Major advances have been made by Polar Bear Racing team at the University of Manitoba for the 2010 season. A driver integration system has been designed which includes electronically controlled brake bias with sensor feedback and a large LCD to relay vehicle diagnostic information. The suspension system which now incorporates a Controlled Load Path system to interlink the front and rear suspension using custom hydraulic cylinders will enhance grip and vehicle control. Significant weight reduction was accomplished with the construction of a full carbon fibre monocoque. The vehicle’s powerhouse is a naturally aspirating CBR600 F4i controlled by a DTAFast ECU. The 2010 entry is complete with an aero package including a diffuser riding at 28 mm above ground creating 490N of downforce at 60 km/h. Custom 6061 T6 aluminum uprights and hubs are used to mount Keizer magnesium wheels for the Goodyear FSAE tyres. With the implementation of such designs, the 2010 Polar Bear Racing vehicle will be a serious competitor.

**BRAKE:** Outboard Floating Grey Cast Iron Rotors clamped by 34mm Calipers  
**COOLING:** Single Radiator With Thermostatic Controlled 22.65 m^3/min  
**DRIVE:** Chain Driven Torsion T1 Differential  
**ENGINE:** 2002 Honda CBR 600F4i, Naturally Aspirated Variable Intake  
**FR SUSPENSION:** CLP front-rear interlinked roll control and dampening.  
**FR/RR TRACK:** 1219 mm (48 in)/1118 mm (44 in)  
**FRAME:** Full Carbon Composite Monocoque  
**FUEL SYSTEM:** DTAFast S80 Pro ECU, Sequentially Operated, Stock Fuel Rail and Injectors  
**FUEL TYPE:** 93 Octane  
**INDUCTION:** Naturally Aspirated  
**MATIERIAL:** Carbon Fiber  
**RR SUSPENSION:** Double unequal length A-Arm. Push-rod actuated spring and damper.  
**SHIFTER:** Student-designed electro-pneumatic  
**TIRE:** Goodyear Racing  
**WHEELBASE:** 62.5 inches
The 2010 car, FW-10, aspires to improve upon team successes of years past with a new engine program, improved suspension kinematics, completely reworked tubular space frame and emphasis on driver ergonomics. The team set its focus on increasing reliability while shedding weight. Simulation played an immense role during the development process. GT Power and DOE methods were used to develop the rapid-prototyped intake and two-piece stainless exhaust. A partnership with CFdesign allowed flow analysis to be conducted for the cooling system, intake and body, while Racing by Numbers was used to model the suspension system. In addition to simulation, empirical testing was a priority. Several mufflers were tested on the chassis dyno to reveal performance and acoustic gains. Testing of various shear panels to fracture resulted in lightweight solutions. The intake, venturi and head were all flow-tested to improve upon the base design. Two versions of the dampers were dyno-tested to dial-in to the desired damping ratio, and the impact attenuator was crashed in a sled test courtesy of CAPE. The result is a well-packaged and engineered FW-10 that the team is proud to present!

**Information submitted by teams pulled on April 5, 2010 and printed as supplied with minimal editing.**

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**University of Windsor**

The 2010 car, FW-10, aspires to improve upon team successes of years past with a new engine program, improved suspension kinematics, completely reworked tubular space frame and emphasis on driver ergonomics. The team set its focus on increasing reliability while shedding weight. Simulation played an immense role during the development process. GT Power and DOE methods were used to develop the rapid-prototyped intake and two-piece stainless exhaust. A partnership with CFdesign allowed flow analysis to be conducted for the cooling system, intake and body, while Racing by Numbers was used to model the suspension system. In addition to simulation, empirical testing was a priority. Several mufflers were tested on the chassis dyno to reveal performance and acoustic gains. Testing of various shear panels to fracture resulted in lightweight solutions. The intake, venturi and head were all flow-tested to improve upon the base design. Two versions of the dampers were dyno-tested to dial-in to the desired damping ratio, and the impact attenuator was crashed in a sled test courtesy of CAPE. The result is a well-packaged and engineered FW-10 that the team is proud to present!

- **BRAKE:** Wilwood Calipers, Tilton Masters & Bias Bar, Rotors: Floating, Steel
- **COOLING:** Water-cooled, Single Custom Downflow Radiator in Sidepod
- **DRIVE:** Chain Drive, Honda CVs, Differential: Cam and Pawl
- **ENGINE:** Honda CBR600RR
- **FR SUSPENSION:** Unequal Length Double A-arms, Pull-rod Actuated
- **FR/RR TRACK:** 1260mm / 1210mm
- **FRAME:** 4130 Space Frame with Aircraft Shear Panels
- **FUEL SYSTEM:** Electronic Fuel Injection using the MEFI 4 ECU, Student-designed Tank
- **FUEL TYPE:** 100 Octane
- **INDUCTION:** Naturally Aspirated, Rapid-prototyped Intake and Venturi
- **MATERIAL:** Fiberglass: Body; Carbon Fiber Seat, Fan Shroud, Clutch Lever
- **OLWH:** 2690mm, 1450mm, 1200mm
- **RR SUSPENSION:** Unequal Length Double A-arms, Pull-rod Actuated
- **SHIFTER:** Touch-pad Activated Pneumatic System
- **TIRE:** Goodyear D2696 20.0x7.0-13
- **UNIQUE:** Student-built Muffler, Two-piece Exhaust, Detangler Clutch Lever
- **WEIGHT:** 485 lbs
- **WHEELBASE:** 1590mm

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**Istanbul Technical University**

Istanbul Technical University FSAE Team is a first year competitor in the Formula SAE. The newborn FSAE Team’s first goal is to build a challenging car. To impress the judges, fascinating view with combination of ergonomics is our second goal. In chassis design special importance was given to durability and reliability. Our impact attenuator is chosen by very detailed physical tests with high speed cameras. This allowed our team to test various materials in real conditions. Suspension system, one of the most important subjects of the car, has a convenient damping rate for better stability and concerning performance. After calculations for shock absorbers, it has been decided to carry a choice on bell-crank and pushrod mechanism. Besides the suspension system, steering system was designed to have good handling, stability and linearity. Since the brake system has an enormous affect on performance and safety, brakes are used on each front and rear sides also supporting the independence between front and rear with the aim of a better stability and balance on cornering.

- **BRAKE:** 240 mm vented discs, dual piston calipers
- **COOLING:** OEM Honda Radiator
- **DRIVE:** Chain Drive with Quaife ATB Differential
- **ENGINE:** Honda CBR600F F4i
- **FR SUSPENSION:** Unequal Length Double Wishbone
- **FR/RR TRACK:** 1240 mm / 1200 mm
- **FRAME:** Space Frame Construction
- **FUEL SYSTEM:** OEM Honda Fuel Injection, Semi-Sequential
- **FUEL TYPE:** 100 Octane Gasoline
- **INDUCTION:** Naturally Aspirated, Student-Built Intake System
- **MATERIAL:** 1020 Steel
- **RR SUSPENSION:** Unequal Length Double Wishbone
- **SHIFTER:** Push-rod Activated
- **TIRE:** Hoosier R25B 20.5x7.0-R13
- **UNIQUE:** Fully Closed Bodywork
- **WEIGHT:** 660 lbs
- **WHEELBASE:** 1700 mm
River Hawk Racing is a product of many hard-working individuals at the University of Massachusetts Lowell. Our team of engineers has designed a car that appeals to the weekend racing warrior - exemplifying affordability, an intelligent, durable, and efficient design, and easy access to parts.

**BRAKE:** Wilwood Dynalite  
**COOLING:** Aluminum Radiator  
**DRIVE:** 525 Chain / Torsen  
**ENGINE:** 2003 Suzuki 600cc  
**FR SUSPENSION:** Adjustable Pull-Rod  
**FR/RR TRACK:** 55"  
**FRAME:** 1020 DOM Steel  
**FUEL SYSTEM:** Megasquirt EFI  
**FUEL TYPE:** 93 Octane  
**INDUCTION:** Naturally Aspirated  
**RR SUSPENSION:** Adjustable Pull-Rod  
**SHIFTER:** Pneumatic  
**TIRE:** Hoosier  
**UNIQUE:** Stressed Skins  
**WEIGHT:** 500 lb. est.  
**WHEELBASE:** 62"

This being our second year competing we are trying to take all that we learned last year and roll it into a car that we hope will be a big step forward in terms of speed and reliability. This being said we have still developed a new differential and redesigned our corner assemblies, taking huge amounts of weight off of each, and tried to trim some weight off every other component we could. Now that we have designed something we feel has a chance at a top thirty finish we just need to make sure it will complete the enduro, and on to spring testing we go.

As always a big thanks to our sponsors, family and friends with out your support none of this would be possible.

**BRAKE:** Steel Rotors, Opposing piston calipers same front to rear  
**COOLING:** Side mounted radiator, aluminum lines  
**DRIVE:** Custom differential open  
**ENGINE:** Honda CBR600F4i  
**FR SUSPENSION:** Double A-arm, Short VSAL, pull rod  
**FR/RR TRACK:** 62in, 61in  
**FRAME:** Tubular space frame using mild steel  
**FUEL SYSTEM:** Fiberglass fuel tank, in tank pump  
**FUEL TYPE:** 93 Octane  
**INDUCTION:** Naturally aspirated  
**MATERIAL:** Rapid prototyped ABS plastic  
**RR SUSPENSION:** Double A-arm, pull rod  
**SHIFTER:** Hand operated w/ integrated clutch  
**TIRE:** Hoosier R25B on 13x8 Keiser  
**UNIQUE:** 2nd year team  
**WEIGHT:** 665 lbs  
**WHEELBASE:** 65in
Concordia University

Concordia University’s 2010 entry to the Formula SAE series provides unique features incorporating advanced composites, aerodynamic devices as well as an innovative drivetrain and suspension systems.

Concordia FSAE would like to thank our many sponsors for all their support throughout our project.

Our Sponsors: Mechtronix, Honda Canada, NGK, Verdun Anodizing, LBPSB, SolidCAM, ECA, ENCS.

**BRAKE**: 4 Wheel Outboard 9” Crossdrilled Discs - Dual Piston Calipers  
**COOLING**: Single Side Mounted Custom Aluminum Shrouded Radiator  
**DRIVE**: Custom Aluminum Torsen / Taylor Drivetrain  
**ENGINE**: Honda CBR 600 F4i  
**FR SUSPENSION**: Double Equal Length A-Arms - Pushrod Activated Elka Stage-5 Shocks  
**FR/RR TRACK**: 1.32m / 1.22m  
**FRAME**: Tubular Space Frame - Mild Steel  
**FUEL SYSTEM**: EFI - Performance Electronics ECU  
**FUEL TYPE**: 93 Octane  
**INDUCTION**: Naturally Aspirated  
**OLWH**: 2.8m Long / 1.5m wide / 1.4m long  
**RR SUSPENSION**: Double un-equal Length A-Arms - Pushrod Activated Elka Stage-5 Shocks  
**SHIFTER**: Electronically controlled with On-Command Gear Selection  
**TIRE**: Goodyear D2692 20.0x7.0-13 R075  
**UNIQUE**: Carbon Fiber: Front Wing / Diffuser / Intake Manifold  
**WEIGHT**: 300kg with 68kg driver  
**WHEELBASE**: 1.66m

For the 2010 Formula SAE competition, Panther Racing followed a strict design philosophy of simplicity and weight reduction. The space frame chassis is suspended via double A-arm independent suspension with dampers loaded directly to the frame from the lower A-arms. Also featured in car #85 are fully adjustable front and rear anti-roll bars, as well as a simplified hand shifter with foot actuated clutch. Improved cockpit layout, predictable handling characteristics, and in-house dyno tuning make car #85 a true contender for the 2009-2010 season.

**BRAKE**: Brembo P34G caliper with 190 mm rotors  
**COOLING**: Duel Honda Goldwing radiators  
**DRIVE**: Torsen differential with Taylor race driveshafts  
**ENGINE**: Honda CBR 600RR  
**FR SUSPENSION**: Unequal a-arms, spring/damper lower a-arm loaded, fully adjustable swaybars  
**FR/RR TRACK**: 48”/46”  
**FRAME**: 4130 chromoly steel  
**FUEL SYSTEM**: externally managed fuel injection  
**FUEL TYPE**: 93 octane  
**INDUCTION**: Naturally Aspirated rapid prototyped intake  
**MATERIAL**: fiberglass bodywork  
**OLWH**: 105” x 55” x 42”  
**RR SUSPENSION**: Unequal a-arms, spring/damper lower a-arm loaded, fully adjustable swaybars  
**SHIFTER**: left side mounted lever  
**TIRE**: Goodyear D2696  
**WEIGHT**: 450lb  
**WHEELBASE**: 63”
The Villanova University Formula SAE team is coming off its very first competition ever last year. The VU-01 finished in the top 20% of registered teams in the endurance/fuel economy event at FSAE Michigan finishing 62nd overall, a very impressive feat for a first year team. This year the team will be bringing the VU-02, a progression of the previous vehicle. The car is a much lighter and much faster version of its predecessor.

The car features a completely new frame that is lighter and stiffer than last year’s car. The team has also redesigned all of the driver controls, uprights and suspension rockers, braking system, exhaust components, and wiring harness. These improvements will help to achieve the team’s goal of removing over 100lbs from the car compared to last year. The team is also going to have more time to tune the car, and optimize suspension set-ups for all of the dynamic events. The goal is to improve upon the overall finishing position by competing in all the events, finishing in the top 30 teams overall.

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake</td>
<td>4 Outboard</td>
</tr>
<tr>
<td>Cooling</td>
<td>Water Cooled</td>
</tr>
<tr>
<td>Drive</td>
<td>Chain Driven</td>
</tr>
<tr>
<td>Engine</td>
<td>Ninja ZX-6RR</td>
</tr>
<tr>
<td>FR/RR Track</td>
<td>48/46</td>
</tr>
<tr>
<td>Frame</td>
<td>4130 Steel Tube</td>
</tr>
<tr>
<td>Fuel System</td>
<td>Fuel Injected</td>
</tr>
<tr>
<td>Fuel Type</td>
<td>93</td>
</tr>
<tr>
<td>Induction</td>
<td>Naturally aspirated</td>
</tr>
<tr>
<td>Shifter</td>
<td>Push Pull Cable</td>
</tr>
<tr>
<td>Tire</td>
<td>Goodyear</td>
</tr>
<tr>
<td>Unique</td>
<td>Non-rotating differential housing</td>
</tr>
<tr>
<td>Weight</td>
<td>450lbs</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>63in</td>
</tr>
</tbody>
</table>

ARG10 is Cornell University’s entry in the 2010 Formula SAE Michigan competition. The design of ARG10 takes into account all aspects of the competition and represents Cornell’s vision of what tradeoffs must be made in an FSAE racecar. Components are not designed individually, but rather with the entire system in mind. This ensures that all interactions and interfaces among parts and subsystems create the best performing package. In order to accomplish this, decisions were made using a points analysis system that included, but was not limited to factors of cost, weight, manufacturability, and reliability.

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake</td>
<td>Tilton 75 series master cylinders, hub mounted front and rear rotors</td>
</tr>
<tr>
<td>Cooling</td>
<td>Dual-pass radiator with ECM controlled electric fan</td>
</tr>
<tr>
<td>Drive</td>
<td>Chain</td>
</tr>
<tr>
<td>Engine</td>
<td>Yamaha YZF-600R</td>
</tr>
<tr>
<td>FR Suspension</td>
<td>Double unequal length A-Arm. Pull rod actuated spring and damper</td>
</tr>
<tr>
<td>FR/RR Track</td>
<td>1200mm/1175mm</td>
</tr>
<tr>
<td>Frame</td>
<td>Carbon fiber monocoque with 4130 steel spaceframe</td>
</tr>
<tr>
<td>Fuel System</td>
<td>Fuel injected, returnless</td>
</tr>
<tr>
<td>Fuel Type</td>
<td>E85</td>
</tr>
<tr>
<td>Induction</td>
<td>Borg Warner KP35 turbocharger</td>
</tr>
<tr>
<td>OLWH</td>
<td>2474mm long, 1276mm wide, 1178mm high</td>
</tr>
<tr>
<td>RR Suspension</td>
<td>Double unequal length A-Arm. Push rod actuated spring and damper</td>
</tr>
<tr>
<td>Shifter</td>
<td>Manually actuated lever/ linkage</td>
</tr>
<tr>
<td>Tire</td>
<td>20.5x7-13 R25B Hoosier</td>
</tr>
<tr>
<td>Unique</td>
<td>Semi-active differential, dry sump pump</td>
</tr>
<tr>
<td>Weight</td>
<td>217kg</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>1536mm</td>
</tr>
</tbody>
</table>

Information submitted by teams pulled on April 5, 2010 and printed as supplied with minimal editing.
Bradley University's design criteria for the 2010 year is to reduce the overall weight of the vehicle, lower the center of gravity, increase power and reliability. The frame is a 4130 Chromoly space frame that has a torsional rigidity of 1600 lbs/degree and weighs 75 lbs with all tabs mounted on the frame. Unequal length double a-arms suspension is used for the front and rear of the car. The front and rear suspension uses pullrods with Fox Racing dampers with titanium springs vertically mounted to the frame using progressive 1.7 ratio rockers. Ackerman steering was incorporated into the suspension design and is adjustable for 100%, 120% and 150% Ackerman geometry. The front camber is also adjustable through the use of camber plates from 1.5 degrees to 3 degrees. The drive train incorporates a 2001 GSxR600 motor with a CVT transmission to ensure the motor is operating at peak power levels during acceleration. A custom intake was designed to reduce the maximum rpm range to 10,500 rpm where peak power will be made for optimum CVT operation. Bradley expects a top finish in the acceleration event.

**BRAKE:** AP Racing dual piston calipers, Rear: Wilwood PS-1, 14mm AP master cylinders  
**COOLING:** Aluminum radiator w/ electric fan  
**DRIVE:** CVT: Comet 4 post primary, Polaris Secondary, Chain drive  
**ENGINE:** 01 GSXR600 with custom intake, tri-y exhaust, and tune  
**FR SUSPENSION:** Double unequal length a-arms with pullrods/ vertically mounted Fox DHx shocks  
**FR/RR TRACK:** 52”/ 48”  
**FRAME:** 4130 Chromoly Space Frame  
**FUEL SYSTEM:** Stock gsxr fuel rail with external fuel pump w/regulator  
**FUEL TYPE:** 93 Octane  
**INDUCTION:** Custom Aluminum intake  
**MATERIAL:** 4130 Chromoly Tubing  
**RR SUSPENSION:** Double unequal length a-arms with pullrods/ vertically mounted Fox shocks  
**SHIFTER:** N/A  
**TIRE:** Goodyear Intermediates  
**UNIQUE:** Removable LED display with wireless capabilities for data logging for testing  
**WEIGHT:** 500 lbs  
**WHEELBASE:** 63.5”

The SVSU Race Team is devoted to producing the most competitive, high performance race car in the FSAE competition. Drawing from years of documented experience, helpful sponsors, and inspirational leaders, the SVSU Race Team will present to the world a car to be the envy of all schools. Featuring a Suzuki GSXR 600 powering a custom designed, light-weight driveline, the SVSU 089 Car lays down torque to Hoosier Racing slicks to fly around the cones on the finely tuned, customizable suspension. Ohlins FSAE specs shocks, a DTA Fast ECU, and an adjustable bias Brembo brake system allow for customization to accommodate any track layout and driver preference. The chrome-moly tube frame gives the car its necessary rigidity and safety features and is powder-coated for a bold look and durable protection. The car’s carbon fiber body panels give it a stylish look as well as contribute to the aerodynamics. A six point TeamTech safety harness keeps the driver safe and secure as he/she pilots around the course using a hand actuated clutch to shift through the gears with the custom paddle shifting system. The SVSU 089 Car is a product of ingenuity and team work, a definite force to be reckoned with.

**BRAKE:** 4 Wheel Disc  
**COOLING:** Water/Oil Cooled  
**DRIVE:** Visco-Lok speed sensing differential  
**ENGINE:** 2004 Suzuki GSX 600  
**FR SUSPENSION:** Independent push-rod actuated  
**FR/RR TRACK:** 46.75”/45.5”  
**FRAME:** Chrome-moly steel space frame  
**FUEL SYSTEM:** Fuel injected  
**FUEL TYPE:** 93 Octane  
**INDUCTION:** Naturally aspirated  
**OLWH:** 100” x 60” x 47”  
**RR SUSPENSION:** Independent push-rod actuated  
**SHIFTER:** Hydraulic clutch and pneumatic shifter  
**TIRE:** Hoosier R25B  
**WEIGHT:** 650lbs with driver  
**WHEELBASE:** 62.5”
For 2010, the UNC Charlotte FSAE team has strived to produce a lightweight, simple, and competitive vehicle without compromising the reliability and robustness required to complete all the dynamic events. The goal was to build a vehicle that provides sufficient feedback and control to enable amateur-level drivers to reach the vehicle’s limits. The synthesis of a responsive, predictable, and controllable suspension; reliable braking system; appropriately stiff and lightweight chassis; competitive engine modified for efficiency and robustness; simple yet forgiving drivetrain; and attention to driver ergonomics with steadfast controls yields a lightweight, simple, and competitive vehicle that will enable the UNC Charlotte team to be contenders in all aspects of the 2010 Formula SAE Michigan event.

We would like to thank the following Sponsors for their continued support:
- Brown and Miller Racing Solutions
- Calico Coatings
- CV Products
- Stock Car Steel and Aluminum
- Gough Econ Inc Fabrication
- Kenny's Components
- Safety-Kleen
- LJM Machine Co
- Alpinestars Inc
- Bell Sports Inc
- Miller Electric Mfg
- Performance Friction Brakes
- Kooks Custom Headers
- Cometic

**BRake**: Full Floating Cast Iron Rotors, AP Racing CP4227 Front, CP4226 Rear
**CooLING**: Single, Sidepod Mounted, H2O-to-Air, Tube-and-Fin Enthalpy Removal System
**DrIVE**: 420 Dual-Roller Chain and Viscous-type Limited Slip Differential
**EnGinE**: Aprilia SXV 550, Coated Internals
**Fr SuSPEnSion**: Unequal Length SLA, Dual A-arm, Pull-rod
**Fr/Rr TracK**: 48in/46in
**FramE**: Chromoly Steel Space Frame, GTAW 100% Argon Shield, Ceriated Tungsten ER80SD2
**FUEL SYStEM**: Motec M400 ECU
**FUEL tYPE**: Sunoco Ultra 93
**INDuCTIoN**: Naturally Aspirated
**OLwH**: 87” x 56.83” x 43.81”
**RR SuSPEnSion**: Unequal Length SLA, Dual A-arm, Push-rod
**SHIFTER**: Mechanically Actuated Butterfly Shifter
**TIRE**: Goodyear D2696 - 20.0 x 7.0 - 13.0
**UNIQuE**: Custom-valved Cane Creek Shocks, SLA Rapid Prototype Intake Manifold
**WEIGHT**: 0.1181 Hecto-slugs (380lbs)
**WHEELBASE**: 67in

The University of Wisconsin Platteville has been involved in the Formula SAE Series since 2003. Their Formula team has been, and will continue to be a team that prides themselves on ambitious design and implementation of new ideas. After having an educational year in 2009, they are enthusiastic for the 2010 Michigan Competition. In 2009, the team primarily focused on improving engine horsepower and torque, decreasing overall vehicle weight through detailed analysis of its chassis, drive-train and suspension components, and re-designing the suspension for better maneuverability and handling. This year the team built off of those goals to create a car that now rivals its predecessor. Goals for 2010 consisted of re-designing some of the suspension components to further improve handling, conducting further analysis on the chassis design through finite element analysis and strain gauge testing to improve its strength to weight ratio, and putting a stronger emphasis on manufacturability and cost. Engineering new, reliable, and efficient vehicle components to implement in their Formula cars gets them excited for competition every year!
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• Complete the team volunteer verification process
• Submit your proof of CDS team registration
• Receive a reimbursement equal to your registration fee

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Program support and materials provided by:
After winning the William C. Mitchell Rookie Award last year, ThunderWolf racing is poised to be very competitive at FSAEM 2010. The lessons learned from last year’s event allowed us to focus our design efforts towards creating a lighter, more powerful, better handling, more tightly packaged race car with a lower CG. Quantum leaps were made in the areas of frame triangulation, suspension kinematics/dynamics, power production, and mass reduction. Switching from a spool to a Torsen differential and tripods reduce rotating mass, and improve cornering and fuel efficiency. The engine mounting has also been vastly improved, increasing strength while decreasing the removal/installation time. A custom oilpan and exhaust system allows the engine to sit lower. The Kevlar body and diffuser help to reduce drag and overall mass. Suspension has changed to a pullrod design with adjustable dampers. Many thanks to all our sponsors who allowed this project to happen.

**BRAKE:** Dual outboard front, single inboard rear. Wilwood calipers, Tilton mc
**COOLING:** Single side-mount radiator with elec. fan and Kevlar duct
**DRIVE:** Torsen style diff, custom Al housing, Taylor race tripods etc.
**ENGINE:** Honda CBR600RR
**FR SUSPENSION:** Unequal length A-arm, pullrod actuated, 4-way adjustable dampers
**FR/RR TRACK:** 50/48 in
**FRAME:** mild steel spaceframe
**FUEL SYSTEM:** PE-ECU
**FUEL TYPE:** 93 Octane
**INDUCTION:** Carbon fiber intake manifold with 101300Pa abs boost
**MATERIAL:** Frame: A513ERW; Body: Kevlar
**OLWH:** 1.4E-2/7.46E-3/6.94E-3 Furlongs
**RR SUSPENSION:** Unequal length A-arm, pullrod actuated, 4-way adjustable dampers
**SHIFTER:** Pingel
**TIRE:** D2696 20.0x7.0-13 R075 Goodyear
**UNIQUE:** Unicorn skin seat covers with Saffron stitching, among others.
**WEIGHT:** 550 lbs
**WHEELBASE:** 65 inch

The 2010 Auburn University Formula SAE Racing Team is made up of 14 section leaders (32 years combined FSAE experience) and 8 new members. The team designed the 2010 vehicle to be reliable, easy to manufacture, and able to meet performance targets for weight and event times. The Aprilia SXV550 engine has a flat, smooth torque curve and puts power to the road through a student-designed Salisbury limited-slip differential. The electro-pneumatic shifting system and launch control program give quick acceleration times. Unequal length suspension links and 4-way adjustable dampers help the FSAE-spec Michelin tires reach their potential in corners and on the skidpad. Many hours of testing helped verify the performance and reliability of the vehicle and allowed the drivers to improve their performance in each event.

Auburn University Formula SAE Racing Team would like to thank:
- Dr. Peter Jones
- The Samuel Ginn College of Engineering
- Michelin Competition
- VT Milltop
- Campbell Engineering
- Cromer Printing
- Schlumberger
- APR
- Halla-Mando Corporation
- Honda Manufacturing of Alabama
- Holston Gases

**BRAKE:** Floating outboard rotors, Brembo calipers, Tilton master cylinders
**COOLING:** Dual pass aluminum radiator with electric fan
**DRIVE:** Shaft driven gearset, Salisbury LSD
**ENGINE:** Aprilia SXV550
**FR SUSPENSION:** Double unequal length A-arms, pullrod actuated
**FR/RR TRACK:** 50° / 48°
**FRAME:** 4130 chromoly steel space frame
**FUEL SYSTEM:** Fuel injection
**FUEL TYPE:** 93 Octane
**INDUCTION:** Naturally aspirated
**OLWH:** 102” x 56” x 47.5”
**RR SUSPENSION:** Double unequal length A-arms, pushrod actuated
**SHIFTER:** Electro-pneumatic sequential
**TIRE:** Michelin 16 / 53 - 13
**UNIQUE:** Longitudinally mounted engine mated to custom shaft driven gearset
**WEIGHT:** 410 lbs
**WHEELBASE:** 63”
The 2010 Minnesota State University, Mankato formula team would like to thank Minnesota Corn Growers, Polaris, Star Cycle Mankato, APT Machining, Poet, McNeilus Steel, Express Composites, Hitch Doc, IFS Machining, QA1, Delta Cams and all of our other sponsors for your help and support.

**BRAKE**: 4 Wheel Outboard Disc, PS1 Calipers, Tillton Master Cylinders
**COOLING**: Sidepod Mounted Single Radiator, ECU Controlled Fan
**DRIVE**: Chain Driven, Zexel LSD
**ENGINE**: KTM 525cc
**FR SUSPENSION**: SLA A-Frames, Push-rod Actuated Cane Creek Shocks w/ Eibach Coil Springs
**FR/RR TRACK**: 1270mm/1244mm
**FRAME**: Spaceframe
**FUEL SYSTEM**: Motec M-48 ECU, Walboro In-Tank fuel Pump
**FUEL TYPE**: E-85
**INDUCTION**: N/A
**MATERIAL**: Mild Steel
**OLWH**: 2463mm/1473mm/1079mm
**RR SUSPENSION**: SLA A-Frames, Push-rod Actuated Cane Creek Shocks w/ Eibach Coil Springs
**SHIFTER**: Hand Operated Manual
**TIRE**: Hoosier 10" x 6.5"
**UNIQUE**: Hard WOODGRAIN Steering Wheel
**WEIGHT**: 170kg
**WHEELBASE**: 1549mm

The 3rd car of the University of Patras Formula Student team is the most sophisticated and advanced until now. The best features of the previous cars were retained and optimized upon, while others were thoroughly revised. The major change from the previous car is the chassis, where a full length carbon fiber monocoque was favored against a spaceframe one, seeking for the optimum torsional stiffness and weight. Aiming to further decrease the overall weight, a single-cylinder Yamaha WR450 motor was selected to power the vehicle, transmitted over a chain and sprocket with the addition of a Drexler LSD differential. A multi adjustable suspension system was designed emphasizing on ease of set up and adjustability, which would render the car agile and fast on various track schemes and demands. The system utilizes pull rod actuated shock absorbers in order to keep the center of gravity as low as possible. ISR disc rotors and calipers were assigned the task of rapidly bringing the car to a halt.

**BRAKE**: 4 Disc Brake System, ISR Discs (180mm), Master Cylinders and 4piston caliper
**COOLING**: Water Cooled, Side pod mounted radiator
**DRIVE**: Drexler Limited slip differential, chain driven
**ENGINE**: Yamaha WRF450, single cylinder, 449cc, 95x63.4
**FR SUSPENSION**: Double unequal, non-parallel A-arms, pullrod actuated shock absorber
**FR/RR TRACK**: 1240/1220
**FRAME**: Two piece carbon fiber monocoque
**FUEL SYSTEM**: Custom fuel injection system, single injector, in-tank pump and Haltech ECU
**FUEL TYPE**: 98 RON Gasoline
**INDUCTION**: Natural aspirated, custom intake, 20mm restrictor
**MATERIAL**: Carbon Fiber
**OLWH**: 2537mm long, 1431mm wide, 1146mm high
**RR SUSPENSION**: Double unequal, non-parallel A-arms, pullrod actuated shock absorber
**SHIFTER**: Pro-Shift electronic assisted Gearshift Linear Actuator
**TIRE**: Hoosier 18x7.5-10 slick
**UNIQUE**: Aim Data logging system
**WEIGHT**: 180kg
**WHEELBASE**: 1630mm
For the 2010 season, the Knights Racing garage has produced a vehicle that they feel will be the most competitive vehicle yet to roll out of the shop. The KR10 has been completely redesigned from the tires up, to be the best it can be.

The chassis is both torsionally stronger and lighter than the ’08 and ’09 cars, and while dimensionally smaller the ’10 car has more driver room due to better planned driver controls. The suspension geometry has been completely redesigned with all components designed by the team tweaked to try and remove as much unsprung mass as possible. The drivetrain is similar to ’09, with the Honda F4i being used for it’s unfailing reliability, but new to ’10 is the use of the Haltech Platinum Sport 1000 giving us fully sequential fuel and spark control. The drivetrain is also similar utilizing a Torsen differential in a custom aluminum housing. Braking is handled by Wilwood PS1 calipers, MCP master cylinders, and outboard disk brakes. The bodywork this year was kept simple with the use of Lexan side panels and a fiberglass/Kevlar nosecone.

Overall Knights Racing feels strongly that we have produced a highly competitive car for the 2010 season.

**Brake:** Outboard disk, Wilwood PS1 calipers, MCP master cylinders  
**Cooling:** Single side radiator, stock water pump  
**Drive:** Torsen differential, 11t front 45t rear sprockets  
**Engine:** Honda F4i  
**FR Suspension:** Pull rod, Penske dampeners  
**Frame:** Steel tubular space frame  
**Fuel System:** Walbro 255 inline fuel pump, stock fuel rail, Haltech Platinum Sport 1000  
**Fuel Type:** 93 octane  
**Induction:** Normally Aspirated  
**Material:** 4130 Steel  
**OLWH:** 120” L, 59” W, 41” H  
**RR Suspension:** Unequal length A-arms/ Independent Suspension  
**Shifter:** Butterfly shifter  
**Tire:** Goodyear FSAE D2696 20.0x7.0-13  
**Weight:** 525lbs  
**Wheelbase:** 62”

The University of Texas at Austin has been breaking things rigorously in the pursuit of speed since 1982 and is proud to present our 2010 entry.


**Brake:** Single rear diff. mounted  
**Cooling:** Water Cooled  
**Drive:** Chain  
**Engine:** Honda CBR600 F4i  
**FR Suspension:** Unequal length A-arms/ Independent Suspension  
**FR/RR Track:** 49 in. /45 in.  
**Frame:** Tubular Steel Frame  
**Fuel System:** Fuel Injection  
**Fuel Type:** 100 Octane  
**Induction:** Naturally Aspirated  
**Material:** 4130 Steel  
**OLWH:** 120” L, 59” W, 41” H  
**RR Suspension:** Unequal length A-arms/ Independent Suspension  
**Shifter:** Butterfly shifter  
**Tire:** Hoosier 20.5x6.0-13  
**Unique:** Aerodynamics Package  
**Weight:** 460 lbs  
**Wheelbase:** 64 in.
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The FSSRacing team is proud to present its F2010 Formula SAE. This year's car is an improved version of the F2008 car which competed in Detroit in May 2008. The main design orientations for the F2010 car were the optimization of its weight distribution and the stiffening of chassis/suspension interfaces. The rear portion of the chassis has been shortened by 10", enabling more load to be distributed on the rear wheels while keeping the same wheelbase. This year, we come back with our 2008 turbocharged Yamaha Genesis 80FI engine from a Phazer snowmobile which drives a CVT transmission. The new features are the dual stage chain and sprocket reducer as well as a new custom engine management system. We provided our car with a better packaging due to our short reducer as well as our new turbo and exhaust set-up. To sum up we worked in providing a more refined overall design as well as a restyled bodywork. With this all, we created a car in which we have high hopes.

**BRAKE**: Adjustable bias via balance bar  
**COOLING**: Water cooled  
**DRIVE**: CVT with custom reducer  
**ENGINE**: Yamaha Genesis 80FI  
**FR SUSPENSION**: non-equal length wishbones, seperated ride&roll spring&damper  
**FR/RR TRACK**: 48" / 46"  
**FRAME**: Steel tubular space frame  
**FUEL SYSTEM**: Custom Injection system, Microsquirt ECU  
**FUEL TYPE**: 100 octane gasoline  
**INDUCTION**: Garrett GT-12 Turbocharged  
**RR SUSPENSION**: non-equal length wishbones, seperated ride&roll spring&damper  
**SHIFTER**: N/A  
**TIRE**: Goodyear D2696  
**UNIQUE**: SRR Suspensions  
**WEIGHT**: 449 lbs  
**WHEELBASE**: 64"
This is NJ Tech Racing’s second year in the FSAE competition and its first in Michigan. The team’s design philosophy is to keep it simple and reliable. The chassis is made of chrome-moly steel tubing. The front brakes consists of outboard floating calipers off a YFZ 450 and the rear has a single inboard Wilwood caliper. The front hubs are single piece aluminum. The Pedal box is adjustable. Fiber glass seat designed and made by students. Double A-arm pull rod type suspension system is used. 4-2-1 exhaust system is used for better performance. Intake and exhaust designed using Ricardo WAVE and Fluent. PE ECU used for fuel and ignition control. TRE Limited slip differential is used with chain drive. Aluminum differential mounts. Engine used as a semi-stressed member.

**BRAKE** : 3 Disk System, Student designed rear rotor.  
**COOLING** : Single side pod mounted Radiator with driver controlled Fans  
**DRIVE** : Chain drive using TRE Limited Slip Differential  
**ENGINE** : Honda CBR F4i 600 cc  
**FR SUSPENSION** : Double A-arm, pull rod  
**FR/RR TRACK** : 1338 mm / 1272mm  
**FRAME** : Steel tubular space frame  
**FUEL SYSTEM** : MPFI using PE ECU  
**FUEL TYPE** : 93 Octane  
**INDUCTION** : Natural Aspiration, Helmholtz tuned intake.  
**MATERIAL** : Carbon Fiber  
**OLWH** : 2406mm long, 1553mm wide, 1176mm high  
**RR SUSPENSION** : Double A-arm, pull rod  
**SHIFTER** : Paddle shift using push/pull cable  
**TIRE** : Hoosier R 25b. Size: 20.5 x 7 -13 in.  
**WEIGHT** : 550 lbs  
**WHEELBASE** : 1573mm

The 2010 University of Minnesota UMN10 is the 10th vehicle produced by the university since 1996.

With the current effort started back up in 2008, the team has focused on establishing a maintainable program which not only produces a well designed car, but also produces quality engineers with an understanding of performance vehicle design fundamentals. Drawing from our past experiences this year’s design is an iteration from our prior vehicles. Priority was placed on vehicle weight, compact packaging, increased data acquisition, and the use of highly developed and common manufacturing methods. These were taken into account while also maintaining and increasing driver comfort and control.

Thank you to all our sponsors!

**BRAKE** : Front: Floating caliper, Rear: Dual inboard floating disks  
**COOLING** : Ducted left side-pod mounted radiator, Thermostatically controlled fan  
**DRIVE** : Chain  
**ENGINE** : 2004 Yamaha R6  
**FR SUSPENSION** : Unequal length A-Arm. Pull rod actuated vertically oriented spring and damper  
**FR/RR TRACK** : 48.8in/46in (1245mm/1168mm)  
**FRAME** : Nodal space frame  
**FUEL SYSTEM** : Sequential fuel injection, student designed/ built fuel rail  
**FUEL TYPE** : 100 octane  
**INDUCTION** : Naturally aspirated  
**MATERIAL** : 4130 steel tube with carbon fiber nomex shear panels for added rigidity.  
**OLWH** : 92in long, 58in wide, 55in high (2338mm, 1476mm, 1404mm)  
**RR SUSPENSION** : Pull rod actuated horizontally oriented spring and damper.  
**SHIFTER** : Manually actuated lever.  
**TIRE** : 20.5x7.5-13 R26B Hoosiers  
**WEIGHT** : 475lbs (215kg)  
**WHEELBASE** : 68.75in (1746mm)
The engine for the 2010 car will be a 2006 Honda CBR 600RR. A Motec fuel injection will be utilized, mated to a trapezoidal intake, and a custom exhaust. The layout the car will be mid engined with rear wheel drive; consisting of a chain driven limited slip differential, constant velocity joints, and custom splined shafts that directly drive the wheels. The chassis design will constitute a new frame, including all new suspension components. A composite body will be fabricated to fit the altered frame.

**BRAKE**: 4-Wheel Disc Brakes, Wilwood PS1 Calipers  
**COOLING**: PRC Double Pass Radiator  
**DRIVE**: Taylor Race Engineering Quaife Limited Slip Differential  
**ENGINE**: 2006 Honda CBR 600RR  
**FR SUSPENSION**: double, non-parallel, unequal length a-arm geometry, RC of 1.09 inches  
**FR/RR TRACK**: 50 inch front and 48 inch rear  
**FRAME**: 4130 Chrome-Moly Tubing, Optimized Triangulation  
**FUEL SYSTEM**: .040 Aluminum, Steel Braided Fuel Lines, 1.367 gallons of fuel  
**FUEL TYPE**: 93 octane  
**INDUCTION**: Trapezoidal Intake, plastic SLS material  
**RR SUSPENSION**: double, non-parallel, unequal length a-arm geometry, RC of 1.34 inches  
**SHIFTER**: Pneumatic Shifter  
**TIRE**: Hoosier  
**WEIGHT**: 460 lbs  
**WHEELBASE**: 64 inches

The 2010 Stevens Formula SAE team’s car design is based off of the groundwork set by last year’s senior design team. The team used their experiences from last year’s competition to build a more competitive car. This year’s design focused on a simple, efficient car which would give us the best chance at completing every event. The team would like to thank the Mechanical Engineering Department, the Office of Advancement, the Class of 57”, Majka Railing, Bay Cycles, and everyone else who has supported our project.

**BRAKE**: Front: Hub mounted Honda; Rear: Inboard Wilwood  
**COOLING**: Single radiator  
**DRIVE**: Chain driven limited slip differential  
**ENGINE**: Yamaha R6 600cc  
**FR SUSPENSION**: Double unequal length a-arm; push rod actuated spring and damper  
**FR/RR TRACK**: 1219 mm / 1168 mm  
**FRAME**: 4130 Tubular steel space frame  
**FUEL SYSTEM**: Inline fuel pump with EFI  
**FUEL TYPE**: 93 Octane  
**INDUCTION**: NA  
**OLWH**: 2257 mm x 1625 mm x 1351 mm  
**RR SUSPENSION**: Double unequal length a-arm; push rod actuated spring and damper  
**SHIFTER**: Hand Controled Teleflex Cable  
**TIRE**: Hoosier R25B 20x7.5-13  
**WEIGHT**: 308 kg  
**WHEELBASE**: 1626 mm
Built from the ground up over the last year, the Florida Tech 2010 competition car is simple yet effective. The chassis was designed to fit the teams’ varying body types, while the suspension was designed to be adjustable depending on what performance characteristics were desired. The changes include adjusting front and rear toe, camber, and suspension travel. The drivetrain was chosen to provide the needed horsepower while giving the driver complete control on the course. Through rigorous Finite Element Analysis, Computational Fluid Dynamics, Materials, and field testing, the design evolved several times from rough sketches to the current design.

The goals for our team are: to design a car capable of performing at a high level of competition, to complete each FSAE event, and to place higher than any previous Florida Tech team.

**BRAKE:** Wilwood 19mm bore front / 17.8mm bore rear Cast Iron hub mounted 6.35 mm dia  
**COOLING:** Duel side mounted Ninja 250cc radiators  
**DRIVE:** 520 chain drive Viscous LSD  
**ENGINE:** 2007 Yamaha YZF-R6 600cc  
**FR SUSPENSION:** Double unequal length A-Arm. Direct acting spring and damper  
**FR/RR TRACK:** 1429 mm / 1385 mm , 56.25 in / 54.50 in  
**FRAME:** Tubular space frame  
**FUEL SYSTEM:** Stock Yamaha system  
**FUEL TYPE:** Gasoline 93 octane  
**INDUCTION:** Natural Induction  
**MATERIAL:** 4130 steel round tubing .625” to 1” dia, Al 5052, Al 6061  
**OLWH:** 2877 mm x 1625 mm x 1357 mm / 113 in x 64 in x 53 in  
**RR SUSPENSION:** Double unequal length A-Arm. Direct acting spring and damper  
**SHIFTER:** Manually actuated lever/ linkage, right side cockpit mount  
**TIRE:** 20 x 7.5-13 R25A Hoosier  
**WEIGHT:** 249 kg / 550 lbs  
**WHEELBASE:** 1689 mm / 66.5 in
The University of Cincinnati Bearcat Motorsports 2010 car is engineered to be a winning solution for both the amateur and experienced racer alike. Careful balancing between performance, reliability, and cost will leave the autocrosser burning up the track, not their hard earned dollar. To increase performance the vehicles weight, inertia’s, and center of gravity height were minimized; predictable response and drivability were optimized to improve the driver performance. Reliability drove designs to be robust to resist the abuse of driving at the limit. Cost lead to simplified designs, inexpensive materials, and commercially available components. Ample implementation of varying set up options, intelligent packaging of components, and ergonomic considerations allow for numerous tuning options, for easy maintenance, and for the driver to drive, not fight the car. Attention was taken to design the car as an integrated system with increased safety.

**BRAKE:** 4 wheel disc, outboard cross drilled  
**COOLING:** Side mounted radiator, electric fan and water pump  
**DRIVE:** Chain Drive, Torsen differential  
**ENGINE:** 2008 Honda CBR600RR  
**FR SUSPENSION:** Double unequal length A-arm, push rod actuated spring and damper  
**FR/RR TRACK:** 1117.6 mm/1079.5 mm  
**FRAME:** Tubular steel spaceframe  
**FUEL SYSTEM:** Returnless sequential fuel injection  
**FUEL TYPE:** 93 Octane  
**INDUCTION:** Naturally Aspirated student designed intake plenum  
**OL/VH:** 2510 mm long, 1310mm wide, 1035mm high  
**RR SUSPENSION:** Double unequal length A-arm, pull rod actuated spring and damper  
**SHIFTER:** Electro-pneumatic actuated (CO₂) via push-buttons at steering wheel  
**TIRE:** 20x7-13 D2692 Goodyear  
**UNIQUE:** Custom dry sump oiling system and slide throttle  
**WEIGHT:** 200 kg  
**WHEELBASE:** 1524 mm

Our major design priorities are reliability and simplicity, weight reduction and emphasis on team work, leadership and persistence along with technical competence for creating a winning car and establishing a foundation for future teams.

The use of mild steel tubular space frame chassis was based upon the ability to manufacture in house with existing skills and equipment as well as the inherent damage tolerance and reparability of such a structure. The main roll hoop supports integrate with the rear bulk head which performs several functions.

**BRAKE:** HYDRAULIC 2 STAGE  
**COOLING:** AIR COOLED  
**DRIVE:** BELT DRIVE  
**ENGINE:** 2008 HONDA CBR 600 F4i  
**FR SUSPENSION:** DOUBLE UNEQUAL LENGTH NON PARALLEL A-ARM.  
**FR/RR TRACK:** FR-1118 RR-1168  
**FRAME:** MILD STEEL TUBULAR SPACE FRAME  
**FUEL SYSTEM:** STUDENT DESIGNED:RETURN FUEL INJECTION, INDIVIDUAL INJECTOR PER CYLINDER  
**FUEL TYPE:** 100 OCTANE  
**INDUCTION:** NATURALLY ASPIRATED/ACOUSTICALLY TUNED  
**MATERIAL:** MILD STEEL  
**RR SUSPENSION:** DOUBLE UNEQUAL LENGTH NON PARALLEL A-ARM.  
**SHIFTER:** PADDLE SHIFT  
**TIRE:** 185/60-13 JK TYRE  
**UNIQUE:** USE OF MONOSHOCKS TO FRONT AND REAR SUSPENSION  
**WEIGHT:** 350Kg.  
**WHEELBASE:** 1625mm
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Front row left to right: Matt Leone, Hunter Locke, Erik Ollila
Middle row left to right: Derek Chan, Fernando Roman, Mitch Paulson, Michelle Locke, Aaron Beddor, Philip Siemieniewski
Back row left to right: Kevin Backer, Eric Ollila, Adam Schuleman, Mike Baltus, Adam Houtari, Mike Locke, Joe Lutz, Adam Evans, Joe Ritter, Matt Johnson

P100497
There is a large group of individuals who make sure the numerous details are completed to make a successful event.

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**EDUCATION RELATIONS:**
- Bob Sechler – Manager, Education Relations
- Steve Daum – Manager, Collegiate Design Series Programs
- Sam Barill – Manager, Collegiate Design Series Programs
- Kaley Zundel – Senior Collegiate Program Coordinator
- Kristin Galuska – Collegiate Program Coordinator
- Gretchen Chamberlain – Event Development, Corporate Sales

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**FORMULA SAE CONSULTANTS**
- Kathleen and Larry McDonald, Creative Consulting Services

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- Acceleration – Bob Goppold and Steve Balanecki
- Autocross – Joe Paolicchi and Laura Wontrop
- Brake, Practice & Switch Test – Alba Colon and Mark Scott
- Cost – Suzy Zukowski
- Design – Tony Lyscio and Bill Riley
- Endurance – Alejandro Nunez-Del Rio and Angel Samalot-Quiles
- Fuel – Mike Thodoroff, Mark Scott and Herb Seubert
- Noise Test – Greg McConville and Gary Newton
- Presentation – Adam Zemke and David Roberts II
- Scales – Mike Thodoroff and Steve Balanecki
- Skid Pad – Laurence Lemaire and Steve Taylor
- Technical Inspection – Bill Riley, Kevin Royce, and Mark Muddiman
- Timing/Scoring – Steve Sayovitz
- Tilt Table – Alba Colon and Gary Newton
- SCCA Liaison & Dynamic Events Safety Steward – John Lisiiecki and Ed Arthur

**COST JUDGES**
- Rick Maynard, Dave Chegash, Dennis Greathouse, Stan Pilchowski, Leonard Wu, Jerry Kowalski, Tom Tran, James Farmer, Cyndi Charney, Manny Barbosa, Jorge Carmelo, Paul Duskey, Judi Pilchowski, Chris Kowalski, Shirley Farmer, Eden Zukowski, Heather Jagoda, Marie Jagoda, Aaron Zukowski, Susan Zukowski, Tom Zukowski

**PRESENTATION JUDGES**


Pat Clarke: Alma Mater: BEngMech UK ’71, but never really worked as an ‘engineer’. Immigrated to Australia ’71, so have dual personality, er, citizenship. Employment History: Training manager for Hyundai in Australia. Came to FSAE as VP (Technical matters) of CIK/FIA (’94 ~’96). I was disappointed at what Karting was doing to the education of the young elite contestants. Had an epiphany at Pontiac in ’94. Bye bye karting! First FSAE event: ’94 at the Silverdome as a spectator. First time Design Judging: FSUK: ’99; FSAE: ’00 (recruited by Carroll Smith). Chief Design Judge: FSAEA since first event; FSG since first event. Design Judge moderator FSUK. Student Tech advisor FSG & FSAEA. Expertise: chassis, suspension, powertrain. First car: Volkswagen Beetle....sold because the rear seat was too small. Favorite Race Car: A toss-up between the Jaguar D type (long nose with fin), the Lotus ’72 F1 car and Silent Sam, the STP Horizon.

Jeff Curtis: Alma Mater: Cornell University: BS Mechanical Engineering. Employment History: Richard Childress Racing (Race\Simulation Engineer, 7 years); Carter-Hass Racing (Race\Simulation\Test Engineer, 2 yrs), 18 years of racing experience including 9 years in NASCAR Sprint Cup Series. Expertise: Race Engineering, simulation development, suspension design, tire analysis, set-up optimization. First car: ’89 Acura Integra Favorite Race Car: Trinity Evolution 10 SS
Key Players
(as of April 13, 2010)

- Kent Day Ph. D.: **Alma Mater:** Florida Tech: BSME; Virginia Polytechnic: MS Mechanical Engineering; Clemson University: Ph.D., Mechanical Engineering. **Employment History:** Michelin Americas R&D Corporation: Test method development for vehicle handling & model validation; Clemson University Motorsports Engineering Program: Senior member: Managed & mentored students on research projects with Sprint Cup race teams. PPI Motorsports: Defined engineering support and roles required, chassis design, & in-house simulation code. Race engineer: #32 Tide Pontiac. Penske Racing: In-house simulation code. Chief Engineer of NASCAR. Richard Childress Racing: Technical Director ’09 – current. **Expertise:** Vehicle testing, Simulation development and implementation. **First Car:** ’70 Fiat 124 Sport Spider. **Favorite race car:** Porsche 911/30.

- Matt Defever: **Alma Mater:** Saginaw Valley State University: BS Mechanical Engineering; University of Michigan: MS Automotive Systems Engineering. **Employment History:** General Motors Powertrain, since ’98; Progressive Tool, 3 years. **Expertise:** Engineer; engine hardware development and controls calibration, auto racing; construction, preparation, and driving. **First Car:** ’79 VW Rabbit. **Favorite race car:** Lotus 25.

- Craig Derian: **Alma Mater:** Ohio State University: BS Mechanical Engineering, MS Mechanical Engineering (tire modeling). **Employment History:** Stackpole Engineering, 5.5 years (1 year at Evernham Motorsports, 3.5 years at Chip Ganassi Racing-NASCAR), now focusing on OEM, military and off-road vehicles. **Expertise:** Suspensions, tires, dampers and test engineering and design & analysis; vehicle simulations. **First Car:** ’76 Chevy Vega (229 cu. in; V6; Camaro front brakes; Eldorado rear brakes; custom front suspension, dash and electronics). **Favorite Race Car:** Lotus Elise.

- Zack Eakin: **Alma Mater:** Messiah College: BS Mechanical Engineering; Cornell University: MEng Mechanical Engineering for Vehicle Simulation. **Employment History:** DeltaWing Racing Cars 1 year (Engineering Design Leader). Chip Ganassi Racing Teams Inc, 4 years (Research and Development in NASCAR, IndyCar, and Grand-Am Series). **Expertise:** Chassis, Suspension, Aerodynamic Design & Development. **First Car:** Mom’s flapped out ’86 Lincoln Town Car. **Favorite Race Car:** Brabham BT46B.


- David Finch: **Alma Mater:** UCLA, University of Michigan: BS and MS Mechanical Engineering. **Employment History:** President of Raetech Corp. 26 years. **Expertise:** Automotive Research and Product Development (Motorsports) specifically Chassis, Engine and Instrumentation products. David is also an accomplished Motorsports Race Engineer and Driver. Major Motorsports Awards: SCCA-President’s Cup, Porsche - Al Holbert Memorial, USRDC-Mark Donohue Award. **First Car:** ’57 Plymouth Belvedere with rusted out front fenders, & blanket which covered holes in rear seat and also used to smother carburetor fires. **Favorite race car:** The Raetech/Porsche 944 with six SCCA G2 National Championships!

- Steven Fox: **Alma Mater:** Iowa State Law Enforcement Academy, U.S. Army Military Police academy. **Employment History:** PowerTrain Technology, President / Director of Engineering, since ’01. Quarter Master Industries, Project Engineer, 20 years, responsible for new product development, manufacturing, testing & breaking. **Expertise:** Skilled Mechanic, Journeyman Machinist, Power transmission over a broad spectrum of applications, Engine Development, Materials Selection & (Lean) Manufacturing Engineering. Over 40 years total motorsports / engineering career. **Favorite Race Car:** Porsche 911/30 & McLaren M8.

- Judd Glenn: **Alma Mater:** Cornell University: Mechanical Engineering. **Employment History:** Someday we will actually figure where Judd earns his spending money! **Expertise:** Dyno Hardware, data acquisition, and controls; dry sump systems, fuel injection calibration (Bosch), turbo systems. **First truck:** ’89 Jeep Comanche pickup. **Favorite race car:** Beneton B186 F1 car with the BMW M13 1.5L turbo engine.

- Kevin Golsch: **Alma Mater:** University of Michigan: BS Aerospace Engineering; University of Detroit: MBA. **Employment History:** Contact Engineer for General Motors, & Chrysler: structures, body closures, & race aerodynamics. AAR Composites: composite structures project manager. PPI Motorsports: NASCAR #32 aerodynamics. Dale Earnhardt, Inc: aerodynamics. Morgan McClure Motorsports: Team Engineer. Back to GM: race vehicle aerodynamics, ’06-current. **Expertise:** Aero - CFD, wind tunnel, coast down, chassis & body structures, tire data, vehicle dynamics, lap simulation, strategy, Technical consulting. **First Car:** 1979 Fiat X-19. **Favorite Race Car:** Lamborghini Murcielago R-GT (How a vehicle looks is important also)
Bob Goppold: **Employment History:** Ford motor company.  
**FSAE-MI History:** Acceleration Captain: 4 years; Design Judge: 3 years; Rules Committee (Ford Motor Co representative): 5 years; Tech Inspector: 8 years; Endurance Event Tech Lead: 6 years; FSAE-VIR inaugural year Endurance Event Operating Steward.

Doug Gore: **Alma Mater:** New Jersey Institute of Technology; BS in Electrical Engineering Northeastern University; MS in Physics.  
**Employment History:** ‘69-’89 RCA Laboratories. Designed and built “widgets” to solve problem for various government agencies. ‘78-’09 Sr. Technical Editor for Stock Car Racing magazine, Open Wheel Magazine, and Speedway Illustrated. ‘89-current: Founder and owner of Gore Engineering, a race car engineering services firm.  
**Expertise:** Over thirty five years experience racing oval tracks as a crew member, team engineer, car builder and a car owner. While I am not a driver, my experience includes racing NASCAR Stock cars, dirt track Sprint Cars, pavement Supermodifieds, and in the Indy 500. Formula SAE Design Judge since ’99.  
**First car:** ‘66 Shelby GT 350  
**Favorite Race Cars:** On dirt: Sprint Cars. On pavement: Big Block Supermodifieds.

Jerry Grandov: **Alma Mater:** Rutgers University: Physics.  
**Employment History:** Alcatel-Lucent Bell Laboratories (10 years), Shadow Racing Products (13 years).  
**Expertise:** Race Engineer, Suspension Engineer, Shock Manufacturer, FEA Analyst.  
**First car:** ‘79 Chrysler Cordoba (with rich Corinthian Leather seats).  
**Favorite Race Car:** McLaren MP4/4.

Charlie Harris: **Alma Mater:** Texas A&M: BS in Mechanical Engineering Technology.  
**Expertise:** Powertrain Design and Development. Practical experience is biased towards physical testing versus extensive simulation work.  
**First car:** ‘75 Pontiac Grand LeMans. (This car taught me that 400 cubic inches is a sorry match for 4200 lbs.)  
**Favorite Race Car:** Lotus 49 - mid-engine, light weight, stressed engine. This car sealed the deal on the main design philosophy for the next full decade.

Jim Kasprzak: **Alma Mater:** Milwaukee School of Engineering: BS Mechanical Engineering Technology, AAS Internal Combustion Engines Technology.  
**Employment History:** President and Technical Director of Kaz Technologies since ‘95. Over 35 years experience as race engineer, chassis specialist, & 7-Post / shock engineer & driver. 31+ years automotive engineering. Arvin Ride Control: Director of Engineering; Monroe Auto Equipment: Chief Engineer.  
**Expertise:** Race engineering, suspension & chassis tuning, 7-post rig, shock design.  
**First car:** ‘62 Ford Falcon Ranchero. 6 cylinder, 3 on the tree painted Hugger Orange with chrome reverse wheels.  
**Favorite race car:** ‘92 Jaguar XJR-14 GTP car. (The most exciting race car I have ever worked on. An F1 car disguised as a GTP car!)

John Lankes: **Alma Mater:** Michigan State University: BS Mechanical Engineering.  
**Employment History:** Design and analysis engineer at Pratt & Miller Engineering & Fabrication, Design engineer at FEV, Fabricator at Rocketsports Racing.  
**Expertise:** Design engineering/analysis, fabrication.  
**First car:** ‘92 Eagle Talon Tsi.  
**Favorite Race Car:** Porsche 917-30 or the Lola B03/00 Champ Car.

Ben LeVesque: **Alma Mater:** Michigan State University: BS Electrical Engineering.  
**Employment History:** Pratt and Miller Engineering (2 yrs.).  
**Expertise:** Control Algorithm development, simulation, circuit design, data analysis.  
**First car:** ‘86 Buick Riviera.  
**Favorite race car:** Subaru Impreza WRC.

Kim Lind: **Alma Mater:** University of Michigan Ann Arbor: BS Mechanical Engineering.  
**Employment History:** General Motors - 25 years; Previously: Michigan Automotive Research Corp - 7 years.  
**Expertise:** Dyno testing and development; by-wire systems; active suspension systems; AWD systems; vehicle concept development demonstrating turbocharging, supercharging, AWD and DCT technologies; and pre-production vehicle architectures. Raced 9 years in SCCA & was a driving instructor for SCCA driving schools.  
**First car:** ‘68 Pontiac Bonneville (small aircraft carrier).  
**Favorite race car:** My SCCA F-Production MG Midget.

Gene Lukianov: **Alma Mater:** Worcester Polytechnic Institute, Lawrence Technological University: BS Mechanical Engineering, MS Automotive Engineering.  
**Employment History:** Currently retired and consulting.  
**Expertise:** Chrysler: 20 years vehicle dynamics tuning, development and analysis.  
**First car:** Gabriel Shocks: 7 yrs. shock absorber design, manufacturing and tuning; also automotive brake design and weapons.  
**Expertise:** Specialist in all aspects of vehicle dynamics: calculations, design, development, tuning and subsystem/component performance.  
**First car:** ‘61 Volvo 544.  
**Favorite race car:** Ford GT40 (the original one).

Steve Lyman: **Alma Mater:** Purdue University: BS Mechanical Engineering Technology.  
**Employment History:** All American Dynamics ‘08-current.  
**Expertise:** Automotive Engineering Consultant, Vehicle Dynamics, Vehicle Design and Development, Concept vehicle design/development, program manager, race engineer, F5000/ Midget owner/driver, lecturer, evaluator training.  
**First car:** Meyers Marx kit, (shortened VW Beetle floor pan/susp., w/ Corvair flat 6, VW transaxle, VW wheels split/widened to fit Big tires, & alum. beer keg fuel tank.  
**Favorite race car:** ‘72 Don Edmunds Autoresearch 4 bar midget with Sesco-Chevy, car #29.
Key Players
(as of April 13, 2010)

Kim Lyon: **Alma Mater:** University of Minnesota / Minneapolis. **Employment History:** B.S. Mechanical Engineering, BA Chinese. **Favorite race car:** Lola T70 coupe, Porsche 962, Nissan GTP, 93' F1 McLaren MP4/8.

Anthony (Tony) Lyscio: **Alma Mater:** University of Minnesota: B.M.E.- Mechanical Engineering; Purdue University: M.S.-Design Engineering; Indiana University: M.B.A. **Employment History:** General Motors- Camaro Lead Suspension Design Engineer, Vehicle Dynamics Advanced Development- Vehicle Dynamics Development, Vehicle Handling Lab- Analysis/ Test Engineer, Concept / Advanced Vehicle Integration-Design Engineer. Consultant Race Engineer. **Expertise:** Calibration, data acquisition, software design & coding, engine and chassis dyno testing, modeling and simulation. First car: '66 Chevy Impala SS (327ci., 4-speed).

Bill Mitchell: **Alma Mater:** Stanford University: BS Mathematics, MS Computer Science. **Employment History:** '83-88 Motorsports Journalist; '91-‘92 Ganassi Indy Car team, data analyst; '93-‘97 Roush Trans-Am team, data analyst; 1998- Current Wm. C. Mitchell Software. **Expertise:** Computer programmer dealing with suspension geometry analysis and data analysis. First car: '69 Camaro. **Favorite race car:** Ford GT40. Proof that revenge can be a very productive emotion.

Doug Milliken: **Alma Mater:** MIT, Mechanical Engineering, Employment History: Milliken research Associates (MRA) since '77, also independent consulting. **Expertise:** Design, analyze (see "Race Car Vehicle Dynamics"), build, test, repeat. First car: 2-seat rear engine project, using Corvair parts (high school project). Favorite race car: Maybe the Lotus 11? 143 mph (230 kph) lap at Monza w/1100cc, '56.

Marc Musial: **Alma Mater:** Western Michigan University. **Employment History:** B.S. Automotive Engineering. **Favorite race car:** Lola T70 coupe, Porsche 962, Nissan GTP, 93' F1 McLaren MP4/8.

Dick Myers: **Alma Mater:** University of Vermont: Mechanical Engineering, Women & Race Cars. (Occasionally in that order.) **Employment History:** Chrysler Corp (28 yrs.), Ford (4yrs). **Expertise:** Design/development engineer, program manager, engineering supervisor and manager, race car engineer. First truck: '56 Chevy 3/4 ton pickup (461,000 miles, honest) from my dad. **Favorite race car:** Winged 410 sprint car.

Dan Nagelhout: **Alma Mater:** University of Maryland: BS Mechanical Engineering, '91; University of Arizona: MS Mechanical Engineering, '94. **Employment History:** Ford '94 – current, including Jaguar Racing F1. **Expertise:** Vehicle Dynamics CAE, multi-body dynamics (ADAMS) simulations, software development, suspension design. First car: '86 Mazda 323: 2100lbs, 82hp, P155/80R13 tires, no power steering, no A/C (not ideal for 122degF desert crossings). **Favorite Race Car:** '66-’69 Ford GT40’s: 4 wins at LeMans using pushrod V-8’s against more sophisticated competitors.

Brett Oltmans: **Alma Mater:** Rochester Institute of Technology: Mechanical Engineering with Automotive Focus. **Employment History:** Polaris Industries ’96 – current, Ford, 5 yrs. **Expertise:** Dyno calibration, Alternative fuels engine design and calibration, Alternative fuels engine design and calibration, Induction system design, boosted and N.A. **Favorite race car:** A rusty ‘71 Datsun 240Z. **Favorite race car:** My ITS Datsun 240Z, car #06.

Chris Paulson: **Alma Mater:** Miami High School, Milwaukee, OH: '77. **Employment History:** '73-'78: Mechanic / fabricator Sprint Cars and Super Modifieds throughout the west, machinist at ARC Industries building sprint car suspension and drive train components. **Favorite race car like NASCAR used to be.** "68 Chrysler Newport that I got from my grandfather. **Favorite race car:** More of a type: North American touring cars or touring cars in general. A door slammer race car like NASCAR used to be.

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Zarine Pavi: Alma Mater: University of Windsor: BS Mechanical Engineering Automotive Option. Employment History: Ilmor Engineering (current); Chrysler LLC, Diamond Aircraft, Nemak, Ford (past). Expertise: Engine calibration, On-Board Diagnostic specialist (Marine and Automotive), Government Compliance, Data acquisition, development testing (incl. dyno and boat). First car: ’86 Toyota Celica GT-S. Favorite race car: Don’t have a favorite, unless I can consider my ’90 3S-GTE Celica as one.


Andy Randolph Ph.D.: Alma Mater: University of Texas at Austin, Northwestern University, BS Chemical Engineering, MS, Ph.D. Chemical Engineering. Employment History: 13 years General Motors, 12 years in NASCAR, current Engine Technical Director for Earnhardt Childress Racing (ECR). Expertise: Combustion diagnostics, power development. First car: Martin. Favorite race car: Chaparral (light, agile, powerful).

David Redszus Ph.D.: Alma Mater: Northwestern University: BS Industrial Engineering and Economics, MS Systems Management and Operations Research, PhD Product Development Processes. Employment History: Precision AutoResearch (founder, 25 yrs), Over 35 years total (research, engineering services, and specialty products for the motorsports industry). Expertise: Technical consultant, engineer, coach, and racer, advanced driving techniques, vehicle design, and engine development. Data analysis techniques and ability to translate complex issues into racer-understandable language. First car: ’70 Porsche 911S Targa. Favorite race car: What other than the Porsche 917-307? Or any other car which causes rules-changes ex-post should be a favorite!


Claude Rouelle: Alma Mater: Institute Gramme, Belgium: Industrial Engineering MSc. Employment History: Founder of Optimum G (race car engineering consulting) 97-current. Past experience includes race engineer for Volvo, Toyota and Alfa Romeo (European Touring Car Championship, European Rally Championship), French Formula 3 Team Oreca, development engineer AGS Formula One team, Reynard technical representative in Japan, technical advisor for Apomatox Formula 3000 team. Indy Lite series teams, CART teams, endurance, and sprint cars teams. Expertise: High performance and race car designer, research and development engineer with over 30 years of experience in design, test and racecar engineering, frequent lecturer at the Ecole Supérieure des Techniques Aéronautiques et de Constructions Automobiles in Paris and UNC-Charlotte. First car: 15 years old Renault 4 station wagon with a heavy CNG reservoir on the roof. It helped to understand the influence of CG height on weight transfer! Favorite race car: The next one we are designing.


Key Players
(as of April 13, 2010)


- Jake Ware: Alma Mater: Vanderbilt University; Northwestern University. Employment History: Andersen Rahal Letterman Racing mechanic, data acquisition engineer, and assistant engineer for F2000, Star Mazda, and Indy Lights. First car: Porsche 944 (this doesn’t count if it had to run more than 10% of the time). Favorite race car: The first one I built.


- Mark Zagata: Alma Mater: Lawrence Technological University. Employment History: 26 years work experience as follows: ZagataRiley; Ford Motor Company; Dynotech; & Batten Engineering. Expertise: Powertrain Design and Analysis. First Car: '66 Ford Fairlane, 289 CID, then swapped in a 390! Favorite Race Car: F1 race cars, especially the turbo engine cars in the early ’80’s.
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