

HyTech

RACING

2016 WELCOME PACKET

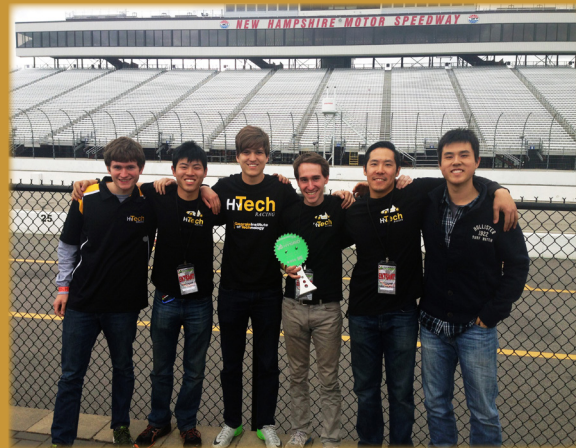


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RACING

Georgia Institute
of **Technology**

WELCOME TO HyTECH RACING!

HyTech Racing was formed in 2011 as a student competition team at the Georgia Institute of Technology, dedicated to the design and development of alternative energy, open-wheel race vehicles. Members of HyTech Racing have a chance to learn about all components of electric vehicle design and production through research, CAD, machining, component sourcing, manufacturing, testing, and project management. HyTech participates in Formula Hybrid and Formula SAE Electric competitions. They involves a variety of dynamic and static events, including: acceleration, autocross, business logic case, efficiency, endurance, and skid-pad. The team is composed of a diverse, talented, and active group of undergraduate and graduate students studying mechanical, electrical, chemical, computer engineering, and business. Members have accepted internships, co-ops, and taken full-time jobs at a wide range of companies. Examples include: BMW, Chattahoochee Composites, Deloitte, ExxonMobil, Ford, General Motors, Honda, Joe Gibbs Racing, KPMG, NASA, Panasonic, Porsche, SpaceX and Tesla Motors. This packet aims to provide information about our areas of engagement.



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OUR NEXT VEHICLE

HyTech is currently designing a new vehicle from the ground up for the 2016 Formula SAE Electric and Formula Hybrid competitions. The 2016 vehicle for HyTech will include a newly designed chassis, enhancements to the current mechanical systems, and implementation of a new motor and motor controller. The expected cost for production is \$20,000, and the expected completion date is February, 2016.

PRIMARY IMPROVEMENTS FOR 2016

Our expected improvements for the 2016 vehicle include:

- 50 kg Weight Reduction
- Regenerative Braking for Improved Electrical Efficiency
- Replacement of Serial Communication Network with CAN Protocol
- Successful Completion of vehicle SolidWorks Model
- Full Test of Vehicle Performance and Efficiency

KEY SPECIFICATIONS

Our 2016 Competition Vehicle includes:

- Drive Train: Electric
- Motor: Emrax 207 Liquid Cooled 3-Phase AC Induction (100 kW Max)
- Motor Controller: Tritium Wavesculptor200 Motor Inverter
- Accumulators: 300V Customized Battery Pack
- Controls: CAN Protocol
- Expected Vehicle Weight: 240 kg

AREAS OF ENGAGEMENT

HyTech Racing is inherently an interdisciplinary team consisting of technical and non-technical members alike. All majors listed below are merely suggestions, not requirements. No prior experience or knowledge is required, you will learn by working with senior members of the team. The following is an overview of sub-systems that are critical to the car's completion.

CHASSIS TEAM

The chassis is the backbone of any vehicle (including airplanes, trains or ships). Experience in this area may be valuable in mechanical/civil engineering internships or jobs related to structures or manufacturing. Working in this team involves learning CAD/FEA tools and an interest in structural analysis.

PEDAL BOX DESIGN TEAM

The pedal box connects the driver's throttle and brake action to the electrical and hydraulic systems respectively. Experience gained here may be valuable for nearly any mechanical/civil engineering internship or job related to design or manufacturing. Working on this team involves an interest in CAD, material procurement, dynamics, machining and rule compliance.

STEERING DESIGN TEAM

The steering system connects the driver to the wheel through a series of gears and shafts. While it may appear simple, there are devils in the details. Experience gained here may be valuable for nearly any mechanical/civil engineering internship or job design or manufacturing. Working on this team involves an interest in CAD/FEA, material procurement, dynamics, material deformation, machining and rule compliance.

SUSPENSION DESIGN TEAM

The suspension system is critical to vehicle performance and therefore vital to design correctly. Experience gained here may be valuable for nearly any mechanical/civil engineering internship or job related to structures or system control. Working on this team involves an interest in CAD/FEA, material procurement, system dynamics, machining and rule compliance.

ENERGY MANAGEMENT TEAM

This team is responsible for designing systems that keep the batteries and motor cool in addition to environmental and sustainability calculations. Experience gained here maybe valuable for nearly any mechanical/civil/environmental engineering internship or job related to thermal analysis, fluid modelling or green energy. Working on this team involves interest in CAD, heat transfer, machining, material procurement, numerical simulation and rule compliance.

POWERTRAIN TEAM

This team is responsible for connecting the motor to the differential along with designing and manufacturing all adjustments as a result of any changes. This responsibility may seem easy at first, but will quickly become challenging. Experience gained maybe applicable to nearly any mechanical/civil engineering internship or job related to design or manufacturing. Working on this team involves an interest in CAD, machining, and rules compliance.



ACCUMULATOR TEAM

The accumulators (batteries) are the heart of an electric vehicle. Experience gained maybe useful in chemical/electrical/mechanical engineering internships or jobs related to safety, design or thermo-chemical processes. Working on this team involves interest in CAD, rule compliance, electrical wiring, electrical diagramming, and specifying requirements.

TRACTIVE SYSTEM TEAM

The tractive system is the link between pushing the accelerator and the spinning the wheel. This team is responsible for nearly 50% of the entire car. Experience gained may prove useful in electrical/computer engineering or computer science internships or jobs. Working on this team involves interest in electrical wiring and diagramming, rule compliance, circuit design, PCB fabrication, programming, micro-controller networking, and CAD.

BUSINESS TEAM

Business is responsible for 4 major areas, Recruitment, Sponsorship, Outreach and Accounting. Experience in this area may be useful in Media/Communications, Industrial Engineering, Marketing/Accounting or Business Administration internships or jobs. Working in this team involves interest in engaging with people or corporations, preparing material for events, and writing proposals for budgets.

OTHER MAJORS

If your major or interest was not outlined in the subsections above, please reach out to one of our leadership and we will help you find a place on the team! Examples of other majors not listed are, but not limited to: Aerospace Engineering, Biomedical Engineering, Earth and Atmospheric Sciences (EAS), Industrial Design, Literature, Media and Communications (LMC), Mathematics and Physics!

CONTACT Us

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