

- Have you moved?
  - Are you getting duplicates of this newsletter?
  - What's going on in your life?
- Let us know at [phoestenbach@tamu.edu](mailto:phoestenbach@tamu.edu)

Department of  
**MECHANICAL ENGINEERING**

Texas A&M University Mail Stop 3123 College Station, Texas 77843-3123  
[www.mengr.tamu.edu](http://www.mengr.tamu.edu)

Nonprofit Org.  
U.S. Postage  
**PAID**  
College Station  
Texas 77843  
Permit No. 215

## Aggies race to top honors at California formula car competition

A formula-style racecar designed, built and driven by Texas A&M University student engineers won the 2007 Formula SAE West competition June 13-16 at the California Speedway in Fontana, California.

The four-day event drew teams from 80 universities. En route to its overall win, the Texas A&M team finished first in the competition's autocross and business case presentation events, third in the endurance event, and won the Honda Dynamic Events Award for amassing the top score in combined dynamic events. Additional points are awarded based on the judges' evaluation of engineering design, cost and an oral presentation of a business case.

Advisors are Dr. Make McDermott and Kim Moses, senior academic advisor in the Department of Mechanical Engineering.



### Formula SAE in Need of New Dyno

Texas A&M University's Formula Society of Automotive Engineers (Formula SAE) exposes its members to automobile engineering, design, and teamwork. The students have had their share of success in recent competitions, including first place finishes at the past two SAE West Competitions in California.

A necessary tool for completing the Formula SAE team experience is the engine dynamometer, which is a laboratory tool for testing and operating an engine outside of a vehicle. The current one in use by Formula SAE is a 1920's vintage GE direct unit. In addition to its age, its large inertia makes it impractical and unrealistic to mimic acceleration testing of the small engines used by Formula SAE. The team, along with the Department, would like to augment the department's testing capabilities with a smaller eddy-current dyno capable of providing more realistic loading conditions on the TAMU Formula SAE engines and use the new dyno for undergraduate and graduate student instructional laboratories.

The budgetary cost of such a system is \$75,000, and would be a minimal burden on the facility or lab personnel. Please consider contributing to the purchase of such equipment; equipment that will continue the success of TAMU Formula SAE. For more information, please contact SAE Advisor Tim Jacobs at (979-862-4355).

## Department receives new endowments

The Department of Mechanical Engineering is grateful for the gifts and donations it receives from its many friends, former students, and industry. These gifts help many of our students receive a quality education from the department. Recent gifts include:

**Gladys and William Allison '44 Scholarship in Mechanical Engineering.** This is the third endowment the Allison's have made to the department. The previous two were established in the Engineering Scholars Program.

**Don P. Dixon '57 and Sons Scholarship in Mechanical Engineering.** This scholarship will go to those students who are graduates of a private school, parochial school or home school, and have demonstrated leadership in high school through participation in organizations or activities such as 4-H, FCA, FFA, Scouts, JROTC, or athletics.

**George and Marilyn Jewell Scholarship and Fellowship in Mechanical Engineering.** Both endowments will be designated for first-generation scholars with high financial need from the Galveston County area.

**Linda and Ralph Schmidt '68 Scholarship in Mechanical Engineering.** Recipients of the Linda and Ralph Schmidt '68 Scholarship, to be awarded for the first time in fall 2007, will be graduates of Schulenburg, La Grange, Sacred Heart (Hallettsville) or Weimar high schools. Financial need will be considered.

**Jeanette and Robert Conn '51 Scholarship in Mechanical Engineering.** This scholarship will provide one or more scholarships to full-time students in good standing pursuing a degree in the Department of Mechanical Engineering.

**Jay H. Stafford '46 Scholarship in Mechanical Engineering.** Mr. and Mrs. Jay H. Stafford established the Jay H. Stafford '48 Scholarship in Mechanical Engineering in 2006. They recently added another \$100,000 to their scholarship, which will allow the department to fund several more scholarships to worthy and deserving students in mechanical engineering.

**Warren Rice,** Texas A&M class of 1946, has donated a gift of \$50,000 to the department "as a small token in recognition of what A&M did for me," said Rice. Proceeds from the gift will benefit the Mechanical Engineering Excellence Fund.

## Students Design System to Return Astronauts to Earth

NASA's planned mission to the moon won't lift off for more than seven years, but student engineers at Texas A&M University are already designing the systems that could get it safely back to the ground. The students designed a system of parachutes and air bags that could slow the crew return vehicle (a capsule similar to the ones used in the Apollo moon missions but much larger) after it enters Earth's atmosphere and cushion its landing on the ground.

The systems the students presented consisted of three 120-foot parachutes and an array of eight air bags housed between the vehicle's heat shield and the capsule itself. The student engineers calculated how big the parachutes needed to be to slow the capsule through the last 10,000 feet of its descent, the length of the lines that connect the canopies to the capsule and determined the best materials for the canopies and suspension lines and the best method of sewing them.

They also designed an array of eight spherical airbags to cushion the capsule when it gets to the ground. The airbags would be stowed between the capsule and the heat shield until needed. Each airbag is actually two bags, one inside the other. The outer bags are intended to deflate as the capsule compresses them so that the capsule won't bounce when it hits. A second, smaller, bag inside each airbag will complete slowing the capsule to a stop on the ground.

The students' 2007 design project will be part of the lander that will carry astronauts from an orbiting space vehicle to the surface of the moon. For more information, contact Dr. William Schneider at [wschneider@tamu.edu](mailto:wschneider@tamu.edu) or 979/458-0116.

## Mechanical Engineering Friends

Financial support from former students and friends of the Department of Mechanical Engineering at Texas A&M University provides funding for student scholarships, equipment upgrades for our undergraduate labs, and program needs that are not met by general state and university appropriations. By contributing to the "Mechanical Engineering Friends," you can become an active participant in our future successes.

Your contributions to the Department of Mechanical Engineering provide support for our academic programs and our students. To donate, make your check out to "Mechanical Engineering Friends" and mail to Department of Mechanical Engineering, Texas A&M University, Mail Stop 3123, College Station, Texas, 77843-3123, ATTN: Pam Hoestenbach.

Thank you for your support of the Department of Mechanical Engineering this year. For more information about the program, please call Pam Hoestenbach at (979)845-9625.

### ME Friends Donation Levels

\$20-99	Bronze
\$100-249	Silver
\$250-499	Gold
\$500-749	Platinum
\$750-above	Honors

**A Few Words...Dennis O'Neal '73**

It's hard to believe another school year is underway. We continue to benefit from the Robert Gate's faculty reinvestment program. Since the Spring of 2004, we've hired 22 new faculty! We've featured some of these in our newsletters and

annual reports (which you can view on our web page). In addition to the two new faculty who started in September, we have four new faculty starting in January 2008. We have faculty searches for seven faculty positions we're trying to fill for next year. When the dust is settled in a couple of years, we hope to have about 63 faculty in the department, up from 45 in 2003. This will make us the second largest mechanical engineering department in the country behind Georgia Tech.

Demand for our graduates is the strongest it has been in over ten years. Last academic year, over 480 companies interviewed on campus for mechanical engineers! Many of these companies were seeking to fill multiple positions. We only graduate about 200 B.S. and another 100 M.S./Ph.D.s each year. The students are getting fabulous job offers and many get signing bonuses.

Our Formula SAE team continued its excellent record by winning the West Coast competition in California for the second year in a row. Each year, we have a new group of students competing. They have to design, build, and race a new car. It's quite a remarkable accomplishment for these students. They wouldn't be successful without the financial support of former students and corporations.

In September, we had our first scholarship banquet. It was a great time of celebration as endowed scholarship donors got to meet with their scholarship recipients. Over the past five years, the number of scholarships awarded by the department has grown from 80 to over 150. A big reason for this increase has been due to the increase in scholarships endowed by our former students. If you would like to consider endowing a scholarship, please feel free to contact me. It's a great way to leave a legacy that will help future Aggies reach their dream of completing their education in mechanical engineering.

**Faculty & Staff Awards**

**N.K. Anand**, professor & Assistant Dean of Graduate Programs: James & Ada Forsyth Endowed Professorship; Charles W. Crawford Service Award

**Malcolm Andrews**, professor: DOE Ernest Orlando Lawrence Award

**Kalyan Annamalai**, G. Paul Pepper Professor: Associate Editor, Journal of Engineering Gas Turbines & Power

**Brian Bachmeyer**, technician: Department of Mechanical Engineering Outstanding Support Staff Award

**Debjyoti Banerjee**, assistant professor: Morris Foster Faculty Professorship

**Jerald Caton**, professor: Thomas A. Dietz '31 Endowed Professorship

**Jaime Grunlan**, assistant professor: NSF CAREER Award

**Harry Hogan**, associate professor: Mervin & Annette Peters Advising Award

**Ibrahim Karaman**, associate professor: Dietz Career Development Professorship I; TEES Fellow

**Won-jong Kim**, associate professor: Dietz Career Development Professorship II; BP Award for Teaching Excellence; Associate Editor, ASME Journal of Dynamic Systems, Measurement & Control

**Helen Liang**, associate professor: STLE Fellow

**Kim Moses**, advisor: President's Award for Academic Advising

**Anastasia Muliana**, assistant professor: TEES Select Young Faculty

**Alan Palazzolo**, professor: ASME Fellow; Halliburton Faculty Fellow; ME Outstanding Graduate Teaching Award

**Bryan Rasmussen**, assistant professor: NSF CAREER Award

**J.N. Reddy**, distinguished professor & Oscar S. Wyatt Chair: Association of Former Students Distinguished Teaching Award

**Hung-Jue Sue**, professor: E.D. Brockett Professorship Award

**Dharba Swaroop**, associate professor: Paggy L. & Charles L. Brittan Undergraduate Teaching Award

**Xinghang Zhang**, assistant professor: ASHRAE New Investigator Award; NSF Faculty Early Career Development (CAREER) Award

**NEW FACULTY: Fall 2007**

The department is in the process of hiring new faculty as part of Texas A&M's "Vision 2020" project. Vision 2020 is designed to guide the university to become a 'top 10' public university by the year 2020. The new faculty will help the department and university improve the institution's faculty/student ratio, enhance the faculty, and improve the students' educational experiences.

New department faculty for fall 2007 are:



Yu

Choongho Yu, assistant professor, received his Ph.D. from the University of Texas at Austin in 2004. Prior to joining the department, Yu was a post doctoral researcher at the University of California at Berkeley and the Lawrence Berkeley National Laboratory. Some of his research interests include investigation and synthesis of new nanostructured materials for energy conversion systems and design and fabrication of nano/micro-electromechanical systems (N-MEMS) and bio-MEMS.



Wen

Sy-Bor Wen, assistant professor, received his Ph.D. from the University of California at Berkeley in 2006. Before joining the department, Wen was a post doctoral fellow in the Environmental Energy Technologies Division of the Lawrence Berkeley National Laboratory. His concentration is in thermal sciences and fluid mechanics and he is interested in designing and conducting experiments in micro to nano scale energy transfer and constructing theoretical analyses in explaining and predicting experimental results.

**Your Gifts at Work**

The Department gratefully recognizes all our donors for their support. The corporations, organizations, friends and former students who donate are deeply appreciated, as they directly impact our commitment to teaching and research excellence.

Your gifts help the department maintain a creative learning environment for each student to reach his or her potential, ensure that the students learn the latest teaching and research, and provide the students with activities such as field trips and special projects that perhaps some of you also took part in while you were at the university.

You can designate your gift to the department for a particular scholarship or program or leave your gift unrestricted so it can be used for others needs such as faculty recognition or recruitment, research or technology. Whatever you give, whether it's \$10 or \$10,000, you help play a vital role in making the department a great place for future generations of students.

**Students in the News****Current Students**

**Texas Regional Engineering Conference (TREC):** TREC was hosted by A&M on February 9-10, 2007. Twenty-six teams signed up and each team was given the challenge of creating a craft that would navigate along a water track, earning points based on materials used, weight of the watercraft, and total time to run the course. A&M's team, named "ScrumDiddleUmpitious", was one of only four teams to finish the course and was the lightest and cheapest of those four. Team members were: Vanessa Barrett, Bryan Knight, Matt Krautkremer, Wade Marcantonio, Ismael Martinez, and Kevin Robinson.

**Student Professional Development Conference:** Nine of A&M's ASME students attended the conference on April 12-14, 2007 in Tulsa, OK. Carlo Silva, a mechanical engineering PhD student, won first place in the Graduate Student Research and Innovation paper competition for his technical paper, "Optimization of Heat Sink Performance in Microelectronics through Dimpled Surfaces: Study on Dimple Geometry and Array." In addition, senior Brian Wilks won the Best Technical Award for his oral presentation on the Old Guard Oral Presentation competition for his paper, "Experimental and Numerical Investigation of Non-Linear Acoustics in Compressor Manifold Design."

**National Science Foundation Fellowship Awards:** The NSF has awarded eight Texas A&M Engineering students three year graduate fellowships starting in the fall of 2008. Of those eight, David Huitink will be continuing his graduate studies here at A&M. Five other A&M students received honorable mentions. The NSF Graduate Fellowships are very competitive; only 1,000 are given from a pool of more than 3,000 applications.

**Former Students****Jackie Mohrfeld, GM Racing Trackside, Chevrolet Silverado Program**

Jackie Mohrfeld didn't know she would love working in a major motorsports series; in fact, until she was in college at Texas A&M University, she didn't know anything about the sport.

Now she climbs on the pitbox of the No. 33 Camping World Silverado team driven by two-time NASCAR Craftsman Truck Series champion Ron Hornaday every race as the GM Racing engineer assigned to the team to lend critical support.

A native of Houston, Texas, Mohrfeld attended and graduated from Texas A&M in 2000 with a degree in mechanical engineering. Her first entry in to the racing world was a Texas A&M Formula SAE project. In 2000, the team won its first championship in only its second year of competition.

As one of a very limited number of female engineers in the garage area of all three NASCAR major touring series, Mohrfeld has quickly established herself as one of the best by assisting Hornaday and Kevin Harvick, Inc.

SOURCE: GM Communications

**Former Student Whitaker Receives University of Alabama T. Morris Hackney Leadership Award**

The University of Alabama College of Engineering announced Dr. Kevin Whitaker, associate dean for academic programs, as the 2007 T. Morris Hackney Endowed Faculty Leadership Award recipient.

The award honors a faculty member who exemplifies the constant guidance and leadership necessary to make the College of Engineering exceptional.

Whitaker began working at The University of Alabama in 1987 as an assistant professor of aerospace engineering. He currently serves as associate dean for academic programs and as associate professor of aerospace engineering and mechanics. In addition, Whitaker has more than 16 reviewed publications and 49 conference presentations.

In 1980, Whitaker received his bachelor's degree in mechanical engineering from General Motors Institute. He went on to receive his master's and doctoral degrees from Texas A&M University in 1982 and 1986, respectively.

This award was created as a tribute to T. Morris Hackney and was made possible by the contributions from Mr. John H. Josey and his son, Mr. Howard Josey.

**E3 Research Laboratory**

Texas A&M's E3 Research Laboratory, under the direction of Dr. Jerald A. Caton, conducts research in the areas of Energy, Engines and Emissions (E3). The lab is one portion of the overall Combustion and Fuels Laboratory of the Department of Mechanical Engineering. The majority of the activities are directed by Caton and conducted by his graduate students.

Reciprocating engine research forms a major part of the laboratory. Thermodynamic simulations have been developed for spark-ignition engines and these simulations provide detailed descriptions of the various processes during the engine cycle. The instructional versions of these simulations are used in academic courses on internal combustion engines and retain important features necessary to illustrate the use of cycle simulations. A number of research programs have also been conducted on the use of alternative fuels for engines, such as: coal slurries and natural gas for diesel engines and LPG (propane) and hydrogen for spark-ignition engines. The most recent of these projects involves investigations of the use of biodiesel fuels.

Emissions research is also a part of the lab; one area being engine emissions. Pollutant emissions from internal-combustion engines have been studied in several projects, including examining both spark-ignition and diesel engines. The researchers have investigated hydrocarbon oxidation in exhaust ports of spark-ignition engines, calculated nitric oxide production in engines, and used gas analysis equipment, which includes conventional emissions analyzers and a Fourier transform infrared spectrometer. Other examples of emissions research are studies of Selective Catalytic Removal (SCR) and Selective Non-Catalytic Removal (SNCR) of Nitric Oxides (NOx). For the SCR applications, a number of catalysts have been examined. The effects of various parameters, including reaction temperature, oxygen concentration, space velocity and inlet species concentrations have been investigated. For the SNCR applications, three chemical agents have been tested: ammonia, urea, and cyanuric acid. For the proper gas conditions, these agents participate in a series of complex chemical reactions that remove nitric oxides. Up to 95% removal of nitric oxides has been demonstrated for certain conditions.

Another area of emissions research, Advanced Laser-Based Sensors for Gas Analysis, is being conducted in collaboration with Professor Robert Lucht, mechanical engineering at Purdue University, and Professor Thomas Walther, Darmstadt University of Technology, Darmstadt, Germany. These advanced laser-based sensors are developed for the quantification of gaseous species, and have been demonstrated for several applications. The basic principle of these systems is to measure the absorption of energy at specific wave lengths. Systems are available to measure nitric oxide, carbon monoxide, hydrocarbons, and other species.

Activities within the E3 laboratory also include technical and economic assessments of cogeneration systems, which provide both electrical power and a thermal commodity (such as heating or cooling). These assessments have been completed for a number of Texas state agencies, and computer programs have also been developed to complete these technical and economic assessments. Another form of energy research is distributed electrical power production. This is an important aspect to manage electrical power needs and the key equipment is the prime mover which may be a gas turbine, steam turbine, or reciprocating engine.

The overall goals of these activities are the efficient and clean use of fuel energy to provide electrical power or power for transportation. Studies in these areas are based on core subject matter in thermodynamics, heat transfer, fluid mechanics, chemistry, and physics.

For more information on the E3 (Energy, Engines and Emissions) Research Laboratory, please contact Dr. Jerald A. Caton at 979-845-4705 or jcaton@tamu.edu.

