

Team Purpose

We will be designing a Formula vehicle for the 2026 SAE Formula Competition. We aim to have a car ready in time for the competition. Our purpose is to design a vehicle to compete in the SAE Formula by collaborating in design, development, and validation, expressing our engineering skills and problem-solving capabilities. By utilizing our knowledge in thermodynamics, mechanics, dynamics, and fabrication, we aim to deliver a vehicle that balances speed, handling, safety, and reliability while staying within the limits of SAE competition rules. Each member of the team brings their own individual skillset and in collaboration we will deliver solutions to real engineering problems.

Stakeholders include the SAE Formula Competition judges and staff, staff surrounding the capstone project itself, and any industry sponsors collected throughout the lifetime of the project.

Team Goals

Our team's project goal is to make a competitive build for the 2026 SAE Formula Competition. Our primary goal, in accordance with the SAE formula rulebook, is to conceive, design, fabricate, develop, and compete with a small formula style vehicle. All of this will be brought about by a strong collaboration between our team members, while simultaneously increasing our individual skills with mechanical engineering, thermodynamics, fabrication, manufacturing, and other disciplines.

Team members will contribute to the project with a high level of performance to ensure the best possible product is delivered. Collectively, our team will, of course, aim for an A in the course. We plan to prioritize communication between team members to reduce the loss of motivation and participation from members. We would like to encourage open communication between members regarding the quality of produced parts.

Team Member Personalities/Roles/Responsibilities

Trent Greene - I can be a leader, and I have building experience with several materials.

John Steffen - Focused and diligent. I have some skills in the design of machinery and basic geometrical design. Assigned to the design of frame, chassis, and aerodynamics of vehicle, as well as certification and/or proofreading of engineering calculations.

Reuben Goettee - Organized and goal-oriented. I am excellent at assembly, and am getting lathe training to aid in the fabrication process. Heading the design and assembly of the brake and steering assemblies.

Nate Winn - I have experience working on an aerodynamic package from last year and I also know a lot about cars. I am hard working and motivated to do things I am interested in.

Daniel Grimm - Flexible, easy to work with. Experience flux welding, working on personal vehicles. Responsible for chassis and structure.

Liam O'Connor - Reserved and a hard worker. I have a lot of experience working on cars, engines, fabrication, etc.

Jackson Nichols - Likes to work with hands with strong communication skills. Ready to learn and produce a project the team can be proud of.

Marshall Fritz - Detail oriented. I know how to weld TIG, stick, dual shield, and MIG. Lots of general fabrication and mechanical knowledge / experience.

Aidan Willson - Currently learning the mill and lathe in the machine shop lab and with advanced training. Friendly, detail oriented and hard working.

Chloé Meyer - Friendly and a hard worker. Suspension lead. Experience in fabrication

Maeve Jastrzebski - Organized with strong communication skills. Experience in developing and executing testing plans to ensure system reliability. On the suspension subteam and responsible for engineering calculations.

Austin Hess - Experienced with Solidworks, can lock in for long periods of time. Generally knowledgeable about cars. Pretty social and flexible.

Tanner Coles - Somewhat social and flexible schedule. Insane amount of interest in automotive engineering that strongly outweighs actual experience.

Andrew Smith - Frame-Body-Aero lead. I have experience with aero design and testing including CFD. I also have experience with racing and preparing cars for competition. A small amount of MIG experience. I'm not extremely social but I aim to be as useful as possible.

Sub team assignments:

Frame/Body/Aero (3-6)-

LEAD: Andrew Smith - Aero lead

John Steffen

Nate Winn - Frame lead

Daniel Grimm

Powertrain (4-5)-

LEAD: Liam O'Connor

Trent Greene

Jackson Nichols

Marshall Fritz

Aidan Willson

Suspension/Brakes/Steering (3-4)-

LEAD: Chloé Meyer

MANUFACTURING: Tanner Coles

CAE: Austin Hess

ENGINEERING CALCULATIONS: Maeve J.

BRAKES/STEERING LEAD: Reuben Goettee

Administrative Roles

Powertrain Subteam

Project Manager - Trent Greene

Manufacturing Lead - Liam O'Connor

Powertrain Sub-team Lead - Liam O'Connor

Document Manager (Scribe) - Jackson Nichols

Fab lead- Marshall Fritz

Suspension/Brakes/Steering

Budget Liaison (cardholder) - Robert Tanner Coles

Suspension Sub-team Lead - Chloé Meyer

Fundraising Lead - Aidan Willson

CAE/CAD Tool Lead - Austin Hess

Brakes/Steering Sub-team Lead - Reuben Goettee

Frame/Body/Aero

Chassis/Aero/Frame Sub-team Lead - Andrew Smith

Website Coordinator - Nate Winn

Engineering Calculations Proofreader - John Steffen, Maeve Jastrzebski

Technical Roles

Frame/Body/Aero Subteam

Primary CAD designer - John Steffen

Computational Fluid Dynamics (ANSYS Fluent), On-Road Testing - Andrew Smith

Structural Rigidity of Frame - Nate

Chassis and Structure Construction - Daniel Grimm

Powertrain

Thermodynamic Computations - Jackson

Engine Flow Computations - Liam

Suspension/Brakes/Steering

Brakes and Steering designer: Reuben Goettee

Ground Rules

Decision-making Process

Subgroup makes a decision → Get approval from all team leads and run by SAE Members → if all team leads say yes, the thing is approved

Should a decision involve more than two subteams, 10 members must agree to pass

Other Rules

- Weekly Team meetings at Capstone time will be decided the week before if not meeting during class time.
- Weekly Subgroup meetings
- Minutes will be recorded and filed for every Team and Subgroup meeting.
- Put Accomplishments/decisions in subgroup channels in teams
- Be nice to each other
- Violators of ground rules must sit in the corner for 10 minutes
- 2nd violation: 15 minutes face the corner, and a stern talking to.
- 3rd violation: project lead, subgroup leads, and the problem person will go to Willy
- Every team member submits their own records on timesheet
- File naming convention: FSAE26_SUBTEAM_PART_DATE:###/###_REV#
Until final iteration: name last file part "FINAL"
- Maeve submits timecards; each student is responsible for updating their own.
- Jackson will submit minutes

For the purposes of team coordination and synergy, a set of ground rules has been established. These rules will determine team conduct, expectations for individual members and teams, as well as disciplinary measures for violations of said rules. These are dynamic and will change in response to ongoing situations and changes in project direction, as well as team composition. Furthermore, many of these rules may not be hard-set. However, an expectation of adherence will exist and be enforced as necessary.

For a subteam-related decision to be approved, the sub team must first come to an agreement on the specifics of the decision and how it will affect the end product. After this decision has been finalized, it is presented to the leads of all teams as well as SAE members. If all team leads approve, the decision is implemented. In the event that a decision affects the car as

a whole, however, a 2/3rds majority (10/14 people) must approve for the decision to be implemented.

Meetings with the whole team are generally held at Capstone time, with decisions made the week prior if the meeting will not occur during Capstone. Subgroups should attempt to meet weekly at least once, multiple times if preferable. However, this is not required, as progress in a specific week may not require meetings. Meeting minutes are to be recorded for ALL MEETINGS, be it team or subteam, and minutes are to be submitted by Jackson. Progress and decisions made by individual teams are to be put into the appropriate team channel for review by other teams. All files created by individual members will follow the following format: FSAE26_SUBTEAM_PART_DATE: Month/Day_REV#. Final iteration files will add FINAL to the end part of the name. Timekeeping in regards is to be done by individual members, while submission of timecards falls to Maeve. Honesty is expected, and violations will result in an instant report to Professor Willy.

There is an expectation of civility between team members; We are all adults, and should act as such. Violations of the ground rules work on a three-strike basis. The first violation will result in the violator assigned to isolation for a period upwards of 10 minutes. The second violation will result in an isolation period of upwards of 15 minutes, followed by a meeting between violator, subteam lead and project lead. A third violation will result in an immediate meeting between project lead, all subteam leads and Professor Willy.

Potential Barriers and Coping Strategies

- Large team size means scheduling will be difficult at the best of times, even on weekends.
 - Designate subteam meetings on a regular basis, and set whole team meetings whenever possible for all parties- subteam meetings should be constant and focused.
 - If the whole team can't meet: Team leads will meet and send an update/summary of meeting in the teams
- Long working hours and stress build up could cause reduced motivation and productivity.
 - Designate teambuilding outings to increase morale and member participation. Aims to improve member relationships and facilitate communication.
- Regardless of our fundraising plans, the team may run into a lack of funds.
 - Implementing backup strategies
 - Collaboration with NAU SAE, Theta Tau
 - Gofundme/ crowdfunding
- Small team size compared to other FSAE competition teams.
 - Collaboration between members will accelerate our design process. If we do not qualify for competition, we will do our best to get the project where it needs to be for the next round of capstone students.

Shop Rules

- BEFORE TOUCHING ANY TOOLS
 - Fill out form from Trent, get it signed by Perry and have a brief conversation with him.
 - Basic machine shop safety training is required
- No personal projects allowed
- At least one shop manager must be present at all times, one person and one person only must be on payroll. Especially during build times
- 20 hours a week across all managers has been approved by Dr. Ciocanel. If an increase is warranted, make sure he has approved an increase in hours.
- The shop is on campus, which means campus substance policy applies. No alcoholic beverages or tobacco products are allowed.
 - Any student under the influence of any substance must not be allowed in the shop.
- No sleeping allowed in the shop.
- Ventilation is poor; special permission is required for chemical use and welding.
- Wear necessary PPE; this includes safety glasses or full face shield while cutting or grinding.
 - Closed toe shoes are required, even when no building is happening.
- Vertical bandsaw and belt sander; ensure shop manager knows you are using either tool before you begin. No gloves are allowed for these machines and extra precaution must be used.
- If personal tools are lent to the shop: ask before using. Return to original location.
- Use safe judgement about fatigue: if it is late or you have been working for several hours take a break.
- Clean your station before leaving if reasonable; this includes sweeping, wiping down surfaces, and returning tools.

Project Mentors

Perry Wood