Mission Statement

The mission of the University of Tennessee College of Engineering is:

To provide high quality education in the major engineering disciplines from the undergraduate through doctoral levels through a creative balance of academic, professional and extracurricular programs;

To foster and maintain mutually beneficial partnerships with our alumni, friends, industry and local, state and federal governments through public services assistance and collaborative research; and

To be a major contributor to our nation’s technology base through scholarship and research.
We present our 2011 fiscal year annual report with enthusiasm and excitement about the great year that we have just had, and yet, we are reluctant to breathe a sigh of relief. It has been a tumultuous three years since the economy began to shrink, and we are just now entering a new semester (Fall 2011) where the real impacts of 30% and 10% reductions in base budgets occur respectively for the university and college. We also recognize that the economic recovery may not occur as quickly as we had hoped. But we must also celebrate our successes!

Fiscal year 2011 saw many exciting changes in the college. The college’s FY11 enrollment grew on both ends of the spectrum with a notable 30% increase in the size of the freshman class and a 25% increase in the total number of Ph.D. students. This was marked by a simultaneous increase in quality with incoming engineering freshmen having an average high school GPA of 4.0 and a math ACT of 30.0, and increases in both our freshman retention and four and six-year graduation rates. The state has provided an opportunity for the university and college to provide raises for staff and faculty for the first time in three years, and we were able to make substantial progress in that area for the coming year.

The college’s research funding, as measured by external research expenditures, increased by about 23% this year compared to FY10, and the college leads the university in the number and value of research awards—which have allowed us to increase our graduate student enrollment. The increase in our student enrollment has presented and will continue to present challenges.

Space issues will be eased to some extent as the new Min H. Kao Electrical Engineering and Computer Science Building comes on line in late October 2011, and with the initiation of construction of the new John Tickle Engineering Building in August 2011 (estimated completion in approximately 20 months from that date—the Tickle building is seen through the window in the photo). We recognize the need for growth in engineering graduates who will enter the profession and help our country’s economic and technological progress, and we thank our faculty, staff, students, alumni and other friends of the college who have and will continue to help us as we grow in enrollment and graduates, and as we continue to increase the quality of our programs.
Emmabeth Parrish, a senior in the Department of Materials Science and Engineering (MSE), grew up in Knoxville, where she said the environment heavily shaped her educational pursuits. “Education was always a high priority with both my parents and siblings,” Parrish said. “My father is an electrical engineer and my mother is a high school biology teacher.”

But it wasn’t until she played with diapers, silly putty and shopping bags during “Polymer Week” in high school chemistry class that she decided to pursue polymer engineering. Parrish said this path was one where she could best use her talents and interests.

A few months before coming to the University of Tennessee, Parrish applied for an internship at Oak Ridge National Laboratory (ORNL) and received the opportunity to work in a tensile testing and fatigue facility. One of the main aspects of her job was to obtain and analyze stress strain curves for metals at high strain rates. Parrish said the enjoyment she received from this work is what solidified her decision to pursue a degree in materials science and engineering.

Pursuing Work Worthy of Effort

Her decision to come to UT stemmed from a tour of the MSE department. “Three current students were there for me to ask questions,” Parrish said. “I was impressed with how much these students loved their major and how dedicated the faculty was both to research and most importantly, the students.”

And now Parrish is one of those students who loves her major and specifically, her concentration in biomaterials. “Biomaterials research actually helps people,” Parrish said. “I want to pursue something that I feel deserves effort.”

In 2010, Parrish was a research assistant for Dr. Wei He, a joint assistant professor in the MSE department and the Department of Mechanical, Aerospace and Biomedical Engineering (MABE). She was working on a project that used chitosan and agarose gel for cell regeneration. The overall goal was to produce a hydrogel that could be placed in places of trauma in the brain. Parrish counted fluorescent cells, mixed solutions and obtained brain cells from chicken eggs.

Overall, the experience was very rewarding and enjoyable,” Parrish said.

Parrish is the fundraising chair for Tau Beta Pi and a member of the Society of Women Engineers. She is also involved in Engineers Day, the college’s nearly 100-year tradition that allows university students and faculty to spend time interacting with hundreds of potential engineering students from high schools across the region. She has aided in both the egg drop competition and the quiz bowl.

“The day is really effective in promoting engineering as a whole and showing different areas for students to pursue,” Parrish said.

Parrish is the recipient of the Raymond A. Buchanan Outstanding Junior Award, the Materials Science and Engineering Departmental Scholarship and has made the dean’s list since her first semester at UT. In fact, she has maintained a 4.0 GPA.

“I have not missed a class since my freshman year,” Parrish said. “I try to study adequately for each test. So overall, my work ethic has been most helpful. I know my goals and what I am capable of.”

Looking ahead to the not-so-distant future, Parrish will graduate in May 2012 and plans to attend graduate school for both her M.S. and Ph.D. degrees. After that, she would like to work in the industry until an opportunity arises for her to teach.

“Teaching and doing research at a university or teaching upper level mathematics and science classes at a high school are jobs I can see myself doing.”

Outstanding Undergraduate Student Emmabeth Parrish

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Steven Coley has always had an interest in math and science, so engineering was an easy choice for him when he was making a decision about his college education. After he graduated from the University of Tennessee with a B.S. in mechanical engineering in 2010, he became increasingly interested not only in the science and design behind engineering problems, but also in determining good solutions to problems and helping to make an impact in the real world.

His current position is an ideal fit. Coley, a graduate student pursuing a dual M.S./M.B.A. degree in mechanical engineering, is the lead graduate student and project engineer for an interdisciplinary project called Living Light.

Coley's involvement with Living Light’s house for the Solar Decathlon competition (shown in the photo) includes leading and coordinating its engineering design. In the 2010-2011 academic year, he led a team of 20 undergraduate seniors through their capstone design class that involved designing and analyzing the technical systems of the house. He was in charge of coordinating project deadlines and deliverables between mechanical and electrical engineering students and the other disciplines involved, including architecture, business, graphic design and interior design.

Coley said his experience with Living Light has been unique.

“This is the most rewarding and fulfilling experience I have had in my entire education,” Coley said. “Having a lead role in an interdisciplinary project of this scale has been an invaluable experience in learning how to communicate between disciplines and work through not only engineering problems, but problems on which each discipline has a different perspective.”

After Coley graduates in December 2012, he would like to find a job in the building industry within a wide range of areas—energy model or commercialization and product development of energy-related technologies. His graduate coursework has put him on the right path to fulfilling his goals.

“My coursework in the Department of Mechanical, Aerospace and Biomedical Engineering (MABE) has been an extremely useful resource to me in pursuing my career interests in engineering and business,” Coley said. “I have learned about sustainable energy production technologies, pros and cons of each technology and the difficulties associated with getting a product to market. The courses have also increased my technical understanding of thermal systems and have helped me understand the complexities of the science behind whole building energy modeling.”

Coley interned with ORNL in its Building Technology and Integration Center, where he developed EnergyPlus models for two of the Zero Energy Building Research Alliance homes and helped define important modeling parameters and data acquisition techniques to achieve research goals. He also analyzed field data in comparison to EnergyPlus simulation results.

Coley is also a teaching assistant for ME 345, Instrumentation and Measurements.

“Teaching ME 345 has been a great experience,” Coley said. “I enjoy helping students learn the importance of instrumentation and measurement in engineering application.”

Before Coley graduates, he hopes to gain a better understanding of interdisciplinary design and the fundamental building sciences so he can apply this knowledge in practice and do his part to help solve problems related to the world’s energy concerns.
IIE Student Gains
Glorer and Parker were then featured on four episodes of mtvU's "Glovin and Parker" and were invited to four events including the Final Pitch Competition of Entrepreneurial Growth at the UT Research Foundation and the Vol Court Pitch Competition, a joint event among the UT Research Foundation, the College of Engineering, and the UT Anderson Center for Entrepreneurship. As the first UT Research Foundation place winner, HowsTheLiving.com received a $10,000 business development grant to further develop their company. Additionally, HowsTheLiving.com was awarded the grand prize of $25,000 to further grow their online community. Glorers' most recent venture includes interning at Google in the summer of 2011. He worked in the Media and Platform Solutions department and with the display advertising arm where the company helps implement large media advertising campaigns for clients.

The internship had some perks, too, according to Glorers, who included taking planes to travel from floor to floor. "But despite those perks, Google culture place a huge emphasis on maximum performance," Glorers said. "The people are always building products and services that change millions of lives and that change the world. But they do it having fun." Glorers was granted an opportunity for Glover to attend the Finned Retreat and the Enterprise Development Program played a large role in Glover's success. In the spring of 2010, Glover enrolled in Engineering Fundamentals 130: Survey of Technology Business Center for one year, one year of engineering from Technology, 2010, 5 hours each, attending a course called "Glovin and Parker" and receiving a scholarship from Miller & Martin, LLC.

In his junior year, he decided to add Computer Science (B.S.) to his resume. While he's still able to add quite a few awards, too. He is at it again with new prizes and awards, too. He is at it again with new prizes and awards, too. But it didn't stop there for these two. Tennessee Technology Development Corporation (TDDC) awarded a $15,000 business development grant to Glorers and Parker at the Venture Showcase competition during the Tennessee NSTD 2011 Conference held in Nashville, Tenn., on May 5, 2011. They used their winnings to put together a new and improved website in May 2011. A more robust version will be released in a few months. Glorers credits his engineering background for much of his success. One of the cornerstones of an engineering education is a solid critical thinking and analytical foundation. "Glorer and I both possess the ability to dissect, synthesize, and to think through complex strategies. My industrial engineering education has helped me with this, and it also gave me glimpses of all the technical and business sides, which is always helpful in a creating and growing an Internet start-up company," Glorers said. The College of Engineering's Entrepreneurship Program played a large role in Glorers' success. In the spring of 2010, Glover enrolled in Engineering Fundamentals 130: Survey of Technology Entrepreneurship in this class, as opposed to many of the web start-up entrepreneurs, and he got the chance to hear first-hand their experiences. First-hand From Glorers. He attended several events in the UT Research Foundation, the UT Anderson Center, and the UT College of Engineering. Glorers credits this valuable resource and mentor throughout the process.

The total package was valued at $23,000. It all started when Glover studied abroad in Spain in the summer of 2006. I lived with a host family for nearly two months, and after that, I realized that there was nothing like gaining depth, student-generated feedback on this family before moving in with them. Glorers said. "I tied my finely on broad-based information as a company that paired with the family." In January 2010, six months after arriving in the U.S., Aeron Parker, a junior in the College of Business, started setting the business plan for HowsTheLiving.com, a website that allows students, parents, and housing administrators to collaborate on student housing. It also allows users to post residence hall events and comes with mobile apps and a suite of other features.

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The year 2011 was a busy one for diversity activities at the UT College of Engineering (COE) as the university celebrated 50 years of African-American achievement.

On April 18, 2011, the university hosted its first Tennessee Louis Stokes Alliance for Minority Participation (TLSAMP) Awards Banquet at the UT Visitors Center. Travis Griffin, director of the Engineering Diversity Office, and his staff coordinated the event.

TLSAMP’s goal is to increase the enrollment and graduation rate of underrepresented ethnic minority students (Hispanic, African-American, American-Indian, Alaskan Native and Pacific Islander) in science, technology, engineering and mathematics (STEM) by at least 100 percent at the end of a five-year period.

Dr. Wayne Davis, Dean of the College of Engineering (COE), and Charles and Annazette Houston, representatives from the UT 50th Anniversary for African-American Achievement celebration, welcomed guests and participants. Students, faculty, administrators and guests were recognized for their exceptional involvement in the TLSAMP program.

Dr. Howard G. Adams, former Executive Director for the National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc. (GEM), was the evening’s guest speaker. Adams is the Founder and President of H.G. Adams & Associates, Inc., a Norfolk, Va., based consulting company that provides human development services and products to educational, governmental and industrial organizations.

The program included recognition of faculty and students receiving special honors from TLSAMP, the Society of Hispanic Professional Engineers (SHPE) and the National Society of Black Engineers (NSBE). A slideshow was also featured during dinner of TLSAMP, SHPE and NSBE activities that took place throughout the school year.

Dr. Lonnie Sharpe, Executive Director for the TLSAMP program, made the closing remarks.

The COE and Fisk University, a historically black educational institution in Nashville, Tenn., formalized a dual-degree program agreement on May 23, 2011. Dean Wayne Davis and former U.S. Secretary of Energy and Fisk President Hazel O’Leary signed the agreement, which offers students a bachelor of science degree from Fisk and a bachelor of science from UT-K. Participants will spend 3-4 years at Fisk and then complete the requirements for an engineering degree at UT. Both the engineering college and Fisk will assign liaison officers to supervise the program. The agreement will be evaluated after a five-year period to determine if any changes are necessary.

The COE’s outreach efforts to underrepresented students began with the Minority Engineering Scholarship Program (MESP), which was initiated in 1973, under the direction of Mr. Fred Brown. Since that time, the diversity program has expanded and has graduated more than 900 students, due in large part to the college’s success in recruiting, retaining and graduating underrepresented engineering students.

The COE’s Diversity Update TLSAMP Awards Banquet, Dual-degree Program are Year’s Highlights

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Dr. Howard G. Adams (left), former Executive Director for the National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc. (GEM), accepts a plaque commemorating his role as keynote speaker for the TLSAMP Awards Banquet from Mona King (center) and Dr. Lonnie Sharpe (right), Executive Director for the TLSAMP program.

Fisk University President Hazel O’Leary and UT COE Dean Wayne Davis are sign the dual engineering degree program agreement.

Dr. Howard G. Adams (left), former Executive Director for the National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc. (GEM), accepts a plaque commemorating his role as keynote speaker for the TLSAMP Awards Banquet from Mona King (center) and Dr. Lonnie Sharpe (right), Executive Director for the TLSAMP program.

Fisk University and UT COE officials at the signing of the dual engineering degree program agreement (left to right): Fisk University’s Dean of Academic and Student Affairs Musa Woodard; UT COE Dean Wayne Davis; President of Fisk and former U.S. Secretary of Energy Hazel O’Leary; Fisk Vice President for Academic Affairs Armeda Burger;melon of Physics’ Steve Morgan; and Fisk Interim Executive Vice President and Provost Pricilla Evans Morris.
The Center for Interdisciplinary Research and Graduate Education (CIRE)

In January of 2010, the Tennessee State Legislature authorized the university to establish an academic unit (UT Knoxville Graduate and Undergraduate Education) in collaboration with Oak Ridge National Laboratory (ORNL). This Center for Interdisciplinary Research and Graduate Education (CIRE) was established with $1.2 million in one-time funding provided through a one-time commitment from then-Governor Phil Bredesen to the university.

CIRE combines the educational resources of the state’s largest flagship institution with the research capabilities of the Department of Energy’s leading science and energy laboratories, providing expanded opportunities for graduate students in energy-related sciences and engineering.

The center aims to add 10-40 full-time graduate students each year, moving the university closer to its goal of becoming a Top 25 research institution.

Dr. Lee Riedinger, a professor in the Department of Physics and ORNL’s former deputy director for science and technology, is one of the first interdisciplinary doctoral program in energy science and engineering (ESE). Students will be able to specialize in nuclear energy, bioenergy and biofuels, renewable energy, energy conversion and storage, distributed energy and grid management and environmental and climate sciences related to energy.

The newly created UTK-ORNL Distinguished Graduate Fellowship Program, in which students may pursue existing doctoral programs with concentrations in computational sciences and engineering, materials science and engineering, and nuclear science and engineering, is also a component of CIRE.

The overarching goal of CIRE is to engage these extremely talented young people to attack some of the crucial energy problems around the country. That’s a very serious goal that our university needs to work on to become one of the leading institutions on those energy challenges. That’s one goal for the good of the country,” Riedinger said. “For the university it’s also another way to do better recruiting the best people,” Riedinger said.

Riedinger is delighted with the energy created by the multidisciplinary program. “I had actually been interested in the problem of materials for, say, comparison between different research groups around the country at different locations. As it turned out I wasn’t planning on going for my Ph.D until next year, but once I found out about the CIRE program, I started talking to the right people, and things sort of went from there,” Riedinger said. “I think there’s a lot of great research going on at Oak Ridge, so that really what drew me in. One of the really good aspects of this program is that it has an entrepreneurial focus, so you have the option of pursuing research at a national laboratory which is really great, but then there’s also the possibility of your research resulting in some sort of a breakthrough technology which you can then form and a company around it.”

CIRE students also see the program as major support for their future career goals. “What I plan on doing with my career is I’d like to get my Ph.D and then spend some time working at a national lab, preferably ORNL, and eventually I’d like to come back and teach and do some research groups around the country at different locations,” Riedinger commented. “We had out first class of the center and I was impressed to see a core of people from physics backgrounds and biology backgrounds were talking to each other and getting to know each other. That was the power of this interdisciplinary program that we want to happen. That was just inspiring to me. The response has been excellent. Riedinger adds that the aim is aimed at how well the program is already working.

“After the students have been engaged in choosing courses, talking to faculty and taking to each other, I am encouraged by the beginning of this life bringing together the best people,” Riedinger said.

“My research interest is climate science, and that is by no means interdisciplinary because in not just the atmosphere, it’s not just the land, it’s not just energy, putting things into the atmosphere. It’s all of that combined,” commented CIRE student Melissa Allen. “I really take a good look at climate, you have to take an interdisciplinary approach, and that’s what this program helps me to do.”
The College of Engineering (COE) continued to move forward with design and construction on two new buildings and a related research facility in 2010-2011.

The Min H. Kao Electrical Engineering and Computer Science Building is expected to be substantially complete and will be commissioned by the middle of October 2011. Progress Continues on Buildings At that point, the contractor will return the building to the university, so that the faculty, students and staff from the department will begin to move into the facility. By January 2, 2012, the Department of Electrical Engineering and Computer Science (EECS) research programs, academic functions and administration will have moved into the six buildings that they currently occupy. A dedication ceremony for the building will take place in the spring of 2012.

Plans were finalized, project bids and the construction work was awarded for the John D. Tickle Engineering Building by July 2011. On July 28, the construction site was occupied, and site preparation began. Please view progress at http://www.engr.utk.edu/tickle/webcam.html and learn more about the project at http://www.engr.utk.edu/tickle.html. The facility, which will house the Departments of Civil and Environmental Engineering (CEE) and Industrial and Information Engineering (IIE), is scheduled to be substantially complete in 24 months by August 2013.

Facilities Progress Continues on Buildings

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Progress continues on the design stage for the Joint Institute for Advanced Materials (JIAM) building, which will be constructed on the university’s Cherokee Campus. The design plan is currently undergoing review by the state fire marshal’s office and if the approval phase goes smoothly, construction should start in early 2012. Plans for updated labs in the Dougherty Engineering Building, which received a $1.8 million National Science Foundation (NSF) grant in late 2010 for the renovations, are going forward, and completion of the project is currently scheduled for early 2013. The majority of the labs will be designed to focus on research related to energy storage, with seven COE faculty members involved in the planning stages.

The college will also benefit from added space in Senter Hall, the former White Avenue Biological Annex, which will provide six research labs for faculty members who need temporary lab space while their permanent lab space is being prepared. The building primarily acts as limited-duration surge space for new hires and research programs and provides surge space for both the COE and the College of Arts and Sciences. A key exception is about 20% of the space that provides a permanent location for the world-class ion-beam/radiation defects facility of Dr. William McBride, Governor Chair in Materials Science, and his colleagues at both UTK and Oak Ridge National Laboratory (ORNL).
The UT College of Engineering (COE) has received a five-year, $18 million award from the National Science Foundation (NSF) and the U.S. Department of Energy (DOE) to establish an NSF Engineering Research Center (ERC) focused on research, education and technology for sustainable energy systems with an emphasis on power transmission systems. This is the first time the university has been designated to lead an ERC and the first time an ERC will address power transmission systems. The NSF ERC is historically the most prestigious award given to a university industry team. The new center, called CURENT (Center for Ultra-wide-area Resilient Electric Energy Transmission Networks), involves a consortium of academia, industry and national laboratories. CURENT will play a central role in President Barack Obama's goal to overhaul the nation's power grid. The president outlined a framework to take America's early-twentieth-century power system into the twenty-first century through cutting-edge research. The NSF and DOE have partnered to address the nation's critical need to develop a smart grid, and CURENT will play a leading role in this initiative.

Dr. Kevin Tomsovic, head of UT’s Department of Electrical Engineering and Computer Science, will direct CURENT and Yilu Liu, Governor’s Chair for Electrical Engineering and Computer Science, will serve as co-director. The country’s electrical grid has chronically been overstretched, manifesting itself in costly and inconvenient blackouts. Since 1982, an increase in peak demand for electricity has exceeded transmission growth by almost 25 percent, according to the DOE. As the nation’s population grows, this overload is expected to worsen. CURENT seeks to solve this problem by focusing its technologies and methods to operate the power grid efficiently and reliably over long distances.

“Using wide-area synchronized measurements, large-scale computer simulations, and hardware testbeds that represent the major US power grids, we will seek fundamental breakthroughs and investigate the enabling technologies needed to achieve a resilient transmission network on a continental scale,” Tomsovic said.

CURENT engineers’ contributions will have a positive environmental impact. The center’s innovations will enable a global shift away from fossil fuels by facilitating higher levels of renewable energy resources within electric grids. To consumers, it means green, sustainable and reliable power. CURENT is also focusing on the future workforce by educating a new generation of energy leaders from diverse backgrounds with a global perspective. The educational mission encompasses developing a global interdisciplinary program that benefits graduate, undergraduate and pre-college students.

CURENT will be housed in the COE’s new Min H. Kao Electrical Engineering and Computer Science Building.

Over forty companies support CURENT, including electric power utilities, manufacturers, consulting firms and national laboratories, such as Oak Ridge National Laboratory. Former academic institutions include Northwestern University, Rensselaer Polytechnic Institute, Tufts University, Tsinghua (China) University, the University of Waterloo (Canada) and the National Technical University of Athens (Greece). CURENT has the potential for continued NSF–DOE funding of $4-5 million dollars per year over the next 10 years.

“The confidence placed in us by NSF and DOE puts UT at the center of everyone who is doing research in this area,” Tomsovic said. “This immediately opens up even greater opportunities for the center. We’re already being contacted by industry and research institutions that want to be associated with CURENT.”

For more information about CURENT, visit http://curent.utk.edu/
for discovery, innovation and overall competitiveness and to advance science and technology throughout the United States. EPSCoR’s (NSF) in its efforts to strengthen research is to assist the National Science Foundation Competitive Research (EPSCoR) program was established by the Experimental Program to Stimulate Competitive Research (EPSCoR) in 1992. The overall theme of the TN-SCORE was aimed at increasing Tennessee’s research capacity. It was a collaborative effort involving researchers from across Tennessee, including universities, colleges, and national laboratories. The program’s goal was to improve the competitiveness of Tennessee’s research infrastructure and to develop new technologies, products, and services. The overall theme of the TN-SCORE was designed to increase the state’s research capacity, improve the competitiveness of Tennessee’s research infrastructure, and develop new technologies, products, and services.

When a previous effort to attain EPSCoR success was unsuccessful, Zawodzinski led efforts to augment the research focus with a battery and fuel cell thrust. Leaders of Thrust 1 were Barry Brunson from the State Energy office and Center Department of Biochemistry and Cellular and Molecular Biology. UTK participants in the solar conversion thrust were engineering, and many collaborators from other higher-learning institutions, and universities. The overall goal of the State Economic Development Office was to improve the efficiency and sustainability of solar cells.

Tennessee Solar Conversion and Storage using Outreach, Research and Education (TN-SCORE) aimed to increase statewide resources, provide opportunities for students and faculty that might otherwise not be available, and provide research development approach designed to enhance the state’s research capacity. The overall goal of EPSCoR is to increase the state’s research capacity, improve the competitiveness of Tennessee’s research infrastructure, and develop new technologies, products, and services. EPSCoR districts are defined as states that compete for federal research grants. However, the educational institutions must compete as a school-state block for the funding. In October of 2010, the Tennessee State EPSCoR partnership officially received a grant for a proposal submitted by the University of Tennessee System, the Tennessee Board of Regents, Vanderbilt University, and the Tennessee Independent Colleges and Universities Association. The overall goal was to improve the competitive standing of Tennessee Science, Technology, Engineering and Mathematics (STEM) outreach programs, and providing opportunities for students and faculty that might otherwise not be available. The overall theme of the TN-SCORE was aimed at increasing Tennessee’s research capacity. It was a collaborative effort involving researchers from across Tennessee, including universities, colleges, and national laboratories. The program’s goal was to improve the competitiveness of Tennessee’s research infrastructure and to develop new technologies, products, and services.
**Dr. Wei He**

Dr. Wei He, a joint assistant professor in the University of Tennessee’s Department of Materials Science and Engineering and the Department of Mechanical, Aerospace and Biomedical Engineering, is the recipient of the National Science Foundation’s (NSF) Faculty Early Career Development (CAREER) Award for her project “Immunologically Responsive Therapeutic Biomaterials to Modulate Wound Healing in the Nervous Systems.” The award is effective from August 1, 2011, through July 31, 2016.

Dr. He’s research focuses on the interface of materials and biological systems, particularly the nervous system where implantable biomaterials and biological systems, particularly the nervous system where implantable biomaterials and biological systems, particularly the nervous system where implantable biomaterials and biological systems, particularly the nervous system where implantable biomaterials and biological systems, particularly the nervous system where implantable biomaterials and biological systems, particularly the nervous system where implantable biomaterials and biological systems, particularly. This area is recognized as an essential component to build a firm foundation for a lifetime of leadership in integrating education and research. The College of Engineering is pleased to announce that two young faculty members recently received NSF CAREER Awards.

**Dr. Chris Cherry**

Dr. Christopher R. Cherry, an assistant professor in the University of Tennessee’s Department of Civil and Environmental Engineering (CEE), is the recipient of a National Science Foundation (NSF) Faculty Early Career Development (CAREER) Award for his project “Immuno-dynamically Responsive Therapeutic Biomaterials to Modulate Wound Healing in the Nervous Systems.” The award is effective beginning April 1, 2011, through March 31, 2016. Dr. Cherry received his B.S. and M.S. degrees in civil engineering from the University of Arizona and his Ph.D. from the University of California, Berkeley. He joined the UT College of Engineering as a faculty member in 2007.

Dr. Cherry received his B.S. degree in chemistry from Tsinghua University in China. He received his Ph.D. from the University of Connecticut, and his thesis research sparked his interest in the biomedical engineering field. He held a post-doctoral position at Georgia Institute of Technology, where he advanced research in the field of neural engineering, particularly on brain-machine interfaces and neural regeneration. In 2004, he accepted a senior fellowship position at the University of Washington in Seattle to develop new materials for tissue engineering. Shortly thereafter, he joined the UT College of Engineering faculty.

“The CAREER Award will allow me to further advance the design and development of therapeutic biomaterials, understand their interactions with cells responsible for the immune-defense against invading biomaterial implants and explore their potential in managing the surrounding healing response around medical implants such as neural electrodes,” he said. He also sees the funding as a way to support outreach. “In general, funding is required to support graduate and undergraduate students in research, particularly women and minority students. Outreach activities of the project will include hosting high school students and science teachers by developing a new summer biomaterials program, and engaging participants of the annual Materials Camp at UTK with a hands-on biomaterials lab module.”

Dr. Cherry has been exploring behavioral and environmental issues related to electric bikes, scooters and larger electric vehicles in his research. In an article published in 2015, “Electric Two-Wheelers in China: Promise, Progress and Potential,” he discussed the growth of electrical two-wheelers that has increased substantially in the last decade. Cherry is also developing new bioactive materials for orthopedic applications. He received his B.S. degree in chemistry from Tsinghua University in China. He received his Ph.D. from the University of Connecticut, and his thesis research sparked his interest in the biomedical engineering field. He held a post-doctoral position at Georgia Institute of Technology, where he advanced research in the field of neural engineering, particularly on brain-machine interfaces and neural regeneration. In 2004, he accepted a senior fellowship position at the University of Washington in Seattle to develop new materials for tissue engineering. Shortly thereafter, he joined the UT College of Engineering faculty.

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“The CAREER will assist in my research by providing the opportunity for myself and my students to conduct field work in China, collecting and modeling data on travel behavior and environmental impacts in the transportation sector.” Cherry said. “This award will also cement long-term collaborations with colleagues at Tsinghua University.”

Cherry received his B.S. degree in civil engineering from the University of Arizona and his Ph.D. from the University of California, Berkeley. He joined the UT College of Engineering as a faculty member in 2007.

Cherry received a 2009 Faculty Environmental Leadership Award from the university for his demonstration of strong and continuing commitment to environmental stewardship on campus. Cherry plans to use the CAREER funding to support his ongoing efforts towards educating others about sustainability.

“Thank you to the award to support graduate students travel and data collection. I also intend to use the funding to develop educational materials to increase the amount of sustainability related topics teach in CEE and at 4-12 opportunities.” Cherry added.

The CAREER program is a foundation-wide activity that offers the NSF’s most prestigious awards in support of junior faculty who exemplify the role of teacher-scholar through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations. This area is recognized as a crucial component to build a firm foundation for a lifetime of leadership in engineering and research. The College of Engineering is pleased to announce that two young faculty members recently received NSF CAREER Awards.
The College of Engineering Research Fellow Awards are presented to faculty members with an exceptional record of research activity, whose efforts clearly contribute to the overall mission of the college. The awards were established to recognize and reward superior research.

Dr. Mongi Abidi, Professor, Electrical Engineering & Computer Science
Abidi(212,494),(349,920) has research areas including image processing, robotics, artificial intelligence, multi-sensor integration and data fusion.

Dr. Hahn Choo, Associate Professor, Materials Science & Engineering
Choo’s research areas include mechanical behavior of materials, neutron diffraction, amorphous and alloys.

The College of Engineering Fellows 2011
The COE Teaching Fellow Awards are presented to faculty members who possess an exceptional record of graduate and undergraduate teaching and a strong performance in teaching-related service activities and whose efforts clearly contribute to the overall mission of the college. The awards were established to reward superior teaching.

Dr. John Landes, Professor, Mechanical, Aerospace & Biomedical Engineering

Dr. Ben Balick, Associate Professor, Electrical Engineering & Computer Science

College of Engineering Teaching Fellows 2011

Dr. Gerd Duscher, Associate Professor, Materials Science & Engineering
Duscher’s research interests include interface science and analytical transmission electron microscopy.

Dr. Aly Fathy, Professor, Electrical Engineering & Computer Science
Fathy’s research areas involve electromagnetic, antennas, microwave, wireless and Usable Bandwidth.

Dr. Jason Hayward, Assistant Professor, Nuclear Engineering
Hayward’s research areas include radiation detection and measurement, radiation non-proliferation and medical and health physics.

Dr. Ramki Kalyanaraman, Associate Professor, Chemical & Biomolecular Engineering and Materials Science & Engineering
Kalyanaraman’s research areas involve phase transformation and self-organization, energetic beam processing, thin film growth and characterization, and functional micro/nanocomposites.

Dr. Mohamed Mahfouz, Associate Professor, Mechanical, Aerospace & Biomedical Engineering
Mahfouz’s research areas include musculoskeletal mechanics, orthopedics, and medical imaging.

Dr. Stephen Feddison, Associate Professor, Chemical & Biomolecular Engineering
Feddison’s research interests include computational materials science as applied to fuel cell electrolytes and electrocatalysts and sustainable energy.

Dr. Mingjun Zhang, Associate Professor, Chemical, Aerospace & Biomedical Engineering
Zhang’s research areas include nanobiosystems, nanoparticles for drug delivery, cell motility and inspired robotics.

Dr. John Landes (left) and Dr. Ben Balick (right) receive their Teaching Fellow Awards at the 2011 COE Faculty & Staff Awards Dinner.

College of Engineering Fellows 2011

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College of Engineering Teaching Fellows 2011

The COE Teaching Fellow Awards are presented to faculty members who possess an exceptional record of graduate and undergraduate teaching and a strong performance in teaching-related service activities and whose efforts clearly contribute to the overall mission of the college. The awards were established to reward superior teaching.
they have emerged,” Mench said. “We started the program to cover important new areas as very grateful that my program manager at over the years to include many things. I am “The work for this grant has really evolved through this year, and it has had a very positive effect on his research. Award (CAREER) in 2007. The award runs Foundation (NSF) Early Career Development Mench received a National Science the COE faculty in 2010. “It will also feature open access through large systems like fuel cells and flow batteries. The has the basic ingredients to become a top 25 research university. In the future, I want to look back at the engineering program and ask UTK as a whole and know that I helped the university, to reach its goals.”
As College of Engineering (COE) faculty members did not have enough to do—including teaching classes, working on research projects and composing journal articles—several ambitious professors have taken on another task and have written and published textbooks.

Engineering professors who have authored textbooks include:

Dr. Hal Icove, professor in the Department of Industrial and Information Engineering (EECS), the 4th and 5th editions of Engineering and Computer Science published by Prentice-Hall.

Dr. Paul Crilly, associate professor of Force–Managing for Excellence, Sustainability and Quality: A Corporate Quality Department of Industrial and Dr. Hal Aikens, professor in the authored textbooks include:

Dr. Takeshi Egami, professor in the Structural Analysis of Complex Materials, with S.J.L. Billinge, published by McGraw-Hill.

Dr. Mike Roberts, professor in the Department of Nuclear Engineering published by Pergamon Press.

Dr. Alberto Garcia, professor in the IIE Department of Industrial and Information Engineering (EECS), the 7th edition Kirk’s Fire Investigation, is the leading and most of the EECS department, the 7th edition of Genetic Algorithm: Foundations and Machine Vision with W.E. Snyder, published by 


Dr. Alexey L. Lastovetsky, published by Wiley Publishing.

Dr. J. Wesley Hines, professor in the Department of Nuclear Engineering and Neural Approaches to Engineering published by Prentice-Hall.

Dr. Albert Garcia, professor in the Department of Materials Science and Engineering, co-authored by one of my former students who is now a professor, and Roberts commented. “I also wrote a book to explain details of this process of organizing the theory and found very satisfying. There is no better way to have a subject than to write a book about it.”

“My textbook goals turned out to be too ambitious for a single textbook, so I authored two book series,” Aikens said. “The first book Quality A Corporate Force–Managing for Excellence’s intended to provide a guide to stop management on how use quality principles to build and implement corporate strategy. The second, and most recent, in the series, Quality Integrated Management: The Key to Sustainability, gets more into engineering and design details, and creates corporate leaders to develop and operate competitive sustainable organizations that can really adapt to change.”

All of the faculty authors agree that finding time to work on the project and going through the editorial process can be very difficult.

“Although I am not working on a new book right now, I expect to do so eventually,” Vose said. “One thing that is difficult is finding time where I have to say, well, I need more time to say it right.”

“Despite the problems, most of the faculty authors agreed that they found it very satisfying. There is no other way to learn a subject than to write a book about it.”

“One difficulty in writing a textbook is dealing with the review process from faculty members in other universities,” Roberts said. “Sometimes the reviewers make valid criticisms, and that can lead the author to improve his book. But other times, the reviewers do not agree with each other on major points, and the author must decide to please one reviewer while displeasing another. Sometimes the author must decide to write the book the way he thinks is best despite reviewer criticism. No one can write a book that all potential adopters will like. After all, no one can try to interest his market.”

“Here’s an insight for others who want to author other textbooks in the future.”

“Always be involved in research, so finding time is not a problem for me. The key is finding time to write a book right now, I expect to do so eventually.” Vose said. “One thing that is difficult is finding time where I have to say, well, I need more time to say it right.”

“Despite the problems, most of the faculty authors agreed that they found it very satisfying. There is no other way to learn a subject than to write a book about it.”

“I have published three textbooks and have three more in preparation—although I have the copyright. I went to gain greater acceptance of applied research in a format that will demonstrate our leadership the role in the area of forensic fire and explosion investigation.”

“I developed a new technique of studying the atomic structure in disordered crystals, and needed a book to explain details of this technique and demonstrate its power so it would be widely used,” Egami said. “My book is not a textbook on a general topic, but is focused on one subject.”

Roberts wanted to author a book that was an improvement on current textbooks in the field of research.

“Wrote a textbook before I had accumulated a large collection of courses in my field. English and Spanish, and then thought my organization of the materials would be superior to the books I had read,” Roberts commented. “I also wrote the book because I completed the process of organizing the theory and

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“A new textbook for my class that reflected the learning outcomes,” Crilly said.

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Faculty-led Study Abroad

The first of three new developments in COE faculty-led study abroad trips to London and Austria in the summer of 2012. Students will have the chance to take part in a computer science course. Theory of Computation, an intro to the life of Alan Turing, which will be taught in London and Cambridge by Dr. Michael Berry, professor in the Department of Electrical Engineering and Computer Science (EECS). This course will feature trips to computer and university sites: the birthplace of Turing, a highly influential computer science genius. The second trip allows students to take part in a mechanical engineering course, Thermodynamics, and an electrical engineering course, Electromechanical Components. These courses will be taught in London by Dr. Roger Parsons, the director of COE Outreach. For more information, visit www.engr.utk.edu/grandchallenge.html.

VolsTeach

The COE has joined the VolsTeach program, which was established in the College of Arts and Sciences to serve students who are interested in using their academic talents and accomplishments to educate the nation’s high school students in science and math. For the first time, engineering students can work toward a secondary education teaching certificate along with their engineering degree. More information can be found at http://vols teach.utk.edu.

Dougherty Award Winner

COE Alumnus Dr. Terry Douglass

Dr. Terry Douglas, President of Provision Healthcare, LLC (http://www.provisionhealthcare.com) and President, Trust, and Chairman of the Board of Provision Foundation, Inc. (http://provisionfoundation.org) was named the 2011 Nathan W. Dougherty award recipient by the UT Knoxville College of Engineering at the college faculty and Staff Awards Dinner on April 7.

Douglass, an alumnus who received his B.S., M.S., and Ph.D. degrees in electrical engineering from the University of Tennessee, is the former Chairman of the Board of CTI Molecular Imaging Inc. (CTI), a public company that specializes in the development and distribution of products and services for the therapeutic and diagnostic imaging market from 1983 to 2001, when it was acquired by Siemens. Douglass also served as president and CEO of CTI from its formation in 1981 and 1993. Douglass was employed by EG&G Ortec from 1968 to 1983, and he served as president of the company during his last years of service.

During his years at CTI, Douglass played an integral role in the development and commercialization of polymer emission tomography (PET) technology, and was instrumental in the development of Medicare reimbursement for PET services.

The Provision primary initiative in healthcare is the development of a multi-discipline cancer care capability, named Provision Health Alliance at Dowell Springs, that will include proton therapy capacity and will allow to develop protocols and treatment modalities for cancer care. Currently, there are three proton therapy centers across the country.

Douglass focuses on the development of new innovations, comprehensive healthcare products and service solutions that will make major improvements in patient care, outcomes and value by establishing a health care provider model in which the patient is better served through physician and hospital system cooperation and partnership; offering an emphasis on personal wellness, choice and accountability through preventative, personalized, predictive and participative healthcare.

Douglass and the the UT and Provision entities have supported and partnered with both UT and the University Health Systems in many ways including research grants, faculty consulting agreements and student co-op programs. CTI established a $1 million endowment to initiate the CTI Biomedical Research Center at the UT Medical Center. In 2006, Douglass and the other CTI partners gave an additional gift of $1 million to the university to establish a new endowed chair in the Department of Electrical Engineering and Computer Science (EECS). All of the CTO’s remaining equity was reunited at the college’s Honors Banquet in recognition of Douglass, an alumnus who received his B.S., M.S., and Ph.D. degrees in electrical engineering from the University of Tennessee. Dr. Terry Douglass, president of Provision Healthcare (http://www.provisionhealthcare.com) and President, Trust, and Chairman of the Board of Provision Foundation (http://provisionfoundation.org) was named the 2011 Nathan W. Dougherty award recipient by the UT Knoxville College of Engineering at the college faculty and Staff Awards Dinner on April 7.
The very word invest conveys a sense of confidence in the future. It is forward-thinking and active. Investors put money on things that will have a positive return. The donors who invest in engineering education propel our vision to be recognized in the Top 25 public colleges of engineering in the country. The donors who invest with us understand that UTK engineering is preparing graduates to be leaders. They invest to accelerate our national reputation. They invest because they know it matters.

This investment giving can take many forms. Current gifts provide immediate capital. Endowments afford long-term security and strategic planning opportunities. Bequests provide future resources. In fiscal year 2011, the College of Engineering realized significant funds from bequests designated years ago that will resonate far into the future.

**Development Report**

Rihert Bight (BS/ME '36), who retired from Chrysler Corporation as Vice President, left a $500,000 bequest that will help equip labs for Mechanical Engineering. A significant lab will be named in his honor.

Dr. Richard Finner (cousin of Glenn Finner who taught engineering drawing at UT in the 1940s) provided over $250,000 for a scholarship endowment created by the Finner family in 1987 and a general excellence fund for the college.

John (BS/BA '38), former President & CEO of Ball Corporation, and Janice Fisher created faculty endowments for engineering during their lifetimes. Their joint estates gave $1,000,000 more in FY2011.

This year over $3 million has been documented in future bequests. Sixteen individuals (or couples), some with gifts large, some with gifts smaller but no less important, have provided for UT in their wills and documented these very simply with us. It is easy to see that advance planning will provide for professorships, departmental endowments, scholarships and general funds. Those are toward-thinking engineering graduates and heads of the college who realize that they can give more through these relations than they could during their lifetimes. During FY2011, annual giving to the College Fund and parallel engineering department funds grew by 25% from the previous fiscal year. While dollar figures have grown, the number of donors has remained constant for about five years with only 5% of engineering graduates making gifts to the college. This is puzzling when we know the correlation of an engineering education to career success. One of our fundraising challenges is to increase the number of alumni who give to engineering. We know you are problem-solvers by nature and education, so we welcome solutions from our engineering graduates and readers!

The Engineering Development Office is working to motivate each donor to feel excited about continuously giving. Every gift is an investment in engineering education, and investment giving makes a difference.

For information about giving to the College of Engineering or to offer suggestions about how to motivate more engineers to give, contact:

**Dorothy Barkley Bryson**  
Senior Director  
120 Perkins Hall  
Knoxville, Tennessee 37996  
865-974-2779  
engrdev@utk.edu
Ralph D. Heath (BS/EE ’70, MBA ’75), Executive Vice President of the Aeronautics Business Area for Lockheed Martin Corporation (LM), may have come to the field of engineering by chance, but his career choice turned out to be one of the best decisions he's ever made.

Heath, the son of a military family, was born at Walter Reed Army Hospital in Washington, D.C. Although the Heaths moved around quite a bit, they eventually settled in Bluff City, Tenn., where Heath graduated from the former Blountville High School (now part of Sullivan Central). He has called himself a native Tennessean ever since.

Heath entered the University of Tennessee (UTK) with the idea of pursuing a science major. As he began to think about career options, however, he happened to have a conversation with the head of the electrical engineering department, Dr. Pearce, who convinced him to join the program.

"It actually took a few days for everyone in the department to figure out exactly what courses I needed to take," Heath said. "I am probably one of the few engineers who took a foreign language and anthropology for elective courses!"

Heath enjoyed years at UT, although during the late 1960s many college campuses, including UT, were experiencing outbreaks of anti-war protests and other disturbances.

"The university provided a place of stability and a sense of direction," Heath commented. "Andy Holt was president at the time, and he helped to maintain an overall positive image and a sense of pride in UT."

After graduating with his bachelor’s degree in engineering, Heath, who had been a member of the campus ROTC, was commissioned as a lieutenant in the U.S. Army and served four years as an airborne ranger combat engineer. Along the way, he also earned a commercial pilot’s license, acquiring a love for airplanes and flight that would eventually provide him with the desire to fly for the rest of his career.

Heath returned to the university for his MBA degree and shortly afterward accepted a position with General Dynamics (GD) during the beginning of the F-16 aircraft development. Heath was a design engineer, working on avionic systems including radars and computers. The GD aeronautics division eventually became part of LM.

In subsequent years, Heath entered the management track and was involved with a wide range of projects, including flight test of the F-16 at Edwards Air Force Base, development of the F-22 stealth fighter and assignments in operations, business development, manufacturing and logistics. He was ultimately appointed as a corporate officer and Executive Vice President of the Aeronautics Business Area for Lockheed Martin in 2005. He has been with the company for more than 35 years.

"Even today, I draw upon the basics I learned way back in engineering school at UT," Heath said. "There are nearly 10,000 engineers in my organization now, and they all have the technical background I received in the basic sciences. I love interacting with our newest engineers who know how to use design tools that weren't even invented when I was in school. I guess I'm still an engineer at heart! Happily, the fundamentals never change; it is just how we apply them that does."}

Heath's company has responsibility for all of the aircraft that LM builds and is a $14 billion business with approximately 28,000 employees at nine locations and operations around the world. Key aircraft produced by LM include the F-22, F-16, C-130, C-5 and the newest addition, the F-35 Joint Strike Fighter. The organization’s world-renowned Skunk Works® operation in Palmdale, Calif., has been the pre-eminent seat of aerospace innovation for more than 50 years.

At this point in time, Heath likes his work and has no specific plans to retire. “I love this business, and even after this job, I will continue to be engaged in this industry that I enjoy so much,” Heath commented.

Heath and his wife, Janet, who is a registered dietitian and UTK grad ("and a die-hard Vol like me," Heath added) have been married for 35 years and have two adult daughters.

"I won't say it has been easy balancing a demanding career with the needs of my family, but if it weren’t for Janet and the girls, none of the rest would matter," Heath said. "I’m very lucky."
The College of Engineering is resolved to become one of the country’s top 25 public engineering educational institutions. To bring this vision to reality, our college is committed to these five charges:

Attaining national and international recognition among peer institutions for excellence in both research and teaching;

Assembling a dynamic body of faculty who exemplify excellence and innovation in the pursuit and delivery of knowledge and will perpetuate the highest standards of engineering education for future generations;

Graduating students who are well educated in technical knowledge, with solid communication and teamwork skills, who can compete successfully in the global business world and contribute significantly to the national base of engineering education and technology;

Investing strategically in the college’s most important resources — students, faculty and programs — through the vigorous acquisition of private gifts from individuals, corporations and foundations;

Partnering with academic, industrial and government entities that share and enhance the mission of the College of Engineering so that our educational and collaborative efforts result in the maximum, positive, economic impact locally, regionally, nationally and globally.