FORMULA HYBRID +ELECTRIC

COMPETITION

SPRING 2023

Founded by

DARTMOUTH ENGINEERING 1867

IEEE

SAE INTERNATIONAL

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welcome

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17th annual

Welcome to the 17th Annual Formula Hybrid+Electric International Competition!

We are thrilled to be back on track again this year for our 17th Formula Hybrid+Electric International competition.

This year we welcome 23 teams to competition, including four new teams: MIT, Cornell, the University of Maryland, and the University of Toronto. As we welcome them to the FH+E family, we congratulate our returning teams for overcoming tremendous obstacles over the past few years. Through all of the uncertainty, rebuilding, and in some cases, starting over, these teams continue to epitomize the collaborative, innovative, and tenacious spirit at the heart of our competition.

Over the past few years we have all reinvented parts of ourselves, and FH+E is no exception. From increased participation in the Virtual Racing Challenge to our regularly scheduled Office Hours throughout the season, we have found inventive ways to connect our teams and volunteers. We extend our deepest thanks to all of the sponsors and volunteers and wish all our teams a fun and successful 2023 competition!

Mike Chapman, Director
Michael.C.Chapman@dartmouth.edu

Co-founder and Director Emeritus
doug@formula-hybrid.org

Jessica Kinzie, Coordinating Manager
jessica.d.kinzie@dartmouth.edu

Formula Hybrid Competition Organizers

"While we all come from different schools, the problem solving approach of engineering is reasonably universal."

spotlight

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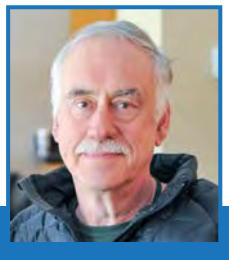
In their View

Five FH+E judges weigh in on what the competition means to them.

"I have been involved in FH+E since the planning conference in 2006 because I believe in mentoring the engineers of tomorrow..."

FH+E judges are so much more than the title suggests. Part mentor, part evaluator, they bring commitment, encouragement, and enthusiasm to their official role. We asked them why—and here's what they said.



ROBERT WILLS

President, Intergrid, LLC

Electrical Tech Lead

Why have you been involved in FH+E for so long?
My interest in an EV future started with building Dartmouth's Sunvox solar car in 1989. Following that, we ran a U.S. EV rally event, American Tour de Sol, for 19 years, and then FH+E. My interest comes from a long-held understanding that transportation had to move to electric to address climate change.

What is the most interesting aspect of judging for you?
Sharing engineering understanding (that is, mentoring) from my own experience.

What is the trickiest aspect of judging?
Balancing fairness with safety and getting cars on track.

What do you hope students will take from FH+E?
Enthusiasm for this rapidly emerging technology and the opportunity to work in this field.

MICHAEL ROYCE

Chrysler Corporation & DaimlerChrysler, Retired

Dynamic Events Lead
Mechanical Technical Inspection

Why have you been involved in FH+E for so long?
I have been involved in FH+E since the planning conference in 2006 because I believe in mentoring the engineers of tomorrow and because the FH+E competition offers a unique blend of mechanical and electrical challenges unmatched by any other student competition.

What is the trickiest aspect of judging?
In Mechanical Technical Inspection there will always be "grey areas" of rules interpretation and enforcement. How these are handled is the trickiest part of being a lead technical inspector.

KENDRA BOGREN-BROCK

Senior R&D FPGA Engineer,
Evident Scientific

Head Design Judge

> "...I learned not to hold back any 'stupid questions' and understand that we are all working towards a common goal."

Why did you want to become a FH+E judge?

After college I wanted to remain involved with FH+E. The experience had become such a big part of my life, and I wanted to be able to give back in some way. Being a judge is a bit of a challenge as it requires me to understand more than just the electrical systems I had worked on when I was on a team. I feel like I am still learning something new every year.

How has your RIT Hot Wheels experience influenced your career?

Working on a first-year team of all women I learned not to hold back any "stupid questions" and understand that we are all working together towards a common goal. This is also true in a professional setting and has allowed me to approach problems in my career as opportunities to learn.

What do you hope students will take from FH+E?

I hope that during all the stress and long nights students remember to look around and remember that they are doing something that not many students get the opportunity or have the dedication to do. It's hard work, but it should also be fun!

MISSY CHMIELOWIEC

Product Owner, Customer Engagement Analytics:
General Motors

Head Project Management and Presentation Judge

Why did you want to become a FH+E judge?

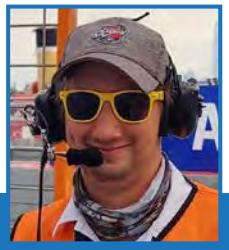
FH+E was a huge part of my college experience and helped launch my career. I wanted to be able to give back to the competition that helped me learn and grow professionally and as an engineer.

How has your RIT Hot Wheels experience influenced your career?

I competed in 2016 and 2017, but I still use examples from my time as an Electrical Lead and the Project Manager of my FH+E team in interviews. My network expanded significantly from being involved in this competition, which ultimately helped me get my foot in the door in industry. It has given me the confidence to tackle new and exciting challenges in my career, including cross-functional assignments.

What do you hope students will take from FH+E?

Don't take this time for granted. It's such a unique opportunity to be exposed to all aspects of a project lifecycle. Exposing yourself to finances, project management, marketing, etc., in addition to the technical challenges will help provide a well-rounded background. This will help you immensely when you work on project teams in industry.



ANDREW BENAGH

Virtual Racing Chief Judge and Organizer

Why did become involved with FH+E?

I became involved in Formula Hybrid + Electric during Covid thanks to my friend, Wiley Cox, a longtime Formula Hybrid scrutineer, who approached me about trying to create a virtual dynamic event for the competition. It has been very fun to be involved with after growing up hearing about it as a member of the New England Region of the SCCA.

Has FH+E experience influenced your career at all?

Formula Hybrid + Electric has been a great partnership to help showcase the many dynamic ways that the iRacing software can be used. It is also great to be able to show coworkers and potential clients what students are able to do!

What do you hope students will take from FH+E?

I hope that students take a love of motorsports engineering from Formula Hybrid + Electric. All levels of motorsports are looking for the skills that the students are learning from the competition. The skills you learn from working with the teams will bring you a step ahead in your career.

DOUG VAN CITTERS
Associate Professor of Engineering
Thayer School of Engineering
at Dartmouth

Mechanical Tech Lead

Why have you, a biomedical engineer, been involved in FH+E for so long?

Fortunately, I've never had to practice any biomedical engineering as part of the FH&E program! Since I was little I have loved working on cars and learned from my father how to perform all of my own maintenance and major repairs. My capstone project as an undergraduate was working on the frame design for Dartmouth's FSAE car. When I returned to graduate school, I joined a capstone design review board with oversight of our Formula car projects, and I was immediately sucked back in. The enthusiasm of the students and the collegiality of the review panel members—including FH+E Founder Doug Fraser—was such a draw for me. This was the year that Dartmouth campaigned for a hybrid vehicle at FSA. When Doug suggested that we start FH the next year he asked me to help out with reviewing the mechanical designs. I didn't think twice. I've stuck with it all of these years because seeing a program grow from an exhibition to a significant production has been a thrill. Michael and Suzanne Royce taught me everything I know about inspection, and I'm still in contact with competitors from a number of schools from the early 2000s through today. It's such an inclusive community, and the opportunity to teach students about cars in a hands-on way—just like my father taught me—is more than enough to get me to the track every year.

What is the most interesting aspect of judging for you?

I truly enjoy listening to the students describe their design approaches and different decision pathways. While we all come from different schools, the problem-solving approach of engineering is reasonably universal: We speak a similar language to dig into problems that are intentionally open-ended by competition rules. I once highlighted all of the "restriction" rules in the FH+E rulebook and then all of the "safety" rules. It was remarkable to me that there are actually very few rules that constrain the design of these vehicles. Virtually the entire rulebook is written to protect student safety. In the heat of technical inspection and competition, it's refreshing to me that nearly everyone can easily focus back in on the entire reason inspection exists: To protect the students and the volunteers. The result is a near-universally polite banter between judges and students that is simultaneously educational and collaborative.

> "Above all else I want FH+E competitors to walk away with a fearlessness of tackling BIG, open-ended problems in a collaborative environment."

What is the trickiest aspect of judging?

Having been part of the competition since inception, I've seen a LOT of different ways to solve problems. Most of these are clever, a few are exceptionally "janky" but safe, and all are positioned to get the students' hard work on track. The trickiest aspect is therefore not failing a team outright, but also not telling students exactly what to do to solve their problems. My objective is to get students to the dynamic events as efficiently as possible without violating our culture of safety and education. The educational challenge is finding the sweet spot between telling students exactly what to do (which is likely the fastest pathway) and leaving them with no options. I've been in the garages at all hours working on white boards with students, teaching them how to use tools, and explaining why certain decisions might lead to later problems. One way or another, we'll figure something out even if there are limited resources (I actually have MacGyver socks and they come to competition with me). It is super fun when the students are successful in solving a problem because they know that they did it themselves. I'm always happy to ask guiding questions and point the students toward the right aisle in Walmart, Home Depot, or an auto parts store.

What do you hope students will take from FH+E?

Above all else I want FH+E competitors to walk away with a fearlessness of tackling BIG, open-ended problems in a collaborative environment. That is what the real world needs right now. If the organizers and volunteers can teach this in a hands-on, interdisciplinary, and fun way, we will have accomplished the objectives that Doug Fraser set out 20 years ago. ■

specifications

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data & specifications

* Estimated Value

Milwaukee School of Engineering

001

Team Name	Mozee Motorsports
Car Name	MP6
Advisor	Dr. Matt Schaefer

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	HIP
ACCUMULATOR	Battery Energus 2,736 W·h
DRIVE MOTOR	Parker GVM142 35.71 kW @ 6,600 RPM
ENGINE	KTM 250 SXF 249.1 cc 30.42 kW @ 13,400 RPM
FUEL TYPE	Gasoline
GENERATOR	N/A
REGEN BRAKING	None
WEIGHT	360 kg
UNIQUE FEATURES	Team designed isolation circuits and printed circuit boards. Custom designed gearbox enables parallel powerplant configuration. 6 speed IC engine transmission.

University of Wyoming

002

Team Name	Wyoming Motorsports
Car Name	7220 Honey
Advisor	Brad Orr

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Hybrid
ACCUMULATOR	Battery Samsung Bosch SDI 4,347 W·h
DRIVE MOTOR	MoteEnergy ME1616 55 kW @ 3,300 RPM
ENGINE	Kawasaki EX250J 250 cc 24 kW @ 11,000 RPM
FUEL TYPE	Gasoline
GENERATOR	N/A
REGEN BRAKING	Rear
WEIGHT	395 kg*
UNIQUE FEATURES	Chain drive parallel hybrid. All fabrication done by students when possible. Revamping 2022 car for better reliability and increased performance.

University of Victoria

003

Team Name	UVic Hybrid
Car Name	Unicorn 2023
Advisor	Dr. Zuomin Dong
Country	Canada

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Hybrid
ACCUMULATOR	Battery A123 1,235 W·h
DRIVE MOTOR	Zero Motors 75-5 40 kW @ 4,000 RPM
ENGINE	KTM 2014 250 SX-F 249 cc 31 kW @ 13,000 RPM
FUEL TYPE	Gasoline
GENERATOR	N/A
REGEN BRAKING	Rear
WEIGHT	265 kg
UNIQUE FEATURES	Chain drive with coupling shaft for reduced weight and simplified tensioning. Simulink designed control scheme with multiple drive modes and regen braking.

data & specifications

* Estimated Value

Carnegie Mellon University

201

Team Name	Carnegie Mellon Racing
Car Name	23e
Advisor	Satbir Singh

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Custom 5,080 W·h
DRIVE MOTOR	(4) AMK DD5-14-10-POW-18600-B5 36 kW @ 16,000 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	Front and Rear
WEIGHT	227 kg*
UNIQUE FEATURES	4 Wheel Drive hub motor architecture. Dashboard display and controls. Active aerodynamic system (not used at FH+E). Advanced traction control and torque vectoring. Water-cooled motors and accumulator.

Northeastern University

202

Team Name	Northeastern Electric Racing
Car Name	NER17D
Advisor	Andrew Gouldstone

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	N/A
ACCUMULATOR	Custom 3,560 W·h
DRIVE MOTOR	EMRAX 228 MV 109 kW @ 5,500 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	N/A
WEIGHT	350 kg*
UNIQUE FEATURES	Custom in-house accumulator and AMS. GM10 bolt differential with 3D printed case and gear drive. Generatively designed, metal 3D printed steering wheel.

Lawrence Technological University

203

Team Name	Blue Devil Motorsports
Car Name	2023 Car
Advisor	Dr. Hamid Vejdani

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Custom 4,147 W·h
DRIVE MOTOR	EMRAX 228 MV 124 kW @ 6,500 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	Rear
WEIGHT	272 kg
UNIQUE FEATURES	One year build cycle, team built PCB's, three-tier modular accumulator, adjustable pedal box, single motor chain and sprocket drivetrain, double wishbone push-rod rear and pull-rod front suspension.

data & specifications

* Estimated Value

Worcester Polytechnic Institute

204

Team Name	Goat Fast Racing
Car Name	TBD
Advisor	William Michalson and David Planchard

Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Custom 5,290 W·h
DRIVE MOTOR	EMRAX 228HV LC 53 kW @ 5,500 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	Rear
WEIGHT	238 kg*
UNIQUE FEATURES	Custom built accumulator.

University of Waterloo

205

Team Name	Waterloo Formula Electric
Car Name	E-model 4B
Advisor	Mohammed Nassar
Country	Canada

Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Custom 4,233 W·h
DRIVE MOTOR	(2) EMRAX 208 68 kW @ 6,000 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	Rear
WEIGHT	325 kg
UNIQUE FEATURES	Dual rear motors for torque vectoring. Traction control algorithm. Custom isolated BMS. Distributed CAN Bus architecture with datalogging. Dynamic endurance power limit with PID control.

data & specifications

* Estimated Value

Illinois Institute of Technology

206

Team Name	IIT Motorsports
Car Name	TBD
Advisor	Mahesh Krishnamurthy

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery LGHG2 AllCell 5,184 W·h
DRIVE MOTOR	(2) EMRAX 188 70 kW @ 8,500 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	None
WEIGHT	250 kg
UNIQUE FEATURES	Electric motor torque vectoring. Inline powertrain. Teensy central controller. Touchscreen equipped dashboard. Wireless dynamic data logging.

Princeton University

207

Team Name	Princeton Racing Electric
Car Name	MK2
Advisor	Dr. Minjie Chen

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Custom 6,200 W·h nominal (4,920 W·h @ 2C)
DRIVE MOTOR	(4) DHX Electric Machines, Inc. Hawk 20 (Front), Hawk 40 (Rear) 110.4 kW @ 4,400 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	None
WEIGHT	270 kg
UNIQUE FEATURES	148 horsepower 4WD w/ SMPM hub motors. Student-TIG-welded 120+ tube chassis. Traction control by vehicle computer. Custom touchscreen Linux dashboard. Integrated water cooling and aero kit.

University of Vermont

208

Team Name	Alternative Energy Racing Organization
Car Name	Cleanspeed 5.5
Advisor	Dustin Rand

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Energus 5,184 W·h
DRIVE MOTOR	EMRAX 228 109 kW @ 6,500 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	Rinehart PM100
REGEN BRAKING	Rear
WEIGHT	363 kg*
UNIQUE FEATURES	Integration of Data Acquisition system to log data. Integration of Start controls onto the steering wheel, along with secondary switches in case wheel controls are inactive. Inboard suspension for better aerodynamics.

data & specifications

* Estimated Value

Rensselaer Polytechnic Institute

209

Team Name	Rensselaer Formula Hybrid
Car Name	Xplod
Advisor	Kyle Wilt

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Custom 6,882 W·h
DRIVE MOTOR	EMRAX 228 68 kW @ 5,500 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	Rear
WEIGHT	240 kg*
UNIQUE FEATURES	Carbon fiber bodykit. Full-vehicle telemetry system. Team-built 444 cell li-ion battery pack with Orion AMS.

Dartmouth College

210

Team Name	Dartmouth Formula Racing
Car Name	Cherri
Advisors	Raina White

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Custom 7,113 (rated) W·h
DRIVE MOTOR	(2) EMRAX 188 104 kW @ 6,500 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	Rear
WEIGHT	295 kg
UNIQUE FEATURES	Cherri runs a high-performance central vehicle controller which handles CAN communication and enables the use of high-speed traction control loops.

Boston University

211

Team Name	Terrier Motorsport
Car Name	Scarlett
Advisors	Enrique Gutierrez-Wing

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Energus PS 4,608 W·h
DRIVE MOTOR	EMRAX 208 68 kW @ 6,000 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	None
WEIGHT	350 kg
UNIQUE FEATURES	The suspension will be very rock solid. The camber won't change when the suspension is under load. We feel this will give us an advantage when the car is cornering.

data & specifications

* Estimated Value

Yale University

212

Team Name	Bulldogs Racing
Car Name	BR16
Advisor	Corey O'Hern

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery N/A 3,563 W·h
DRIVE MOTOR	(2) EMRAX 207 MV 80 kW @ 6,000 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	Rear
WEIGHT	300 kg*
UNIQUE FEATURES	Independent 2-Motor Powertrain. Custom Built Accumulator. Compact Design.

Lafayette College

213

Team Name	Lafayette Motorsports
Car Name	LM0
Advisor	Dr. Alexander Brown

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Custom* 5,367 W·h
DRIVE MOTOR	EMRAX 208 68 kW @ 6,000 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	None
WEIGHT	320 kg*
UNIQUE FEATURES	*Purchased Enepaq 18650 building block cells/models, which then were assembled in house into our larger accumulator

Tufts University

214

Team Name	Tufts Electric Racing
Car Name	TER 11
Advisor	Brandon Stafford

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Energus 3,520 W·h
DRIVE MOTOR	EMRAX 228 109 kW @ 5,500 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	Rear
WEIGHT	340 kg
UNIQUE FEATURES	Custom in-house accumulators. Custom steering wheel with a built-in display. Self-designed wheel hubs. Redesigned aero package.

data & specifications

* Estimated Value

Massachusetts Institute of Technology

217

Team Name	MIT Motorsports
Car Name	MY23
Advisor	Patrick McAtamney

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Custom 5,080 W·h
DRIVE MOTOR	EMRAX 228 MV 124 kW @ 5,500 RPM (2) DHX Hawk40 (custom-wound) 36.8 kW @ 7,200 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	TBD
WEIGHT	270 kg*
UNIQUE FEATURES	Custom inverters and gearboxes. Tripod architecture. Water-cooled battery with custom brazed coldplates.

University of Toronto

220

Team Name	University of Toronto Formula Racing
Car Name	TBD
Advisors	Ryan Mendell
Country	Canada

+ Click to meet the team.

Vehicle Specifications

DRIVE TYPE	Electric
ACCUMULATOR	Battery Custom 5,400 W·h
DRIVE MOTOR	EMRAX 208 HV 109 kW @ 6,500 RPM
ENGINE	N/A
FUEL TYPE	N/A
GENERATOR	N/A
REGEN BRAKING	None
WEIGHT	240 kg
UNIQUE FEATURES	Modular vehicle to compete in Formula Hybrid, Formula SAE, and Formula Student (inc. DV) competitions.

the teams

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001 Milwaukee School of Engineering

MSOE UNIVERSITY

Robi Roy
PROJECT MANAGER

Dwight Maynor
ENGINEERING MANAGER

Matthew Zagorski
RULES & SAFETY OFFICER

Jonathan Kasun
TREASURER

Kyle Thome
SPONSORSHIP COORD.

Matthew Zagorski
MEDIA & OUTREACH

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POWERTRAIN

Kyle Thome

Ben Garvey
Andrew Bathke
Dylan Lawler
Zach Hatseras
Emilio Colunga
Crus Alonso Carmen Soto
Aaron Nickels
John Olson
Ahmed Habeebullah

CHASSIS

Ryan Detlor

Nicholas Gilbertson
Gideon Woehl
Hubert Wasilewski
Maks Kowalski
Lorenzo Giannini
Gavin Gabrish
Emilio Colunga
Francisco Salazar
Ben Turner
Anthony Whylie
Connor Irish
Nicholas Lunn
Zane Rothe
John Olson
Zach Schusterz

HARDWARE

Christian Trujillo

John Linden
Ryan LeMay
Maximus Bryant
Nicholas Lunn
Christian Estrella
Alex Saldivar

SOFTWARE

William Dale

Ian Kirkpatrick
Caleb Andreano
Christopher Imholte

SAFETY & ERGO

Liam Anders

Gavin Gabrish
Nicholas Lunn
Christian Briggs
Ryan Detlor

SIDEPODS

Hoyt Leitzke

Connor Schlick
Ben Gadiano
Chase Wondra

002 University of Wyoming

Louis Failoni
PRESIDENT

Quinton Royle-Grimes
VP OF ENGINEERING

Griffin Willard
RULES AND SAFETY

Dax Jones
VP OF BUSINESS

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POWERTRAIN & CHASSIS

Taylor Leivestad

ELECTRICAL

Bryan Goar

AERO/ SECRETARY

Riley Milburn

SOCIAL MEDIA

Toriano Ellison

Zoe Shannon

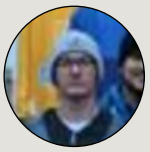
Julian Amundson

Steele Jacobson

McCoy Vozakis

Benjamin Jones

Joshua Gardner


Christopher Edmunds

003 University of Victoria

University of Victoria

David Johnson
CAPTAIN

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BUISINESS

Chantaille Ash

Kalev Adler

CHASSIS & SUSPENSION

Tyler Hills

Matthew Rabillard-Wong

Aidan Sarkozy

Devin Fennerty

Ian Forbes

Tokai Ntanda

Brian Mueller
Lawrence Wong

ELECTRICAL

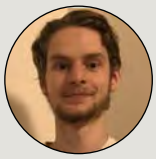
Ava Newell

Cayenne Chen

Brayden Shkwarok

POWERTRAIN

Connor Fedrigo



Mathew Johnson

Robin Zerr

201 Carnegie Mellon University

Carnegie Mellon University

Pravir
PRESIDENT

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MARKETING & OUTREACH

Daniel **VP**

FINANCE

Trent **VP**

RACE OPERATIONS

Gabriel **VP**

STRUCTURES

Anderson **VP**

CAPTAINS

Gabe
Suspension

Arthur
Powertrain

Bisrat
Driver Interface

Jacob
Electrical Integration

Tate
Special Projects

Brian
Aerodynamics

ENERGETICS

Vikram **VP**

CAPTAINS

Navod
Grounded Low Voltage

Gustav
Firmware

Zoe
Tractive Systems

Omkar
Special Projects

Varun
Accumulator

DRIVERLESS

Ravi **VP**

CAPTAINS

Alex
Vehicle Integration

Grace
Software

Deep
LiDAR

Ankit
Perceptions

Andrew
Path Planning

Melinda
Controls

Northeastern University

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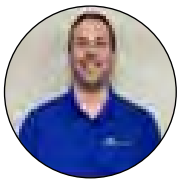
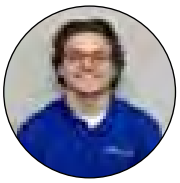
Lawrence Technological University


Andrew Bartman
CAPTAIN

Jon Hodges
CO-CAPTAIN


Tanner Jeska
PROJECT MANAGER

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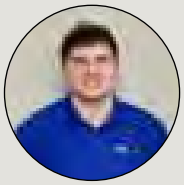
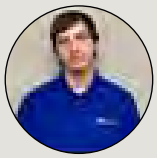
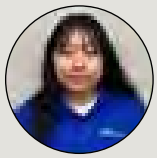
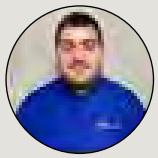
POWERTRAIN

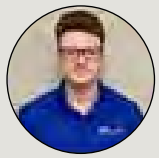

Cameron Urbanick

Joel Clark

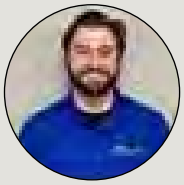

Mackenzie Clark

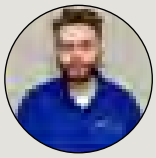

Minhu Ju

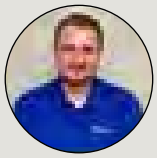

Scottie Rapp


RJ Thompson

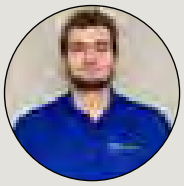
STRUCTURAL

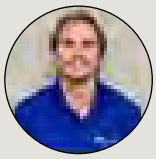

Kyle Bunge

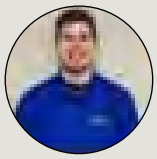

Nathan Greenwood


Maxamillion Peterson

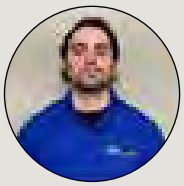
VEHICLE DYNAMICS

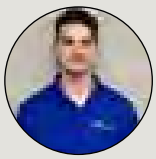

Jacob Kid


Jarred Baxter


Brendan Wolgast

AERO


Christian Kazoleas


Collin Clark

204 Worcester Polytechnic Institute

Thomas Walsh
CAPTAIN

Alexander Wessel
CAPTAIN

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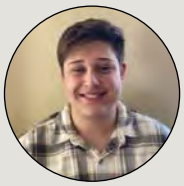
GROUND LOW VOLTAGE


Ori Katz

Edward Clifford

Henry Livingston

Matthew Reynolds

BATTERY

Alan Robertson

James Mitchell

Peter Murray

Javier Espinal

COMPETITION

Eric Gustafson

INTEGRATION

Sam Sands

Michael Rideout

Emily Kelley

Noah Wolf

Macey McEnaney

MECHANICAL SYSTEMS

Jared Bushnell

Pranjal Mann

Daniel Ali

Sophie Chretien

205 University of Waterloo

UNIVERSITY OF WATERLOO

Will Bellotto
CAPTAIN

Owen Brake
TECHNICAL

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ELECTRICAL

Wani Gupta

Jhanvi Shah

Joseph Borromeo

MECHANICAL

Zach Zammit

Tarj Tandel

FIRMWARE

Justin Vuong

PROJECT MANAGER

Renuka Ravinder

BUSINESS MANAGER

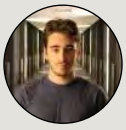
Benjamin Valles

FIRMWARE

Michael Campodonico

Taekhan Choi

Vincent Le



Mathieu Smith

Daniel Bishara

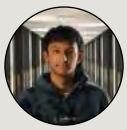
Andrew Schooley

Irekanmi Awoyiga

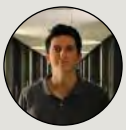
Tommy Lee

Julia Aziz

Manas Gupta



Vedhant Saema



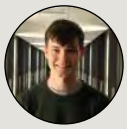
Ben Lazarus

Ameena Abadulaziz

Martin Ndebay

Taras Rawlinson

Arya Hosseini



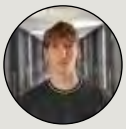
William Welch

Peter He

Jerry Hu

Tine Pu

Chris Tseng



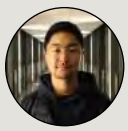
Sebastian Tuck-Melanson

Veral Vishnoi

Ben Miller

Rohan Sharma

Douglas Huang



Kaito Hirai

Laila Elhossini

Jacky Lim

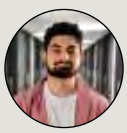
Addison Chen

Ridwan Bari

Robin Xiang

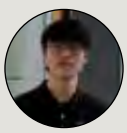
Neil Kaus

Akma Pranenda



Shaan Banday

Prabhjyot Singh Paul



Phillip Zhu

Sebastien Paradis

206 Illinois Institute of Technology

ILLINOIS INSTITUTE OF TECHNOLOGY

Joel Saju
PRESIDENT

Rashed Khraisat
VICE PRESIDENT

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POWERTRAIN

Jay Steinberg

Carter Anderson

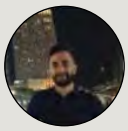
CJ Connors

Aleks Woody

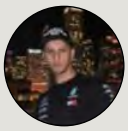
AERO

David De La Fuente

Alex Jin



Muath Abdeljaber



Shazad Ahmed

CHASSIS

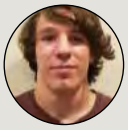
Marvin Calo

Umer Faisal

Wolfang Rugeles

Marco Vega

John Kim



Manuel Rosenkranz

Steven Keeler

ELECTRICAL

Isaias Rivera

Noah Husby

Dominik Chraca

Aiden Verdin

Ava Kelly

Hazim Zain-Edin

Saurabh Saluja

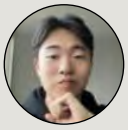
SUSPENSION

Arturo Villegas

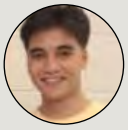
Sarah Exline

Nicolas Etchegaray

Muath Abdeljaber



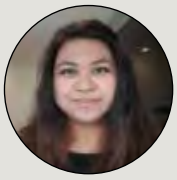
John Kim



Logan Garcia

Wolfang Rugeles

BUSINESS



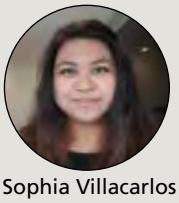
Sophia Villacarlos

Rachel Naomi Tjakra

Emily Yeow

Hikari Nakasone

EXECUTIVE



Sophia Villacarlos

Rachel Naomi Tjakra

Noah Husby

Steven Keeler

207 Princeton University

PRINCETON UNIVERSITY

Daniel Simone
PRINCIPAL

Alexander Haywood
CHIEF ENGINEER

Nathan Gage
CHIEF ENGINEER

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ELECTRICAL

Diane Yang
PCB Design Lead

Franchesca Doell
Dashboard Lead

Daniel Flyer
Dashboard Lead

David Shustin
Wire Harness Lead

Daniel Simone
Wire Harness Lead

PCB DESIGN
Vivian Chen
Wonju Lee
Joel Awuku
John Matters

DASHBOARD
Daniel Yang
Cynthia Or
Ryan Gonzales

WIRE HARNESS
Alex Ni
Bryan Zhang
Pia Capili
Franchesca Doell
Rayyan Nasser
Basha Waxman

POWERTRAIN

Stephane Morel
Differential Lead

Thomas Van Liere
Drivetrain Lead

Iris Ushizima
Drivetrain Lead

DIFFERENTIAL
Brian Mmari
Huseyin Hasin
Franchesca Doell
Bryan Zhang

DRIVETRAIN
Christine Zhang
Yagiz Devre

AERODYNAMICS

Iris Ushizima

Nathan Gage

Pat Grate
Matthew Banaag
Anupta Argo
Ryan Gonzales
Yagiz Devre
Alexander Liou

MECHANICAL

Linda Chen
CHIEF ENGINEER

David Shustin
CHIEF ENGINEER

David Fu
Suspension Lead

Thomas Van Liere
Rear Wing Lead

Daniel Simone
Welding Lead

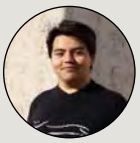
SUSPENSION
Noah Stein

REAR WING
Zayvinn Lin

WELDING
Iris Ushizima
Pat Grate
Siddhant Jain
Samuel Gerhard
Elizabeth Tong

Tim Gubski
Tractive Lead

Patrick Kozak
Seat Lead



Rafael Coca
Water Cooling Lead

Kristen Umbriac
Braking Lead

Thomas Van Liere
Steering Lead

Jessica Celuch
Insulation Lead

TRACTIVE
Emily Luo
Quinn Haverstick

SEAT
Noah Stein

WATER COOLING
Catherine Ruiz

STEERING
Joshua Soberano

BUSINESS

Diane Yang
Social/ Recruitment Chair

Vivian Chen
Treasurer

CHAIRS
Sullivan Meyer
Rafael Coca
Iris Ushizima

MEMBERS
Jashvi Desai
Pia Capili
John Matters
Siddhant Jain
Cynthia Or

PIT CREW CHIEFS
Sullivan Meyer
Patrick Kozak

MK3

Alex Haywood
Chassis-sus-steer Lead

Linda Chen
Powertrain Lead

Cady Feng
Regen Braking Lead

CHASSIS-SUS-STEER
Calvin Pham
Sully Meyer
Noah Stein
Shivam Kak
Caitlin Wang

POWERTRAIN
Daniel Vergara
John Matters
Christine Zhang
Stephane Morel
Matthew Banaag

REGEN BRAKING
John Matters
Tasman Moskowitz
Kareem Jaber
Rena Feng
Thomas Atwood

208 University of Vermont

The University of Vermont

Thomas Field
PRESIDENT & MECHANICAL

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ELECTRICAL

Colin Grund

FIRMWARE

Dominic Gasperini

TREASURER

Zach Abood-Bieber

SOCIAL CHAIR

Jack Kapralick

209 Rensselaer Polytechnic Institute

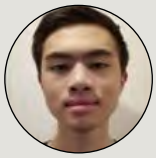
Rensselaer
School of Engineering

Tom Makowka
CAPTAIN

Back to specifications

AERO

Nicholas Jankowski



Calvin Chan

Matias Martinez

Siddhi Patel

POWERTRAIN

Cailean Sorce

Stefan Kortaras

Sanjay St.Lawrence

Himani Mehta

Chris Bialas

CHASSIS

Logan Haw

Loren Stillman

Shane Skylar

ELECTRICAL

Henry Lamkin

Bradley Preiser

Aidan Rainere

210 Dartmouth College

DARTMOUTH ENGINEERING

Max Weinstein
CAPTAIN

Back to specifications

CONTROLS

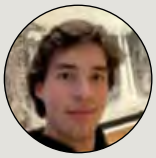
Henry Scheible

Erin Parker

Calista Adler

Robert Blank

Liam Cotter



Kyrylo Bakumeno

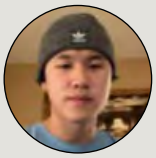
Margaret Atkins

TRACTION CONTROL

Will Foox

ELECTRICAL

Issac Mullen

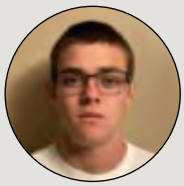


Brandon Zhao

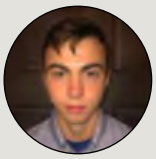
Mubarak Idoko

Martin Roeck

MECHANICAL

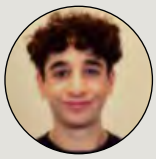


David Adams



Declan Unverferth

Jeff Kobal



Simon Buchsbaum

Ethan Wong-Chassine

Andrew Wilson

Jack Lange

BUSINESS

Ethan Weinstein

Adrianna Drindak

Hamza Najam

Joshua Wolfson

Nathan Tamkin

Jonathan Sumaili

211 Boston University

Izzy Nguyen
PRESIDENT

William Krska
CHIEF ENGINEER

Noah Taniguchi
DEPUTY CE

Sophie Buttery
CHIEF PM

John Carr
SECRETARY

Gautam C.
TREASURER

Back to specifications

AERO

Aayush Amrit
Lead

Tom Wei
Deputy

Costa Camerano
Deputy

POWERTRAIN

Ding Wen
Lead

Thomas Tran
Deputy

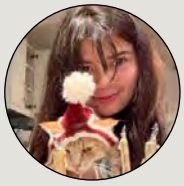
SUSPENSION & CHASSIS

Jeffrey Li
Co-Lead

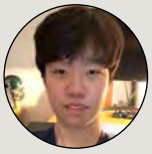
Jonathan Ye
Co-Lead

Gautam C.
Deputy

ELECTRICAL



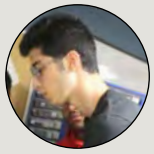
Kirsten Alafriz
Lead



Tsz Wong
Deputy

John Carr
Deputy

Mike Waetzman



Yousif Alhaji

WHEELS

Zaid Bhatti
Lead

Ali Eskiocak
Deputy

212 Yale University

Yale

Oliver Ye
CO-PRESIDENT

Adam Kus
CO-PRESIDENT

Angelica Pelcastre
PROJECT MANAGER

Fanny Zhang
TREASURER

Samantha Lorr
SOCIAL CHAIR

Back to specifications

MECHANICAL

Zubin Kremer Guha
Chief Engineer

Luke Morad
Mechanical Lead

Pev Vail

Henry Berger

Daniel Zhang

Wade Wahlig

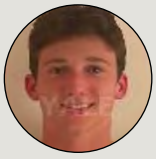
Nathan Sih

Zoe Duran

Tian Hsu

Ricardo Ahumada

Jacob Wang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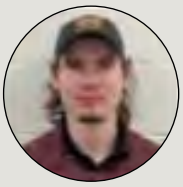
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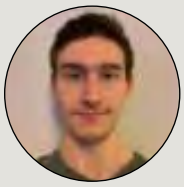
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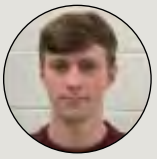
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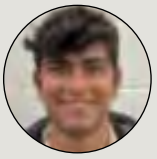
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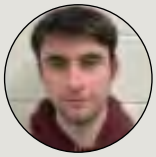
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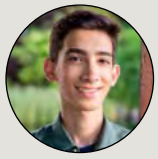
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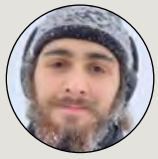
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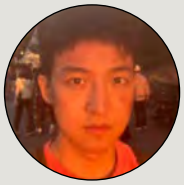
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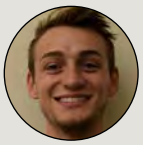

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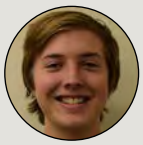

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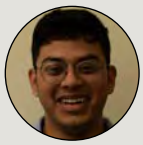
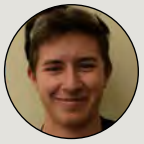
Battery Lead



Rakibul Chowdhury
Battery Lead



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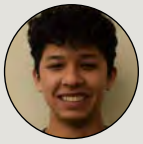
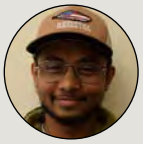
Sims Lead



Gage Rodriguez
Cooling Lead



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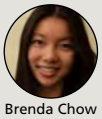

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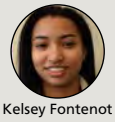

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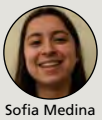

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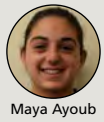

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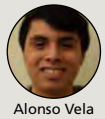

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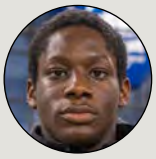

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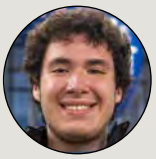

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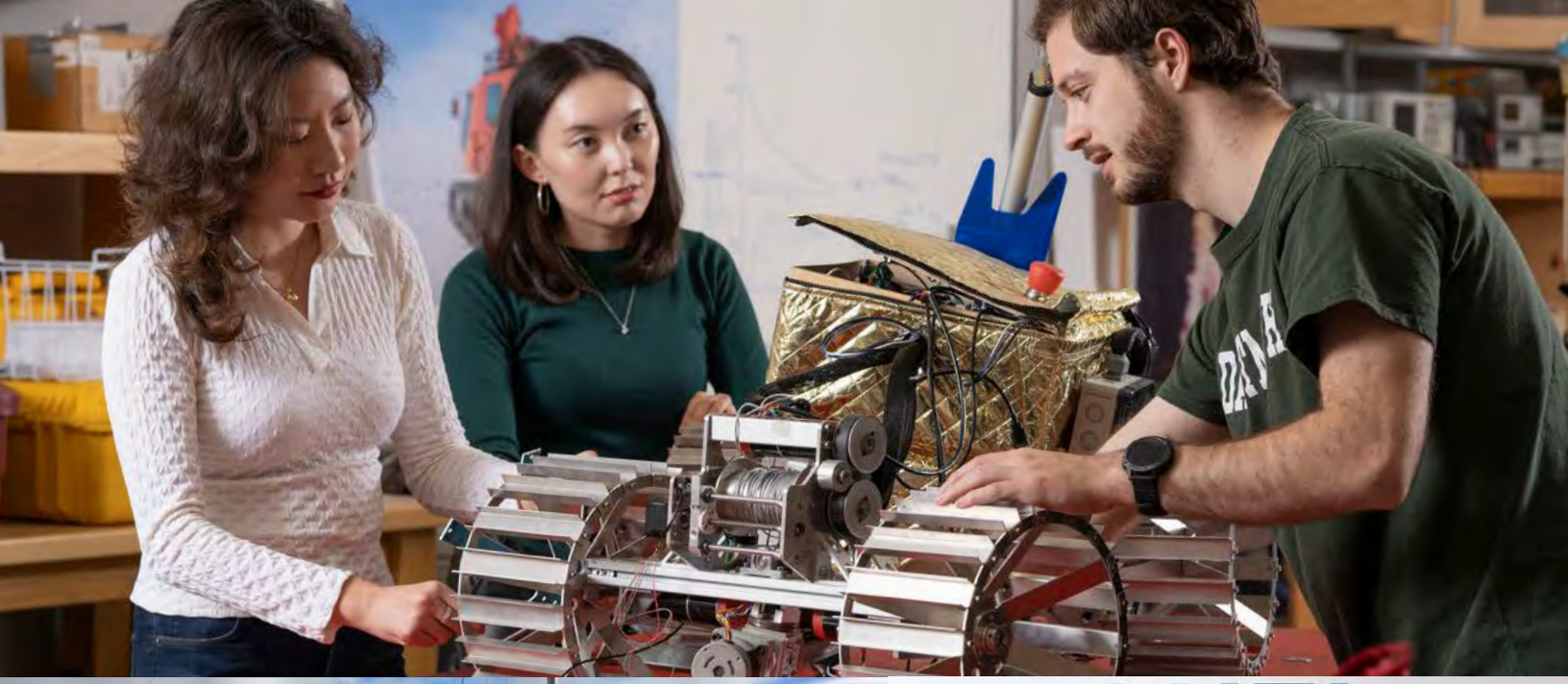

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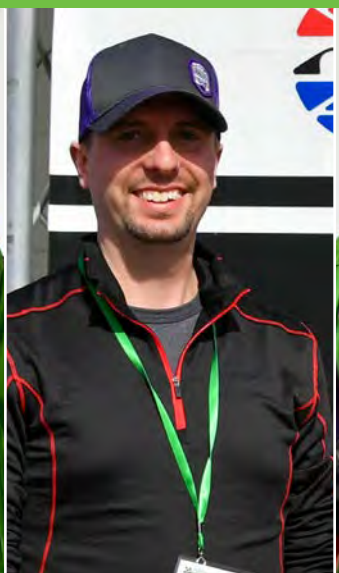

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