipton

Kountry Kettle Lakeside Inn, 6400 Michigan Avenue, 49287	(517) 431-2900
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### **RESTAURANTS/CATERING – PER BROOKLYN CHAMBER OF COMMERCE WEBSITE**

Americrown	517-592-1300
Artesian Wells Sports Tavern	517-547-8777
Beach Bar & Restaurant	517-529-4211
Boot Jack Tavern	517-252-5475
Brooklyn Big Boy	517-592-3212
Cherry Creek Old Schoolhouse Winery	517-592-4663
Clark Lake Golf Course & Restaurant	517-592-6259
Club 223	517-467-2223
Clubhouse Pizza	517-467-6969
Coconuts Grille & Bar	517-456-6887
Cuisine with Collen	517-403-7979
GRADY'S Custom Catering	517-745-1519
Harold's Place	517-467-2064
Hills' Heart of the Lakes Golf Course	517-592-2110
In the Kitchen Personal Chef Services, LLC	517-414-1252
Irish Hills Dairy Bar	517-467-2629
Jenni's Coffee & Cream	517-403-5903
Jerry's Pub & Restaurant	517-467-4700
JR's Hometown Grill & Pub	517-815-1290
Manitou Bar & Grill	517-547-7490
McDonald's	517-592-6134
Napoleon Cafe	517-536-4244
Patriot Pub & Grub	517-431-5010
Petey's Doughnuts, LLC	517-206-3336
Rumors	517-306-6099
Shady's Tap Room	517-938-8733
Subway-Brooklyn	517-592-5994
Subway-Napoleon	517-536-7355
The Doughmesstic Baker, LLC	517-416-0669
The Pointe Bar and Grill	517-529-7116

## MOTORCYCLE SHOPS

### **Tecumseh Harley-Davidson Shop**

8080 Matthews Hwy, Tecumseh, MI 49286  
(517) 423-3333

### **Honda**

14590 US-223, Addison, MI 49220  
(517) 467-7345

### **Iota Products**

8400 M 50, Onsted MI, 49265  
(517) 467-1127

### **Mad Mike's Minis**

10190 Bridge Rd, Onsted, MI 49265  
(517) 467-2442

### **Eagle One Sports Shop**

762 Manitou Rd, Manitou Beach, MI 49253  
(517) 547-7563

### **JB Customs**

427 Laurence Ave, Jackson, MI 49202  
(517) 395-4391

### **Back Alley Cycles**

112 N Evans St, Tecumseh, MI 49286  
(517) 423-9193

### **Holiday Power Sports**

4501 Page Ave, Michigan Center, MI 49254  
(514) 764-3600

### **Xcite Bikez**

3108 Page Ave, Jackson, MI 49203  
(517) 780-9108

### **American Harley-Davidson**

5436 Jackson Road, Ann Arbor, MI 48103  
(734) 747-8008

## FIRE EXTINGUISHER SUPPLIERS

Spears Fire and Safety Services Inc.,  
287 Jackson Plaza  
Ann Arbor, MI  
Tel: (734) 663-4133

Spears Fire and Safety Services Inc.  
1116 Wildwood Avenue  
Jackson, MI  
Tel: (517) 782-8229

## RACING SUPPLIES

### **Averill Racing**

632 Ajax Dr.  
Madison Heights, MI 48071  
(248) 585-9139

HOURS: M-F 10-6; Sat. 10-4

LOCATION: 1 block North of 12 Mile off John R

DISTANCE FROM MIS: ~80.5 miles (~1 hour & 27 minute drive time)

DIRECTIONS: 12623 US-12 Brooklyn, MI 49230 to 632 Ajax Dr Madison Heights, MI 48071

1. Head east on US-12 toward Brooklyn Hwy - 34.0 mi
2. Merge onto I-94 E/US-12 E via the ramp to Detroit. Continue to follow I-94 E - 34.6 mi
3. Take exit 216A to merge onto I-75 N - 10.5 mi
4. Take exit 63 for 12 Mile Rd - 0.3 mi
5. Turn right at W 12 Mile Rd - 0.4 mi
6. Turn left at John R Rd - 0.5 mi
7. Turn left at Ajax Dr. Destination will be on the right - 0.2 mi

### **RJS Racing Equipment, Inc.**

23506 N. John R. Road  
Hazel Park, MI 48030  
(248) 548-5727

HOURS: M-F 8-4

DISTANCE FROM MIS: ~76.5 miles (~1 hour & 22 minute drive time)

DIRECTIONS: 12623 US-12 Brooklyn, MI 49230 to 23506 John R Rd Hazel Park, MI 48030

1. Head east on US-12 toward Brooklyn Hwy - 34.0 mi
2. Merge onto I-94 E/US-12 E via the ramp to Detroit. Continue to follow I-94 E - 34.6 mi
3. Take exit 216A to merge onto I-75 N - 7.1 mi
4. Take exit 60 toward John R St/9 Mile Rd - 0.2 mi
5. Merge onto N Chrysler Dr - 0.2 mi
6. Turn right at John R Rd. Destination will be on the right - 0.4 mi

**Please call first.**

**If you call them, these suppliers may be able to ship the products you need to MIS.**

## ADDITIONAL RACE SHOPS

### **Chassis Shop**

Perf. Prod. Inc.  
1931 N. 24<sup>th</sup> Avenue  
Mears, MI 49436  
800-530-9494  
Mon-Fri 9:00 am – 5:00 pm  
<http://secure.chassisshop.com/>

### **Keyser Manufacturing**

540 Danforth Street  
Coopersville, MI 49404  
Toll-Free: 1-800-472-2464  
Mon-Thur 8:00 am – 5:30 pm  
Fri 8:00 am – 5:00 pm  
Sat 9:00 am – 12:00 pm  
<http://www.keysermanufacturing.com/>

### **Lane Automotive**

8300 Lane Drive  
Watervliet, MI 49098  
1-800-772-5266  
Mon-Fri 9:00 am – 6:00 pm  
Sat 9:00 am – 2:00 pm  
<http://www.laneautomotive.com/Location>

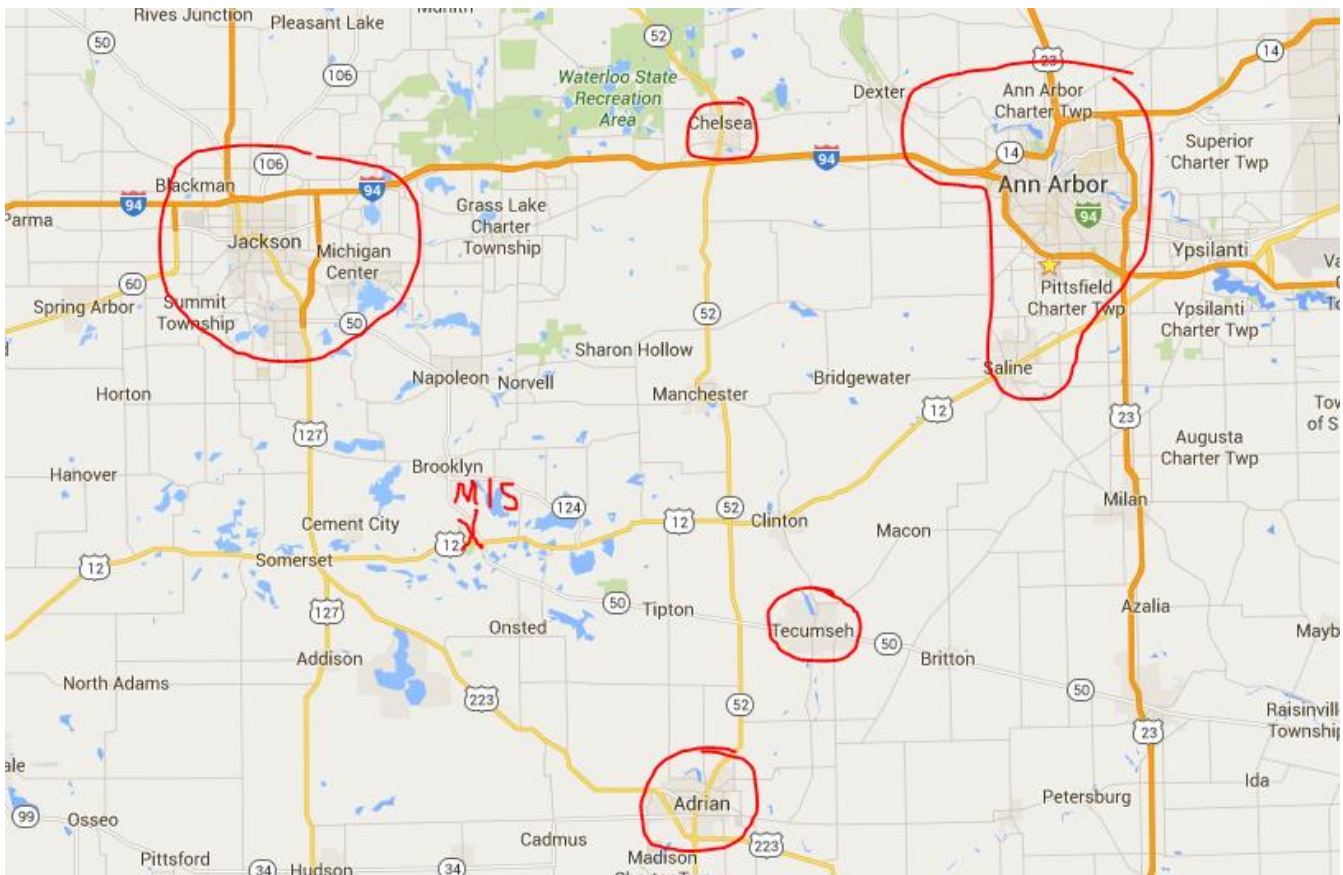
### **Victory Racing Parts**

31831 Schoolcraft Rd  
Livonia, MI 48150  
(734) 762-7665  
Mon Fri 9:00 am – 6:00 pm  
Sat 9:00 am – 3:00 pm

# LOCAL BUSINESS GUIDE

For reference only. Listing here does not imply endorsement. Contact the business first to ensure they have what you need.

<b>Need</b>	<b>Local Supplier</b>	<b>Location</b>	<b>Distance Away</b>	<b>web</b>
Metal / plastic stock	Alro Metals Plus	Jackson / Ann Arbor	20 miles	<a href="http://www.alro.com">www.alro.com</a>
Motorcycle parts	Town & Country Sports Center	Cement City	8 miles	<a href="http://www.cementcityharley.com">www.cementcityharley.com</a>
	Moto 1 Cycle	Onstead	11 miles	<a href="http://www.moto1cycle.com">www.moto1cycle.com</a>
	Slicks Motorsports	Dansville	40 miles	<a href="http://www.slickssalvage.com">www.slickssalvage.com</a>
	TC Powersports	Michigan Center	15 Miles	<a href="http://www.tc-powersports.com">www.tc-powersports.com</a>
Nuts/bolts/supplies	TC's Hardware (Do It Best)	Onstead	7 miles	<a href="http://www.doitbest.com">www.doitbest.com</a>
	Fastenal	Michigan Center	15 Miles	<a href="http://www.fastenal.com">www.fastenal.com</a>
General Auto Parts	Speedway Auto Parts (Auto Value)	Brooklyn	2 miles	<a href="http://www.autovalue.com">www.autovalue.com</a>
	Hubbard Auto Parts (Auto Value)	Onstead	7 miles	<a href="http://www.hubbardsauto.com">www.hubbardsauto.com</a>
<b>The main population centers in the area of Michigan International Speedway are circled</b>				



## SURVIVAL LIST

We suggest you bring (or wear, as appropriate) the following to ensure that you are comfortable and prepared for just about anything. (Temperatures were in the low 40s in 2006 & 2007. In 2016, we had rain, snow and sleet as well as very cold and windy weather during the Endurance event)

- Long pants
- Comfortable, close-toed shoes (absolutely no sandals)
- Heavy jacket
- Rain slicker (please do not wear red or yellow)
- An umbrella
- Extra sweatshirt(s). Dressing in layers is very highly recommended.
- Gloves
- Thermal under layer(s)
- Hat (we suggest both a cap and a winter hat)
- Ear muffs
- Spare pair of dry shoes and socks
- Hand warmers/toe warmers
- Sunscreen
- Lip Balm with SPF
- Insect Repellant
- Anti-bacterial waterless hand sanitizer
- Sunglasses
- Tissues
- Aspirin / Ibuprofen
- Allergy medication
- Band Aids
- Ace Bandages
- Antacids
- Water bottle
- Small cooler with snacks / plastic bottles of drink
- Pen & paper
- Business cards
- Cell phone
- Ear plugs
- Lawn chair
- Stadium Blanket
- Camera (may not be used in some areas/assignments)
- Backpack to contain your belongings
- Large clear plastic bag (labeled with your name) to protect your belongings if it rains

Anything else you think you might need to be comfortable!

# **TIMING & SCORING TECHNOLOGY**

Mobile IT Infrastructure provided by Digital Engineering Solutions

**Connect to the “SAE-GuestsAndTeams” WiFi network**

Password: **welcometeams**

Point your browser to: **<http://mobile.fsaonline.net>**

## **You now have access to:**

- Review & verify your Static, Dynamic, and Endurance results
- View real time results any time during the competition
- Report any problems with your results:
  - Static and Dynamic problem reports are accepted until 6PM on Dynamic Day
  - Endurance problem reports are accepted up until 15 minutes after the Endurance Race ends



## DESIGN JUDGE BIOGRAPHIES

**Steven (Steve) Fox:** Chief Design Judge & Design Event Captain Alma Mater: Iowa State Law Enforcement Academy, U.S. Army Military Police Academy. Employment History: PowerTrain Technology, President / Director of Engineering, '01+. Quarter Master Industries, Design Engineer, 20 years, new product development, manufacturing, testing. Expertise: Skilled Mechanic, Journeyman Machinist, Power transmission design over a broad spectrum of applications, Engine Development, Materials Selection & (Lean) Manufacturing Engineering. Over 40 years motorsports / engineering career. Past Chief Design Judge- Formula Student Germany, Formula Student Austria, Formula Student India. Design Captain- FSAE-Virginia '08 & '09. SAE Industrial Lecturer. Currently resides in: IL First car: '70 Camaro Z-28, (no power steering, power brakes, or AC). Favorite Racecars: Porsche 917-30 & McLaren M8. Sadly, today's liability concerns will never let that much power to weight ratio loose on a racetrack again... Design Judge since: 1999 when recruited by Carroll Smith

**Anthony (Tony) Lyscio:** Chief Design Judge & Design Event Captain Alma Mater: University of Minnesota: B.M.E.- Mechanical Engineering; Purdue University: M.S.E. - Design Engineering; Indiana University: M.B.A. Employment History: SpaceX - '15+; GM - Adv. Technologies, Camaro Lead Suspension Design Engineer, Vehicle Dynamics Adv. Development- Vehicle Dynamics Dev., Vehicle Handling Lab- Analysis/Test Engineer, Concept / Advanced Vehicle Integration-Design Engineer. Race Engineer Consultant Expertise: Suspension /Steering / Chassis Design and Development, Data Acquisition, Race Engineering. Currently resides in: CA First love: '69 Camaro 327/4-speed. Favorite racecar: Ford GT40. Proof that revenge can be a very productive emotion. Design Judge since: 2001

**William (Bill) Riley:** Chief Design Judge & Design Event Captain Alma Mater: Cornell University: BS and MEng Mechanical Engineering. Employment History: Cornell Formula SAE (3 Years), Chassis Team Leader (1 Year). FSAE Rules Committee (9 Years), Ford Motorsports (including assignment with Jaguar Formula 1) and Advanced Engine Engineering (7 Years). General Motors: Combustion and Cylinder Head Design (4 Years). Space Exploration Technologies: Senior Director of Structures Engineer '10 +. Expertise: Chassis Structures, design & analysis. Composites, Composites FEA, Engine Component Design, Combustion. Currently resides in: CA First car: '84 Mercury Topaz 2-Door GS that went to 230,000 miles. Favorite racecar: I like them all! Design Judge since: 2008

**Shiva Aher:** Alma Mater: Pune University: MS in Mechanical Engineering – Mechanical Design Employment History: '05+: Ricardo, Inc: Senior Project Engineer – Engines: Expertise: Powertrain Design and Development Currently Resides in: MI Favorite Race Car: Bugatti with 16 cylinder engine Design Judge since: 2017

**Ryan Arens:** Alma Mater: Northern Illinois University: BS and MS in Mechanical Engineering. Employment History: Honda R&D Americas Expertise: Suspension Design, Tire Development, Overall Vehicle dynamics, Component Design, 5 yrs. Formula SAE experience Currently resides in: OH First car(s): '91 Honda CRX Favorite racecar: Lotus 99T, Red Bull RB7 Design Judge since: 2012

**William Attard:** Alma Mater: University of Melbourne - Australia. BE, BSc, PhD in Mechanical Engineering. Employment History: Chrysler, MAHLE Powertrain; Perkins Engineering; Bishop Rotary Valve Expertise: Powertrain R&D (combustion, fuels, turbocharging, engine design). Currently resides in: MI First Car: '80 Holden Commodore. Favorite racecar: VL Commodore Group A Touring Car Design Judge since: 2008: FS-UK, 2009-FSAE-MI

**Siddarth 'Sid' Attravanam:** Alma Mater: University of Texas at Arlington: BS (Hons.) in Mechanical Engineering (minor in Electrical Engineering) Employment History: '14 – present: Cooper Tire & Rubber Company: R&D Engineer, Vehicle Modeling, Simulation and Track Testing; '13 – '14 Optimum G: Vehicle Dynamics Intern; '13: Fixrim Racing: Track Engineer Expertise: Vehicle handling modeling, simulation and testing, data acquisition, driver metrics Currently Resides in: OH First car: '01 Toyota Celica GTS Favorite Race Car: Ferrari F2004 Design Judge since: 2015

## DESIGN JUDGE BIO CONTINUED

**Robert Bailey:** P.E.: Alma Mater: US Air Force Academy: BS in Mechanical Engineering; University of Dayton: MS in Mechanical Engineering. Employment History: Engineering Systems, Inc. '13+: Engineering Consultant. US Air Force '03 – '13: Mechanical Engineer, Assistant Professor at the US Air Force Academy, Operations Director of the Applied Mechanics Lab. Expertise: Manufacturing technologies, machine design, failure analysis, powertrain development, vehicle dynamics, program management. Currently resides in: CO First Car: '83 Dodge Shelby Charger. Favorite racecar: Toss-up between the Mazda 787B or the Lotus 38. Design Judge since: 2013

**Ryan Baldi:** Alma Mater: Rochester Institute of Technology: Mechanical Engineering. Employment History: '15+: Pratt & Miller Engineering – IndyCar Simulation Engineer; '12-'15: Richard Childress Racing – Lead Vehicle Performance Engineer, NSCS Race Engineer; '10-'12: Tesla Motors, Brake System Design Engineer Expertise: Vehicle dynamic simulation, race engineering, circuit & rig testing, brake system design and testing Currently Resides in: MI First car: '98 Saturn SW2 Wagon Favorite Race Car: Porsche 956 Design Judge since: 2014

**Mike Barkey:** Alma Mater: University of Windsor: Mechanical Engineering with Automotive Option Employment History: '10 – Present – Fiat Chrysler Automobiles. Expertise: Powertrain development, testing and calibration Currently Resides in: Ontario, Canada First car: '67 Ford Mustang Fastback Favorite Race Car: '65 SCCA Shelby Mustang GT350R Design Judge since: 2016

**John Barrick:** Alma Mater: Rensselaer Polytechnic University, MS Mechanical Engineering Employment History: General Motors Engineering, Chassis, Suspension, and Program Engineering Management for Cadillac V Series. Expertise: Suspension, Chassis, Kinematics FSAE Experience: 4 years as a Presentation Judge Currently resides in: MI First Car: '68 Pontiac Catalina Favorite Race Car: '67 STP-Paxton 4 Wheel Drive Turbine Car #40 Design Judge since: 2017

**Randy Beikmann:** Alma Maters: BSME Kansas State University; MSME and Ph.D., University of Michigan Ann Arbor. Employment History: '83+: General Motors Noise and Vibration Center, as Technical Expert. Author of Physics for Gearheads, with Bentley Publishers, published: 2015. Expertise: Vibration analysis and development of powertrains and drivelines, including IC engines and/or electric motors. Currently Resides in: Southeast Michigan. First car: '69 Mercury Cougar (with a 3-on-the-floor!). Favorite Race Car: Chaparral 2E, which set the course for integrating aerodynamics into road racers. Judge since: 2017.

**Martin Belley:** Alma Mater: École de Technologie Supérieure (ETS): BS in Electrical Engineering Employment History: '06 – Present: Electrical Design Engineer at Robert Bosch LLC (USA) and Robert Bosch GmbH (Germany) Expertise: Electronic controls for Diesel and gasoline powertrains, design validation, combustion engines Currently Resides in: MI First Car: '87 Ford Escort GT Favorite Race Car: Mercedes Benz 190E 2.3-16 Design Judge since: 2016

**Jude Berthault:** Alma Mater: Ecole de Technologie Superieure (ETS): FSAE Fellowship 03'-09' Employment History: 2010: Joe Gibbs Racing: NASCAR Chassis Design Engineer; 2011-13: Essex Parts Services / AP Racing: Created Dynamometer for high performance brake system testing; 2013-15: Chip Ganassi Racing: NASCAR Design Engineer. 2015-Current: Ford Motor Company: Product Development Engineer, Engine Systems & Components for Hybrid Electric Vehicles. Currently Resides in: MI First Car: Rust lightened '89 Toyota Corolla Station Wagon Favorite Race Car: My CCM "Jet Speed" Hockey Skates! Design Judge since: 2014

**Michael Black:** Alma Mater: Rutgers Mechanical Engineering '90, Licensed Professional Engineer. Employment History: Ford Motor Company, 15+ Years Automotive Body and Body Structure Product Design. Military Contractor, Machine Design. Initiated Rutgers FSAE Team '89. FSAE Volunteer since 1995. Expertise: Automotive Structures, Metallic Materials, Threaded Fasteners, Chassis Design. Currently resides in: MI First car: '72 Merc Colony Park Wagon w/ 429 engine & simulated wood grain side panels. Favorite racecar: McLaren MP4 F1 driven by Ayrton Senna or any car driven by Senna. Design judge since: 2000

**Hugh Blaxill:** Alma Mater: University of Bath, UK: Mechanical Engineering & MPhil in Automotive Engineering. Employment History: MAHLE Powertrain LLC, General Manager. Previously MAHLE Powertrain Ltd, Chief Engineer, R&D. Expertise: Combustion Engines, High Performance Engine Engineering, Fuel Economy Technologies, Production programs for Niche applications. Currently resides in: MI. First car: BMW 635CSi, Golf GTi Favorite Car: Audi R8 V10, Nissan Skyline GT-R Favorite racecar: Lotus 49, BMW E9 Batmobile Design Judge since: 2014.

## DESIGN JUDGE BIO CONTINUED

**Mike Bobbitt:** Alma Mater: Virginia Tech: Mechanical Engineering Employment History: '11+: Pratt & Miller Engineering: IMSA Race Engineer, Software Program Manager; '09-11: Penske Racing: Aero Designer, '08-09: Honda R&D: Chassis Designer Expertise: Software design and documentation, data processing and metrics, race engineering and strategy, trackside vehicle tuning, chassis design, welding and fabrication Currently Resides in: MI First car: '04 VW Passat Favorite Race Car: Porsche 917 Design Judge since: 2016

**Ben Bosworth:** Alma Mater: Michigan State University: BS in Mechanical Engineering Employment History: '13-Present: Pratt and Miller Engineering: Design and Analyst Engineer; '15-Present: Type2Cycles: Co-Founder. Expertise: Composites testing and analysis, composites manufacturing, FEA optimization methods, and non-linear crash simulation (LS-Dyna) Currently Resides in: MI First Car: Focus ST Favorite Race Car: C7R. Design Judge since: 2016

**Ben Brooke:** Alma Mater: University of Maryland College Park: BS in Mechanical Engineering Employment History: '14 – present: Pratt & Miller Engineering; Defense Design Engineer; '11-'13; Petroleum Institute, Abu Dhabi, UAE; Baja SAE Program Mentor. Expertise: Chassis and Suspension Design, Kinematics and Compliance Testing, Fabrication Currently Resides in: MI First car: '80 Jeep CJ-7 Golden Eagle Favorite Race Car: Audi R10 TDI Judge since: 2016

**James Browne:** Alma Mater: Lawrence Tech – '07 ME, '11 MSME Employment History: '05-'13 TRW Automotive Foundation Brake Development 2013-2016 ADVICS North America Brake Systems Engineering Expertise: Automotive Brake systems, vehicle dynamics, Chassis integration Currently Resides in: MI First car: Oldsmobile 442 w/455ci rocket engine Favorite Race Car: Ford GT \ Shelby Cobra Design Judge since: 2011

**John Bucknell:** Alma Mater: Cleveland State University '95 - BS Mechanical Engineering, University of Michigan '99- MS Systems Engineering. Employment History: '16+ Divergent3D, '12-16 Fiat Chrysler, '11-'12 SpaceX, '07-'11 GM Advanced Powertrain. '95-'07 Chrysler. Expertise: Propulsion systems (Reciprocating, Turbomachinery, Rockets), Chassis, Aerodynamics, Nuclear Reactor design. Currently resides in: CA First Car: '78 Plymouth Horizon, 55 bhp and 3spd ATX. First Street Car (I've Built): A mid-engine 2003 Dodge SRT-4. Full interior and amenities, street legal with 400+ bhp on pump gas, ~2600 lbs, w/ 45/55% weight distribution and to be completed "next month" (for twelve years now). Favorite racecar: Hardman Racing Bonneville streamliner. FSAE competitor '90-'94 Design Judge since: 2000

**John Burford:** Alma Mater: University of Texas – Arlington Employment History: Altair Engineering '98 – '04; Contractor '04 – '15: experienced in multiple fields: Military, Automotive, Heavy Duty Trucks, and Aerospace. Currently works for Aurora Flight Sciences Expertise: CAE analyst focusing on Multi-Body Dynamics and Structural Optimization Currently resides in: VA First Car: '84 Pontiac Firebird Favorite racecar: Group C/IMSA GTP Mazda 787 Design Judge Since: 2011

**David Caples:** Alma Mater: Michigan State University: BS in Mechanical Engineering. Employment History: '14+: General Motors – Corvette Aerodynamics CFD Engineer. Expertise: Performance Vehicle Aerodynamics, Computational Fluid Dynamics, Wind Tunnel Testing Currently Resides in: MI First Car: '02 Mitsubishi Lancer Favorite Racecar: Corvette C7.R Design Judge since: 2017

**John A. Carriere:** Alma Maters: University of Massachusetts Amherst BS in Mechanical Engineering, University of Michigan MS in Mechanical Engineering. Employment History: '76-'80: General Motors, Vehicle Dynamics Project Engineer. '80-'85: General Motors, Vehicle Dynamics Sr. Project Engineer. '85-'91: General Motors, Vehicle Dynamics Sr. Development Engineer. 1991-2003: General Motors, Vehicle Dynamics Staff Project Manager. '03-'15: General Motors, Vehicle Dynamics Technical Fellow. Expertise: Vehicle Dynamics, Tires, Chassis, Suspension, Instrumentation, Aerodynamics, I've spent my career doing full vehicle design, development, simulation, testing & integration (specializing in handling stability, rollover resistance, test systems, and litigation support). I have been an autocrosser since 1977 with 8 Nationals trophies. Designed suspensions for 7 Solo II Mod class cars (3 have won National Championships). Currently Resides in: Ann Arbor, MI First Car: '62 Ford Galaxy 9 pass Wagon Favorite Race Car: Tiga SC85 - a really great car to autocross Design Judge since: 2017

## DESIGN JUDGE BIO CONTINUED

**Gerry Clark:** Alma Mater: THE Ohio State University: BS in Mechanical Engineering. Employment History: '89 – present: General Motors; '97-Present: GM Powertrain Synthesis and Analysis; '89-'96: GM Crashworthiness Test and Non-linear FEA Analysis. Expertise: Engine performance simulation and valvetrain mechanical dynamic simulation. Engine architecture for performance and fuel economy. Camshaft profile design. Currently resides in: MI First car: '72 SAAB Model 96 Favorite racecar: Summer Bros, Goldenrod. Design Judge since: 2010

**Eric Cunningham:** Alma Mater: Kansas State University: BS in Mechanical Engineering; Oakland University: MS in Mechanical Engineering Employment History: '13+: Fiat-Chrysler Automobiles LLC: '13-'15 Chrysler Institute of Engineering; 2016 – Present SRT Motorsports Engineer – Engine Specialist Expertise: Powertrain Design, Development and Optimal Tuning Strategies; Composite Material Design and Analysis; Suspension Kinematics and Suspension Design Currently Resides in: MI First car: '61 Chevy Apache 10 Custom (Three on the Tree!) Favorite Race Car: Red Bull RB7 – blown diffuser with amazing V8 power plant Design Judge since: 2016

**Ian Dahl:** Alma Mater: University of Washington: BS in Mechanical Engineering Employment History: '12+ - SpaceX: Manager – F9 Stage 1 Structures Expertise: Composites, Structural design, Brakes Currently Resides in: CA First Car: 92' EG Civic Favorite Race Car: Benetton B194 – Schumacher's 1st Championship Design Judge since: 2016

**Bill Davidson:** Alma Mater: Brunel University, London, England: BSc Mechanical Engineering Employment History: Ford Motor Co / Visteon (UK & US) 20 yrs., MAHLE Powertrain 8 yrs., Chrysler (FCA) current Expertise: Powertrain mechanical design, calibration and control systems. Currently resides in: MI First Car: '69 Ford Capri Favorite racecar: '72-'74 Ford Capri RS2600 / RS3100 Design Judge Since: 1995

**Jeffrey Davis:** Alma Mater: The University of Michigan: MS Aerospace Engineering. Michigan State: BS Mechanical Engineering. Employment History: '15-present: Owner/Partner JD Innovations LLC, Chassis & Vehicle Systems Design & Development. '10-'15: Cooper Standard, Vice President Engineering. 84-'08' Ford Motor Company, Chassis Systems Engineering Expertise: Chassis System Design / Development, Chassis Structural Design, Vehicle Engineering / Package, Vehicle Tuning/Development Currently resides in: MI First car: '69 VW Beetle Favorite Race Car: Thrust SSC Design Judge since: 2016

**Dominick DeMasi Jr:** Alma Mater: The University of Akron: Mechanical Engineering Employment History: 2012+: Honda R&D Americas Inc. Engine Performance Research Group: Powertrain Research and Development Expertise: DI Combustion system development and calibration. Empirical modeling and modal estimation and prediction. Currently Resides in: OH First Car: Mitsubishi Lancer EVO 8 (currently project car) Favorite Race Car: Audi R18 Judge since: 2017

**Mike DeRonne:** Alma Mater: GMI Engineering Management Institute Employment History: '86 - '99 & '01 – present: General Motors. Plant, body structure, motorsports, engine control systems. '99 - '01 Cosworth Technology. Engine calibration. Driveline controls Expertise: Powertrain calibration with many years focused on diagnostics. A few years as data acquisition expert for GM in the years of growth from Indy cars into all racing. Currently Resides in: MI First car: '70 Impala that dad got for us as a beater high school car First (real) car (I picked): '75 V-8 Monza Favorite Race Car: Chevy Intrepid GTP - great era in GTP Design Judge since: 1999

**Drake DeVore:** Alma Mater: Northern Illinois University: BS Mechanical Engineering. Employment History: International Truck and Engine (NVH Engineer) – '04-'05, MoTeC Systems East '05 - present. Expertise: Electronic fuel injection, data acquisition, engine calibration. Currently resides in: NC First Car: Pro Street '65 Plymouth Barracuda my father and I built. Favorite racecar: My first FSAE car. Design Judge Since: 2011

**Steven Dietz:** Alma Mater: University of Michigan-Dearborn: BS, MS in Mechanical Engineering. Employment History: FSAE (4yrs), DENSO Component Failure Analysis (2yrs), General Motors since '08: Transmission Calibration 6/8 RWD (6yrs), Powertrain Integration Small Block current. Expertise: Powertrain Integration, packaging, calibration, FSAE chassis design Currently resides in: MI First car: '94 F-150 Ext cab w/ 5.0L EFI. Favorite racecar: C6.R Design Judge since: 2015

## DESIGN JUDGE BIO CONTINUED

**Justin T Dolane:** Alma Mater: Saginaw Valley State University: Electrical Engineering Employment History: 5+ Years at Walbro Engine Management: Project Engineer, Currently at General Motors: Calibration Engineer Expertise: Embedded hardware and software, engine calibration, and data acquisition systems Currently Resides in: MI First Car... '95 Supercharged Ford Thunderbird Favorite Race Car: '15 GT-R Nismo Design Judge since: 2017

**Paul Dovi:** Alma Mater: Embry Riddle Aeronautical University: '11 BS in Mechanical Engineering Employment History: SpaceX '11+ Manager, Falcon Structural Test Expertise: System Level Structural Testing Currently resides in: TX Favorite Race Car: 2011 ERAU Formula Hybrid car Design Judge since: 2016

**Murilo Duarte:** Alma Mater: EESC-USP 2003 Employment History: '12+ Ford Motor Company; '11-'12 Honda Research Americas; '04-'10 Ford Motor Company Brasil Expertise: Vehicle Dynamics, suspension design, structural design. Currently resides in: MI First car: '92 Fiat Uno Mille (simple, lightweight, reliable, surprising huh?). Favorite racecar: Brabham BT52 (how to exploit big rules changes). Design Judge since: 2011

**Ash Dudding:** Alma Mater: Virginia Tech: BS Mechanical Engineering, '89. Employment History: Volvo Truck Corporation '89-'96. Hendrickson, '96-Current. Currently Director of Engineering for Hendrickson Truck Suspension Systems. Expertise: Truck chassis, ride, handling and structural development. Truck suspension component and system development. Currently resides in: IL First Car: '72 Fastback Mustang. Favorite racecar: Ford GT 40 (original), Porsche 917, Porsche 962. Design Judge since: 2010

**Dylan Edmiston:** Alma Mater: University of Florida: BS in Mechanical Engineering, minor in Electrical Engineering Employment History: Pratt & Miller Engineering: Cadillac Racing Instrumentation & Electronics, IMSA Corvette DP Customer Engineer Expertise: Electronics and Data Acq Currently Resides in: MI First Car: '98 Civic Favorite Racecar: Subaru Impreza WRC2005 Design Judge Assistant Since: 2017

**Gabriel Eduardo PhD:** Alma Mater: University Sao Paulo: BS and PhD in Mechanical Engineering Employment History: '08 Renault F1 Team, '10+ General Motors Expertise: Vehicle Dynamics, ride and handling, suspension, steering and tire development, simulation and testing Currently Resides in: MI First Car: VW Polo Favorite Race Car: Harsheys Design Judge since: 2014 (in Brasil!)

**Colin C. Engebretsen, MS:** Alma Mater: University of North Dakota, BS in Mechanical Engineering; Air Force Institute of Technology, MS in Aeronautical Engineering Employment History: US Air Force: '08-Present; Structural Engineer, KC-135; Battle Damage Engineer, Tankers & Bombers; Assistant Professor, Engineering Mechanics, US Air Force Academy Expertise: Suspension, Vehicle Dynamics, Tires, Chassis, Data Acquisition, Power Train, Aero, & Brakes (Jack of all, master of some) Currently Resides in: OH First Car: '06 Civic Si Favorite Race Car: Mazda 787B Design Judge since: 2016

**Greg Fadler:** Alma Maters: University of Michigan BS in Aerospace Engineering; University of Illinois MS in Aerospace Engineering; Indiana University MBA. Employment History: '85-'89 McDonnell Douglas, Fighter Plane Flight Test Engineer. '89-'98: General Motors (GM), Senior Corvette Body Design Engineer and Aerodynamicist. '98-'01: GM Aerodynamics Technical Integration Engineer. '01-'03: GM Aerodynamics Engineering Group Manager. '03-'05: GM Cadillac DTS Performance Manager. '05-'07: GM Racing Vehicle Engineering Team Manager. '07-'11: GM Aerodynamics Engineering Group Manager. '11-'14: Navistar Director of Performance Integration, Certification & Compliance. '14 – present: Fiat Chrysler Automotive Group, Wind Tunnel Manager and Aero Technical Specialist. Expertise: Aerodynamics, Body Design, Composites, Chassis, Instrumentation, & Complete vehicle design, development, testing & integration. Currently Resides in: MI Favorite Race Car: '69 L-88 Corvette. Design Judge since: 2010

**David Finch:** Alma Mater: UCLA, University of Michigan: BS and MS Mechanical Engineering. Employment History: President of Raetech Corp. since '84. Expertise: Automotive Research and Product Development (Motorsports) specifically Chassis, Engine and Instrumentation products. David is also an accomplished Motorsports Race Engineer and Driver. Major Motorsports Awards: SCCA-President's Cup, Porsche - Al Holbert Memorial, USRRDC-Mark Donohue Award. Currently resides in: MI First Car: '57 Plymouth Belvedere with rusted out front fenders, & blanket which covered holes in rear seat and also used to smother carburetor fires. Favorite racecar: The Raetech/Porsche 944 with six SCCA GT2 National Championships! Design Judge since: The age of Aquarius

## DESIGN JUDGE BIO CONTINUED

**Nick Fishbein:** Alma Mater: Cornell University, BS in Mechanical Engineering. Employment History: '08 – present, Chip Ganassi Racing NASCAR Program Vehicle Dynamics Engineer; '07, Rahal Letterman Racing ALMS Program Data Engineer; '06, Milliken Research Associates. Expertise: Vehicle dynamics testing and modeling including development of full vehicle simulation models, 7-post rig testing and performance metric correlation. Currently resides in: NC First Car: '59 Austin Healey Bugeye Sprite. Favorite racecar: Cornell FASE ARG06 Design Judge since: 2014

**John Fratello:** Alma Mater: Virginia Tech: BS and MS in Mechanical Engineering. Employment History: '13 – present, Tesla Motors: Chassis Controls Development, '11 – '13, Bosch: Traction/Stability Control Calibration. Expertise: Chassis controls design and practical robust application, applied vehicle dynamics, test planning and execution. Currently resides in: CA First car: '94 Ford Taurus. Favorite racecar: Lancia Stratos. Judge since: 2013

**John Gentilozzi:** Alma Mater:..Michigan State University: BS Construction Management Employment History: Rocketsports Racing, '98-'03: Data acquisition engineer, '04: Assistant Engineer (Champcar), '05-'07: Race Engineer (Champcar), '08: Lead Engineer, Special Projects – Jaguar XF Bonneville speed record, RSR Racing: '09-'12 Technical Director – Jaguar Cars GTLM Project. '12-'15: Race engineer IMSA LMPC Championship. '16+: 3GT Racing: Technical Director, Lexus RC F GT3 (IMSA GTD Championship) Expertise:..Driveline, Suspension Kinematics, Manufacturing, Data acquisition system design and analysis. Currently Resides In:..MI First Car: '96 Chevy Blazer Favorite Race Car:..Williams FW15C Design Judge since: 2017

**Austin Gerding:** Alma Mater: Kettering University: BS Mechanical Engineering Employment History: 2011+: GKN Driveline; '07 – '11 Getrag Corp; '99 – '07 American Axle and Manufacturing Expertise: Gear boxes and gear design Currently Resides in: MI First car: '86 Cutlass Supreme Personal race car: '87 Camaro built for track days Favorite Race Car: Lotus 78 (first ground effect car) Design Judge since: 2017

**Matthew Gesch:** Alma Mater: University of Minnesota-Duluth: Mathematics and Statistics and Actuarial Sciences Employment History: DENSO International America, Inc.: Application Engineer; Modern Automotive Performance: Turbocharger Operations Expertise: Advanced Driver Assistance Systems, Prototype System Installation, and Data-logging, Machining Currently Resides in: MI First car: Mitsubishi 3000gt VR-4 Favorite Race Car: Audi R10 TDI Design Judge since: 2016

**Peter Gibbons:** Alma Mater: Worcester Polytechnic Institute, Mechanical Engineering Employment History: '11+: Multimatic: Technical Director Vehicle Dynamics. '04-'10: Andretti Autosport, Technical Director. '91-'04: Newman Haas Racing, Race Engineer / Technical Director. '88-'91: Penske Racing, Race Engineer. '86-'88 Kraco Racing. '84: MARCH Engineering. '81-'86 Patrick Racing. Expertise: Vehicle Dynamics, Design, Simulation, Simulators Currently resides in: Toronto First Car: '72 Ford Pinto Favorite racecars: Lotus 78-79 (A Paradigm Shift in Motor Racing!) Design Judge since: 2013

**Billy Godbold:** Alma Mater: Florida State University: MS in Physics. Employment History: COMP Performance Group (COMP Cams): 20+ Years, Camshaft Design / Valvetrain Engineering Manager. Expertise: Engine Systems Theory, Design and Development, Metallurgy, Motorsports. Currently resides in: TN First car: '86 Jeep CJ7 (V8 engine swap) Favorite racecar: Panoz Esperante GTR-1, but I have never seen a racecar I did not like. Design Judge since: 2014

**David Gould:** Alma Mater: Newbury Grammar School. Employment History: Gould Engineering since '94. Expertise: Chassis and suspension design, composite & traditional manufacture. Currently resides in: UK First Car: Austin Mini. Favorite racecar: Williams FW07 and Red Bull from 2009 on. Design Judge since: 1996

**Jerry Grandov:** Alma Mater: Rutgers University: BS in Applied Physics Employment History: 1996 Co-Founder of Shadow Racing Products 15+ years experience in Telecom R&D with Bell Labs Lucent Technologies / Alcatel-Lucent / Nokia Expertise: Cockpit adjustable suspension products. Vehicle Dynamics. Trackside racecar setup. Metal fabrication and manufacturing. CAD & FEA. Racing experience covers such diverse classes as IndyCar, NASCAR Busch Series, Silver Crown, Formula Ford, NEMA Midget, Formula Mazda, Super Stock, Pro Stock, Dirt Modified, Dirt Late Model, Super Modified, TQ Midget, Shifter Kart, Quarter Midget and of course FSAE. 1994 FSAE Best Prototype Fabrication Award Currently Resides in: NJ First car: '79 Chrysler Cordoba (With rich Corinthian leather seats) Favorite Race Car: McLaren MP4/4 Design Judge since: 2005 FSAE Volunteer since: 1996

## DESIGN JUDGE BIO CONTINUED

**Alastair Grey:** Alma Mater: University of Western Australia BEng(Hons) in Mechanical Engineering and BSc in Physics and Applied Mathematics. Oxford Brookes University MSc in Motorsport Engineering. Employment History: '16+: Roush Fenway Racing, '13-'15: Honda Performance Development, '11-'12: Richard Petty Motorsports, '10-'11: Stone Brothers Racing Expertise: Computational Fluid Dynamics, External Aerodynamics, High Performance Engine Induction Systems, Vehicle Dynamics Currently Resides in: NC First Car: '92 Mitsubishi Magna Favorite Race Car: tie between Porsche 904 and 917 Design Judge since: 2017

**Christoph Hahn:** Alma Mater: Technical University of Munich: Ph.D. in Mechanical Engineering (Dr.-Ing.) Employment History: '13+: MathWorks Inc., Technical Education Specialist. Expertise: Simulation and modeling. Computational mechanics, CFRP manufacturing. Physical testing and validation of simulation approaches. Hobby: Pilot. ICAO certified to repair FRP components. Currently Resides in: Munich, Germany First car: '96 VW Passat Favorite Race Car: Porsche 356 Judge since: 2013 (FSG, FSUK, FSAE (Lincoln & Michigan), & FSI... so far!)

**Andy Hartsig:** Alma Mater: Michigan State University: BS and MS in Mechanical Engineering. Employment History: '08+ Honda R&D Americas, Inc.: Engine Research. Expertise: Engine/Powertrain calibration, Fuel Economy testing Currently resides in: OH First car(s): '93 Chevy K1500, '83 Jeep CJ-7 Favorite racecar: Audi R10 TDI, 1st Diesel-powered to win 24 Hours of Le Mans Design Judge since: 2015

**Edward Heil:** Alma Mater: Kettering University: MS Automotive Systems, BS Mechanical Engineering Employment History: '01 – '14: Robert Bosch LLC - Technical Expert Brake and Chassis Controls '14+: General Motors –Lead Chassis Controls Systems Engineer Expertise: ABS, TCS and ESC chassis controls. Brake foundation and actuation system sizing and integration. Regenerative braking and electro-mechanical braking systems. Autonomous vehicle fault tolerant braking systems. Currently resides in: MI First car: '67 Mustang Favorite racecar: P. Jones / B. Stroppe "Big Oly" off road racing Bronco Design Judge since: 2015

**Adam Hemmingson:** Alma Mater: South Dakota School of Mines and Technology: BS in Mechanical Engineering Technology Employment History: '12 – '13: Ilmor Engineering, Inc: Trackside, Design Engineer; '13 – '15 FEV INC: Powertrain Design and Development. '15 – '16 Plasan INC: Composite Product Engineer Expertise: Composites design & manufacture, & Aerodynamics Currently Resides in: MI First car: '40 Dodge Coupe Favorite Race Car: Allard J2x-C Design Judge since: 2017

**Edwin Ho:** Alma Mater: University of Waterloo, Bachelor of Applied Science – Mechanical Engineering Employment History: '95-'16: Chrysler – Vehicle Development, Chassis Design, Vehicle Dynamics. '16-'17: Ford – Ford Performance Vehicle Engineering/Vehicle Integration Expertise: Vehicle dynamics, vehicle integration, and chassis design Currently Resides in: MI First car: '89 Honda Civic Si Favorite Race Car: Williams FW11 Judge since: 2017

**Edward M. Kasprzak:** Alma Mater: University at Buffalo, SUNY: BS, MS and PhD in Mechanical Engineering Employment History: President: EMK Vehicle Dynamics, LLC; Associate: Milliken Research Associates, Inc. ('96+); Co-founder and co-director, Formula SAE Tire Test Consortium (volunteer position, '04+) Expertise: Tire testing and modeling, vehicle dynamics, stability & control, vehicle simulation, driving simulators, suspensions. SAE Industrial Lecturer Currently Resides in: NY First Car: '86 Oldsmobile Delta 88 Royale Favorite Race Car: Oswego and ISMA Supermodifieds Judge Since: 2011

**Jeremy Keller:** Alma Mater: University of Windsor Mechanical Engineering '04 Employment History: Roush Industries: Powertrain Development Engineer '04+ Expertise: Exhaust Aftertreatment, Prototype and Production Engine Development Currently Resides in: Ontario First Car: 1981 Buick Regal Favorite Race Car: Ford GT40 Design Judge since: 2016 Tech Inspector since: 2005

**Will Kerley:** Alma Mater: McGill University: BEng - Mechanical Engineering. Employment History: '12-Present: Multimatic: Design Engineer; '11: Newman/Haas Racing: Data Engineer. Expertise: Design and development of vehicle suspension/structures, data acquisition and on-track testing of road/race vehicles. Currently Resides in: Toronto, ON. First car(s): 1990 300ZX (turbos added soon after). Favorite Race Car: Williams FW14B/FW15 Design Judge Since: 2016

**Drew Kessler:** Alma Mater: Purdue University. Employment History: '07+: Penske Racing South, NASCAR Design Engineering; '06-'07: Newman/Haas Racing, design and data engineering Expertise: Chassis and suspension design, structural analysis, testing, and model correlation Currently resides in: NC First Car: '88 Dodge Grand Caravan Favorite Race Car: Porsche RS Spyder Design Judge Since: 2008

## DESIGN JUDGE BIO CONTINUED

**Victor M. Kiss:** Alma Mater: Lakehead University, BS Mechanical Engineering / Centennial College, Mechanical Engineering Technology Employment History: Ford Motor Company – Global Engine Engineering - Turbocharger design and application engineer. Past: Systems Engineering, CAD, 1D/1D3D CAE Engine Modelling, Ford Racing Controls & Calibration Expertise: Engine Design/Development & Engine Boosting Currently resides in: ONT / MI First car: 1987 4cyl Mustang with a built 2.3Turbo SVO engine Favorite race car: '66-'69 MKII Ford GT40 Design Judge since: 2014

**Joseph M. Krzeminski:** Alma Mater: Bradley University: BS in Mechanical Engineering. Employment History: '09 – '15: United Conveyor Corporation: Product Development Engineer '16 – present: Tesla Motor Company: Product Manager, Accessories Expertise: Past FSAE competitor, chassis design and ergo team, driver. Autocross with personally owned FSAE car, BMW CCA, Chumpcar World Series racing Saabs. Currently resides in: CA First car: '95 Mustang GT Favorite racecar: '66 Ford GT40 Mk II Design Judge since: 2010

**Alan Kulifay:** Alma Mater: Lawrence Technological University: Mechanical Engineering. Employment History: 2005-Present: Joe Gibbs Racing: Design Engineer, 2002-2005 Rieter Automotive: Material Test Lab Manager, NVH Test Engineer. Expertise: Chassis and Suspension Component Design and Development, CG and Compliance Prediction and Testing. Currently resides in: NC. First Car: 1986 Dodge Ram ½ Ton. Favorite racecar: Chaparral 2E Design Judge Since: 2012

**Kevin Kwiatkowski:** Alma Mater: University of Michigan: BS in Mechanical Engineering. Employment History: '09+: Pratt & Miller Engineering: Design Department Director; '99-09 Raetech Corporation: Project Engineer; '06+: Kiggly Racing LLC: President. Expertise: Chassis, Suspension, and Powertrain Design and Development, Military Ground Vehicle Occupant Protection Systems. Currently Resides in: MI First car: '94 Ford Escort (I have a hatred for underpowered cars ever since) Favorite Race Car: 1926 Miller 91 FWD – Innovation counts. Judge since: 2015

**John Lankes:** Alma Mater: Michigan State University: BS in Mechanical Engineering. Employment History: '06+: Pratt & Miller Engineering: Trackside Engineer, Design Engineer Expertise: Chassis Design and Development Currently Resides in: MI First car: '92 Eagle Talon Favorite Race Car: Audi R10 Design Judge since: 2010

**Philip LaPointe:** Alma Matter: Wentworth Institute of Technology: BS in Mechanical Engineering Technology. Employment History:.. '91-'07 Honda R&D Americas, Inc.; Suspension Design Engineer, Chassis Design Manager and Technical Leader '07-'15 Honda Performance Development, Inc.; Chassis Design and Development Manager as Principal Engineer then Chief Engineer including aerodynamics, transmission, bodywork '07,-'11 LMP2. '09 LMP1, '12-'15 IndyCar DW12 including Engine installation, HPD Aerokit composite design. Wind tunnel program management; HPD Performance Engineering Chief Engineer. '15+: Honda R&D Americas, Inc.; Manager of Technical Information Management. Expertise: Suspension, Brakes, Wheels, Axle, Mounts, Exhaust, Brakes, Steering, Cooling, and Aerodynamics. Currently Resides in: OH First Car: VW Super Beetle Favorite Race Car: '09 Acura LMP1 ALMS Champion Design Judge since: 2010

**Luke Legatt:** Alma Mater: University of North Dakota: BS in Mechanical Engineering Employment History: Honda R&D Americas '09+ Expertise: Automotive closure design. Including experience in white body and assembly part design Currently Resides in: OH First car: '87 Toyota 4-Runner Favorite Race Car: McLaren Honda MP4/4 Design Judge since: 2011

**Eric Leichtle:** Alma Mater: University of Texas at Arlington: BSME Employment History: '10+ Pratt & Miller Engineering: Race Engineer – Cadillac Racing, Design Engineer; '07 – '10 Taylor Race Engineering: Design Engineer Expertise: Suspension setup, vehicle dynamics, data analysis, mechanical design, systems integration Currently Resides in: MI First car: '48 Chevy Fleetline Favorite Race Car: Whichever one I'm currently working on Design Judge since: 2017

**Kim Lind:** Alma Mater: University of Michigan Ann Arbor: BS Mechanical Engineering. Employment History: General Motors - 25 years; Previously: Michigan Automotive Research Corp - 7 years. Expertise: Dyno testing and development; by-wire systems; active suspension systems; AWD systems; vehicle concept development demonstrating turbocharging, supercharging, AWD and DCT technologies; and pre-production vehicle architectures. Raced 9 years in SCCA & was a driving instructor for SCCA driving schools. Currently resides in: MI First car: '68 Pontiac Bonneville (small aircraft carrier). Favorite racecar: My SCCA F-Production MG Midget. Design Judge since: 2010



## DESIGN JUDGE BIO CONTINUED

**Gene Lukianov:** Alma Mater: Worcester Polytechnic Institute, Lawrence Technological University: BS Mechanical Engineering, MS Automotive Engineering. Employment History: Currently Owner and Principal of VRAD Engineering LLC, a vehicle design, consulting and service company. Chrysler: 22 years in vehicle dynamics tuning, development and analysis. Gabriel Shocks: 7 yrs. shock absorber design, manufacturing and tuning, also automotive brake design and weapons. Expertise: Specialist in all aspects of Chassis design, vehicle dynamics, calculations, development, tuning and subsystem/component manufacturing and performance. Currently resides in: MI First car: '61 Volvo 544. Favorite racecar: Ford GT40 (THE Original One). Design Judge since: 1999

**Kim Lyon:** Alma Mater: University of Minnesota / Minneapolis: BS Mechanical Engineering, BA Chinese. Employment History: '84 – '08 Chrysler Powertrain Engineering, Advanced Engine Systems Senior Specialist, VVT engine development – I4, V6, V8, V10; LeMans LMP 900 engine and chassis systems development; hybrid electric Le Mans racecar (Patriot Project); Formula One engine, chassis systems, and calibration development- Lamborghini Engineering. Expertise: Calibration, data acquisition, software design & coding, engine and chassis dyno testing, turbocharger and auto-manual transmissions development, modeling and simulation. Currently resides in: MI First car: '66 Chevy Impala SS (327c.i. 4-speed). Favorite racecar: Lola T70 coupe, Porsche 962, Nissan GTP, '93 F1 McLaren MP4/8. Design Judge since: 2003

**Luca Mantovano:** Alma Mater: University of Wisconsin – Madison: BS in Mechanical Engineering. Employment History: '11 – present: Ford Motor Company: Hardware Controls Integration Engineer. Expertise: Powertrain Design and Development, engine dynamometer testing, data acquisition / post processing, combustion development, engine calibration/ controls, wiring harnesses. Currently resides in: MI First car: 1990 Nissan 240sx Favorite Racecar: Formula One Ferrari F2004 (winning 15 out of 18 races) Design Judge since: 2011

**Greg Massey: Alma Mater:** The Ohio State University: BS in Mechanical Engineering Employment History: '15-'16 Bosch Chassis Controls Traction & Stability Control Calibration. '16+ Tesla Chassis Controls. Expertise: Vehicle Dynamics, Brakes, Data Acquisition & Analysis Currently Resides in: MI First car: Honda Civic Favorite Race Car: Brawn GP 001 Design Judge since: 2017

**Kyle McArver:** Alma Mater: North Carolina State University: BS in Mechanical Engineering. Employment History: '06 – present: Roush Fenway Racing: Junior Aero Engineer '06-'08; R&D Team Engineer '09-'10; Race Engineer + Simulation Engineer '11-'14; #17 Team Race Engineer, '15-'16; Race Support Group Engineer, '17 Expertise: Overall vehicle dynamics, vehicle simulations, suspension, aerodynamics / wind tunnel testing Currently Resides in: NC First Car: '83 Mercedes Benz 300D Favorite Race Car: '67 Lotus 49 Design Judge since: 2017

**Doug Milliken:** Alma Mater: MIT, '77. Employment History: Milliken Research Associates (MRA) since '77, also independent consulting. Co-director of the FSAE Tire Test Consortium (TTC). Expertise: Design, analyze (see "Race Car Vehicle Dynamics"), build, test, repeat. Tire modeling. Currently resides in: NY First car: 2-seat rear engine project, using Corvair parts (high school). Favorite race car: Maybe the Lotus 11? 143 mph (230 kph) lap at Monza w/1100cc in 1956 Design Judge since: 1995

**Ryan Moody:** Alma Mater: University of Texas at Arlington: BS in Mechanical Engineering, minor in Material Science Employment History: 2013+: SpaceX, Space Suit Engineer Expertise: Structural analysis, testing, materials, and system design architecture Currently Resides in: CA First car: '06 Mazda RX-8 Favorite Race Car: Mazda 787B – Rotary engine powered car that won 24 hours of Le Mans with no significant mechanical problems Design Judge since: 2017

**Luke Morrow:** Alma Mater:..University of Newcastle, Australia; BS in Mechanical Engineering Employment History: '07-'08 Prodigy Motorsport (Australian V8 Supercars, Development Series), Data Engineer; '08 General Motors Holden, Chassis Design Release Engineer; '08-'14 Toyota Technical Center Australasia, Senior Customer Quality Engineer; '14+ Tesla, Staff Product Support Engineer Expertise: Chassis and Mechanical Structure, Data Acquisition, implementation, and analysis, Electric Vehicle Powertrain architecture / design / safety / performance and Mechanical Systems Integration packaging / manufacturing / serviceability Currently Resides in: CA First car: '76 Volvo 244DL..Favorite Race Car: Ferrari F2002 - beautiful and effective (see Pomeroy Index) Design Judge since: 2009 (at FSAE-A)

## DESIGN JUDGE BIO CONTINUED

**Anthony Musci:** Alma Mater: Michigan Ross School of Business MBA, Rutgers BS Mechanical and Aerospace Engineering Employment History: current - JetHeat LLC, VP of Product and Business Development. Team Leader for Design and Development – Aston Martin V12 engine program. Mechanical Design Leader for Honeywell line of home-standby and portable generators. Ford Motor Company Advanced Powertrain Engineering. Expertise: Powertrain Design and Development. Jet Engine Design and Development. Aerodynamics. Electronic control systems, simulation, and Data Acquisition Currently Resides in: MI Favorite Vehicle: actually an aircraft – North American X-15 Judge since: 1998

**Marc Musial:** Alma Mater: Western Michigan University: B.S. Automotive Engineering. Employment History: Started at Chrysler in '91. Moved to Saleen for 1.5 years in '08 and returned to Chrysler in '09. Expertise: Engine systems (combustion, Air Flow, Calibration, Controls and dynamometer testing). Latest development project: Hellcat. Technical lecturer and driving instructor. Worked on Chrysler's North American Touring Car Race Team. Currently resides in: MI First car/coolest car: '68 Chrysler Newport that I got from my grandfather. 2002 Dodge Viper GTS Coupe Favorite racecar: North American touring cars or touring cars in general. (door slammer race cars like NASCAR used to be) Design Judge since: intermittently since 1996

**Bhushan Nagarajan:** Alma Mater: University at Buffalo, SUNY: MS in Electrical Engineering. M. Visvesvaraya Institute of Technology, VTU: BE in Electrical & Electronics Engineering Employment History: '15-Present: Rivian Automotive; Sr. Powertrain Engineer, '11-'15: FEV Inc.; Electronics & Controls Engineer Expertise: Hybrid Powertrain Controls, Vehicle Simulation, Vehicle Integration-Electrical Currently Resides in: MI First Car: '08 Nissan Altima Favorite Race Car: Audi R8 V10 Design Judge since: 2017

**Jacob Oberlin:** Alma Mater: U. of Michigan: Computer Engineering. Employment History: '11 – present: Tesla Motors: Firmware Engineer. '10: MRacing Chief Powertrain Engineer. Expertise: Automotive firmware and electronics, powertrain and HVAC thermal systems, Data acquisition, 12V battery system charging and wiring harness design, lithium ion battery modeling. Currently resides in: CA First car: '96 Ford Thunderbird LX Favorite Racecar: Williams FW15C – From a time when engineers did the racing Design Judge since: 2014

**Erich Ohlde:** Alma Mater: University of Kansas – Lawrence: Mechanical Engineering FSAE '04-'09. Employment History: Fiber Dynamics '09-'10, Tool and die designer for USF1 projects; Pratt & Miller Engineering '11-'14, Systems/Data Acquisition Engineer; GM R&D projects & Corvette Racing. Robert Bosch '14 +, Motorsport Engineer. Expertise: Data Acquisition/Control Systems, Wiring harness design and manufacture Powertrain design and calibration. Currently resides in: MI First truck: '96 Mazda B-Series Pickup. Favorite Racecar: Chaparral 2J Design Judge Since: 2014

**Bret Olsen:** Alma Mater: University of Windsor: Mechanical Engineering with Automotive Option. Employment History: '08 – Present: Chassis Controls Application Engineer, Robert Bosch LLC. '06 – '08: Body Structures Engineer, TAC Automotive. Expertise: 8 years experience in Automotive industry. Automotive Body Structures, Brakes, Chassis Controls, Data Logging, Embedded Control Software. Currently resides in: Ontario, Canada. First Car: '88 GMC Sierra 1500. Favorite Racecar: 1975 Ferrari 312 T Design Judge since: 2014

**Henning Olsson:** Alma Mater: Dartmouth College, Mechanical Engineering Employment History: '07-'09: Ohlins Racing; '09-'14: Optimum G; '15+ Calspan Expertise: Tire performance testing and analysis, tire and vehicle dynamics simulation, motorsports performance engineering, numerical methods Currently Resides in: CO First Car: '77 Opel Kadett 1.2, 52 hp and RWD Favorite Race Car: Toyota TF110 Design Judge since: 2017

**Brett Oltmans:** Alma Mater: Rochester Institute of Technology: Mechanical Engineering with Automotive Focus. Employment History: Polaris Industries '96 – current. Ford, 5 yrs. Expertise: Dyno calibration, Alternative fuels engine design and calibration, Alternative fuels engine design and calibration, Induction system design, boosted and N.A. Currently resides in: MN First car: A rusty '71 Datsun 240Z. Favorite racecar: My ITS Datsun 240Z, car #06. Design Judge since: 2008

## DESIGN JUDGE BIO CONTINUED

**Mike O'Neil:** Alma Mater: University of Akron, BS and MS Mechanical Engineering, competed in FSAE the first four years of their program Employment history: Technical Director for Tilton Engineering, Inc. for 14 years, Technical Director at Essex Parts Services, Inc. since 2010, works with a wide variety of teams in professional sportscar, NASCAR, Indycar, and other forms of racing Expertise: Racing brake, clutch, and driver control systems, dynamometer testing of brake systems, holds a patent related to his work developing a machine and process for bedding brake discs and pads, wide experience with most areas of a racing vehicle, testing, and manufacturing processes. 2009 AMA flat track motorcycle amateur national champion. Currently resides in: NC First car: '73 Chevy Nova Favorite race car: Ford GT40 Design Judge since: 1998 Served as Chief Design Judge for FSAE West from formation through 2012 and in Lincoln, Nebraska before stepping down to work more with the students and focus on training new judges.

**Sriram Pakkam:** Alma Mater: North Carolina State University, MS in Aerospace Engineering. Employment History: '11-'14 General Motors Racing. '14-present: Chrysler SRT. Expertise: Racecar aerodynamics, Aerodynamic design leveraging wind tunnel testing and CFD. Currently resides in: MI First Car: '04 Mazda RX-8. Favorite Racecar: Porsche 917K and 917/30. Design Judge since: 2014

**Chris Patton Ph.D.:** Alma Mater: Oregon State University: BS, MS and PhD in Mechanical Engineering Employment History: '13-'14: Caterham F1; '14-'15: Nissan LMP1, '16+: SpaceX Expertise: Dynamics, numerical methods and simulation: Tire modeling, vehicle modeling, lap simulation Currently Resides in: CA First Car: '73 BMW 2002 Favorite Racecar: 1928 Bentley Speed Six (200 hp 6.5 liter 6 cyl. w/ 6.1:1 comp.) 1929 Le Mans winner, & (at the time) THE most powerful car in the world. Design Judge since: 2015

**Andrew Pautsch:** Alma Mater: South Dakota School of Mines and Technology, BS Mechanical Engineering Employment History: '11+: Robert Bosch LLC, 2011-2015 Diesel Aftertreatment, '16 – Bosch Motorsport Diesel Projects Expertise: Calibration, diesel fuel injection, diesel aftertreatment Currently Resides in: MI First car: '92 Pontiac Grand Am (manual, mercifully) Favorite Race Car: Lancia Delta S4 Group B – 1.8L, Turbocharger, Supercharger, and capable of 1000 hp.... What's not to like? Design Judge since: 2013

**Joseph Penniman:** Alma Mater: San Jose State University: Mechanical Engineering Employment History: Tesla Motors since '12, FSAE volunteer since '11, initiated SJSU FSAE in '08 as suspension lead and chief engineer Expertise: Sensing system design and development. Mechanical system design and development. CAN bus. Suspension and chassis design. Currently Resides in: CA First car: 1976 Datsun 280z Favorite Race Car: Bob Sharp CP 280zx Design Judge since: 2015

**Aratz Pinter:** Alma Mater: Tecnun, University of Navarra, Industrial Engineering, MS Mechanical Engineering '13 University of Sheffield Aerospace Engineering '12 Employment History: Nissan Technical Center Europe 1+ years Drivability and Acceleration Performance Engineer. Gearbox and IC calibration. FSE team leader Expertise: Mechanical Design, IC Powertrain, Aerodynamics Currently Resides in: MI First car: '05 Toyota Aygo Favorite Race Car: Mazda 787b Design Judge since: 2014 (Formula Student Spain)

**Benjamin Pohl:** Alma Mater: University of Florida, Mechanical Engineering. Employment History: Ford Motor Company '00-'03 in Chassis Engineering, Brembo North America '03-Present as a Program Manager. Expertise: Chassis Design, Vehicle Dynamics, emphasis on Brake Systems. FSAE Competitor 4 years. Currently resides in: MI First Car: '95 Acura Integra GS-R. Favorite Racecar: Ferrari 333SP Design Judge since: 2014

**François Rainville:** Alma Mater: ÉTS : BS in Automation engineering Employment History: '08+: Effenco Hybrid Solutions, Inc: R&D Director Expertise: Efficiency optimization, data acquisition and data analysis system, electric motor control, embedded control systems, live vehicle monitoring, system integration Currently Resides in: Montreal First car: '93 Honda Civic Favorite Race Car: Audi R10 TDI, This car was a proof that fuel economy and performance could work together very well Judge since: 2011

**David Redszus Ph.D.:** Alma Mater: Northwestern University: BS Industrial Engineering and Economics, MS Systems Management and Operations Research, PhD Product Development Processes. Employment History: Precision AutoResearch (founder, 25 yrs), Over 35 years total (research, engineering services, and specialty products for the motorsports industry). Expertise: Technical consultant, engineer, coach, and racer, advanced driving techniques, vehicle design, and engine development. Data analysis techniques and ability to translate complex issues into racer-understandable language. Currently resides in: IL First car: '70 Porsche 911S Targa. Favorite racecar: What other than the Porsche 917-30? Or any other car which causes rules-changes ex-post should be a favorite! Design Judge since: 2004

## DESIGN JUDGE BIO CONTINUED

**Richard Reichenbach III (Son):** Alma Mater: Michigan State University: BS Computational Mathematics. Employment History: '11 – present: Pratt and Miller: Analyst / Tire Modeling Engineer: '09 – '11 Roush Fenway Racing – Design Engineer: Expertise: Mechanical Simulation, Chassis Design, Tire Modeling: Currently resides in: MI First car: Fiat X1/9 Favorite Racecar: Cadillac ATS Design Judge since: 2012

**Mike Reising:** Alma Mater: Purdue University: Electrical Engineering Technology Employment History: MoTeC Systems East, Applications Engineer. Electronics Lead, and Chief Engineer FSAE Expertise: Embedded circuit design/programming, Data Acquisition, Human-machine interfacing Currently Resides in: NC First Car: '84 Mercedes 300d turbo diesel Favorite Racecar Race bike: My Yamaha R6 Design Judge Assistant since: 2017

**Russell Richards:** Alma Mater: Virginia Tech University: BS & MS in Mechanical Engineering. Employment History: General Motors, '07-'12: test engineer, '12-'16: suspension design engineer, '16+: Global technical lead for control arms, springs, anti-roll bars, isolators, and SLA suspensions. Expertise: Vehicle dynamics and suspension systems. Currently Resides in: MI First car: '88 Pontiac Firebird Trans Am Favorite Race Car: Swift 007i – my favorite racing series growing up was CART, and being American made I thought when I grew up I could be working there designing a Champ Car..... Design Judge since: 2014

**Conor Riordan:** Alma Mater: Western Michigan University: BS Mechanical Engineering; University of Notre Dame: ME Mechanical Engineering. Employment History: '09 - '12: Hamilton Sundstrand, Aircraft Emergency Power Systems, Mechanical Design Engineer; '12+: Woodward, Inc., Aircraft Turbine Combustion Systems, Senior Research and Development Engineer Expertise: Primary and secondary turbine engine combustion (fuel nozzles and after burners), Aircraft emergency power systems, Topology optimization, High temperature superalloys, Additive Manufacturing, Abrasive flow machining Currently Resides in: MI First car: 1996 Buick Regal Custom Favorite Race Car: Aston Martin DB9R Design Judge Since: 2012

**Tony Roma:** Alma Mater: LTU (BSME) / Purdue (MSE) Employment History: General Motors since '93: Transmission Calibration (4L60e) / Engine Development (Small Block) / Powertrain Integration (Corvette) / Powertrain Program Manager (Cadillac World Challenge Program) / Engineering Group Manager for Vehicle Integration (Cadillac V Series) / Sr Engineering Group Manager for High Performance Vehicle Operations / Camaro Performance Variant Manager (responsible for the ZL1) Expertise: Powertrain Integration and Chassis Engineering Currently resides in: MI First Car: '83 VW Rabbit GTI Favorite Racecar: Chaparral 2E Design Judge Since: 1998

**Steve Rosenkrantz:** Alma Mater: BS in Mechanical Engineering from University of Delaware, '14 Employment History: Body Design Engineer at Honda R&D Americas, '14 – present. Expertise: Mass production platform design Currently resides in: OH First car: 2002 Saab 9-5 Favorite race car: Blue Hen Racing's 2014 FSAE car! Design Judge Assistant since: 2015

**Claude Rouelle:** Alma Mater: Institute Gramme, Belgium: Industrial Engineering MSc. Master Thesis on the design and manufacture of a wind tunnel and racecar. Employment History: Including, but not limited to: Racing a Formula Ford designed & built while completing his Master Thesis. Race Engineer for Volvo, Toyota and Alfa Romeo (European Touring Car Championship / European Rally Championship). Race Engineer for French Formula 3 Team Oreca. Development Engineer for AGS Formula One team. Technical Representative for Reynard in Japan. Technical Advisor for Apomatox Formula 3000 team, various Indy Lite Series Teams, CART Teams, Endurance Teams, and Le Mans series cars. Founder of Optimum G (racecar engineering consulting) '97-current. Expertise: High performance and racecar designer, research and development engineer with over 35 years of experience in design, simulation, data analysis and data base management. Hundreds of 3 to 12 day Vehicle Dynamics Training Seminars (presented to automotive manufacturers (OEMs), motorsports engineers and university students). Over 11,000 professionals taught since '97... and counting. Consulting services for passenger cars and race teams on all continents, and almost all countries in the world. Design and support kinematics, tire modeling. Vehicle dynamics and lap time simulation software. Currently resides in: CO First car: 15 yo Renault-4 Station Wagon with a heavy CNG reservoir on the roof. (It helped to understand the influence of CG height on weight transfer!) Favorite racecar: The next one we are designing. Design Judge since: Cars have had wheels

## DESIGN JUDGE BIO CONTINUED

**Dev Saberwal:** Alma Mater: University of Manitoba, BS in Physics. Wayne State University, MS in Mechanical Engineering. Employment History: '94+, Ford Motor Company including Mustang powertrain calibration, Jaguar Formula 1 engine calibration, Ford Racing Parts, and Ford Motorsports calibration supervisor for IMSA GTLM, GT4, and WEC GTE entries. Expertise: Engine controls, calibration, and mapping. Currently Resides in: MI. First Car: '84 Dodge Colt. Favorite Race Car: 2016 Le Mans winning Ford GT. Design Judge since: 2013.

**Jeff Scheurer:** Alma Mater: The University of Alabama: BS in Mechanical Engineering. Employment History: '09-present: Honda R&D Americas, Inc. Expertise: Seat design, safety, and comfort. Currently Resides in: OH. First Car: 1990 Nissan 300ZX. Favorite Race Car: 2017 Acura NSX GT3 - Judge since: 2011.

**Eric Schieb:** Alma Mater: Georgia Institute of Technology, BS in Mechanical Engineering, '92. Employment History: Electron Speed '06 to present, GM, CMI, Kelsey-Hayes, TRW Automotive, Elan Power Products, specializing in: System-level, data-driven development of chassis and powertrain controls. Expertise: Data-based, System-level development. Currently resides in: GA. First car: Mini 1000. Favorite Racecar: The one that is making me think. (FSAE car, various Road Racing Karts, Elan DP02). Design Judge since: 2003.

**Preston Schipper:** Alma Mater: University of Colorado at Boulder: BS in Computer and Electrical Engineering. Employment History: Pi Innovo – 4 years semi active suspension controls and brake based chassis controls, Bosch – 3 years gasoline powertrain calibration and motorsport software/systems engineering. Expertise: Powertrain controls, chassis controls, embedded software, Simulink rapid code prototyping, motorsport electronics. Currently resides in: MI. First car: 1990 Ford Thunderbird. Favorite Racecar: 2000 Audi R8, first GDI racecar. Design Judge since: 2014.

**Matthew Schmalenberg:** Alma Mater: Oakland University: Mechanical Engineering. Employment History: '11+: GKN Driveline - Applications Engineer. Expertise: Active Driveline Design and Development. Currently Resides in: MI. First Car: '95 Chrysler Concorde. Favorite Racecar: DeltaWing. Design Judge since: 2017.

**Jason Schwanke:** Alma Mater: University of Wisconsin – Madison; BS in Mechanical Engineering. Employment History: 2009-present: Robert Bosch LLC; Sr. System Engineer responsible for advanced combustion controls and micro/mild-hybrid system development. Expertise: Powertrain controls and combustion development. Embedded software system development. Powertrain cooling design. Currently resides in: MI. First Car: '82 DeLorean DMC-12 with a twin turbo Chevy 350 V-8. Favorite Racecar: McLaren MP4-4. Design Judge Since: 2009.

**Jake Seeger:** Alma Matter: South Dakota School of Mines & Technology BS in Mechanical Engineering. Employment History: 2012+: FEV Engine Technology Inc: 1'2 - '16 engine structures at FCA, '16 - present camshafts & timing drive. Expertise: Powertrain. Currently Resides in: MI. First Car: Crown Victoria. Favorite Race Car: BRM H16. Design Judge Since: 2017.

**James Shaw:** Alma Mater: University of Pittsburgh, '02. Employment History: Managing Director of Fastway Engineering; Teaching CAD/CAE classes and consulting based on experience from Aerospace, Automotive, Manufacturing, & Electronics Industries. Expertise: CAD/CAE software, Electronics Packaging, Chassis and Suspension design. Currently resides in: MA. First car: '85 Oldsmobile Cutlass Supreme. Favorite race car: Audi R18. Design Judge since: 2015.

**Ana Sopalovic:** Alma Mater: Tecnum, University of Navarra, Industrial Engineering, MS Mechanical Engineering '12. Employment History: GKN Driveline, '13+ electric powertrain design, development and integration. Started the Tecnum FSE Team in '10. Expertise: Mechanical Design, Electric Powertrain, System Integration. Currently Resides in: MI. First car: '98 Rover 623GSi. Favorite Race Car: Shelby Cobra 427. Design Judge since: 2014 (Formula Student Spain).

**Ken Sperry:** Alma Mater: Highland Park High School. Employment History: U.S. Army. General Motors: Chevrolet engineering Tech. Kinsler Fuel Injection, then back to GM: Chevrolet Engineering, Technician Air Flow Development. Engineer, Air Flow Dev. Manager, Inline Engine Dev.; Gas Engines; Hi-Performance Vehicle Operations-Powertrain. Retired G.M.: '07. Consultant, Experimental Engine Development: '08-current. Expertise: Air Flow Development of Engine components. Power and supporting engine system development. Currently resides in: MI. First car: '57 Chevy 1500 Businessman's Coupe, 220hp/283, 3 speed, 4.11 axle. Favorite Racecar: M8B McLaren (Can Am), Chaparral 2E (Can Am). Design Judge since: 1990.

## DESIGN JUDGE BIO CONTINUED

**Ron Sperry:** Alma Mater: General Motors Institute: BS Mechanical Engineering Major studies in Powertrain. Employment History: Retired from General Motors after 44 years with experience in production and performance engine design. Production design, after market applications and enhancements of production components, engineering support in performance engine components, Production Release Engineer, V8 group and GM Racing Group supporting the Corvette and NASCAR racing series. Currently working for GM Racing group as a contract employee. Expertise: Engine design, component design and development. Currently resides in: MI First car: '62 Chevy Impala SS - 409/409. Favorite racecar: C5R Corvette. Design Judge since: 1995

**Étienne St-Laurent:** Alma Mater: École de Technologie Supérieure: BS in Mechanical Engineering Technology Employment History: '14 – '15 Brimotion: Automation and control system engineer; '16 + Bosch Motorsport: software and application for engine and brake control Expertise: Motorsport engine calibration, ABS calibration, data acquisition and telemetry Currently Resides in: MI First car: '91 Honda Civic (can reach 192 km/h on a frozen lake in Canada, this has to be some kind of record) Favorite Race Car:..Audi R10 LMP1 Design Judge since:..2017

**Garrett Stockburger:** Alma Mater: University of Minnesota – Twin Cities: BS and MS in Mechanical Engineering. Employment History: '04-'07: Honda R&D Americas, '07-'09: Honda Performance Development, '09: Honda R&D Americas, '09-'11 Honda R&D (in Japan), '12+: Honda R&D Americas. Expertise: Powertrain Design and Development. Practical experience is biased towards engine performance specification setting, testing, dyno automation and 1D engine simulation Currently Resides in:..OH First Car:..Rusted out '80 Chevy Suburban Favorite Race Car: I would go with favorite race car type, which would be GT Design Judge Since:..2007

**Mike Tam:** Alma Mater: Virginia Tech '06 Employment History: '08+ Roush Fenway Racing; '07-'08 Brewco Motorsports Expertise: Vehicle Dynamics; Computer Simulation; Track Testing & Data Acquisition Currently resides in: NC First car: '87 Mazda Rx-7 Turbo II Favorite racecar: Ford Focus RS WRC Design Judge since: 2015

**Steven Taylor:** Alma Mater: University of Akron: BS in Mechanical Engineering Employment History: '14 – present: SpaceX: Structures Engineer. '07 – '14: General Motors; Powertrain Lubrication and Ventilation Engineer Expertise: Powertrain lubrication system design & testing Currently Resides in: CA First car: '73 Pontiac Firebird Favorite Race Car: AC Cobra Design Judge since: 2016

**Salvador Toledo:** Alma Mater: University of Puerto Rico-Mayaguez, BS Mechanical Engineering; University of Michigan: MS Mechanical Engineering. Employment History: Ford Motor Company since 2000, Chassis PD Supervisor and Recruiter. 1 year: DaimlerChrysler. 3 years: Drag Racing Pit Man. 3 years: Mechanic assistant. Expertise: Chassis Engineering. Currently resides in: Michigan. First Car: '00 Ford Explorer. Favorite Racecar: '09 F1 Brawn GP Car Design Judge since: 2004

**Pierce D. Umberger, Ph.D.:** Alma Mater: Virginia Tech: BS Mechanical Engineering, MS and PhD Engineering Mechanics Employment History: '08-'13: Virginia Tech Materials Response Group and US Army Research Lab; '14+: Engineering Systems, Inc., Applied Mechanics / Polymers / Composites Consultant Expertise: Composite Materials, Finite Element Analysis, Applied Mechanics. Currently resides in: GA First car: Ford Escort Favorite Racecar: '89/90 McLaren MP4/5 and 4/5B Design Judge since: 2015

**Wm Joe Vitous:** Alma Matter: Western Michigan University: BS Mechanical Engineering Employment History: '83-present: FCA (Chrysler): Body Structure Engineering '83-'99. CAE Manager '00-'07 Motorsports Aero/Thermal & Body Manager '08-'11. Production Car Aero-'12-'14: Advance Development Engineering. '15-present Expertise: Structures, Aero, Project Management & Team Leadership Currently resides in: MI. First car: '71 Chevy C-10 Favorite Race Car: Pro Stock Dragsters Design Judge since: 2016

## DESIGN JUDGE BIO CONTINUED

**Andy Vrenko:** Alma Mater: University of Akron: BS Mechanical Engineering Employment History: '01 – present: Ford Motor Company. Vehicle Dynamics and Race Development Engineer Expertise: Vehicle dynamics and production based racecar development Currently resides in: MI Favorite Racecar: Boss 302S or Cobra Jet Design Judge since: 2014

**Chris Warren:** Alma Mater: UMASS Lowell BSME 2008, MSME 2010 Employment History: '15-Present: Amalgamated Titanium International Corporation: Engineering Manager '10-'15: Naval Surface Warfare Center, Carderock Division: Mechanical Engineer, Submarine Acoustics. Expertise: Modal analysis and vibrations; experimental mechanics. Currently resides in: MA Favorite Race Car: 1966 Ford GT40 Design Judge since: 2016

**Hannah Westbrook:** Alma Mater: University of Pittsburgh: Electrical Engineering, Mechanical Engineering minor. Employment History: MoTeC Systems East. : Applications Engineer, Electronics Lead, FSAE. Expertise: Motorsports Industry, Data Acquisition systems, Electronics Integration, Powertrain, employed since 2013. Currently Resides in: NC First Car: Honda Civic 2003 Favorite Racecar: Budweiser Rocket Car. First car to go supersonic... way back in 1979! Design Judge since: 2014

**James Whisler:** Alma Mater: Iowa State University: Mechanical Engineering. Employment History: MoTec Systems East: Applications Engineer; Engine Systems Lead, FSAE. Expertise: Motorsports industry, powertrains, electronics integration, data acquisition systems. Currently resides in: NC First car: '76 Datsun 280Z Favorite Racecar: Mazda 787B Design Judge since: 2013

**Craig Wood:** Alma Mater: University of New Brunswick, BS in Mechanical Engineering, University of Windsor, MS in Mechanical Engineering. Employment History: '05+: Roush Industries; FSAE Volunteer since 2005. Expertise: Powertrain design and development, combustion analysis, engine controls and calibration, kinematics and dynamics modelling. Currently resides in: ON, Canada First Car: '69 Camaro RS/SS. Favorite Racecar: Ford GT40 Mk II. Design Judge since: 2015

**Dwight Woodbridge:** Alma Mater: Rensselaer Polytechnic Institute, University of Illinois: MS Engineering Science (Engineering Management), BS General Engineering (Automotive Engineering/Design). Employment History: General Motors – '85 to present, 17 years with GM Racing. Expertise: Program Management, vehicle test and development, aerodynamics. Currently resides in: MI First car: Triumph TR-4. Favorite racecar: Dakar Hummer H3. '10 GS Camaro. '96 Aurora GTS. Design Judge since: 2000

**Jason Wozniak:** Alma Mater: Oakland University: BS in Mechanical Engineering Employment History: '11 – '14: Drivetrain Application Engineer; '14+: Vehicle controls and calibration engineer, Software Program Engineering Manager Expertise:..Driveshaft and geared product design and development, vehicle mechatronics software and controls Currently Resides in: MI First car: '90 Ford Mustang LX Favorite Race Car: '66 GT40 Design Judge since: 2017

**Paul Yaw:** Alma Mater: University of Arizona Employment History: Owner Yawpower Products, LLC 1995 – Present Expertise: Electronic Fuel Injection, Engine Optimization, Data Acquisition and Interpretation, General Non-Aero Suspension Design, Damper Design and Tuning Currently Resides In: Phoenix, AZ First Car: Buick Skylark Favorite Race Car: Audi 200 Quattro – Driven by Hans Stuck in Trans Am Series Design Judge Since: 2017

**Katie Zielezinski:** Alma Mater: Northern Illinois University: BS and MS in Mechanical Engineering. Employment History: '14+: Hendrickson Truck: Project Engineer, Bus Business Unit; '13 – '14 Affinia Global Chassis: Product Engineer Expertise: Brakes, Suspension Design and Development Currently Resides in: IL First car: '03 Saturn L200 in Powder Blue Favorite Race Car: Audi R8 LMS Judge since: 2015

**Kevin Zielezinski:** Alma Mater: Northern Illinois University: BS in Mechanical Engineering. Employment History: '17+: Hendrickson Truck, New Products Rear Suspension Project Engineer; '13 – '17: Auto Truck Group: Engineer, Body and Rail Gear; '10+: Lorz Motorsports: Team Engineer and Driver; '10 – '13: Northern Illinois University FSAE Co-Team Captain, Suspension Team Captain, and Driver Expertise: Suspension Design and Tuning Currently Resides in: IL First car: '98 Ford Contour SVT Favorite Race Car: Oreca Viper GTS-R. Design Judge since: 2015

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