Opening new doors to young women

The College of Engineering and Natural Sciences regularly sponsors science, technology, engineering and mathematics (STEM) activities on campus and throughout the Tulsa community. Many of these initiatives specifically focus on attracting girls to STEM.

This summer, TU hosted the weeklong residential camp Tech Trek to educate eighth-grade girls about STEM fields and career opportunities. TU Annual Fund dollars helped make this event possible and regularly support similar events.

Join your alma mater’s campaign to reach these future scientists and engineers.

For more information on supporting the College of Engineering and Natural Sciences, please contact Natalie Adams, development director at 918-631-3514, or natalie-adams@utulsa.edu.

utulsa.edu/giving

The College of Engineering and Natural Sciences Homecoming Events

Friday, October 23, 2015

Chili Cook-Off
5:00-6:30 p.m., Samson Plaza
Near north entrances of Stephenson Hall and J. Newton Rayzor Hall, 3205 East 5th Place

Download contest rules and the official entry form at www.TUAlumni.com/homecoming under “schedule of events,” or pick up a copy in Keplinger Hall, Room 201. The deadline for chili cook-off entries is Tuesday, October 13. For more information, contact Dottie Smith at (918) 631-2478 or dottie-smith@utulsa.edu.

Keplinger Hall Renovation Tours
5:00-6:30 p.m., Keplinger Hall, 441 South Gary Avenue

Take a guided tour of the extensive remodel in Keplinger Hall, flagship home of the College of Engineering and Natural Sciences. Many thanks to those supporting this $34 million, multi-year project including a special group of chemical engineering alumni who have chosen to fund a classroom. Gifts and pledges can be mailed to The University of Tulsa, Attention: Natalie Adams, 800 South Tucker Drive, Tulsa, OK 74104.

On the cover: Women in STEM. Alumna Suzanne Dodson (BS ’02) and her daughters’ Girl Scout Brownie troop attend TU’s Brownie Day on April 11.
The University of Tulsa Mission

The mission of the University of Tulsa is to educate men and women of diverse backgrounds and cultures to become literate in the sciences, humanities and arts; think critically, and write and speak clearly; succeed in their professions and learn the responsibility of citizenship, service and leadership in a changing world; and acquire the skills and appetite for lifelong learning.

The University achieves its mission by educating men

The articles and news in this magazine remind me of how successful we are as an engineering and natural sciences college. Today’s students, just like those of yesterday, are outstanding examples of intelligence mixed with integrity. We have the best alumni who are willing to step up and contribute to their school in many ways including Keplinger Hall’s renovation, student travel and write and speak clearly; succeed in their professions and acquire the skills and appetite for lifelong learning.

This fall, we welcome some cream-of-the-crop faculty to campus, just as we have for many years. They are driven to develop research programs with undergraduates, help graduate students reach their highest potential and promote science and engineering education. This issue of the magazine highlights how widely diversity within our programs. We continually strive to make this a reality; and while we have much progress to make in other disciplines, we’re happy to report 80 percent of our chemical engineering faculty are female.

Also in this issue, you will see a significant increase in STEM (Science, Technology, Engineering and Mathematics) news. It isn’t that we haven’t previously participated in such activities, but we are involved in STEM-related programming now more than ever before.

Finally, we hope you’ll join us at Homecoming this year by participating in our annual chili cook-off, visiting with friends or touring Keplinger Hall’s renovations. We look forward to seeing you!

Sincerely,

James R. Sorem, Jr.

The University of Tulsa College of Engineering and Natural Sciences Magazine

Chemical engineering honors alumnus with department name

TU has announced the naming of the Russell School of Chemical Engineering in honor of renown energy industry entrepreneur and devoted alumnus Thomas H. Russell BS ’57. He and his wife, Pan, provided a thoughtful gift to establish the Professor A. Paul Buthod Endowed Chair in Chemical Engineering. Russell recently committed additional funds to TU’s Keplinger Hall renovation.

“This transformational commitment will further advance the national reputation of our chemical engineering program,” said TU President Strickman Upham. “Tom and Pan’s efforts support the university’s comprehensive mission to excel in academics, research and community endeavors.”

Russell is the founder of two successful energy companies, T.H. Russell Co. and the Thomas Russell Co. Both firms specialize in the design and fabrication of oil and gas processing plants and refining equipment for operations around the world.

“We are grateful for the unwavering support of Tom and his family,” said James R. Sorem, Jr., dean of the College of Engineering and Natural Sciences. “His generous gifts help provide the invaluable resources that enrich our students’ educational experience such as exceptional facilities, thoughtful instruction and innovative research in chemical engineering.”

Russell was named a TU Distinguished Alumnus in 2013 and was inducted into the College of Engineering and Natural Sciences Hall of Fame in 1993. He has served on the Chemical Engineering Advisory Board since 1981 and is a member of the TU Circle Society and the President’s Council.

Graves, MacKay join ENS Hall of Fame

Graves Trustee Scholarship Endowment Fund for TU students who plan to work in cyber security. In addition to Golden Hurricane Athletics, the Gravess have supported the Keplinger Hall renovation, construction of J. Newton Raynor Hall and other capital projects across campus.

MacKay is a co-founder and president of Maccor, Inc., a Tulsa-based manufacturer of sophisticated battery test systems that use advanced electronics technologies and computer programming. He also is co-founder and president of Uncorp Systems, Inc., a Tulsa company specializing in aircraft equipment repair.

Graves is a board member of the Golden Hurricane Club, Gilcrease Museum, McFarlin Library and Friends of Finance.

Left to right: Andy and Helen MacKay, Sarah and John Graves

TU inducted John G. Graves (BS ’71) and Andrew D. MacKay into the College of Engineering and Natural Sciences Hall of Fame at a special ceremony in April 2015. The Hall of Fame honors individuals who have distinguished themselves in engineering or science. These professionals have developed key technologies, managed successful companies and served as mentors.

Graves earned a bachelor’s degree in criminal justice studies and served as a Tulsa police officer before founding an independent oil and gas production company in the 1980s. His entrepreneurial venture into the energy industry inspired the U.S. patenting of several values for self-use. Graves’ innovative designs led to the establishment of Cyanide Valve Co. in 1990. Graves’ keen interest in promoting national security through technological advancements of law enforcement and cyber defense is reflected in his devotion to TU. Among the scholarships they have established, are the Paul and Helen Graves Trustee Scholarship Endowment Fund for TU students who plan to work in cyber security. In addition to Golden Hurricane Athletics, the Gravess have supported the Keplinger Hall renovation, construction of J. Newton Raynor Hall and other capital projects across campus.

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MacKay is a member of the TU Board of Trustees. He and his wife, Helen, are avid TU supporters who have established nine presidential scholarships. Their extensive list of meaningful contributions is rooted in a true love for TU and its academic and athletic programs. The MacKays’ generosity has contributed to the advancement of several departments including chemistry and biochemistry as well as electrical and computer engineering. They invested in the development of Raynor Hall and are devoted members of the Golden Hurricane Club, Gilcrease Museum, McFarlin Library and Friends of Finance.

The University of Tulsa does not discriminate on the basis of personal status or group characteristics including, but not limited to, race, color, religion, national or ethnic origin, age, gender, disability, veteran status, sexual orientation, gender identity or expression, genetic information, ancestry, or marital status in the administration of its educational policies, admissions policies, employment policies, scholarship and loan programs, athletic programs, and other University sponsored programs. Questions regarding implementation of this policy may be addressed to the Office of Human Resources, 800 South Tucker Drive, Tulsa, Oklahoma 74104-9700, 918-631-2616. Requests for status, sexual orientation, gender identity or expression, genetic information, ancestry, or marital status in the administration of its educational policies, admissions policies, employment policies, scholarship and loan programs, athletic programs, and other University sponsored programs. Questions regarding implementation of this policy may be addressed to the Office of Human Resources, 800 South Tucker Drive, Tulsa, Oklahoma 74104-9700, 918-631-2616. Requests for
Many national programs encourage today’s young women to pursue careers in science, technology, engineering and math (STEM), but with the support of alumni and faculty, the College of Engineering and Natural Sciences also participates in local initiatives to assure women they belong in the STEM world.

When the school bell rings every afternoon signaling the end of another day, students have a choice to make: sports, hobbies, music, socializing or TV. But a year ago, faculty in the Department of Mathematics began offering an alternative after-school option specifically for girls — critical problem solving.

Once a week, sixth-, seventh- and eighth-grade girls from the Tulsa area meet in TU’s student union to participate in the Tulsa Girls’ Math Circle (TGMC). The club provides a “free zone” for math learning under the guidance of Visiting Associate Professor Rose Gamble, who also serves as the group’s facilitator.

“We’re only enroll math circle in Oklahoma, and the only one for girls in the nation,” Farrior said. “We’re trying to teach them problem-solving techniques. It’s about the process more than the answer.”

Faculty established the girls’ math circle after the Tulsa Teachers’ Math Circle was created in 2013. The teachers’ organization invites professional mathematicians, middle school math teachers and school administrators to experience open-ended problem solving in lively sessions of discussion.

Farrior said around 20 students attend TGMC each week.

“They take a problem, gather data and present their solutions in a more logical way than they did before; they’re not afraid to make mistakes,” she said. “As the circle has grown, we’ve done less teaching and more mentoring and listening. Schools don’t have time to teach this way, but we’re addressing topics beyond what they see in their classroom curriculum.”

At one of the sessions this past spring, a group of teenage girls sat on the edge of their seats around a table with pencils in hand, poring over their assignment for the evening.

“It’s not straight formulas, they’re more realistic,” said Mechille Weldon, a sixth grader in Tulsa Public Schools. “You think outside the box.”

The girls describe their math circle meetings as a “no pressure” environment where “everyone is really nice, and you work with everybody.”

“Even if they don’t go into a STEM discipline in college, it gives them confidence and curiosity about the world,” Farrior said. “We’re all using our brains together, so it’s got to be good for us.”

The College of Engineering and Natural Sciences is focused on cultivating a welcoming environment for young girls interested in STEM opportunities. In April, 75 Girl Scout Brownies spent a Saturday at TU’s engineering facilities exploring STEM activities and learning about career options. Electrical engineering senior Lindsay Flake, a former Brownie, organized the event.

“I’ve always been interested in building and making things — working with my hands,” she said. “I enjoyed my science and math classes. Flake recently completed a summer internship for NASA at Edwards Air Force Base in California. Her ambition to establish a STEM career parallels the academic path of the third-generation Girl Scout Suzann Dodson (BS ’06), a pipeline integrity engineer at Magellan in Tulsa and the leader of her two daughters’ Girl Scout troops. Dodson, a chemical engineering alumna, is heavily involved in her children’s pre-robotic and LEGO activities that incorporate motors, gears and simple machines. Twice she has accompanied Tulsa Girl Scouts to the White House Science Fair in Washington, D.C., where they exhibited their projects to President Obama. Their first visit in May 2014 demonstrated a flood-prooﬁng bridge prototype with cantilevering sides.

“The girls did a lot of critical thinking and engineering types of problem solving,” Dodson said.

“We’re developing girls with conﬁdence and character, and they were excited to meet some of the other participants. It was inspiring to learn how they’re making the world a better place.”

Dodson said she hopes the White House appearances will encourage more professional engineers to volunteer their time with Girl Scouts. She and her daughters attended TU’s most recent Brownie Day, and she’s pleased with how STEM activities have positively impacted her daughters.

“I’ve already noticed more resilience in them. STEM encourages more creative play and forces them to take a step back when searching for a solution,” she said. “They’re not afraid of failure.”

In addition to the math circles and Brownie Day, TU promotes many other STEM-related camps and events for students of all ages. The engineering college hosted Oklahoma’s regional Math Counts competition in February as well as an annual Mathematical Association of America contest in April.

In June, TU partnered for the first time with the Tulsa Regional STEM Alliance and the American Association of University Women to host Tech Trek Tulsa. The weeklong camp welcomed 30 eighth-grade girls to inspire them to create interest in the STEM disciplines of math, computer science and chemistry. TU collaborates with the STEM alliance on a regular basis to present additional “girls-only” programs throughout the year.

Another initiative that TU officially has sponsored for several years is the For Inspiration and Recognition of Science and Technology (FIRST) Robotics Competition. Individual FIRST programs are available to Tulsa-area students in elementary and high school. Professor J.C. Diaz and a group of computer science students often serve as mentors for the individual robotic teams.

“Using Legos, the campers could immediately understand the logic needed to control a small machine,” she said. “The hope is that by experiencing programming in this tangible way, the students will continue their interest in this ﬁeld.”

In addition to faculty, current students exhibit leadership as creative and conﬁdent females in STEM. Mechanical engineering senior Laura Waldman is overseeing the design and construction of a special tricycle for physically or developmentally challenged Tulsa-area residents. The project supports the Make a Difference Engineering (MADe) at TU initiative. Reassembling a similar model built by previous students, Waldman said the tricycle’s new version will feature several improvements and serve as a learning tool for future classes.

“It’s fun to work on a project that’s different from school work,” she said. “I like the idea of trial and error and building something to see if it works.”

Of the 10 team members contributing to the tricycle project, half are female, and Waldman said she hopes her engineering passion has set a positive example for younger peers.

“It really helps them to see a girl in a leadership position. We see someone they can relate to and maybe make it easier for them to present their ideas to the project.”

TU also offers local chapter membership to the Society of Women Engineers and the chemistry women’s honor society Iota Sigma Pi. Outside of TU’s campus and the Tulsa community, alumnae are establishing themselves as highly respected engineers and scientists in professional STEM settings. Criniti Moran (BS ’06) is the Front End Innovation leader for 3M’s Health Care Business Group in St. Paul, Minnesota. She is responsible for directing transformational innovation programs, developing and teaching innovation science and methodology, and applying that knowledge to the seven divisions within the 3M Health Care Business. As a vital asset to 3M’s new product platforms, she has 17 issued patents and 13 publications.

“If I ever get to work with smart, creative people every day who are excited about science and its possibilities,” she said. “We get to imagine the future and try to create it.”

Although her late father, William P. “Bill” Moran, was a physics professor at TU for 17 years, Moran chose to major in chemistry because of the flexibility it allows her to cross over into other STEM areas. She works closely with many talented engineers but is glad for the opportunity to prove herself as a highly skilled female in such a male-dominated industry.

“A balanced and diverse set of opinions and contributions only strengthens any given endeavor,” she said. “Women’s viewpoints, leadership styles and unique strengths create a healthy tension that elevates the performance of everyone on a given team.”

Professor Rose Gamble, the Tandy Endowed Chair in Computer Science and Engineering, directs students in the development and delivery of innovative software systems for local nonprofit organizations, such as the Salvation Army, the Marine Foundation’s Toys for Tots, and Charmers, the Tulsa Symphony Orchestra and the Little Light House. These projects allow students to showcase their breadth of STEM knowledge and experience while benefiting the organization. Gamble participated in Tech Trek Tulsa, introducing the young women to programming and networking using LittleBits and Glowbits.

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Women of science
A

board the midnightsnatch of American oil and gas prices, exciting climbs precede unexpected drops that can take passengers by surprise and leave them unsure of what’s next. The energy industry has become notorious for its historic highs and lows that define pricing trends and reveal untargeted opportunities to reinvent the market. Although some current petroleum engineering students worry that declining oil prices will limit their employment options, the sound advice of a veteran energy executive can ease their fears.

“When I was an undergraduate student at TU in the late ’60s, the industry outlook was pretty dismal — so dismal in one talked about ups and downs,” said Bill Scoggins (BS ’70, PhD ’78), former industry peers, but also the students Scoggins has mentored at Mines.

The energy industry is much more multidisciplinary today than when Scoggins arrived on scene in 1970. Whether they specialize in geoscience or electrical engineering, recent graduates are expected to communicate effectively beyond their technical discipline and with other company resources such as HR, legal or finance staff. These skills are essential to labor and manage expenses, restructuring operations and selling poorly performing assets — we were also forced to just do things smarter and apply technology to be more efficient. We found this opened up considerable opportunities for us in spite of the weak market conditions. And, as the market improved, we were able to grow the business once again,” Scoggins said. “Those were exciting times. When we’d go through another cycle, we had learned to pause and reflect on what was working and what could be changed.”

Through his career, Scoggins notes each market slump typically inspired major industry consolidation only to be followed by new investment thrusts. In every situation, he said, advancements in technology and industry innovations have made robust recovery possible. Deepwater exploration and development and unconventional oil and gas production from shale are familiar examples.

“I’ve seen the boom and busts, and technology has always been developed and deployed to keep up with the times,” he said. “With the right resources and talent, the industry survives. There are so many more tools available today to enable profitable growth and improve performance efficiency.”

Lower prices today are the result of what Scoggins refers to as a relatively small global surplus exacerbated in the United States by the unconventional oil and gas production boom and sluggish global economic growth. And clearly this has caused considerable uncertainty and unfortunate outcomes for many in the industry, he notes.

“As the economy improves, I’m confident the industry will take off again — maybe not at $90 to $100 per barrel but $70 to $80,” he said. “Prices will increase substantially from where they are right now.”

His optimistic perspective not only is an encouragement to former industry peers, but also the students Scoggins has mentored at Mines.

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Unlike Lathrop, he has reservations about finding a permanent position.

“Petroleum engineering became a very popular degree when the price of oil was high,” Dunne said. “Now with lower prices, I’m worried there will be a surplus of engineers and not enough jobs.”

Still, that won’t keep him or any of his fellow graduates from job hunting.

“I’m excited to get out and apply what I’ve learned,” he said. Scoggins, who retired from his Mines presidency in June, admires the students’ positive attitude.

“The industry keeps evolving. I’m a believer that in the blink of an eye, the industry can reinvent itself and take off in another direction.”

Editor’s note: Scoggins is a longtime donor and after retiring from the Colorado School of Mines on June 30, he is pleased to support his alma mater and return to the TU Board of Trustees.

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ALUMNI INVEST IN OKLAHOMA WITH DIGITAL START-UPS

The need for digital security and data protection grows exponentially as society shifts to an online marketplace. Two computer science alumni have developed their livelihood around web security, and their entrepreneurial ventures have garnered the attention of businesses nationwide.

Alex Pezold (MS ’03) set his sights on a TU graduate degree in computer science after earning a bachelor’s from the University of Oklahoma and beginning his career at a Tulsa company. However, he discovered the position lacked a certain spark he was searching for in information technology. His introduction to a few TU faculty members persuaded him to apply to the Cyber Corps program.

“I became enamored with technology, and unless you are a developer, there’s not a whole lot of creativity involved,” Pezold said. “Information security breaks those boundaries, and I was pretty excited about getting out of corporate America and moving into more of an art.”

After completing the Cyber Corps training, he spent two years working for the U.S. Department of Commerce in Washington, D.C. Later, Pezold served in the information security departments at Anheuser-Busch and MasterCard in St. Louis, Missouri. While his wife’s career and other opportunities led Pezold home to Tulsa and then Chicago, he kept in touch with fellow TU alumni Jerry Dawkins (MS ’03, PhD ’05). The excitement surrounding daily advancements in digital technology inspired Pezold and Dawkins to join forces. So on the back of a napkin one day at a Tulsa Starbuck’s, the pair mapped out a business plan.

“The agreement was if I helped Jerry with his company, True Digital Security, he would help me with TokenEx,” Pezold said. “We spent the first three or four years building the TokenEx technology and growing the business (for True Digital Security).”

Although Dawkins isn’t a Cyber Corps graduate, he too was experienced in securing federal organizations. He had turned down a position in Washington, D.C., because he wanted to continue to serve the nation in a slightly different capacity in Oklahoma.” Dawkins said. “I thought if I could tap our resources and capabilities, we could continue to serve the nation in a slightly different capacity in Oklahoma,” Dawkins said.

He reached out to his colleagues and learned they also had a vision to move back home, start families in Oklahoma and work to secure the nation’s public and private information infrastructures. As a result, the information security services firm True Digital Security was established in 2004 to assist organizations in creating and operating efficient information security programs. Based in Tulsa, the company remains closely tied to the federal government and provides information security and compliance services to government agencies and private sector corporations of all sizes, across a broad range of industries.

True Digital Security’s early mission focused on simply educating customers about the risks and challenges involved in preventing data theft. Dawkins said digital security is not only a technology problem, but also a people and process problem, and entities are beginning to take notice.

“For boards of directors, information security is now an item they’re interested in, and they’re challenging their organizations to answer questions about building a stronger security program,” he said. “It has enabled our business to grow, and we’re excited about building something here in Oklahoma that supports customers across the nation.”

With True Digital Security firmly established, Pezold and Dawkins began the development phase of TokenEx in 2010.

“Information security is generally viewed as a roadblock or hindrance,” he said. “It carries the connotation of disrupting business or unnecessary regulation and expenses, but it is our mission to deliver information security technologies that can actually enable businesses to function in a more secure and efficient manner.”

TokenEx is a cloud-based security platform that offers tokenization, encryption and data vaulting, while providing compatibility to payment processors and card-reader devices. Stream of surrogate data sets, also known as tokens, instantly replace sensitive payment, personal and health data in business systems. If an online security breach occurs, these tokens are useless to hackers and malware bots.

“We offer unlimited flexibility in how our customers can securely send data to TokenEx, store it secure within our environment,” Pezold said. “We take their sensitive data out of their environment and place it on our platform, reducing cost, risk and compliance burden.”

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“TokenEx customers include retail businesses, insurance companies and nonprofit organizations. From a large Fortune 10 company to a small startup, True Digital Security’s True Digital Security and our consultants bring to support that growth.” — Jerry Dawkins

— Jerry Dawkins

“Alex is solving problems that my customers are having, and we both really thrive off each other,” Dawkins said. “He’s doing business all over the world and has the ability to put minds at ease about using a start-up company in Tulsa. People on the east and west coasts underestimate the capabilities we have here in the Midwest.”

With True Digital Security and TokenEx complement each other while presenting a unified campaign to promote Oklahoma enterprise. With Dawkins in Tulsa and Pezold in Oklahoma City, the alumni hope to attract clients to their home state.

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With a sky-is-the-limit mentality, these Oklahomans eagerly are expanding their ventures both together and as individual entrepreneurs. The partnership continues to prove a valuable asset to not only digital security worldwide, but also the momentum of Oklahoma startups.
Anne Gambrel

Every day, Anne Gambrel (BS ‘11) gets to learn or do something new in science fields ranging from theoretical physics and mechanical engineering to electrical and cryogenic engineering. As a doctoral student specializing in cosmology at Princeton University, she is striving to answer one of physics’ most challenging questions: How did the universe begin?

“My experiment could help us understand the answer to that question, which is by far the coolest thing I’ve ever been able to say about anything I’ve ever done,” Gambrel said. Her experimental project is a balloon-borne telescope known as SPIDER that launched from Antarctica on January 1, 2015. Equipped with six telescopes, the device flew in space for 16 days, capturing 120 photos of the sky every second. Gambrel and her research colleagues will spend the next year analyzing the 1.5 terabytes of data SPIDER collected.

“We successfully recovered the hard drives from the payload at its landing spot, and those drives held a fantastic dataset,” she said. “We have a lot of work ahead of us to combine those images into a single picture and then figure out what that picture tells us about the beginning of the universe.”

While sifting through mounds of data, Gambrel and the Princeton team also are developing an improved version, SPIDER 2, which is expected to take flight from Antarctica in December 2017. She said her travels in space exploration were inspired by foundational TU mentors who encouraged independent thought and bold ideas.

“Both in labs and in research, TU gave me the opportunity to find problems that interested me and then come up with solutions on my own for how to find answers,” Gambrel said.

As an undergraduate, the Omaha, Nebraska, native collaborated with Associate Professor Parameswaran Harikumar to create a composite material of carbon nanotubes and copper. In Associate Professor Alexi Grigoriev’s laboratory, she researched the temperature dependence of switching times for thin-film ferroelectric materials. Outside the classroom, Gambrel participated in TU’s Sustaining Engineering for Needy and Emerging Areas (SENEA) organization where she helped design and build a human-powered vehicle for villagers in China.

“It was basically a recumbent tricycle with a small bed in the back. We designed it using bicycle parts and other equipment that people in rural areas would have access to, so they could build these vehicles themselves with our prototype and instructions as a guide,” Gambrel said.

Looking back at her TU days, each research scenario and experiment led Gambrel to where she is today. Once the SPIDER team has published its findings, she plans to graduate from Princeton in 2016 and continue research at a government laboratory or university. No matter where her future endeavors take her, Gambrel said TU’s physics department has left a lasting impression on her life and career.

“I enjoyed interacting with faculty and a motivated student body that helped me pursue my passion. It’s a close-knit group in a very welcoming and encouraging environment.”

Erin Stranford Lamb

Erin Stranford Lamb (BS ‘10) is celebrating a huge achievement in her physics career. After earning a master’s degree in applied physics from Cornell University in 2012, she received her doctorate in August and is starting a post-doctoral research appointment.

For the past five years, Lamb has researched nonlinear optics in fiber lasers and devices. Her work involved investigating sources for coherent anti-Stokes Raman scattering (CARS) microscopy and stimulated Raman scattering (SRS) microscopy – imaging techniques useful in the examination of biological samples. These methods offer high-resolution, three-dimensional sectioning of live tissue without the need for fluorescent labels. However, CARS and SRS must be executed in highly specialized laboratories due to the cost and maintenance associated with the current solid-state laser source.

To address these challenges, Lamb has dedicated much of her collegiate research agenda to developing an improved imaging source that performs much like the solid-state option but utilizes the alignment-free nature and reduced costs of standard fiber optics.

“I enjoy building experiments you can understand and contribute to on a daily basis. I like research that applies to the real world and helps people,” she said. “The math of optics is intriguing, and it links back to the applied math work I did at Tulsa.”

As a TU undergraduate, Lamb double majored in physics and applied math while conducting optics research with faculty including Associate Professor Scott Hokm.

In 2010, she was awarded a National Science Foundation Graduate Research Fellowship to pursue her interests at Cornell. A native of Albuquerque, New Mexico, Lamb chose TU for its strong math and science programs and was drawn to the enthusiasm on campus.

“Even though I’ve worked at larger research facilities at Cornell, the level of personal attention and support at TU is unique,” she said. “Tulsa fosters a good environment for people to learn and work.”

Lamb encourages female scientists to join her field and feed their passions for math and physics. She loves research and forges it at the center of her promising career.

“It’s a satisfying experience to get to learn about and understand new things and see them work,” Lamb said.

With a new doctorate to her name, Lamb and her husband Alan, a software developer, are moving from Ithaca, New York, to Boulder, Colorado, where she will begin a two-year term of post-doctoral research at the National Institute of Standards and Technologies.

Lamb’s sister Devin Stranford was a 2014 Goldwater Scholar and earned TU bachelor of science degrees in chemical engineering and biology in May. She will begin a doctoral program in chemical engineering at Northwestern University this fall.
Interns leave mark at Ford

Throughout their collegiate careers, TU engineering students are encouraged to experiment with original ideas and tackle product design from scratch. For more than 20 years, Professor John Henshaw, chair of the Department of Mechanical Engineering, has tasked his students with performing failure analysis on commercial products. In 2014, the project became a class competition, and the winning team featured three female engineers.

Seniors Hannah Emmett, Hannah O’Hern and Katy Riojas, a 2015 Goldwater Scholar, under the team name KHE2, conducted a failure analysis on a pair of Germapan double-action bone-cutting forceps, used primarily in cardiovascular surgery. Of the eight independent analyses conducted by the team, Riojas said all pertained directly to the forceps’ material properties. “For example, in order to determine the specific type of steel used to create the forceps, we performed a microhardness test and a metallurgical analysis,” she said.

The students were required to answer three questions: How did the forceps fail, how they functioned and how they could be redesigned to prevent additional failures. Team KHE2 determined the forceps failed from mechanical overload caused by the stress concentration at the base of the device’s pincer. According to the team, the force required to cut a bone is much less than the force required to fracture the forceps, suggesting the forceps failed from misuse. Additionally, the surface clearly indicated a brittle fracture, which was further evidence of failure from misuse.

“Our mission was to take the design one step further and improve the safety of the forceps to prevent future failures, even those caused through misuse,” Emmett said.

KHE2 recommended increasing the radius at the base of the pincer to minimize the stress concentration. Also, increasing the cross-sectional area at the base of the pincer would alleviate induced stress on the forceps. The redesign reduced maximum stress by 42 percent.

In addition to teaching students the importance of thorough product testing, Riojas said the process has confirmed her desire to pursue a career in medical device testing and design. She and the KHE2 team received Lesto’s gift cards as the inaugural class winners of the Hackworth-Wilson Prize for Excellence in Failure Analysis, a new award named in honor of mechanical engineering alumni Matt Hackworth (BS ‘96, MS ‘98, PhD ‘00) and Kelly (Wilson) Hackworth (BS ‘86, MS ‘88), former TU classmates who are married and now serve on the TU Mechanical Engineering Industrial Advisory Board. Matt’s project as a student in the mechanical engineering course involved the analysis of an exploded soda can under the mentorship of Henshaw.

“Matt and I did close to $1 million in external research for Alcoa, Coca-Cola, Anheuser-Busch and others,” Henshaw said. “When he and Kelly asked how they might give back to TU in a creative way, we established the Hackworth-Wilson Prize.”

To learn more about supporting students in the College of Engineering and Natural Sciences, please contact ENS Director of Development Natalie Adams at 918-631-3287, or natalie-adams@utulsa.edu.
Booth uncovers origin of bed bugs

It’s a terrifying pest, a menacing insect that can ruin your home and compromise your sanity. The species Cimex lectularius, commonly known as bed bugs, is on the rise across the United States, and TU researchers are working to prevent further infestation. TU Assistant Professor of Biology Warren Booth recently published his latest findings on the origin of bed bugs in the science journal Molecular Ecology. His research also was reported in the New York Times.

“Bats are considered the ancestral zoophagic host of bed bugs, but the association with humans likely is much more ancient, going back to the time when humans and bats sheltered together in caves,” Booth said.

Widespread use of DDT and other powerful pesticides nearly eradicated bed bugs in the 1940s and 1950s, but Booth said today’s resurgence points to many factors including the bug’s evolution to insecticide resistance, increased national and international travel, global commerce and the growth of dimples.

Booth and his team of biology students investigated more than 700 individual bed bugs collected from human dwellings and bat roosts at multiple locations in 13 countries. Gene fragments were analyzed for commonalities between the bed bugs found on bats and those in human quarters. The study revealed two defined genetic groups, one of bat-associated bed bugs and another strictly associated with humans.

“Our research supports the existence of two host-associated races in bed bugs based on ancient genetic divergence of populations on two sympatric host species,” Booth said. “Population establishment, high turnover and extinction events are common with little opportunity for the introduction of new adaptations, likely due to human-mediated movement and frequent interventions through pest control.”

Armed with this new information of bed bug ancestry, Booth and his research lab will continue studying the parasite’s origin and behavior. The removal of bed bug populations in human dwellings costs residents and business owners millions of dollars each year, and treatment often is not guaranteed. Although earlier studies have proven bed bugs are not disease carriers, Booth said further research is needed to permanently eliminate populations.

Brown receives NSF grant, publishes in Royal Society Open Science

Charles R. Brown, professor of biological sciences, has received a five-year, $148,000 grant from the National Science Foundation for his continuing studies on the social behavior of cliff swallows in western Nebraska. Brown has studied cliff swallows for 34 years. The NSF grant will support his research on how nest site preference on group size varies in different years and can cause a range of colony sizes documented within the species’ natural habitat.

Brown’s paper “Extrapatriation shortens the breeding season in a colonial bird” was published in the journal Royal Society Open Science in February 2015. The research reports the first evidence that the cliff swallows are breeding earlier than other cliff swallows in their host countries.

“It is a cause for concern that cliff swallows are breeding earlier in our study population than birds of the same species in other parts of the world,” Brown said. “These birds are very sensitive to temperature changes and are extremely vulnerable to the effects of climate change.”

For the past two years, students and faculty have spent hundreds of hours studying the capabilities of nanobatteries with the help of a grant from NASA and the Experimental Program to Stimulate Competitive Research (EPSCoR). In collaboration with faculty at Oklahoma State University and the University of Oklahoma, TU investigators specializing in chemistry, physics, electrical engineering and mechanical engineering are setting the standard in solar-powered nanobatteries.

Peter Hawrylak, assistant professor of electrical engineering, is developing advanced circuit models of the system to determine how best to combine the nanorod and nanobatteries into a unified energy storage system. TU Associate Professor of Physics Parameswar Hankar and OU Assistant Professor of Physics and Astronomy Ian Sellers are developing a photovoltaic nanorod for harvesting the light energy. Advanced models of this nanorod include a third form that can be painted onto the surface of a small solar panel. Beneath the panel lies a battery control system of nanorods designed by TU Professor of Chemistry Dale Testers.

TU’s current research focuses on how to build the control system, change the nanobatteries, collect the energy and direct it to separate battery banks. Hawrylak is working with all three components to develop circuit models for optimal performance.

TU pioneers in solar-powered nanobatteries

“Over a 30-year period, we’ve surmised colonies of cliff swallows to remove their parasites and the birds responded by lengthening their breeding season and sometimes nesting twice in a summer,” Brown said.

His research showed the number of pairs initiating double nesting at a site increased each year for 27 years, suggesting natural selection for double nesting occurred when parasites were removed. According to Brown, the results indicate parasites have a previously unknown but major effect on their hosts.

Research improving FSO technology

Professor Peter LoPresti (right) advises graduate student in the Optics Lab of Rayzor Hall.

If the many groundbreaking projects underway in TU’s J. Newton Rayzor Hall, one aims to transfer data through the transmission of light through air. Known as optical wireless or free space optics (FSO), TU’s research on this form of communication has been funded by the National Science Foundation for the past seven years.

Professor Peter LoPresti in the Department of Electrical and Computer Engineering currently is developing an optical transceiver design that will establish a rapid optical link/network among multiple unmanned aerial vehicles and support multi-user communication.

“The goal is to develop a very secure, very high bandwidth form of communication that is mobile,” he said. “Optical transmission is the ideal technology because lasers transmit very directionally, and the signal is difficult to intercept.”

Graduate students contribute to the research conducted in Rayzor Hall’s Optics Lab, where a floor independent from the building’s concrete slab prevents the slightest vibrations from disturbing experiments involving sensitive equipment.

According to LoPresti, the heightened FSO technology potentially could improve critical applications such as wireless communications in disaster areas.

“Technological advancements during the past 15 years are positioning unmanned aerial systems to play a pivotal role in civilian and military domains,” he said.

Simulating turbulence through the application of a heated box, TU researchers study how the laser light of FSO technology is affected by turbulence in air. Today’s optical equipment uses multiple receivers pointed at each other to transmit a signal, but LoPresti’s research intends to employ only one unit that can transfer several different communications simultaneously on different light waves.

“We want one optical receiver to detect two or three signals just like a radio receiver,” he said. “The math and our initial experiments say it can be done.”
Earthquakes: Ancient fault zones raise questions

Over 3,400 earthquakes rocked Oklahoma in 2014—a single year record, according to the Oklahoma Geological Survey. Officials say additional tremors went undetected because of limited state resources to record them. In March 2015, the U.S. Geological Survey (USGS) released a new study suggesting Oklahoma’s earthquake problem is cause for concern.

The research, published in Geophysical Letters, investigated earthquake hypocenters and local mechanisms in central Oklahoma. Geoscientists identified and flagged the exact location of more than 3,600 events from 2009 to 2014. The data reveal ancient fault lines once quiet now are shifting at alarming rates, suggesting Oklahoma’s reactivated faults are capable of larger events.

“We have rediscovered the central Oklahoma and Nemaha fault zones are a strike-slip boundary, and the big debate is how much print-up strain we have in those ancient systems,” said Bryan Tapp, professor of geosciences. “The state is under shear, but we do not know how much deformation has built up.”

Tapp is a member of the Coordinating Council on Seismic Activity; a group of scientists, state officials, researchers and oil and gas representatives, organized in 2014. The council’s purpose is to better understand the earthquakes and provide feedback to state agencies. Although earthquake activity officially hasn’t been linked to oil and gas extraction, Tapp said the Oklahoma Corporation Commission is working with injection well operators to reduce seismic potential.

“Injectors are likely related to earthquakes in Oklahoma, but we can’t say definitely if they are the sole mechanism of these earthquakes,” he said. “State agencies are trying to get ahead of the problem and look at best practices to help mitigate and prevent potential damage from these earthquakes.”

In April, the Oklahoma Geological Survey released a statement suggesting many of the state’s earthquakes are caused by injection well activity. According to state geologist Richard D. Andrews and the state’s seismologist, Austin Holland, the “primary suspected source” of seismic movement is not hydraulic fracturing but instead is the insertion of wastewater from fracking into disposal wells.

“The USGS, Stanford researchers, TU and other groups are working furiously to gather information and understand the problem,” Tapp said.

Black hole systems help detect gravitational waves

It’s an exciting time to be a physicist working in the investiga-
tive world of general relativity. Not only does Albert Einstein’s famous theory celebrate its centennial anniversary in 2015, but also physicists believe they are on the brink of discovering gravita-
tional waves from space. These waves, suspected by-products of binary black hole activity, potentially could break the silence of our universe and further bolster Einstein’s theory.

Assistant Professor of Physics Scott Noble continues his research quest into the strong-field limit of gravity and the behavior of orbiting black holes. Large black holes are seen at the centers of most galaxies (including our own) and are expected to collide with each other often throughout the universe.

“The 100-year-old theory of general relativity saw the motion of compact objects (such as orbiting black holes) disrupt space and time, creating gravitational waves or ripples in the fabric of space-time,” Noble said. “The waves kick off energy and momentum in all directions and allow the black holes to spiral toward each other, ultimately resulting in an explosion of gravitational waves as they merge.”

In 2002, a team of physicists and astronomers from across the country collaborated to construct a device known as the Laser Interferometer Gravitational-Wave Observatory (LIGO), in an effort to detect gravitational waves. Each LIGO interferometer features a set of man-made tunnels four kilometers in length that intersect at a 90-degree angle or “L” shape. Mirrors placed within LIGO are designed to reflect laser beams back and forth along each arm to measure any interference. A loss in the returning beams’ synchrony is expected to indicate the presence of a gravitational wave. Thirteen years later, the original LIGO is being overhauled to achieve even more sensitivity for wave detection.

“A detection would provide direct evidence of the binary black hole systems we suspect are out there and would represent the first time humans have proved through this new window onto the universe, ushering in a whole new field of gravitational wave astronomy,” Noble said.

Computer science research tracks patient health

TU engineering and science students are passionate about contributing to the advancement of American health care. This past year, a group of computer science majors developed two prototypes for application in ongoing projects at the Laureate Institute for Brain Research (LIBR).

**tDCS Therapy Software**

David Glover (BS ’15) designed a mobile transcranial Direct Current Stimulation (tDCS) platform under the advisement of Professor John Hale (computer science) and Assistant Professor Peter Hashwylak (electrical engineering). The software will play a critical role in LIBR’s development of safe and portable tDCS therapy that can be administered to patients within the comforts of their own home monitored remotely.

“This neuromodulation therapy is electrical stimulation for the brain and effectively treats multiple disorders such as Parkinson’s disease and mood disorders,” Glover said.

Currently, patients must visit LIBR to receive tDCS treatment, but the TU research will eliminate that inconvenience.

“The mobile application and database backend acts as an interface between the patient, the tDCS device itself and the clini-
cian,” Glover said.

TU’s Department of Electrical and Computer Engineering has assisted in building the actual tDCS equipment and creating its sensing capabilities. One of the device’s electrodes carries a charge to the brain while the other takes it away.

“The process of tDCS alters your brain, enabling a current to flow through it in a way that is desired for treatment,” Hashwylak said.

**Life Charting App**

Computer science seniors Severa Buchele, Matthew Hruza and Mariano Marin are fine-tuning features on a smartphone life charting app that monitors research participants’ stress or happiness levels during long-term experiments and other factors coinciding with their moods. The research supports LIBR’s Tulsa 1000 project—a study to determine how biological and objective behavioral measures contribute to improving assessment and treatment of psychiatric patients. The project will recruit 1,000 Tulsa residents who suffer from a wide range of conditions such as eating, mood and anxiety disorders as well as substance abuse.

The app’s digital documentation is the equivalent of a partici-

pant filling out paper questionnaires, which can be tedious and difficult to track.

“The less effort needed, the more apt people are to do it,” Buchele said. “We’re tapping into their digital habits. We want to track their locations and find the daily factors that alter their moods.”

The app also is flexible enough to record different types of self-reported data such as subject weight, activities and diet, Marin said. “If participants can get something out of it, they will continue using the app. We’re looking into what people do day in and day out that affects their moods.”

The assessment data collected will be safely stored for referencing across participants who express similar moods and behaviors.

“For LIBR, this app will provide researchers with the exact information they want, and this is something that can only be offered if it’s locally developed,” Hruza said.

Tulsa 1000 and other study participants could begin using the interface by the end of the year.
Assistant Professor Kyle Simmons is a faculty member in the Tulsa School of Community Medicine and conducts neuroinformatics research at the Laureate Institute for Brain Research (LIBR). He began teaming up with faculty from the College of Engineering and Natural Sciences through a casual work group.

"We recognized the need to build capacity in Tulsa and primarily with TU, which had faculty with experience working in neuroinformatic data," he said. "We went over to TU every Friday primarily with TU, which had faculty with experience working in the human brain. We sit down in a conference room and discuss an article we'd read." Professors Bill Coberly (mathematics), John Hale (computer science), Brett McKinney (computer science) and Richard Redner (informatics) regularly met with Simmons and became curious about his research.

"I gave them access to resting state fMRI (functional magnetic resonance imaging) data associated with the autism spectrum and neurotypical disorders in kids," Simmons said. "We took analytical tools of genetic analysis and applied it to neuroinformatic networks of brain networks, and out of that came the basic collaboration."

The neurological data generated from resting fMRIs that patients undergo at LIBR allows Simmons to study brain activity in humans noninvasively while they are awake. Sharing the fMRI data from MDD patients has proven to be a very valuable partnership. Researchers are beginning to apply recently developed methods to test their effectiveness on completely new data sets.

McKinney also is a faculty member of the Institute for Bioinformatics and Computational Biology, a role that has opened many doors for research. He and Gael Llopis (BS ’15), a math and biochemistry major at the time, published research in 2015 in collaboration with the Oklahoma Medical Research Foundation (OMRF) in Oklahoma City. Their investigation into gene expression networks led to the development of methods that help researchers understand diseases with an inherited component such as lupus, cardiovascular disease, Alzheimer’s and diabetes.

"It would have been possible for either institution alone, but together we have published four scientific manuscripts since 2012. In the future, Teague, McKinney and their colleagues anticipate additional collaboration thanks to TU’s new College of Health and OMRF enable the team to compete for and obtain multiple large National Institutes of Health grants to support the projects.

"This is the nature of research these days in this highly competitive environment with limited funding. To be in a good position to obtain substantial funding, institutions must combine their resources," Teague said.

In the future, Teague, McKinney and their colleagues anticipate additional collaboration thanks to TU’s new College of Health Sciences and the Tulsa School of Community Medicine.

"I am very optimistic that we will be able to leverage each other’s strengths to achieve much greater success in the future than would have been possible for either institution alone," Teague said.

To learn more about the College of Health Sciences, please visit healthsciences.utulsa.edu.
“The computer simulation and gaming industry is growing locally and nationally,” said Roger Mailler, associate professor of computer science. “Within the Tulsa area, there are three game companies and nine others that develop simulation technology for commercial and military entities. We’re excited to extend our curricula to meet the demands of such a booming niche industry.”

Mailler said potential simulation and gaming students must learn specialized skills that cross current academic boundaries. Developers are tasked with considering a game’s overall user experience, which includes graphic art, music and sound effects, plot and storyline, as well as custom simulation hardware and software. In addition to providing students with a new skill set, the computer simulation and gaming degree supports the school’s efforts to promote the industry.

Other related initiatives include the Heartland Gaming Expo, a weekend gaming event Mailler and other computer science faculty have organized and hosted for the past three years. The expo invites Oklahoma high school and college students to compete in four categories of competition. The 2015 expo included tournaments and contests for members of the general public. New this year, the expo added a free-play arcade, door prizes, tutorials, keynote speakers and other attractions. Mailler hopes to brand the event as the largest gaming expo in the region and encourage TU students to pursue employment locally rather than out of state.

Brandon Pollet (BS ’03, MS ’05) began his career at IBM providing software support to energy traders on the Williams trading floor in Tulsa. A computer programming enthusiast since high school, he also spent three years as an app developer for Tulsa’s MacroSolve, now known as Drone Aviation Corp. The experience inspired him to branch out on his own and establish F5 Games in 2012.

“The industry has taken off with iPhones, app stores and mobile gaming,” Pollet said. “Even though a lot of the industry’s new growth is coming from overseas, it doesn’t matter where your business is located because of the way app stores work. I can sell to customers in Russia or China, all while staying in Tulsa where there’s a lower cost of living and a higher quality of life.”

F5 Games focuses on mobile apps and games and currently has five games available in the iPhone app store. From his office across from historic Cain’s Ballroom near downtown Tulsa, Pollet develops business apps for local companies while exploring different gaming styles such as puzzle and traditional adventure. His most popular product game is House of the Lost.

“My goal is to build F5 Games into a company that can sustain growth in Tulsa,” Pollet said. “Other companies gain traction and move away, but I want to keep it local and help grow Tulsa’s tech scene.”

For more information about TU’s new computer simulation and gaming degree, email roger.mailler@utulsa.edu. Follow the Heartland Gaming Expo on Twitter @HeartlandGaming.
Open House inspires young engineers

The College of Engineering and Natural Sciences celebrated Engineering Week with an open house for local middle school students. Among other special activities throughout the week, the annual event is an opportunity to demonstrate some of TU’s latest research while educating students on the many STEM-related career possibilities.

More than 300 students from 10 Tulsa-area middle schools attended this year’s open house. Ketchum Middle School science teacher Jenny Spielman accompanied 15 seventh- and eighth-grade girls to attend the event. Among other special activities throughout the week, the annual event is an opportunity to demonstrate some of TU’s latest research while educating students on the many STEM-related career possibilities.

“So many girls lose interest in science and engineering in their middle school years, but we’re trying to keep them going in that direction as best we can,” Spielman said. Students explore electrical and computer engineering with the help of Wall-E.  

Spring Senior Projects

■ A group of mechanical engineering seniors designed, built and delivered a cooking center to children at Little Light House in May 2015. The portable kitchen features baking tools and appliances that can be operated manually and by remote control by children with mobility and developmental challenges. The project is a part of the Make a Difference Engineering (MADe) at TU program.

Advancements in cancer research

Former TU student and supporter Dr. Patrick McKee and his research group at the University of Oklahoma Health Sciences Center-Oklahoma recently published their design and synthesis of two experimental cancer drugs in the January 2015 issue of the cancer research journal, *Neoplasia*. McKee and his colleagues developed two highly effective pseudopeptide inhibitors that block the activity of pro-fibroblast growth factors, which are commonly overexpressed by epithelial-derived malignancies, such as breast, lung, colon and pancreatic cancer. The new inhibitors, M83 and J94, markedly suppressed human colon and lung cancer xenograft growth. McKee’s team continues to move the two inhibitors toward human testing.

McKee is a George Lynn Cross Professor of Medicine and the Laurate Chair of Molecular Medicine at the OU Health Sciences Center. He attended TU before graduating from the OU College of Medicine in 1962. McKee was instrumental in the development of TU’s Institute of Bioinformatics and Computational Biology and the Laurate Institute for Brain Research. He was inducted into the ENS Hall of Fame in 2012.

ENS College Fast Facts

Graduating class of 2015
- 229 undergraduates
- 47 graduate students (25 master’s, 12 doctoral)
- 91 seniors recognized at spring awards ceremony
  - GPA of 3.5 or higher
- 15 double majors
- 8 students with a 4.0 GPA — 5 of those are double majors
- Nearly 40 percent of seniors achieved a 3.5 GPA

Placement
The following statistics provided by Career Services:
- 90% placement rate for undergraduate and graduate students
- 118 companies hired ENS graduates

New Faculty
Maria Carreon, assistant professor of chemical engineering
Sandeep Kuttal, assistant professor of computer science
Angus Lumsar, assistant professor of chemistry and biochemistry
Gabriel LeBlanc, assistant professor of chemistry and biochemistry
Tyler Moore, assistant professor of computer science, Tandy Endowed Chair of Cyber Security & Information Assurance
Matteo Dalla Riva, assistant professor of mathematics
Bethany Thelting, assistant professor of geosciences
National scholars and award winners
In April 2015, the National Science Foundation awarded graduate research fellowships to John Eason (BS ’13), Caleb Laroe (BS ’15), Thomas Linscott (BS ’14), and Mitchell Trafford (BS ’15). The alumni will pursue advanced degrees in science, technology, mathematics and engineering this fall.

Seminars Austin Evans (chemistry and chemical engineering), Kay Riage (mechanical engineering) and Marissa Schmauch (chemistry and biochemistry) received Goldwater Scholarships based on their academic merit and intent to begin research careers in science, mathematics and engineering.

McKinney named Outstanding TURC Mentor
TU has honored Brett McKinney, who holds the William K. Warren, Jr. endowed chair in bioinformatics, with the 2014 Outstanding Tulsa Undergraduate Research Challenge (TURC) Mentor award. McKinney serves as associate professor of mathematics and computer science in the Department of Mathematics and the Tandy School of Computer Science.

Research Day at the Capitol
Two students received top honors at Research Day at the Capitol on March 31, 2015, in Oklahoma City. Chemical engineering major Austin Evans won the overall grand prize. Mechanical engineering major Jordan Hoyt earned first place in the research intensive campus category.

Reynolds is SPE/AIME Honorary Member
Professor of Petroleum Engineering Albert C. Reynolds, Jr., was awarded honorary membership in the Society of Petroleum Engineers (SPE)/American Institute of Mining Engineers (AIME) at the SPE Annual Technical Conference and Exhibition in Amsterdam. Reynolds has served as a faculty member in the TU College of Engineering and Natural Sciences for more than 40 years.

EPA project receives Phase II funding
Students from the College of Engineering and Natural Sciences and the Collins College of Business have won $75,000 in a second phase of research funding through the Environmental Protection Agency’s People, Prosperity and the Planet grant competition. The interdisciplinary team originally received $15,000 to develop the design concept for a wireless device that monitors water usage in hotel diners.

AerOcean dominates at OK Governor’s Cup
TU’s student entrepreneurial team AerOcean received top honors and a $20,000 cash prize for winning the graduate high growth division of the 2015 Donald W. Reynolds Oklahoma Governor’s Cup collegiate business plan competition. The AerOcean product substantially reduces watering and irrigation costs in the agriculture industry by using the condensation of moisture already present in the atmosphere. Led by MBA student Philip McCoy, the team included MBA/law student Joshua Donaldson, mechanical engineering senior Jared Starkweather and mechanical engineering junior Gann Swan. AerOcean’s faculty advisor was Todd Otani, assistant professor of mechanical engineering.

Teal wins at Gussman Juried Art Show
College of Engineering and Natural Sciences technician supervisor Mike Tral received best in show for an original work he entered in the 2015 Gussman Juried Art Show. Tral is a graduate student in the TU School of Art.

Shirazi recognized as NACE Fellow
Professor of Mechanical Engineering Siamack Shirazi received the 2015 NACE International Fellow award from the National Association of Corrosion Engineering International. Shirazi is director of the Erosion/Corrosion Research Centre at TU.

McElroy opens India office
Tulsa-based McElroy Manufacturing opened a branch office in Bangalore, India, in January 2015. McElroy is one of the largest producers of thermal fusion machines worldwide. TU Trustee A.H. “Chug” McElroy II (BS ’72) serves as president and chief executive officer of McElroy Manufacturing.

Kruse receives top industry award
Nancy Kruse, director of Continuing Engineering & Science Education, has received the Joseph M. Biedenbach Distinguished Service Award, the highest honor granted by the Continuing Professional Development (CPD) division of the American Society for Engineering Education (ASEE). Kruse has served the organization’s CPD division as a board member, program chair and membership chair. She has presented many sessions and workshops at the annual ASEE conference and the Conference for Industry and Education Collaboration (CIEC). Most recently, she assisted in the establishment of a new membership, marketing and communications committee as part of the division’s strategic plan to better promote and serve members. Kruse’s workshops and presentations have been named among the best at the CIEC. In addition to her technical training contributions, she is a welcoming mentor to new CPD division members. Kruse’s dedication to the organization’s success is evident in the hard work and creativity she commits to every project.

IPEC 2015 set for November
The International Petroleum Environmental Conference will be held November 17-19 in Denver, Colorado. TU continues to provide a forum for participants to discuss the many aspects of current oil and gas environmental issues. The plenary session will feature the following top industry experts:

Stan Bellieu, deputy director, Underground Injection Control program, field operations
Nebraska Oil & Gas Conservation Commission
Sidney, Nebraska
“Analysis of the Chemicals Used for Hydraulic Fracturing Using FracFocus Data: Are We Seeing a New Trend Toward Transparency?”

Jill Cooper, health, safety, environmental adviser
Anadarko Petroleum Corp.
Denver, Colorado
“Engaging Communities on Environmental Topics”

Dave Stewart, Stewart Environmental Consultants
Fort Collins, Colorado
“The Search for Water Used in Hydraulic Fracturing: Water Reuse and Reducing Potential Earthquake Activity”

The scheduled luncheon speaker is Patty Limerick, professor of history and faculty director & board chair of the Center of the American West at the University of Colorado.

Conference session topics include:

Environmental Management, Compliance and Auditing ■ Open Discussion Session on Produced Water

Continuing Engineering & Science Education
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Rick Shipley (BS ’13, MS ’14) and his friends were notorious for their harmless antics around campus. During the five years he earned two TU degrees, Shipley and his engineering peers were involved in more than 100 pranks that are now fun college memories they share.

“I remember when the Glenn Dobbs football statue was being installed, my good friend Tyler Pansa (BS ’13) borrowed a football helmet, painted his entire body gold and stood on the platform for over an hour,” said Shipley, a participant in the Department of Defense engineering development program near Washington, D.C. “He definitely got some looks. We were always playing funny tricks like that.”

Now as young alumni spread across the country, the group has found a way to pay tribute to their “shenanigans” by establishing a scholarship fund for future scientists and engineers.

The following alumni and students have committed to funding the Patrick O’Shenanigan Memorial Scholarship Endowment Fund: Iming Chang (BSBA ’14, energy management), Allen Greenlief (BS ’13, electrical engineering), Justin Helt (BS ’14, electrical engineering), Evan King (BS ’13, Physics), Will LePage (BS ’13, mechanical engineering), Kevin Meier (BS ’13, computer science and mathematics; MS ’14, computer science), Jordan Occena (BS ’13, engineering physics), Tyler Pansa (BS ’13, geosciences), Rick Shipley (BS ’13, electrical engineering; MS ’14, electrical engineering), Marcus Winter (BS ’13, chemical engineering) and Luke Wittenbach (BS ’15, petroleum engineering).

Any incoming freshman student who meets academic requirements is eligible for selection. The Patrick O’Shenanigan Scholarship will be awarded to a student for the first time this fall.