



Every year, the Society of Automotive Engineers (SAE) International sponsors the Collegiate Design Series Competitions. These competitions include: Baja, Formula, Aero Design, Clean Snowmobile and Supermileage. Participation in any of these competitions requires dedication and teamwork with an emphasis on securing funding, design and fabrication.

The student organization of SAE at West Virginia University Institute of Technology (WVU TECH) has a long history of competing in the SAE Baja competitions. The Baja team is coming off a great finish in Buds Creek, MD and is looking forward to improving upon their success in Cookeville, TN from April 14-17, 2016.



2014-2015 SAE BAJA Team Photo at Budds Creek, Maryland competition

SAE at WVU Tech will also introduce, for the first time ever, a new Aero Design team! A group of four, senior, Mechanical Engineering students will explore the aerospace discipline by designing, building, testing and competing in the Aero Design East in Fort Worth, Texas from March 11-14, 2016. They will compete against 75 other schools from around the world.

## **PROPOSAL**

SAE at WVU TECH is committed and focused but needs help in raising enough funds to construct the Baja and Aero competition vehicles. The team welcomes any financial and in-kind (materials or services) support! With your sponsorship, the teams hope to demonstrate to everyone WVUITs' excellence in engineering education. For your sponsorship, SAE at WVUIT will proudly display your corporate logo on the vehicles and trailer as they go to competition this year. All donations are tax-exempt. For more information about the WVU TECH team or donations, please contact Jason Browning (SAE President) by email: [jbrowni8@mix.wvu.edu](mailto:jbrowni8@mix.wvu.edu)

Individual team profiles and their budget is attached. Thank you for providing WVUIT engineering students the opportunity to improve their engineering education and compete in these events.

## SAE BAJA: GOLDEN BEAR RACING

Golden Bear Racing (SAE Baja) is a group of volunteer engineering students who design, build and compete a single-seat Baja vehicle. Each year, SAE International hosts three regional Baja competitions that are meant to expose engineering students to the real-life engineering design process and its challenges. At these international competitions, the team has competed against teams from around the US and the world (Canada, Brazil, India and Korea). The engineering experience student's gain from the process is unparalleled.

Currently there are 20 active members. Participants come from in-state, out-of-state and internationally; with 5 seniors, 4 juniors, 6 sophomores, and 5 freshmen.

In the last four years, the team has made huge strides in all aspects of competition. In 2014-2015, the vehicle featured a student designed and in-house built 3-speed transmission, a 5-link rear suspension, and composite body panels. The team finished 45th out of 98 competitive teams in Budds Creek Maryland (as compared with 89 out of 102, four years ago). At competition, the team was required to participate in a series of dynamic events (traction and suspension, hill climb, acceleration, and maneuverability), as well as static events (sales presentation, design presentation, and cost report).

For the 2015-2016 competition year, the team is focused on continuing its upward path and is hoping to break Top 20 with new designs and modifications. Some of these plans include a rear frame and transmission redesign as part of a year-long capstone course, as well as implementation of composites along with data acquisition throughout the vehicle. The team is studying the possibility of a carbon fiber transmission case, an injection molded rear hub, along with aerodynamics analysis. Weight reduction has always been a major part of the design scope; last year's vehicle weighted 402lbs, this year's goal is 350lbs. When compared to previous competition cycles, 600lbs and 550lbs, significant gains have already been made in the area of overall weight reduction.



After the endurance race in Auburn, Alabama.



2014-2015 SAE BAJA Team Photo at Auburn, Alabama

### Golden Bear Racing Team:

SAE President: Jason Browning ([jbrowni8@mix.wvu.edu](mailto:jbrowni8@mix.wvu.edu))

Team Captain: Greg Anderson ([ganders5@mix.wvu.edu](mailto:ganders5@mix.wvu.edu))

SAE Advisor: Dr. Winnie Fu ([Winnie.Fu@mail.wvu.edu](mailto:Winnie.Fu@mail.wvu.edu))

Design Advisor: Dr. Bernie Bettig ([Bernhard.Bettig@mail.wvu.edu](mailto:Bernhard.Bettig@mail.wvu.edu))

\*Further breakdown of budget available upon request.

### 2015-2016 WVUIT SAE BAJA BUDGET\*

<b>Baja Vehicle Expenses:</b>	
Braking System	\$400
Chassis	\$3,950
Suspension	\$4,100
Transmission	\$3,400
Steering	\$300
<b>Total</b>	<b>\$12,150</b>
<b>Other Expenses:</b>	
Competition Registration Fee	\$3,450
Travel	\$11,900
<b>Total</b>	<b>\$15,350</b>
<b>TOTAL BUDGET</b>	<b>\$27,500</b>

## SAE AERO DESIGN:

SAE at WVU TECH is excited to introduce a new team: Golden Wings. As part of a year-long capstone course, a group of 4 Mechanical Engineering students are designing, building, testing and competing in the SAE Aero Design East competition this March in Fort Worth, Texas.

The team is participating in the Regular Class competition which requires them to design an all-electric radio-controlled aircraft, capable of carrying a large payload. The overall weight of the aircraft, including payload, cannot exceed 55 lbs. The purpose of this competition is to provide exposure to real-life engineering situations requiring trade-offs to develop optimal design solutions satisfying mission requirements. As part of their design, the team is required to follow rules developed and designed by industry professionals with a focus on educational values, hands-on experience and communication skills.

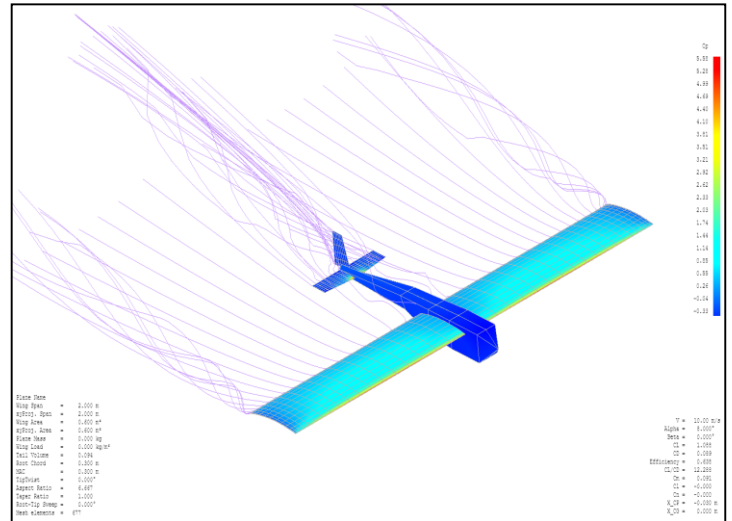
The design objective of the team is to optimize the aircraft weight by making it as light as possible while lifting as much as up to 40 lbs. of payload. The aircraft must be propeller powered by one electric motor. In competition, the aircraft is given 200 feet of runway for taking off. It is required to make a 360 degree circle and turn back to the starting point for landing, coming to a complete stop within 400 feet. The current design is broken into five major components: aerodynamics, stability and controls, structures, propulsion and other important aspects (OIA)

### AERO DESIGN TEAM:

Team Leader: Lyang Suan Wang ([lwang14@mix.wvu.edu](mailto:lwang14@mix.wvu.edu))

SAE Advisor: Dr. Winnie Fu ([Winnie.Fu@mail.wvu.edu](mailto:Winnie.Fu@mail.wvu.edu))

Design Advisor: Dr. Bernie Bettig ([Bernhard.Bettig@mail.wvu.edu](mailto:Bernhard.Bettig@mail.wvu.edu))



Plane Analysis Using XFLR 5

2015-2016 WVUIT SAE AIR PLANE BUDGET	
<b>Air Plane Expenses:</b>	
Electric Motor	\$ 400.00
LiPo Battery and Charger	\$ 1,200.00
ESC and Power Limiter	\$ 200.00
Servo Motors	\$ 450.00
Radio Control and Battery	\$ 350.00
Landing Gears	\$ 100.00
Laser Cut	\$ 450.00
Balsa Wood	\$ 450.00
Aluminum Sheet	\$ 300.00
Monokote plastic	\$ 200.00
Real Flight Simulator	\$ 200.00
<b>Total :</b>	<b>\$ 4,300.00</b>
<b>Other Expenses :</b>	
Competition Registratration Fee	\$ 800.00
Travel	\$ 2,000.00
<b>Total</b>	<b>\$ 2,800.00</b>
<b>TOTAL BUDGET</b>	<b>\$ 7,100.00</b>