Formula Hybrid International Competition

Congratulations to the SAE hybrid team and Dr. Emadi for this outstanding achievement at the 2013 Formula Hybrid International Competition held at the New Hampshire Motor Speedway April 30 - May 2.

* General Motors Best-Engineered Hybrid Award (1st Place)
General Motors Best-Engineered Hybrid Award recognizes the top three finishers within the GM scoring criteria. Three categories of measurement will be evaluated, including introduction of new technologies and/or a remarkable implementation of existing technologies, teams making a positive difference, and extraordinary balance.

* IEEE Engineering the Future Award (1st Place)
Judged by IEEE Fellow and Sports Car Club of America National Champion Harold Flescher, this award considers the multidisciplinary makeup of the team and evidence that the vehicle design contained all of the features of a proper racecar. IEEE Engineering the Future also considers whether the vehicle creates a desire to "take it onto the track and see how it performs."

* Chrysler Innovation Award (3rd Place)
The goal of the Chrysler Innovation Award is to promote, recognize and reward innovative electrification design and implementation. The judging team will evaluate both the theoretical analysis and practical application of the innovating design concepts proposed by the respective teams. The second round of judging/interview will be conducted during the endurance event.

* Overall Hybrid Results (3rd Place)
This award recognizes the top 6 finishers overall.

* Design Report (1st Place)
The students explain their constructive solutions to a jury of experts from the automotive and motorsport industries in report and discussion. The concept of the design event is to evaluate the engineering effort that went into the design of the car and how the engineering meets the intent of the market. The car that illustrates the best use of engineering to meet the design goals and the best understanding of the design by the team members will win the design event.

* Presentation (1st Place)
The objective is to evaluate the team’s ability to develop and deliver a comprehensive business case that will convince the executives of a fake manufacturing firm that the team’s design best meets the demands of the amateur weekend autocross racing market and that it can be profitably manufactured and marketed.
Welcome

Welcome to an intensely competitive motorsport in which technological innovation, sustainability and advanced engineering analysis methods are used to build a hybrid formula-style race car with performance to rival all but the top echelon of racing vehicles. Welcome to the motorsport in which students take their dream car from concept to behind the wheel and on the track. Welcome to the team that conceives a new vehicle from scratch, designs and builds nearly all of its components, and shows an unwavering commitment to performance and style. Welcome to McMaster Formula Hybrid.

Professor Emadi

Professor Emadi, a leading US developer of electric powertrain technology has been appointed Canada’s Excellence Research Chair in Hybrid Powertrain and this appointment will launch the construction of the new hybrid vehicle research facility. Dr. Emadi’s research includes:

- Power electronics and motor drives; advanced electric drive vehicles including electric, hybrid, and plug-in hybrid electric vehicles;
- Transportation energy conversion and vehicular power and propulsion systems; renewable and efficient energy systems; energy and sustainability.
Chassis
Jared Selves, Chassis Captain
Kamran Arshad, FEA Specialist
Cody Rhebergen, Chassis Captain
Alex Dragojlov, Member
Callan Yan, Member
Drew Saltarelli, Member
Dev Myrajan, Member
Robert Lau, Member

Suspension
Barry Mason, Suspension Captain
Joel Rovelveld, Suspension Captain
Alex Small, Member
Alex Yip, Member
Cameron Galipeau, Member
Connor Maloney, Member
Eric Lappalainen, Member
Talha Javed, Member
Tareq Nassar, Member

Brakes and Pedal Tray
Brian Cheung, Brakes and Pedal Tray Captain

Powertrain
Tyler Stiene, Powertrain Captain
Aaron Mormile, Powertrain Captain

High Voltage
Sean Tager, High Voltage Captain
Yassin Strinic, Member

Low Voltage
Zhe Sun
Low Voltage Captain

Safety
William Long
Supervisor

Business
Zachary Lanoue, Business Captain
Bryan Mason, Member
2013 EVENT GUIDE

EVERYTHING ELSE IS JUST TOO EASY
**STATIC EVENTS**

**Design Report:** The students explain their constructive solutions to a jury of experts from the automotive and motorsport industries in report and discussion. The concept of the design event is to evaluate the engineering effort that went into the design of the car and how the engineering meets the intent of the market. The car that illustrates the best use of engineering to meet the design goals and the best understanding of the design by the team members will win the design event.

**Presentation:** The objective is to evaluate the team’s ability to develop and deliver a comprehensive business case that will convince the executives of a fake manufacturing firm that the team’s design best meets the demands of the amateur weekend autocross racing market and that it can be profitably manufactured and marketed.

**DYNAMIC EVENTS**

**Acceleration:** The cars are evaluated on their accelerating abilities from a standing Start in a straight line over a distance of 75 meters.

**Autocross:** The objective is to evaluate the car’s maneuverability and handling qualities on a tight course without the hindrance of competing cars. The course will combine the performance features of acceleration, braking and cornering into one event. The results of the Autocross scores determine the starting order for endurance.

**Endurance/Efficiency:** Over a distance of 22 kilometers the cars have to prove their durability under long-term conditions. Acceleration, speed, handling, dynamics, fuel economy, and reliability all come into play. A change to the 2013 competition is the relocation of the endurance event to the sports road course. This one kilometer hill section offers serious elevation changes – two climbs per lap totaling more than seventy-two feet. Because these climbs emphasize the importance of regenerative braking, students are presented with a new design challenge.
COMPETITION AWARDS

Hybrid
This award recognizes the top 6 finishers overall - Trophies

Electric
This award recognizes the top 6 finishers overall - Trophies

SPONSORED AWARDS

Ford Efficiency Award
Ford Motor Company prize for the 2013 competition is the Ford Efficiency Award. This award is presented to the teams that best engineer and execute an energy-efficient design, as judged by Ford Hybrid engineers. Ford will be looking at details like system sizing calculations, simulation methods, and controls optimization, as well as actual energy consumption measured during the Endurance event.

1st place = $2,500  2nd place = $1,500  3rd place = $500

General Motors Best-Engineered Hybrid Award
General Motors Best-Engineered Hybrid Award recognizes the top three finishers within the GM scoring criteria. Three categories of measurement will be evaluated, including introduction of new technologies and/or a remarkable implementation of existing technologies, teams making a positive difference, and extraordinary balance.

1st place = $2,500  2nd place = $1,500  3rd place = $1,000

Chrysler Innovation Award
The goal of the Chrysler Innovation Award is to promote, recognize and reward innovative electrification design and implementation. In the first year of the competition, the teams will be initially evaluated based on the merits of the submitted Design Reports. Top contenders will be invited for an interview with the Chrysler engineering team. The second round of judging/ interview will be conducted during the endurance event. Selected teams will be informed verbally, after which, they must sign up for a time slot. A sign-up sheet will be available at the Chrysler booth, throughout the competition.

1st place = TBD  2nd place = TBD  3rd place = TBD

IEEE Engineering the Future Award and Excellence in EV Engineering Award

Engineering the Future Award
Judged by IEEE Fellow and Sports Car Club of America National Champion Harold Flescher, this award considers the multidisciplinary makeup of the team and evidence that the vehicle design contained all of the features of a proper racecar. IEEE Engineering the Future also considers whether the vehicle creates a desire to "take it onto the track and see how it performs."

Excellence in EV Engineering Award
This award focuses on the entire EV engineering process. Judging begins when the Design and Sustainability reports are submitted. The judging continues at the Speedway with an evaluation of each team's implementation and performance during the dynamic events. Significant emphasis is placed upon preparation, team dynamics, and attention to details. Also important are the intangibles that lead to good performance, reliability, and establish or continue a legacy.
2013 Formula Hybrid Competition

Final Results

- Acceleration – Electric (PDF)
- Acceleration – Unrestricted (PDF)
- Autocross (PDF)
- Endurance (PDF)
- Summary (PDF)

Hybrid Results

1. Yale University
2. Lawrence Technological University
3. McMaster University
4. University of Michigan - Ann Arbor
5. Embry-Riddle Aeronautical University - Daytona Beach
6. Carleton University

Yale University, Bulldogs Racing, runs the endurance event at the Formula Hybrid Competition.

Electric-only Results

1. Dartmouth College
2. University of Vermont
3. University of Massachusetts - Lowell
IEEE Engineering the Future Award and Excellence in EV Engineering Awards

- Engineering the Future Award: McMaster University
- Excellence in Engineering: Dartmouth College

Ford Efficiency Award

1. Yale University ($2,500)
2. Lawrence Technological University ($1,500)
3. Dartmouth College ($500)

General Motors Best-Engineered Hybrid Award

1. McMaster University
2. Yale University
3. Embry-Riddle Aeronautical University

Chrysler Innovation Award

1. Yale University ($2,000)
2. University of Michigan - Ann Arbor ($1,000)
3. McMaster University ($500)

Events Summary
• Competition photos are available on Flickr.
• Videos from the competition are posted on YouTube.
• Read about the event on the competition blog.

Information About the Event

• **Date:** Monday, April 29 through Thursday, May 2, 2013
• **Location:** New Hampshire Motor Speedway, Loudon, NH
• **Registered teams:** See the entry list
• **Schedule:** See the schedule of events (PDF)
• **Event Guide:** See the event guide (PDF) for event details
• **Program:** Check out the 2013 program (PDF)
• **School Day** was Tuesday, April 30, 2013.

2013 Teams with Cars in Attendance

• Carleton University
• Dartmouth College
• Embry-Riddle Aeronautical University - Daytona Beach
• Georgia Institute of Technology
• Lawrence Technological University
• McMaster University
• Rensselaer Polytechnic Institute
• University of Massachusetts - Lowell
• University of Michigan - Ann Arbor
• University of Vermont
• Yale University