

ME News

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Department of
MECHANICAL ENGINEERING

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Former student makes an impact

Sometimes it's hard to know the impact of our department and faculty on our former students. Proof of success often comes from watching where students go, what they achieve and how they make a difference.

One of our former students, G. P. "Bud" Peterson, has gone far since his days as a graduate student in the department. Throughout his career, he has played an active role in helping to establish the national education and research agendas, serving on numerous industry, government and academic task forces and committees.

In July 2006, Peterson was appointed Chancellor of the University of Colorado at Boulder. Prior to assuming his current position, he served six years as provost at Rensselaer Polytechnic Institute in Troy, New York.

Born in San Francisco and raised in Prairie Village, Kansas, Peterson attended Kansas State University and earned a Bachelor of Science degree in Mechanical Engineering and a second Bachelor's degree in Mathematics. In 1980 he received a Master of Science in Engineering. In 1985 he received a Doctorate in Mechanical Engineering from Texas A&M University. He served as a Visiting Research Scientist at the NASA Johnson Space Center before returning to Texas

"I had a wonderful experience at Texas A&M. The interactions I had with my colleagues in the ME Department and across the university gave me a comprehensive understanding of how a large public university can and should function. I am enormously grateful for the opportunities afforded me while I was there and hope that in some way I can repay the many people who helped me in so many ways."

A&M as a faculty member in the Department of Mechanical Engineering, where he conducted research and taught courses in thermodynamics and heat transfer. He was later named the Halliburton Professor of Mechanical Engineering and the College of Engineering's Tenneco Professor.

While at Texas A&M, he held leadership positions as Head of the Department of Mechanical Engineering, Executive Associate Dean of the College of Engineering, and Associate Vice Chancellor for the Texas A&M University System. In 1993-94 he served as Program Director for the Thermal Transport and Thermal Processing Division of the National Science Foundation.

A Fellow of both ASME and AIAA, Peterson is the author or co-author of 12 books or book chapters, 160 refereed journal articles, more than 150 conference publications and holds eight patents. He is a member of several professional organizations and the recipient of numerous national and international honors and awards for both teaching and research.

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:

Henry J. Bettencourt, Jr. '49 Scholarship in Mechanical Engineering. The scholarship was established by Dorothy F. Bettencourt, Mark H. Bettencourt '79 and Paul D. Bettencourt '80 in recognition of Henry J. Bettencourt '49. It will be awarded to a National Merit Finalist or a National Merit Semi-Finalist if a Finalist is unavailable.

Ruth Partridge and William C. "Bill" Cowan '49 Scholarship in Mechanical Engineering. The scholarship will go to a student who is a member of the Corps of Cadets and who graduated from a AAA or smaller high school in the state of Texas.

Linda D. and Joe R. Fowler Fellowship in Mechanical Engineering. The fellowship will provide one or more full-time students pursuing a graduate degree in mechanical engineering. The gift was matched with funding from the Turbomachinery Laboratory. The first recipient of the fellowship must be a student pursuing a field of study within the Turbomachinery Laboratory.

Charles Jackson '50 Scholarship in Mechanical Engineering. This scholarship will award one or more full time undergraduate students in the Department of Mechanical Engineering. This is an annual award for deserving students.

David L. Sanders '90 Scholarship in Mechanical Engineering. The scholarship will be awarded to full time students in the Department of Mechanical Engineering. Recipients who choose to pursue a graduate degree can continue to receive this scholarship for another two years.

Mary Jo and Donald R. Schroeter '63 Scholarship in Mechanical Engineering. This scholarship will be awarded to a student who has graduated from a high school in the State of Texas and is a child or dependent of a United States service man or woman who was killed or disabled while on active duty with the U.S. military.

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.

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



In a few more weeks, we'll see another group of Aggies walk across the stage and leave here with their Mechanical

Engineering degrees in hand. They'll be at the start of their careers in a variety of industries, from automotive to oil and gas to semiconductors. It's great to be an engineer where just about every industry wants you. With the increase in freshmen enrollment over the past few years, we're now approaching 1200 undergraduates in our program. Our graduate student numbers are now over 350. For many of the industries that hire our students, these are still not enough!

Aggie grads are successful wherever they go. I hope you appreciate the story on the cover. Some of you may remember when G. P. "Bud" Peterson, one of our graduates, was department head here in the mid-90s. Now he's the chancellor at the University of Colorado. His position is equivalent to the president's position at A&M. He leads a major academic program in the Rockies....quite an accomplishment for an Aggie mechanical engineer.

Our faculty numbers continue to grow. There are short summaries on four new faculty we hired last year. We're quite busy this spring as we are trying to hire another eight. Like the oil and gas industry, many of our faculty have been with the department for two or more decades and are deciding it's time to retire. In the past year, Drs. Alexander, Fletcher and Rhode retired. Drs. Vance and McDermott are planning to retire this year. In another two years, half of our faculty will have been hired since 2000. These are talented faculty. Three faculty won prestigious National Science Foundation CAREER awards this year. Many departments in the country don't win any, much less one. Winning three in one year is an outstanding accomplishment.

I continue to acknowledge and thank many of you for your continued support of the department. Your gifts help tremendously in recruiting excellent students and faculty to the department, as well as helping students with major financial needs complete their mechanical engineering degrees. Your gifts also help us compete in Formula SAE. Check out the February 2007 issue of *Road and Track* and you'll see they retired the trophy to our department. The folks in Austin can come visit us anytime to see it. Gig'em!

Faculty & Staff Awards

Malcolm Andrews, professor, National Security Fellow Los Alamos; TEES Fellow

Brian Bachmeyer, Technician, Department of Mechanical Engineering Outstanding Staff Award

Jerry Caton, professor, Halliburton Professorship Award; SAE Fellow; SAE Excellence in Oral Presentation Award

David Claridge, professor, Association of Former Students Research Award

Harry Hogan, professor & undergraduate faculty advisor, ASME South Texas Section Meritorious Service Award

Won-Jong Kim, assistant professor, TEES Select Young Faculty

Sai Lau, professor & graduate program director, Department of Mechanical Engineering Graduate Teaching Award

Ed Marotta, TEES Associate Research Professor & Visiting Associate Professor, Charles & Peggy Brittan '65 Undergraduate Teaching Award

Make McDermott, associate professor, Association of Former Students College Award

Ozden Ochoa, professor, ASCA Award in Composites

Alex Parlos, professor, Alcoa Fellow; TEES Fellow

Luis San Andres, professor, ASME Fellow

Taher Schobeiri, professor, ASME Fellow; ASME Best Paper Award FED; Morris Foster Faculty Fellowship

Mitch Wittneben, Senior Systems Analyst, College of Engineering Outstanding Staff Award

Nicole Woodward, Administrative Secretary, Department of Mechanical Engineering Outstanding Staff Award

Matching funds provided for graduate fellowships

The Turbomachinery Laboratory has pledged up to \$50,000 to match any donor gifts to graduate fellowships for students in the turbomachinery area.

If your company has a matching program, this is an excellent opportunity to leverage your gift. For example, if your company matches your donation one for one, you could endow a \$100,000 graduate fellowship for as little as \$25,000. The endowed fellowship will carry the name of the donor.

New Electron Microscope Improves Undergraduate Education at Qatar and College Station Campuses

The Department has acquired a new scanning electron microscope (SEM) for use by undergraduate mechanical engineering majors. The Tescan Vega II SEM provides high-resolution images under high vacuum and lower resolution images under low vacuum. Students in the materials and design courses can inspect materials and components with magnifications from 4 X to 1,000,000 X.

Students can access the microscope from any location because it has an internet interface. Qatar campus students will prepare specimens, ship them to College Station, and observe them in real time with this remote control system. Students in media classrooms can receive real-time instruction and observe specimens during a lecture. The microscope holds seven specimens; therefore, students can study seven materials in a single session.

The SEM's 3 nm resolution means that our students will be able to study microscale to nanoscale materials and machines. This will keep them up-to-date with the latest in micro/nano technology.

Department hosts high school students

Fifteen outstanding and promising high school students participated in a weeklong class on mechanical engineering as part of the 2006 Youth Adventure Program (YAP). The mechanical engineering course, now in its second year, was led by graduate student Andy Conkey and Dr. Harry Hogan. Students learned about the challenges and excitement of the engineering field and gained greater insight into several aspects of mechanical engineering. They spent time in the same laboratories used by current mechanical engineering students and helped conduct experiments and analyze results.

The main project for the week was to design and build a robotic cart for transporting hazardous material using the same Lego Mindstorm kits used by freshman engineering students in the Engineering 111 and 112 courses. The students were also treated to two special sessions on the last day of the course, traveling to the Riverside campus to see the award-winning racecar designed and built by the Society of Automotive Engineers' student chapter.

Dr. Make McDermott and several of his students helped the YAP students understand the enormous effort required to complete this project and the resulting sense of gratification in helping create such a highly successful engineering product. Dr. Obdulia Ley helped the students learn about bioheat transfer and how animal insulation works. YAP aims to encourage career exploration through in-depth exposure and first-hand interaction with professionals in specific fields.

NEW FACULTY: Fall 2006

The department is in the process of hiring new faculty as part of Texas A&M's "Vision 2020" project, the department is in the process of hiring new faculty. 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 the fall 2006 are:



Arroyave

Raymundo Arroyave, assistant professor, received his Ph.D. from the Massachusetts Institute of Technology in 2004. Prior to joining the department, Arroyave worked on developing thermodynamic models at Penn State University. His main interest area is computational materials science.



Jacobs

Timothy Jacobs, assistant professor, received his Ph.D. from the University of Michigan in April 2005. Before joining the department, Jacobs served as a Research Fellow at the University of Michigan General Motors Collaborative Research Laboratory. His primary research interest is to improve energy conversion and reduce harmful emissions of the internal combustion engine.



Radovic

Miladin Radovic, assistant professor, received his Ph.D. from Drexel University in June 2001. Radovic has over 12 years of experience in structural and mechanical characterization of advanced materials. Before joining the department, Radovic served as a Postdoctoral Fellow for the Mechanical Characterization and Analysis Group at the Oak Ridge National Laboratory in Tennessee. His areas of interest include processing and characterization of nano-laminated MAX phases, and the processing and characterization of high-temperature structural ceramics.



Schwartz

Christian Schwartz, assistant professor, received his Ph.D. from Iowa State University in the summer of 2006. Schwartz served as a Research Engineer from 1998-2002 and as a Senior Research Engineer from 2002-2003 at the Southwest Research Institute in San Antonio, Texas. His interest areas include design and characterization of biomaterials, wear of biomaterials, formulation of polyurethane solutions, and signal processing of nondestructive evaluation data.

Road & Track honors TAMU Formula SAE

Formula SAE, the design series that challenges students from schools around the world to build small race cars, has become so popular that it has become two U.S. events.

Road & Track has covered this event every year since 2001. With more than 200 teams competing, it invites the the five best-performing teams to compete in its *Road & Track* Triathlon. The Triathlon is a test of a car's driveability and performance in 0-60-0 mph, slalom and skidpad tests.

The *Road & Track* applause this year goes to Cornell University and Texas A&M University. Cornell won in Michigan, while Texas A&M won the inaugural California event. This is the third trophy for Texas A&M. To honor that success, the magazine retired the *Road & Track* Trophy to them.

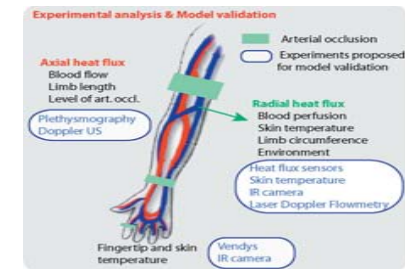


Tech Talk: Bioheat Transfer Laboratory

Analysis of tissue temperature changes gives information about tissue function. Knowledge, prediction and control of tissue temperature is necessary during cryosurgical and hyper-thermic therapies used for cancer treatment, and in early detection of superficial tumors.

Research in the Bioheat Transfer Group (BTG) will further the knowledge and understanding about the evolution of inflammatory diseases by using a set of integrated mathematical models. Current projects of the BTG include:

Thermal analysis of vascular reactivity. Limb and digit temperatures are affected during brachial artery occlusion (blood pressure measurement) and subsequent hyperemia. The temperature change depends on the capacity of the arteries to dilate and restore normal circulation, which depends on an intact and functioning endothelium. Endothelial dysfunction is recognized as an early feature of atherosclerosis and coronary artery disease in humans. Analysis and quantification of such relationships are necessary to establish digit temperature change during arterial occlusion and hyperemia as a significant marker to assess the risk of coronary heart disease and to find the best set of experimental parameters to perform the digit temperature test.



Integrated multi-scale modeling of inflammatory processes.

Chronic inflammatory diseases are associated with local or systemic temperature changes, which are correlated to alterations in diffusion and transport processes, metabolism, as well as mechanical response of the affected tissues. Mathematical models serve to monitor and improve treatment of chronic inflammatory diseases: arteries experiencing atherosclerosis and airways affected by asthma or chronic obstructive pulmonary disease. In these diseases, temperature in addition to other markers is a good predictor of life threatening attacks. Atherosclerosis and asthma affect a large number of Americans and have significant economic costs, such as:

Over 13.2 million Americans are known patients of coronary heart disease and unpredicted heart attacks produced by inflamed plaque account for the majority of the 280 billion dollar burden of cardiovascular disease; and an estimated 20 million Americans have asthma and another 16 million are diagnosed with chronic obstructive pulmonary disease. In the U.S., asthma entailed a total annual economic cost of over 16 billion dollars during 2004.

Interest in tissue temperature as a biomarker for inflammatory disease has increased in the last decade because temperature gradients have been shown to affect transport and activation of immune cells. In order to fully understand temperature variations and its effects on disease progression, it is necessary to integrate different physical factors, such as cellular transport and activation, and tissue deformation or remodeling with models for temperature prediction. These integrated and multi-scale models can help to analyze the effect of factors affecting the evolution of the inflammatory response, make a coherent whole from disparate data sets that will help understand interaction hierarchy and will improve experiment design, and further increase understanding the temperature gradients in addition to other disease biomarkers.

For more information on the Bioheat Transfer Laboratory, contact Dr. Obdulia Ley at 979/458-2264 or oley@tam.u.edu.

