Tennessee Engineer Newsletter

Fall 2012

Tennessee Engineer Fall 2012

College of Engineering

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Mission to Mars: The UT Connection
I am often asked to provide statements about the value of engineering to the economy and to society. This has been a subject of much interest as a result of the economic challenges that have faced many countries over the last five years. Such requests often go further to ask if it is possible to quantify the effect of our engineering graduates or the impact if we were to increase the number of graduates.

I thought about this recently as I was reviewing an Environmental Protection Agency software package called Unmix—it’s a multivariate analysis model that allows one to enter the concentrations of hundreds of volatile organic compounds and other pollutants measured in the environment. Then, knowing the characteristic signatures of what specific sources produce or emit, it identifies all of the contributing sources and the relative contributions of each source to the observed air quality data.

What if this package could look at our world and analyze which professions contributed to society and its economic and technological developments and how much? If you have found a model that does that, please let me know. What we do know is that our graduates and the professions in which they work have contributed in innumerable ways—but not easily quantified from a monetary standpoint. How would one assess the value of the invention of the personal computer; a GPS device; an airplane (or jet)? How does one measure the value that is created by the many engineers who design our highways and infrastructure, or develop new materials that go into every product that is currently manufactured? How does one measure the value when engineering graduates start their own companies, become senior leaders or CEOs, surgeons, and/or lawyers, contributing their critical thinking skills to professions that go well beyond engineering?

One of our featured articles in this newsletter is about extremely robust microchips created by one of our faculty members and his student research team that are now installed on Curiosity, the rover that just landed on Mars in August. While the chips provided functionality that goes well beyond the world in which we live, these, like many other developments intended to study things beyond our planet, often find their way back into applications that are much closer to home. While we cannot begin to truly assess the economic value of the contributions of our graduates, we can all be proud to be a part of a profession that is constantly making a positive difference in this world...and beyond!
A close-up shot of the MSL QOA microchip.

As NASA’s rover Curiosity touched down on the surface of the planet Mars on August 6, an approximately 900 million mile journey he helped to create, “I was too nervous to watch the landing,” said Ben Blalock, a professor in the Department of Electrical Engineering and Computer Science. “I’m just glad that we made it.”

Blalock and his research team, the Integrated Circuits and Systems Laboratory (ICASL), partnered with the Jet Propulsion Laboratory (JPL) (a National Aeronautics and Space Administration (NASA) Center of Excellence for robotic space exploration) in the design and development of the Mars Science Laboratory (MSL) Quad Operational Amplifier (QOA) microchip. This microchip is used in the motor controller electronics on Curiosity for wheel motors, robotic arm actuator motors, camera positioning motors, and other functions. Each motor controller is housed in an actuator assembly that has a position encoder circuit using two QOA chips. Since Curiosity has at least forty actuator assemblies around its body, some eighty copies of the QOA microchips are used on the MSL Mars rover. The QOA microchips are exposed to the ambient environment on the Mars surface, daily subjected to −120°C to +20°C temperature swings.

The involvement of Blalock and his team in the Mars rover project was initiated by a joint project with the JPL. “Our team worked in collaboration with the JPL to develop electronics technologies for the extreme environments of space,” Blalock said. “We were designing the Mars surface temperature varies from −120°C to +20°C and the moon’s surface temperature changes from −160°C to −120°C. These temperatures are much different from what electronics circuits will see on Earth (+34°C to +25°C)”. JPL recognized the need for developing groundbreaking changes from −180°C to +120°C. These temperatures are much different from −120°C to +20°C and the moon’s surface temperature changes from −160°C to −120°C. These temperatures are much different from what electronics circuits will see on Earth (+34°C to +25°C). Blalock said, “For example, the Mars surface temperatures vary from −120°C to +20°C and the moon’s surface temperature changes from −160°C to −120°C. 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MSE Professors Receive Grants from NEUP
Dr. Bill Weber, Governor’s Chair in Radiation Effects on Materials, and Dr. Yanwen Zhang, an associate professor in the Department of Materials Science and Engineering, have won two significant research grants from the Nuclear Energy University Programs (NEUP) research and development competition. Weber’s award for his proposal Radiation and Thermal Effects on Use of Nuclear Fuel and Nuclear Waste Forms totaled $770,000. The research will focus on investigating the structural and chemical response of used nuclear fuel and waste forms during interim storage and permanent disposal. Zhang’s proposal Better Radiation Responses and Accident Tolerance of Nanostructured Ceramic Fuel Materials received an $815,000 grant from NEUP. Zhang’s research will use novel experimental methods to investigate the links between microstructure, phase stability and damage evolution in nanostructured ceramic fuel materials.

MSE Professor Receives Funding for Clean Coal Research
Dr. Peter Liaw, professor and associate head of the Nuclear Engineering Department Dr. Wes Hines; and UT Knoxville Faculty Affairs. Keppens will be the first female senior academic administrator in the college's history.

UCOR is a partnership between URS, a worldwide leader in environmental work, and CH2M HILL, the United States' largest environmental and engineering services company. UCOR is committed to the long-term success of cleanup operations at the DOE Oak Ridge Reservation and also performs work with professional colleagues and graduate assistants, received a $300,000 Clean Coal Research Award for Improved Structural Materials from the Department of Energy (DOE). The group’s research focuses on increasing the efficiency of coal-fired power plants through the development of High-Entropy Alloys—a mixture of multiple strong phases. The award is part of a series that totals $2.7 million that will eventually be awarded to nine universities across the country. UCT joins other academic institutions such as Brown University and Dartmouth that have also received awards. 

Hayward Named First UT UCOR Fellow
UCOR (URS/CH2M Oak Ridge LLC), a Department of Energy (DOE) contractor in Oak Ridge, Tenn. has established the UCOR faculty fellowship in the University of Tennessee, Knoxville’s, College of Engineering (COE). The company donated $350,000 toward the fellowship, and the first recipient is Dr. Jason Hayward, an assistant professor in the COE’s Department of Nuclear Engineering (NE). Hayward, who was named a COE Research Fellow in 2011, is a top recipient of external research awards in the department.

NE Professor Named ISA Fellow
Dr. Belle Updhyaya, a professor in the Department of Nuclear Engineering, has been named a Fellow of the International Society for Automation (ISA). Founded in 1945, the ISA is a leading, global, nonprofit organization that is setting the standard for automation by helping over thirty thousand worldwide members and other professionals solve difficult technical problems, while enhancing their leadership and personal career capabilities. Updhyaya was previously recognized as a Fellow at the upcoming ISA Gala on October, 2012. For more information, visit www.isa.org.

Industrial Engineering Department Changes Name
The Department of Industrial and Information Engineering (IE) at the University of Tennessee, Knoxville (UT) is now officially the Department of Industrial and Systems Engineering (ISE). The name change, which became official on July 1, 2012, was part of a strategic initiative to enhance the department’s teaching, research, and outreach mission by leveraging the intellectual core of the department through a systems perspective. The name change, which has unanimous faculty support, is consistent with a trend in Industrial Engineering (IE) to conceptualize, formulate model, analyze design, and implement systems for the service industry, manufacturing, and government.

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The name change will not affect the current degree programs or course offerings for current UT engineering students. ISE has enhanced its teaching and research mission and the world for both a technical education (classroom and industry experience) and cultural learning, including working on projects in a multicultural group. The redesigning of the undergraduate program to allow ISE to “graduate leaders in IE” that have IE technical skills and critical problem-solving skills, including technical skills in diverse industries, and leadership abilities.

• The department of an international summer program in Lean Enterprise that brings international undergraduate students to the world for both a technical education (classroom and industry experience) and cultural learning, including working on projects in a multicultural group.

• The redesigning of the undergraduate program to allow ISE to “graduate leaders in IE” that have IE technical skills and critical problem-solving skills, including technical skills in diverse industries, and leadership abilities.

• The development of on-site M.S. programs at Y-12 and ORNL.

• These positive changes will provide ISE a better ability to recruit both students and faculty, as well as the ability to place graduates in industry.

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Dr. Roberto Benson, professor and associate head of the Materials Science and Engineering Department, speaks with an equal enthusiasm about teaching, university service, research, and his pride in the accomplishments achieved by his students. Born in Panama, Benson moved to the US for college, receiving his bachelor's degree in chemistry from Lewis University in Illinois in 1972 and his PhD in physical chemistry (focusing on polymers) from Florida State University in 1978. He had post-doctoral training in biomedical engineering at the University of Utah. After a few years as a research assistant professor of materials science and engineering and as an adjunct assistant professor of bioengineering at Utah, he became director of research at Vascular International Corporation in Salt Lake City.

“I worked in the development—modeling the stresses—of the diaphragm for the artificial heart,” Benson said. “I was associated with the blood-contact group, and primarily with the vascular branch.”

Benson often uses his sense of humor to encourage students to keep a steady pace.

“My joke has always been, ‘If this was easy, we’d stand outside and give you the degree,’ ” he said. “Another one of my standard jokes, that all of my students know, is, ‘Sympathies are given out Wednesdays from 11:30 to 2:00.’ ”

The good-natured ribbing goes hand-in-hand with developing a professional relationship with the students.

“I take my teaching seriously, and I try to meet the students’ needs,” Benson added. “They come by and we have a very cordial relationship. But if something is wrong, I don’t mince words. I let them understand, but always from a point of respect.”

Benson enjoys seeing students overcome challenges and find success in engineering careers. He has particular respect for former students (like Dr. Daniel Worley PhD/MSE ’99), who was the first African-American student to get a PhD after participating in the Ronald McNair Post-Baccalaureate Achievement Program, now known as the Education Advancement Program. Worley now works for the Teknor Apex Company.

“This young man, he wasn’t the greatest student in the beginning,” said Benson. “He got into this program, he did his stuff, he became part of my lab, he got a masters, and he got a PhD. Last year, he was promoted to Chief Technical Officer for all of Asia. I’m very proud of that young man because he was someone who actually worked hard.”

He decided to head east in 1986 and joined the engineering faculty at UT. He was attracted to the university by the strong program in polymer research and the positive academic atmosphere. The position also put him and his wife, Barbara Glanz, and their children geographically closer to New York. So it wasn’t a bad idea to come here so that it would be easier to go back and forth.

“Outside of the lab, Benson is active in the classroom and with campus support organizations that guide students toward realizing their potential, such as the Education Advancement Program (EAP), the Engineering Diversity Program, and the UT Commission for Blacks.

“Service is an important thing for me,” Benson said. “As a minority, it’s a case where you can give something back.”

He sees this mixture as simply part of the job, with personal engagement with students as a priority.

“You have got to be interested in the students, in doing some service, in teaching,” he said. Benson also sees this work ethic in his students.

“My philosophy is very simple,” he explained. “I would like you to come to class. I would like you to ask as many questions as possible. If you have the energy to follow me all over the place, I’ll never be rude to you. I’ll answer the same question in as many different ways as possible.”
The Reliability and Maintainability Center: Where Industry Meets Academia

The Reliability and Maintainability Center (RMC) is a crossroads where College of Engineering students and faculty work with members of industry to make valuable connections for education, research, information sharing, and ongoing industry partnerships. The RMC seeks to advance reliability and maintainability education and practices within both the academic and industrial worlds. Students have the unique opportunity to put their job experience through research projects and the center's internship program, companies benefit from access to fresh ideas and approaches that save on cost by increasing throughput and improving safety and quality for their industries.

"We deliver programs and processes that lead to better results in the member companies," said Dr. Klaus Blache, RMC director and research professor. The RMC offers a reliability and maintainability (R&M) certificate program for working professionals. This consists of six courses and a results-based project (in industry) aimed at delivering measurable improvement.

Several companies have already made it a requirement for their R&M engineers and technicians. "We're business-focused," said Blache. "So if they use our processes and programs, the end result is that they are going to improve their operations and they're going to save money. It's a methodology to gain competitive advantage."

The RMC began in 1996 with twelve participating companies and now has more than forty member companies, said organizations, including Alcoa, Bayer, Dow Chemical, DuPont, Eastman Chemical, General Motors, Nissan, Oak Ridge National Laboratories, Owens Corning, Rockwell, Schlumberger, Shell Oil, and the U.S. Army. Discussions are in progress with Amazon, Kraft, and Bell Helicopter.

Summer internships put engineering students in the field with these companies, starting with a one-week training program that mixes academics and professional training. "We keep the students for the first week and put them through a reliability and maintainability boot camp," explained Blache. "What's unique about the spring class is that 85 percent students and sixty percent company representatives." Company participants usually continue to work closely with students, in mentor or supervisory roles, for the fourteen weeks of the internship. The program boasts high job-placement rates for graduates, often with the companies where students intern. Some RMC graduates are now bringing their companies to the program.

"From the companies that I've talked to, they might come here and make seven job offers when they are done with interviews," said Blache. "They will say that five or six of the top seven all went through our program. These students talk with experience and they have a voice.

The RMC also holds regular meetings for members to share practices and information, and sponsors an annual Maintenance And Reliability Conference (MARICON) for discussing new methods, applications, and techniques. The next conference is scheduled for Feb. 25-28, 2013. It will have eleven one- and two-day workshops, more than thirty papers, and three keynote presentations. One of this year's keynote presentations was by the vice president of Nissan, who brought an electric vehicle to display. "From the companies that I've talked to, they might come here and make seven job offers when they are done with interviews," said Blache. "They will say that five or six of the top seven all went through our program. These students talk with experience and they have a voice.

The RMC works in conjunction with the Reliability and Maintainability Engineering (RME) academic program directed by Dr. Wesley Hiels. Undergraduate students can minor in reliability and maintainability, while graduate students can earn master's degrees or graduate certificates. Students can earn RME work-on-campus or distance-learning courses. All College of Engineering departments, except for civil and environmental engineering, currently offer the master's degree in RME.

"This education program not only meets the needs of industry and government," said Hiels. "The RMC is designed to foster the healthy growth and a whirlwind of life changes this past spring, gaining a new title and a new name along the way. Just days after becoming the first African-American student to graduate from the University of Tennessee with a Ph.D. in nuclear engineering, Anderson married fiancé, Terry Porter, and became Dr. Jamie Porter.

The Knoxville, Tenn., native plans to keep charging ahead. "Our nuclear engineering professors care so much about their students that they want to see their jobs so much that I am now looking forward to becoming a professor at the college level," Porter said. Porter's studies, within the radiological engineering concentration, included measurements and modeling of the effectiveness of shielding materials for use in space environments; Monte Carlo space radiation transport and shielding codes; and methods for estimating environmental levels of radioactivity. As a graduate research assistant, she helped develop improvements for the Cosmic Ray Energetic Particle Detector (CREDIT) instrument on NASA's Lunar Reconnaissance Orbiter (LRO) spacecraft and analyzed data from the LRO mission. She also spent a summer as an intern at the Tennessee Valley Authority Watts Bar Nuclear Plant in Spring City, Tenn.

"Dr. Porter is very bright, personable, focused, hard-working, and a pleasure to work with," said Dr. Lawrence Townsend, who advised her. "Her career goal is to become a university faculty member. There is absolutely no doubt in my mind that she will succeed in doing so."

In addition to her experience and coursework, Porter has been honored with several awards in her academic career, including the Hall of Fame Award at the 2012 Tennessee Louis Stokes Alliance for Minority Participation (TLASMP) Banquet. "TLASMP was so important to the jump-start of my engineering career," Porter said. "It gave me a head start on the classes I would face as an incoming engineering student."

Porter has presented numerous papers and co-authored journal articles on her research. She will continue her research with Professor Townsend on a post-doctorate basis at UT. "Becoming the first African-American female nuclear engineering Ph.D. graduate here at the University of Tennessee makes me hopeful for minority women here to follow," said Porter. "Nuclear engineering has never looked more diverse. Women and minorities need to do whatever they can to bring this field into the twenty-first century. As a nuclear-engineering professor, I will hopefully encourage many more after me."

Lean Enterprise Summer Program brings international students and industry together

Students from Mexico, Brazil, and China research, gathered at the Howard H. Baker Jr. Center for Public Policy on July 2 to kick off the 2012 Lean Enterprise Summer Program on the UT, Knoxville, campus.

"Today we are consolidating a dream we had four or five years ago," said Macias de Anda. Program participation jumped from the previous year's twenty-six participants to more than ninety students. Organizations have been motivated by the healthy growth. "We want to grow this so that it becomes a congress for lean enterprise," said Sawhney.

"Lean manufacturing is how we're all going to remain competitive on a global basis," said Davis.

Over the course of the program, participants learned lean techniques while working in groups that mixed students from the different universities. The groups tackled seventeen different projects at partner companies, which included Arc Automotive, Brinsec, East Tennessee Children's Hospital, Energy Solutions, Hartford National Care, Fulton Bellows, Homestead Trailers, Just International, and Monterey Mushrooms.

"Students were really happy with what they learned, and all the companies were highly satisfied with the results of the program," said Macias de Anda. Many of those companies have implemented student recommendations from the previous year's program. When the companies report these improvements to state government, a positive ripple effect occurs.

"You will actually make an impact on the state of Tennessee," said Sawhney told students.
The 2012 Engineers Day, on Oct. 25, will mark the one-hundredth anniversary of this UT College of Engineering tradition. Engineering students and faculty will interact with hundreds of potential engineering majors from high schools across the region.

Events of the day include exhibits and demonstrations prepared by UT engineering student clubs and societies from the different engineering disciplines. At least four competitions will challenge the visiting students and inspire them with the ever-growing fields of engineering.

The Quiz Bowl pits teams of four against each other in three rounds of multiple-choice questions. The Egg-Drop Competition challenges students to design a device that will protect a large, plastic egg from breaking when dropped. The ASCE High School Balsa Wood Bridge Competition tests the structural efficiency of miniature bridges constructed by participating students. The Food Battery Competition, in its second year, provides a lesson in emissions-free transportation.

The keynote speaker this year will be Mark K. Cox (BS/ChE ’89), vice president of worldwide engineering and construction for the Eastman Chemical Company. The Kingsport, Tenn., native joined Eastman as a co-op student in 1986 and has served in several management and leadership roles. He is a licensed Professional Engineer, a senior member of the American Institute of Chemical Engineers, and a member of the Tau Beta Pi Engineering Honor Society.

Engineers Day began in 1912 when UT engineering students were enlisted to complete construction of a road from the foot of The Hill at Main Avenue to Estabrook Hall. Students from the “domestic science” (or home economics) class provided lunch. Dr. Charles A. Perkins served as a water boy and his fellow UT-COE building namesake Dean Charles E. Ferris oversaw the work.

When the day was done, it was decided that an annual event should be established “for the purpose of accomplishing some worthy piece of work or promoting some valuable enterprise.” Over the decades, Engineers Day evolved into its current format, with the goal of inspiring future engineers to follow one of the Science, Technology, Engineering, and Mathematics (STEM) fields.

In conjunction with the 100th anniversary of Engineers Day, the COE asks alumni around the world to show their school colors by wearing orange on Oct. 25. Alumni can send photos of their orange attire, and their Engineers Day memories, to Juliette McClure at jmclu10@utk.edu, or post it to the college’s Facebook page at http://www.facebook.com/coe.utk.

The Bryce Corporation will sponsor student groups from Memphis, where the company is based, for the 2012 Engineers Day. The family-owned business is an industry-leading supplier of innovative flexible packaging and prepress solutions.

General Motors will have a selection of cars on exhibit, and representatives will be on-hand to answer questions. Tau Beta Pi also sponsors the event. The engineering honors society, headquartered at UT since 1907, has offices in the Dougherty Engineering Building.

For more information, visit http://www.engr.utk.edu/ed/ or contact the College of Engineering’s Office of Academic and Student Affairs at (865) 974-2454.
Student Feature

Team UT Continues ATVC Success at EcoCAR 2

The University of Tennessee, Knoxville, College of Engineering has been participating in the Department of Energy’s (DOE) Advanced Vehicle Technology Competitions (AVTC) since 1989. Dr. Jeff Hodgson, a professor emeritus in the Department of Mechanical, Aerospace and Biomedical Engineering (MABE) initiated UT’s involvement in the programs and served as faculty advisor to the AVTC teams until 2004, when Dr. David Irick, a MABE research assistant professor, took over after Hodgson’s retirement. Since 1989, UT has had more than five hundred students participate in the competitions.

DOE partners with one of the U.S. major automobile manufacturers for the competitions, and twenty-eight AVTCs have been sponsored. The intercollegiate competitions are designed to help educate the next generation of automotive engineers and to increase the number of ‘green initiatives’ and this program ties into environmental impact. Our university is currently preparing for the future and also offers an opportunity to create products that take into account environmental impact.

“The real-world experience these students are receiving is invaluable,” said Irick. “They will actually get to see something they’ve developed in practice. But what is more is that we are training our future engineers to create products that take into account the environmental impact.”

The Malibu was showcased at a special media presentation on Monday, August 6 on the top floor of the 11th Street Parking Garage with members of the EcoCAR 2 team, Dr. Bill Hamel, professor and head of the MABE department, and COE Dean Wayne Davis. Also present at the event were representatives of the Denso North America Foundation, which provided additional support of $50,000 over two years.

“The technology in these advanced vehicles is allowing us to use multiple sources of energy within the vehicle, which, in the end, allows us to use less fuel on an average commute,” said Mitchell Routh, controls team lead and a graduate student in mechanical engineering.

“On average, over seventy-five percent of students who have been involved in these alternative vehicle competitions go on to enter the automotive industry after graduation,” said Davis at the event. “This is a phenomenal way to train the engineers of the future and also offers an opportunity to create products that take into account environmental impact. Our university is currently increasing the number of ‘green initiatives’ and this program ties into that very well.”

The UT EcoCAR 2 team will continue work on the Malibu with a goal of achieving high scores at the Phase 2 Final Competition in Yuma, Ariz. and San Diego, Calif., which is tentatively scheduled from May 13-23, 2013.

General Motors provides production vehicles, components, seed money, technical mentoring, and operational support to EcoCAR 2. DOE and its research and development facility, Argonne National Laboratory, provide competition management, team evaluation, and technical and logistical support. In total, the fifteen competing teams have received $745 million in vehicles, software, and support mechanisms.

For more information in the EcoCAR 2 competition, visit http://www.ecocar2.org/ or follow the blog at http://www.denso- greengarageblog.org/.
Holmes’ relationship with the legendary Neyland Stadium was even closer. “My checklist at Neyland Stadium is nearly complete,” he said. “Over the years, I sold soft drinks and programs, worked at sports camp, played high school and junior varsity football, performed on the bar at halftime with the band, and flew an F-15 overhead as part of a pre-game flyby. I was also a walk-on with the football team during the 1975 season and played without any distinction.”

Holmes’ chemistry and physics teacher at West High, Bill Baird, encouraged him to take the engineering aptitude test at UT. Holmes did well on the test and enrolled in the engineering college after graduating from high school. He entered the Cooperative Education Program during his sophomore year and was assigned a job with NASA at the Kennedy Space Center in Florida.

“Ed Morgan was a UT engineering graduate, member of the 1951 national championship football team and my boss at NASA. Ed, along with Dr. Bodenheimer and the late Dr. Blalock, also helped me to learn the work ethic and habits required to be a success and helped me to see what I was capable of achieving,” Holmes said.

Holmes went through the Air Force Undergraduate Training, F-15 Replacement Training, the F-15 Fighter Weapons Instructor Course and teaching and leading in F-15 fighter squadrons during his initial years in the Air Force.

Along the way, Holmes earned three master’s degrees while on assignments for the Air Force, including a Master of Arts degree in history from the University of Alabama, Tuscaloosa; a Master of Airpower Arts and Sciences degree, the School of Advanced Airpower Studies, Air University, Maxwell Air Force Base, Alabama; and a Master’s degree in national defense studies from the Naval War College in Newport, R.I.

Holmes cites three important mentors who guided him as he decided to enlist in the Air Force. “Ed Morgan was a UT engineering graduate, member of the 1951 national championship football team and my boss at NASA. Ed, along with Dr. Bodenheimer and the late Dr. Blalock, also helped me to learn the work ethic and habits required to be a success and helped me to see what I was capable of achieving,” Holmes said.

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Holmes has achieved incredible success during his military career, including promotions to Brigadier General in 2008 and Major General in 2011. He has received the Defense Superior Service Medal, the Legion of Merit with oak leaf cluster, the Bronze Star medal, the Defense Meritorious Service Medal with two oak leaf clusters and the Air Medal with three oak leaf clusters.

“I’ve enjoyed all of my assignments, but the ones that I have spent in command were the best. I’ve been fortunate to command an F-15 fighter squadron in Virginia, a pilot training group in Mississippi, and two wings—the 4th Fighter Wing flying the F-15 and A-10 in North Carolina, and 455th Expeditionary Wing flying fighter transport, electronic combat, and remotely-piloted aircraft and rescue helicopters in Afghanistan,” Holmes said. “I’ll always remember the incredible motivation and skill of the man and women I worked with during a year in Afghanistan to safeguard the civilian population and protect coalition forces.”

Holmes still enjoys working in the Air Force and looks forward to new challenges. He and his wife Sara, a successful children’s book author, plan to make their home in Washington, D.C., once he leaves the service. Their daughter, Rebecca, is a graduate of the University of North Carolina-Chapel Hill and has just finished her first year in the physics PhD program at the University of Illinois-Champaign/ Urbana, where she is a research assistant. The Holmes’ son, Wade is a senior at UNC-Chapel Hill.

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“I was a huge fan of NASA’s space programs as a kid—I kept scrapbooks stuffed with newspaper clippings and followed every mission,” Holmes commented. “I remember CBS interrupting their schedule to announce the Apollo 11 fire, reading about the Apollo 13 explosion and recover, and trying to stay awake to watch Neil Armstrong’s first steps on the moon.”

The NASA assignment renewed Holmes’ interest in space travel, and he also learned to fly in Florida through the Patrick Aero Club, a facility where non-flying members of the Air Force and government employees could learn to fly at reduced rates.

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Development Update

Top 25 and the Philanthropy Equation

Inspired by the dreams of students to get a great education; Advanced by faculty who are simultaneously mentors and catalysts for discovery; Our journey to be recognized as a Top 25 Public College of Engineering is moving on every dimension.

That journey becomes more vibrant with every gift from every donor. The list of names that follows tracks only the gifts and new pledges made this past year, but gifts have a way of reverberating across years. Many additional donors are in the middle of pledges made during The Campaign for Tennessee. Because donors stepped up, the Min H. Kao and John D. Tickle Buildings will inspire learning. Others have put us in their estate plans for the future.

Then there are the endowments—two hundred twenty-nine of them in engineering, each one generating income every year to be given as directed by the donors. These invested funds are permanent legacies that offer story after story of achievement and will continue to do so as long as there is a University of Tennessee. Let me share just a few examples of long-term impact.

Since 1981 the Allen & Hoshall, Inc. Engineering Faculty Award has been given annually to outstanding faculty; that’s thirty-one years that faculty excellence has been celebrated. Multiply that by the students touched by those faculty members; the impact is on hundreds of lives.

Willis Lincoln graduated from UT engineering in 1922. Seventy years later engineering received $500,000 gift through Trusts in Mr. Lincoln’s estate that created an endowment. Fast-forward twenty years: over $500,000 in earnings have benefited the college and the endowment has a current value of over $760,000 which continues to produce annual income.

In 1938—one hundred years after the first engineering courses were taught at the University of Tennessee – Mr. J.E. Lopez established a scholarship endowment in the name of his father-in-law Colonel Samuel Henry Lockett. That’s seventy-four years of continually supporting students, recognizing academic achievement, and helping students with financial need.

“Numerous friends and colleagues of Professor W.O. Leffell, being deeply interested in continuing his good work, hereby establish the W.O. Leffell Scholarship.” So reads the 1977 agreement that established this endowment. It has indeed continued Professor Leffell’s work—a financial legacy alive today in each Electrical Engineering student who holds this award. Good work that lives on, touching lives today and tomorrow.

The Spikard Family Scholarship originated with a gift in 1986 from someone who understands the power of gifts. As Associate Dean of Engineering Andy Spickard’s duties included development activities. He also understands the power of investment capital—before coming to UT he was president of Alcoa Construction Systems. Every year since, Mr. Spickard has given to help it grow. Matching gifts from ALCOA augment each gift, further multiplying its potential. This year the 119th student will be helped through this generous endowment.

So what is the Philanthropy Equation? I would write it something like this:

One gift
+ more gifts
+ many gifts of every size
X years of giving
+ endowment income
X years of earnings
On behalf of the students, faculty, administrators, and staff of the College of Engineering we offer thanks to those named in the following lists. Your support helps propel our vision and we are grateful to you.

The Dean’s Circle

Note the Dean’s Circle is counted on the calendar year. All other giving totals in this report are for the fiscal year July 1, 2011 – June 30, 2012.

Leadership annual giving is recognized in the College of Engineering by our newly created Dean’s Circle. We are grateful to the donors who are leaders in giving to the College Fund for Engineering and engineering department funds.

Engineering Annual Giving Total 2011

Listed here are those who gave to engineering funds at leadership levels.

Platinum ($100,000 and above)

David & Jacqueline Binkley
Michael & Melissa Carroll
Dr. Kenneth & Jennie Kihn

Gold ($50,000-$9,999)

Howard & Debra Chambers
Thomas & Ruth Clark
Michael & Jackie Crabtree
Dr. Wayne & Sylvia Davis
William Dickinson & Carol Sensibaugh
Dr. William & Jenny Eversole
Bruce & Martha Stone
Spice & Lisa Tidle

Silver ($2,500-$4,999)

Timothy & Christine Covington
Ronald &237335; Morris
Timothy & Christine Covington

Outright Gifts

Donors who made a new gift of cash or securities during fiscal year 2012-13 listed within giving ranges. This table does not include pledge payments.

$50,000 and Above

Estate of Betty Barker
Estate of Flath
Siemens Product Lifecycle Management Software, Inc.

$100,000 to $499,999

Advanced Micro Devices, Inc.
CD-adapco
Oncal Fullwood
Estate of Ingrida Kerr
Estate of Roy Martin
Math Werth
NVIDIA Corporation
Estate of Blossom Woods

$10,000 to $99,999

A. T. & T. Inc. Foundation
Agile Technologies, Inc.
Alcoa Inc.
American Association for Engineering Education
AMETEK Foundation
Asahi Kasei Corp.
BeeCyber Foundation
Columbia and Columbia Corporation
Michael Thompson
Curtis Handley
David & Jacqueline Binkley

$2,500 to $4,999

Cranfield University
Dow Chemical Company
Dow Chemical Company

$1,000 to $2,499

Coombs
Garfield

$500 and Above

Cox

Bronze ($1,000-$2,499)

Alton & Jane Adams
Richard Albert
Arup & Nandita Bandypadhyay
Donaldson & Alice Barton, Sr.
Raleigh & Mary Beckham
Terri & Connie Begley
Robert & Elizabeth Bibee
Douglas & Lori Blalock
Michael & Cynthia Brady
Robert & Mary Bryson, Jr.
Robert & Dorothy Bryson
Dr. Joseph & Connie Byington
James & Christine Cartridge, Jr.
Bruce & Ethel Chamberlin
Matthew Chun
Cohens & Dana Cobbe
Dr. Kenneth & Jennie Kihn

Slate ($500-$999)

Tennessee Engineering Women

$250 and Above

Coombs
Garfield

Bronze ($100-$299)

Alton & Jane Adams
Richard Albert
Richard Alan
Arup & Nandita Bandypadhyay
Donaldson & Alice Barton, Sr.
Raleigh & Mary Beckham
Terri & Connie Begley
Robert & Elizabeth Bibee
Douglas & Lori Blalock
Michael & Cynthia Brady
Robert & Mary Bryson, Jr.
Robert & Dorothy Bryson
Dr. Joseph & Connie Byington
James & Christine Cartridge, Jr.
Bruce & Ethel Chamberlin
Matthew Chun
Cohens & Dana Cobbe
Dr. Kenneth & Jennie Kihn

Slate ($100-$299)

Tennessee Engineering Women

$25 and Above

Tennessee Engineering Women
Get Ready to Celebrate 175 YEARS CELEBRATING 175 YEARS

In 1838 the first engineering courses were taught at the University of Tennessee. That’s nearly 175 years of teaching and creative discovery; so we’re getting ready to celebrate! In 2013 we will recognize the many achievements of our graduates, our students, and our faculty. We plan to celebrate the year with a gala for everyone who can possibly come. You are part of this grand history and you are part of our amazing future. We want to follow in coming months. Join the festivities and help send your favorite stories—faculty who influenced you and you are part of our amazing future. We want to plan to cap the year with a gala for everyone who.

You are part of our amazing future. We want to plan to cap the year with a gala for everyone who.

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<th>Name</th>
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<td>Dr. Richard and Linda Bennett</td>
<td>New commitments and bequests made during fiscal year 2011-12</td>
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<td>Andrew and Barbie Bigelow</td>
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Raphael McInnis
Jennifer Eox
Biomedical Engineering
Nicholas Youst
Bob Swann
Dr. P. Sundaram
Gregory Richard
Janis Kukainis
Ted Keller
Mick Dove
Nathan Dougherty, Jr.
Matthew Dofflemyer
Dr. Andrew Denny
Ray Carmichael
Dr. William Baker, Jr.
Ralph Abel
Aerospace Engineering

Pledge Payments By
Gifts, Pledges and Pledge Payments

Dr. James Haynes
Sidney Hayes
Jamshed Havewala
George Haun, Jr.
Everette Harris, Jr.
William Hall
Malcolm Hale
Dr. James Hackney
Dr. Paul Haas
Kenneth Given
M. Benjamin Foard
Kenneth Eakes
Melvis Driver
Dr. Robert Counce
Dr. Nick Collins
James Wilmoth

Civil Engineering

Dr. Ahmed Abu-Rahmah
Clifford Ackerson
John Allen
Richard Ammons, Jr.
D. Allen Anthony
Dr. Daryl Armentrout
Carl Austin

Lt. Colonel Lynn Hickman
Richard Hodgdon
Richard Hodge
Harold Hogue
Avalon Holland
Robert Jordan
Mike Cooper
William James
Steven M. Frazier

Moody Moses
Robert Murphy
Russell Myers
Earnest Napier
Dr. Mark L. Johnson
Jamie Willingham
Frank Willis
Kenneth Williams
Brad Wilson

Stephan Blazer
W. Byron Bleddoe
Lisa Blue
Dr. Rui Bo
Dr. Robert Bodenhamer, Sr.
Thomas Bolander
Johnnie Boling, Jr.
William Booth
Donald Boswall
Jeffrey Bowman
William Boyd
Royal Bowhay

Joel Clifton
Mark Clyman
Wallace Conard
George Conner, Jr.

Dr. James Haynes
Sidney Hayes
Jamshed Havewala
George Haun, Jr.
Everette Harris, Jr.
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Events & Awards

College of Engineering 2012 Commencement

The College of Engineering Spring 2012 graduation ceremony took place on Wednesday, May 9, with over two hundred and eighty engineering graduates participating in the ceremony. A group of approximately two thousand five hundred parents, friends, and relatives attended the event, which took place in Thompson-Boling Arena on the UT-Knoxville campus at 3:30 p.m.

Dr. Wayne T. Davis, dean of engineering, and Dr. Susan Martin, University of Tennessee, Knoxville, provost, led the academic procession that signaled the beginning of the ceremony. The procession included associate deans, department heads, and faculty representatives.

Dr. Thom Mason, the director of Oak Ridge National Laboratory (ORNL) and associate director of neutron science and technology at the Neutron Scattering Society of America, was in Washington, D.C., July 21-27 as part of the 2012 Nuclear Engineering Student Delegation (NESD). Every year, about ten of the nation’s brightest students head to the nation’s capital to discuss the issues facing nuclear energy, policy, education, and research with key policymakers. Crabtree met with the science and energy representatives from both Senator Lamar Alexander and Senator Bob Corker’s offices, and also conferred with members from the Tennessee delegation in the U.S. House of Representatives. The NESD delegation also lobbied members of Congress to support funding for nuclear engineering education, including scholarships, fellowships, and faculty development programs. The delegation provides a student perspective on policy questions related to nuclear science and technology through a written policy statement and meetings with government leaders.

Crabtree completed her master’s degree in nuclear engineering at UT in December 2011. In recent years, the university’s colleges have been conferring diplomas during smaller, more individualized graduation events.

COE PhD Candidate Attends Nuclear Engineering Student Delegation

Lily Crabtree, a PhD candidate in the Department of Nuclear Engineering, was in Washington, D.C., July 21-27 as part of the 2012 Nuclear Engineering Student Delegation (NEDS). Every year, about ten of the nation’s brightest students head to the nation’s capital to discuss the issues facing nuclear energy, policy, education, and research with key policymakers. Crabtree met with the science and energy representatives from both Senator Lamar Alexander and Senator Bob Corker’s offices, and also conferred with members from the Tennessee delegation in the U.S. House of Representatives. The NESD delegation also lobbied members of Congress to support funding for nuclear engineering education, including scholarships, fellowships, and faculty development programs. The delegation provides a student perspective on policy questions related to nuclear science and technology through a written policy statement and meetings with government leaders.

Crabtree completed her master’s degree in nuclear engineering at UT in December 2011.
Living Light the solar-powered house of the University of Tennessee, Knoxville, was one of only seventeen projects chosen to represent the nation’s land grant universities at the Smithsonian Folklife Festival, which took place on the National Mall in Washington, D.C., June 27 to July 1 and July 4 to 8. The ten-day event was co-sponsored by the National Park Service.

Living Light is a functioning, energy-efficient, solar-powered house that competed at the 2011 US Department of Energy Solar Decathlon. The house placed eighth overall in the event, and was the only house from the competition to be featured at the Smithsonian festival. It also placed third in the engineering category of the competition, a remarkable achievement against high caliber teams from universities in Florida, Canada, China, New York, and New Zealand.

Karl Hughes and Steven Davis, both undergraduates in mechanical engineering, maintained the mechanical systems of the house throughout its stay on the National Mall. The two students offered answers to technical questions about the house, which was wholly self-sustained by solar power throughout the event, posed by the nearly sixteen thousand visitors who toured the house at the festival.

The festival commemorates the 150th anniversary of the Morrill Act, which led to the founding of land-grant universities and allowed rural and working-class Americans better access to higher education. The focus of this year’s event was to show an array of ways that universities and the Department of Agriculture put research to action every day.

COE Student Selected to Attend SWE Global Innovation Symposium

Janelle Dunne, a senior industrial engineering major at UT, has been selected to attend the Society of Women Engineers (SWE)–Women Engineers Leading Global Innovation Symposium. SWE is convening a diverse group of women in engineering and technology for a two-day symposium to be held in Bangalore, India. This symposium will provide a forum for discussing engineering developments and challenges across engineering disciplines and countries, focusing on professional development, systems engineering, sustainable energy, and information technology and takes place August 29-31, 2012.

“The Women Engineers Leading Global Innovation International Symposium is an event that will benefit me in many ways,” Dunne said. “The symposium experience will enhance my educational goals by allowing me to disassemble the undergraduate projects that I have worked on. I will receive in-depth feedback from professionals and professors who can provide direction into constructing a research project. This event will also introduce me to new technology and innovations that will enlighten me as a professional and will ultimately allow me to build a network with female engineers, professionals, and students.”

The symposium features keynote speakers and invited technical speakers, panels, workshops, technical posters, and opportunities for global collaboration. To facilitate an environment for collaboration, the total number of participants will be limited to seventy, with thirty-five participants from each country (India and the U.S.) that will include a mix of participants from academia and industry. Dunne was one of the ten students selected to attend the symposium.

For more information, visit www.solarsecure.net.

New Solar Secure Device Installed on Engineering Campus

The University of Tennessee, Knoxville, College of Engineering’s campus got a boost in security when the new Solar Secure SunStation was officially unveiled on July 12. UT is the first university to install Solar Secure. The structure is located just outside Perkins Hall, the college’s administrative building.

The net-zero energy Solar Secure SunStation provides Wi-Fi connectivity, security, shelter, lighting, and benches for seating. It is a solar powered, wireless structure that serves as a self-sufficient power and communications source for video surveillance, LED lighting, Wi-Fi, and an Emergency Assistance Station. It generates all of the energy it needs from solar panels and incorporates rechargeable batteries for energy storage, ensuring uninterrupted power and communications capabilities in the event of an outage or other emergency. The SunStation also features a power outlet, allowing students the convenience to stay connected by using their laptops, cell phones, and other technology outdoors.

UT was selected as Solar Secure’s first higher education installation due to its progressive energy efficiency and sustainability initiatives.

Cochran in Seattle, Wash. developed Solar Secure to overcome barriers of environmental impact and the high cost of installing surveillance cameras and other security infrastructure on campuses. Although the technology was developed in Washington State, Cherokee Millwright and Mechanical in East Tennessee manufactured the UT station.

For more information, visit www.solarsecure.net.
Dr. George Frazier, Jr., the current president of the American Welding Society (AWS) will assume the office of president and chairman of the board on January 1, 2013. During her term, Cole will lead the affairs of the society and will preside at all board of directors and executive committee meetings, as well as the society’s annual meeting and any special meetings of its members. Cole will represent AWS at many of its local section meetings and other technical, national, and international meetings.

Cole is an AWS Fellow, a Life Member, and a registered Professional Engineer in the state of Tennessee. She has chaired the AWS Council on Education and Public Participation, the Welding Research Advisory Board, the Committee on Technical Activities, Fellows, and C3 Brazing and Soldering Committee and has been a member on many other committees. Before forming her own company, she was program and contract manager at Oak Ridge National Laboratory. AWS was founded in 1919 as a multifaceted, nonprofit organization with one goal: to advance the science, technology, and application of welding and related joining disciplines. The international society has seventy thousand members worldwide. AWS leads the way in supporting welding education and technology development to ensure a strong, competitive, and advanced way of life for individuals around the world.

Dr. Siller has published more than seventy papers, edited one book (AWS Handbook, 5th ed.), and contributed to four others, helped organize more than thirty meetings of its members. Cole will represent AWS at many of its local section meetings and other technical, national, and international meetings.

In 2012, after a year about the news of his passing, said Shirley Pih Broadbery, creator of the Dr. Pih Scholarship. His kids took his saying, “He loved exploring, learning, and teaching,” to heart. Shirley was an engineer major for two years here at UT. His children are following in his footsteps by continuing his legacy. He received the Alumni’s Legacy Lives On in Memorial Engineering Fellowship award for the release of her publication "Dear Success Seeker: Wisdom From Outstanding Women." The book features advice from numerous notable successful women. Wright, formerly Michelle Waite, graduated in 1992 as the first notable successful women. Wright, formerly Michelle Waite, graduated in 1992 as the first woman in her family to attend UT. Her children are no exception. Dr. Pih was a trail of kindness and caring for others, whether for his immediate and extended family, friends, or departmental staff at UT. His children are following in his footsteps by continuing his legacy.

Alumni’s Legacy Lives On in Memorial Engineering Fellowship

In 2012, after a year about the news of his passing, said Shirley Pih Broadbery, creator of the Dr. Pih Scholarship. His kids took his saying, “He loved exploring, learning, and teaching,” to heart. Shirley was an engineer major for two years here at UT. His children are following in his footsteps by continuing his legacy. He received the Alumni’s Legacy Lives On in Memorial Engineering Fellowship award for the release of her publication "Dear Success Seeker: Wisdom From Outstanding Women." The book features advice from numerous notable successful women. Wright, formerly Michelle Waite, graduated in 1992 as the first notable successful women. Wright, formerly Michelle Waite, graduated in 1992 as the first woman in her family to attend UT. Her children are no exception. Dr. Pih was a trail of kindness and caring for others, whether for his immediate and extended family, friends, or departmental staff at UT. His children are following in his footsteps by continuing his legacy.
The University of Tennessee, Knoxville
College of Engineering
207 Perkins Hall
Knoxville, TN 37996-2012

Calendar

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<tr>
<th>Fall 2012</th>
<th>Spring 2013</th>
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<tr>
<td>1st Session Ends..................................Oct 10</td>
<td>Classes Begin..................................Jan 9</td>
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<td>Fall Break........................................Oct 11-12</td>
<td>MLK Holiday.....................................Jan 21</td>
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<td>2nd Session Begins...............................Oct 15</td>
<td>1st Session Ends................................Feb 27</td>
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<td>Thanksgiving......................................Nov 22-23</td>
<td>2nd Session Begins..............................Feb 28</td>
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<td>Classes End........................................Dec 4</td>
<td>Spring Break.....................................Mar 22-28</td>
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<td>Exams..............................................Dec 6-7, 10-13</td>
<td>Spring Recess....................................Mar 29</td>
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<td>Graduate Hooding.................................Dec 14</td>
<td>Classes End.......................................Apr 26</td>
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<td>Commencement.....................................Dec 15</td>
<td>Exams............................................Apr 30, May 1-3, 6-7</td>
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<tr>
<td>Official Graduation Date........................Dec 15</td>
<td>Commencement....................................May 8-10</td>
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Contact Information

Senior Administration
Dean of Engineering
Dr. Wayne Davis,
Dr. Bill Dunne,
Dr. Masood Parang,
Associate Dean for Research & Technology
Associate Dean for Academic & Student Affairs

Departments
Chemical & Biomolecular ................................ 974-2421
Civil & Environmental ................................... 974-2503
Electrical & Computer Science........................ 974-3461
Industrial & Information................................. 974-3333
Materials Science.......................................... 974-5336
Mechanical, Aerospace & Biomedical.................. 974-2093
Nuclear................................................................ 974-2525

Administration & Programs
Communications............................................. 974-0533
Dean’s Office................................................. 974-5321
Development................................................ 974-2779
Engineering Advising Services......................... 974-4008
Engineering Diversity Programs........................ 974-1931
Engineering Fundamentals................................ 974-9810
Engineering Professional Practice..................... 974-5323
Engineering Research...................................... 974-8360
Engineering Student Affairs............................. 974-2454
Finance & Admin. Affairs................................. 974-5279

Research Centers
Materials Processing....................................... 974-0816
Maintenance & Reliability............................... 974-9625
Scintillation Materials.................................... 974-0267
Transportation Research................................ 974-5255
Intelligent Systems and Machine Learning............ 974-5803
CURRENT.................................................. 974-9720
Innovative Computing Laboratory........................ 974-8295

Contact: Christina Parsons
(865) 974-2779
cparson4@utk.edu

SAVE THE DATE

COLLEGE OF
ENGINEERING
ALUMNI BBQ

ON THE HILL

Catered by Dead End BBQ, co-owned by UT Electrical Engineering graduate Robert Nutt

SATURDAY NOVEMBER 3, 2012

The University of Tennessee, Knoxville, College of Engineering invites you to Homecoming 2012 and the Annual Alumni BBQ on the Hill.

Saturday, November 3, 2012
3 hours prior to kickoff of the Tennessee vs. Troy football game.

Join us for a barbeque lunch, including hot dogs for the kids.

Enjoy exhibits and demonstrations, reunions with former classmates and faculty, and games for both adults and children. Tours of the Min H. Kao Building will be given.

Register today and be a part of the tradition.

Costs:
$12.00/adults - $8.00/children under 10 years of age

Register online at: www.volsconnect.com

For more information, contact Christina Parsons at (865) 974-2779 or email: cparson4@utk.edu