

N F P A

Fluid Power

VEHICLE

Challenge

2024-25 NFPA Fluid Power Vehicle Challenge

FINAL COMPETITION - April 30 - May 2, 2025

IFP Motion Solutions, Inc. | 1610 Blairs Ferry Road NE | Cedar Rapids, IA 52402

Final Competition

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NFPA
Education and
Technology
Foundation

FINAL COMPETITION

The NFPA Fluid Power Vehicle Challenge final competition will be hosted by IFP Motion Solutions, Inc., donor to the NFPA Foundation's Pascal Society, from April 30 – May 2, 2025.

"IFP is proud to be hosting the 2025 NFPA Fluid Power Vehicle Challenge at our home office in Cedar Rapids, IA! We can't wait to welcome all of you and witness the ingenuity and creativity each team brings to the competition. Seeing your unique problem-solving approaches and innovative designs is always inspiring. Get ready for an exciting and unforgettable experience!"

-- FPVC Team at IFP

The final competition will be an exciting event where students, advisors, industry representatives, and other invited guests experience the final leg of this dynamic undergraduate engineering design challenge. Students will present and demonstrate their designs; industry representatives will judge their work, and winners will emerge.

The nature of the final competition is a three-day endeavor. Student teams travel to IFP Motion Solutions, Inc. in Cedar Rapids, Iowa on Wednesday to drop off their bikes at IFP if they have not previously shipped them and complete any necessary assembly. They get to meet other participants and industry representatives at a welcome reception that evening.

Thursday, it's back to IFP for the final presentation and design review to demonstrate the system integrity and readiness to operate. The competition kicks off when the action moves outside for the regenerative braking demonstration and the three races – sprint, efficiency, and endurance. Thursday night, all participants are invited to a networking reception and dinner in Cedar Rapids.

Competition events continue early Friday with a vehicle performance roundtable and facility tour. Then Judges deliberate while teams disassemble and crate their vehicles. To wrap up the event, everyone gathers for the final awards ceremony lunch. Teams travel home on Friday afternoon.

**This schedule may be adapted in response to weather conditions.*

IMPORTANT DATES and DEADLINES (see additional details below)

Registration by: March 3, 2025

Proof of working vehicle by: April 14, 2025

Hotel reservations by: April 15, 2025, 5:00 PM CST

Ship vehicle by: April 21, 2025 (Arrange shipping by April 10, 2025)

Final Presentation & All Mentor Summaries by: April 29, 2025

If driving, deliver vehicle by: April 30, 2025, between 12:00 - 4:00 PM

Travel Reimbursement and Award Delegation documentation by: May 26, 2025

MAP OF IMPORTANT EVENT LOCATIONS | [2025 FPVC - Cedar Rapids, IA - Google My Maps](#)

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This document is intended to provide more specific details related to the final competition event. Participants should carefully review the Overview, Rules and Awards document to ensure they understand program details and procedures.

FPVC Website

For the most up to date details and documentation, refer to the [Vehicle Challenge website](#).

SOCIAL MEDIA HASHTAG

The Vehicle Challenge hashtag is **#FPVC**. Please use this on all of your social media posts about your project and the event. And don't forget to take and share lots of photos! Show the world your vehicle, your team, and all your favorite parts of the Challenge (like your travel to Cedar Rapids, the nightly events, and the Competition). Remember to tag the NFPA and IFP on your posts (see table below) and use the hashtags:

#FPVC2025 #IFPvehiclechallenge2025 #IFPevents2025 #IFPmomentsinmotion

	Instagram	LinkedIn
NFPA	@The_NFPA	@TheNFPA
IFP	@ifp_motion	@IFPUSA

REGISTRATION

All general attendees including student teams, faculty advisors, industry supporters, judges, marshals and guests will register by **March 3, 2025**. [Register here](#).

Advisors will be asked to:

- Indicate whether the team will ship or drive and deliver their competition bike to IFP.

TRAVEL AND OTHER EXPENSE REIMBURSEMENT

For travel and qualifying expenses related to the final competition, NFPA will reimburse up to a total of \$5,000 directly to universities for one faculty advisor and up to seven students participating in the event. Advisors or university faculty will be required to submit the [Travel Reimbursement Form](#) in excel format and one PDF file of all receipts and supporting documents to NFPA's Event & Administrative Manager, Carrie Berger at cberger@nfpa.com no later than May 26th. NFPA reserves the right to deny reimbursement if expenses are unrelated to the final competition or not a qualified expense. **Travel reimbursement will be paid directly to universities, not to individuals, no exceptions will be made.** Receipts are required for every expense item, no exceptions. *If travel creates a personal or institutional financial hardship, please inform Sineigh at squinn@nfpa.com.*

Team Accommodations

Student teams and advisors are to make hotel reservations following these instructions:

Hampton Inn & Suites Cedar Rapids | 1130 Park Place NE, Cedar Rapids, IA 52402

Phone: (319) 832-1130

Check in: 3:00 PM | **Check out:** 12:00 PM

Group Name: National Fluid Power Association

Group Rate: \$119.00

Complimentary Hot Breakfast: 6:00-10:00 AM

Booking Cut-off Date for Reduced Rate: April 15, 2025, by 5:00 PM CST

To Reserve Your Room: [FPVC at IFP Team Hotel Booking Link](#) or call the front desk, (319) 382-1130. If calling -- mention our group name to ensure you receive the group rate.

NOTICE: You will not be eligible for the reduced rate if you do not book your room by the booking cut-off date.

Luggage Storage: If you plan to leave Friday, May 2nd, the hotel will have a complimentary space available to store your luggage following check-out, while attending the remainder of the

competition and the networking luncheon. To reserve a complimentary storage space, communicate this need with the front desk upon check-in. No late check-outs will be honored.

Qualifying Reimbursable Expenses:

- Team Accommodations at the hotel that NFPA designates.
- Team Transportation
 - Airfare (coach/economy flights only)
 - Auto rental
 - Trailer rental
 - Personal vehicle mileage
- Travel Related Expenses
 - Meals not provided by NFPA or Vehicle Challenge event host.
 - Taxi, Uber, Lyft, Tollways, Parking, etc.
 - Other qualifying expenses as determined by NFPA.

PROOF of WORKING VEHICLE & PHOTO

It is required that teams demonstrate your vehicle is in working condition by submitting a YouTube video to the website indicating your intent to participate in the final event. The footage must:

- Confirm that the vehicle is safe and operational with a team member riding it at least one-half of a block or better.
- Verify stored energy working off the accumulator.
- Confirm the use of pressure indicators and test point.
- Your proof of a working vehicle must be received by **April 14**. Teams can manage who can view content through privacy settings of YouTube videos. [Learn how here](#). Teams are also required to submit one photo of only their vehicle for judges to refer to during the final competition. [Submit your video here!](#)

VEHICLE ASSEMBLY

All teams are expected to arrive at IFP for Vehicle Assembly on Wednesday, April 30th, 12:00 PM to 4:00 PM.

VEHICLE TRANSPORT LOGISTICS

There are two options for transport and delivery of vehicles. 1) Drive and deliver to IFP, 2) Ship. Vehicles should be crated no matter which delivery method is chosen, although not required for drive and delivery if properly secured in a trailer. **Be sure the crate is forklift compatible.** Teams may build a crate from scratch or use a crate from a previous year. Crates must be sturdy and able to withstand rough handling. Vehicles and any other items must be secured inside of the crate. [Here](#) is an example of a well-made crate. If shipping, release all oil pressure and lower the nitrogen pressure to 50 PSI. **Do not empty the accumulator all the way and let air into it.** Keep 50 PSI in the accumulator (plus or minus 25 PSI is okay but aim for 50 PSI). If not shipping, you may keep your accumulator charged.

DRIVE AND DELIVER

If you choose to drive and deliver your vehicle to IFP, be sure it is secure in every possible way during transport and delivery. The vehicle drop off window is strictly Wednesday, April 30th, 12:00 PM to 4:00 PM. Teams will not have access to the facility before 12:00 PM.

Deliver to doors E1, E2, or E3. (These doors are all located at the same spot on the building, with

different unloading options available.) After unloading, enter through door D (Customer Service Door) and ask for Tony Brayton. If needed, you may also contact Tony directly, 319-739-6367.

Crate Labeling Requirements:

Clearly label the crates on multiple sides with: **“FPVC Vehicle for [School Name]”**

SHIPPING via eShipping

If you choose to ship, each university will be asked for a contact name, phone number, pick-up / return address and any special instructions. Each team will be creating shipping labels and scheduling a pick-up for themselves. Competition bikes will be picked up 10 days before the Welcome Ceremony. Arrange for shipping as soon as possible.

- Each team will be required to print the Bill of Lading to accompany their crate.
- The crate must be forklift compatible.
- Environmentally friendly fluids from Lubrizol and nitrogen will be provided on-site. Teams do not need to ship fluid or nitrogen.
- NFPA will not pay for expedited shipping. **If the vehicle needs to be shipped back to your university by a certain date, the university will be responsible for this expense, and it will not be reimbursed.** If you need to make these arrangements, contact your assigned NFPA staff liaison, Sineigh at squinn@nfpa.com.

MATERIALS, EQUIPMENT, AND SUPPLIES

It is required that you bring your own tools, extra equipment or supplies. Environmentally friendly fluids from Lubrizol and nitrogen will be provided on-site. Depending on how you travel, decide which is a better method of transporting extra tools, equipment, and supplies. Packing the tools in the vehicle crate is a good option; be sure to properly secure any additional materials. Bring all extra items to the IFP site as participants will not be allowed to leave the facility to collect supplies left behind.

WEIGHING VEHICLE

Your vehicle will be weighed using a pallet scale. The vehicle must be able to stand on the scale on its own and remain level during weigh-in without tipping over.

ARRIVAL

TUESDAY, APRIL 29th

Tuesday is considered a travel day as needed and will qualify as a reimbursable expense. Please see the details for hotel accommodation above. Check in is at 3:00 PM.

WEDNESDAY, APRIL 30th

STUDENT TEAMS:

Vehicle Assembly will be from 12:00 PM - 4:00 PM. There will be a welcome reception at 6:00 PM with dinner and beverages for participants held at *Cedar Ridge Distillery*. The address is *1441 Marak Rd NW, Swisher, IA 52338*. You are responsible for your own transportation.

INDUSTRY REPRESENTATIVES:

If arriving on Wednesday, April 30th, industry representatives are encouraged to join student teams and advisors at IFP during the 12:00 PM - 4:00 PM assembly window and at Cedar Ridge Distillery for

welcome reception dinner and beverages at 6:00 PM.

THURSDAY, MAY 1st

STUDENT TEAMS:

On Thursday, May 1st, transportation to IFP will be provided. The pick-up time will be 7:00 AM. Upon arrival, student teams and advisors will collect additional registration materials and personal protective equipment. The teams will be split into groups and escorted to the garage for vehicle assembly, design review and races. The races will begin after lunch.

INDUSTRY REPRESENTATIVES:

On Thursday, May 1st, transportation to IFP will be provided. The pick-up time will be 7:00 AM so judges arrive at IFP by 8:00 AM to check-in at the security desk and collect badges. Judges and volunteers will be escorted to the **IFP Cafeteria** for a safety and orientation session. Vehicle Design Review will begin at 9:00 AM. Races will be conducted in the afternoon.

EVERYONE:

A networking dinner will be held 4:30 PM – 7:30 PM at *Big Grove Brewery & Taproom* in Cedar Rapids. The address is *170 1st. St. SW Cedar Rapids, IA 52404*. You are responsible for your own transportation.

FRIDAY, MAY 2nd

Teams and judges will arrive at IFP at 8:30 AM for a breakfast Roundtable on Vehicle Performance and facility tour. The roundtable discussion is not a scored element of the competition, but rather, it is an opportunity to talk freely with judges and other teams about vehicle performance. After the tour, teams will disassemble their bikes and prepare them to be shipped back to their university, while the judges meet. Judges will attend their final meeting after the presentations have concluded. The award ceremony and final networking lunch will begin at 11:30 AM in *Kingston's Steakhouse* in Cedar Rapids. The address is *568 Boyson Rd NE, Ste 100, Cedar Rapids, IA 52402*. You are responsible for your own transportation.

NO ON-SITE PARKING ON RACE DAY

There will be no on-site parking at IFP on Thursday, race day. Event arrival and departure transportation will be provided on Thursday. Tuesday, Wednesday, and Friday Student teams will be required to use alternative transportation, parking will be available at IFP. Remember, NFPA will reimburse Uber/Lyft, etc.

DRESS CODE

The dress code for non-competition events is business casual. Explicitly, the dress code is less formal than traditional business wear, but it is intended to give a professional and business-like impression. The dress code for competition events is informal and casual, however, **no shorts or skirts are permitted for safety reasons**. Remember, there will be long periods of time when teams are outside, dress accordingly and plan for the weather. The wind can be very strong on the competition track. Students are encouraged to wear university-branded shirts to identify different teams during the event. NFPA issues stipends can be used for this purpose.

SAFETY

During the competition events and/or tours, personal protective equipment is required:

- Footwear: Participants are to wear reasonable footwear for the event. No open-toed shoes, sandals, heels, or thick-soled shoes. Steel toe shoes are required. NFPA stipend funds can be used to purchase these if you do not own them.
- Eyewear: Safety glasses (with side shields) will be required. Either bring your own or IFP will provide.
- Riders must bring and securely fasten a CPSC-approved bike or motorcycle helmet during the competition events. See photos below.
- Attire to avoid: shorts, loose-fitting clothing like dresses/skirts, loose necklaces/bracelets.
- Long hair must be tied back.

Note: CPSC Approved Helmets have this sticker. Photo Credit: Beactivedecatur.com



PRESENTATION & POSTER

The final presentation (in PPT) is due no later than **April 30th by 11:00 AM CDT** on the [Vehicle Challenge website](#).

Student teams are invited to create, print, and share a project poster to be displayed in the **IFP Cafeteria** for general attendees. It is not a requirement to create a project poster, however, it would provide excellent visual for guests in advance of the final presentations and competition. A project poster example is shown on the right.



EVENT RACES

The event races will demonstrate the various elements of vehicle design. For additional information, please see the [Track Map with elevations](#).

JUDGING and MARSHALS PROTOCOLS

The final competition relies on the volunteer commitment by many industry representatives.

Judging Committee

A team of industry judges is responsible for assessing the vehicle on-site and the documentation in advance. The nature of the assessment is described in the FPVC Assessment Rubric.

Two responsibilities that we ask Judges to cover are:

(1) Marshals

A team of marshals will be responsible for ensuring teams operate in a safe and sportsmanlike way during the entire event, and during the four competitions (sprint race, efficiency race, endurance race, and regeneration demonstration). Marshals may choose to engage directly with the competitors or observe from a distance.

Marshals may walk, jog, run, or cycle alongside the vehicle during a competition event. Marshals will provide input to the judging committee on the vehicle performance and teamwork of the event participants.

(2) Timekeepers

A small team of timekeepers will be responsible for the clock, recording time, and submitting data to the Program Manager.

AWARDS

The Judging Committee determines final award winners based on a number of factors, including the overall assessment of (1) the Design and Specification Midway Review, (2) the competition results, (3) final presentations, (4) Interaction with Industry Mentors, and (5) Completion of the Regenerative Braking Demonstration. The decisions of the judging panel are final.

WI-FI ACCESS

Network: IFPEHA-Guest

Password: BeOurGuest91

HUMAN RESOURCES

IFP ambassadors and talent scouts may be available during this event as an opportunity for students to network with fellow engineers and ask questions in an informal setting. Please bring a printed copy of your resume if you are still looking for a job.

GUESTS

No guests are permitted at the competition.

RESTROOMS

Please avoid touring the facility in search of restrooms. Restrooms that are to be used by Fluid Power Vehicle Challenge participants will be clearly marked with signage.

NFPA FPVC POLICIES

During the final event, any participant demonstrating unsportsmanlike or unsafe conduct will be disqualified from the Challenge and forfeit any and all awards. Driving under the influence is automatic elimination. The same rules apply as driving a motor vehicle on the highway. It is expected all participants honor the Host Site's local zero-tolerance policies.

IFP POLICIES

IFP Motion Solutions, Inc. has a zero-tolerance weapon, alcohol, and tobacco-free campus policy. E-cigarettes and vaping devices are also prohibited. Participants are subject to elimination and being removed from campus for violating these stated policies.

FINAL THOUGHTS

Let's make a great impression on IFP and the other industry representatives. Both personally, and

professionally, you can never have too many friends.