THURSDAY, OCTOBER 20, 2016
6:00 p.m.  Distinguished Alumni Celebration, Lorton Performance Center

FRIDAY, OCTOBER 21, 2016
5:30 p.m.  1966 and 1991 Reunion Receptions, Collins Hall
7:30 p.m.  Homecoming Bonfire & Pep Rally, Dietler Commons
8:30 p.m.  TU on Tap, Tulsa Oktoberfest

SATURDAY, OCTOBER 22, 2016*
TBA  Gold Medallion Society Brunch, Student Union
TBA  Official Alumni Association Homecoming Tent Party, Chapman Commons
TBA  TU Football vs. Tulane, H.A. Chapman Stadium

* Saturday event times will be announced by October 11

CHILI COOK-OFF
Saturday, October 22
2 ½ hours before kickoff (TBA)
Rayzor Hall; 3155 E. 5th Pl.
Contact Dottie Smith
918-631-2478
dottie-smith@utulsa.edu

TOURS OF KEPLINGER HALL RENOVATIONS
Saturday, October 22

For more information, visit TUalumni.com.
4 Message from the Dean
5 Top News
16 Research News
19 College News
27 CESE News

6 Distinguished Alumni
8 Yale National Initiative
9 TU at Google
10 Engineers on the run
12 Jet acoustics in volcanoes

14 Tandy Supercomputing Center
16 Virus research in plants
17 DOT dust study
19 Women in chemistry
21 Mr. Homecoming 2016
This fall, we welcomed another impressive group of students to the College of Engineering and Natural Sciences. I’m proud to report TU’s 2016-17 freshman class is one of the highest achieving. With an average ACT score of 30, these students have what it takes to succeed not only in the classroom, but also in life. The largest ENS freshman class is in the Tandy School of Computer Science followed closely by first-year students in the Department of Mechanical Engineering.

In addition to academic excellence, our students consistently demonstrate their commitment to community engagement through Make a Difference Engineering (MADE at TU) projects and other capstone courses. Some of this year’s efforts include building a quiet room for children on the autism spectrum at Tulsa’s Little Light House and designing a device that helps clients walk at the Center for Individuals with Physical Challenges.

This fall issue showcases what our students, faculty and alumni have achieved over the past few months. Whether alumni decide to stay local like George Louthan who directs Tulsa’s Tandy Supercomputing Center or work across the country such as Abigail LaBounty at Google, our graduates are doing amazing things.

We’re making steady progress on Keplinger’s remodel and completed renovations in half of the classrooms over the summer. The updated spaces, with brighter lighting and the latest technology, improve the learning environment for students and are more user-friendly for faculty. Stay tuned as the multiphase project continues. Crews currently are remodeling the Department of Physics in Keplinger’s lower level and are adding another classroom.

We’re always looking for ways to stay connected with alumni, and we encourage you to stop by the ENS Chili Cook-off in Rayzor Hall before the Homecoming game on Oct. 22. We hope to see you soon.

Sincerely,

James R. Sorem, Jr.

The University of Tulsa
College of Engineering and Natural Sciences Magazine

Fall 2016

The University of Tulsa College of Engineering and Natural Sciences Magazine is published by The University of Tulsa College of Engineering and Natural Sciences, 800 South Tucker Drive, Tulsa, OK 74104-9700.

The University of Tulsa
Steadman Upham, President
James R. Sorem, Jr., Dean, College of Engineering and Natural Sciences
Richard Reeder, Associate Dean for Academic Affairs, College of Engineering and Natural Sciences
Natalie Adams, Director of Development, Institutional Advancement
Gail Ellis, Communications Specialist, University Relations

ENS Mission

The mission of the College of Engineering and Natural Sciences is to provide a modern, high-quality educational experience for all of our students. We provide the knowledge and principles upon which engineering and science are founded in order to graduate engineers and scientists who are technically competent, creative, literate, ethically informed and socially aware.

The University of Tulsa Mission

The University of Tulsa is a private, independent, doctoral degree-granting institution whose mission reflects these core values: excellence in scholarship, dedication to free inquiry, integrity of character and commitment to humanity.

The University achieves its mission by educating 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 careers; behave ethically in all aspects of their lives; welcome the responsibility of citizenship, service and leadership in a changing world; and acquire the skills and appetite for lifelong learning.
Engineering Hall of Fame honors new members

The College of Engineering and Natural Sciences welcomed a new group of distinguished industry leaders, educators and alumni to TU’s Engineering Hall of Fame at a special ceremony April 21 at Gilcrease Museum.

Diane and Wiley Cox

K. Wiley (BS ’65) Cox earned a TU bachelor’s degree in chemical engineering. His wife, Diane (BS ’65), is a graduate of the mathematics program.

Wiley worked 16 years in data processing at Celanese and Amerada Hess before joining his father-in-law, Harlan Krumme, in the family oil business in Bristow, Okla. They founded the oil and gas company Falcon Oil Properties in 1993.

Diane retired in 1995 after teaching math in Broken Arrow and Jenks Public Schools. The couple has supported many TU projects including construction of the Donald W. Reynolds Center, renovations to H.A. Chapman Stadium, the Golden Hurricane Club, Gilcrease Museum and the Keplinger Hall remodel.

Robert Strattan, PE

Robert Strattan is a TU emeritus professor of electrical engineering who served as a faculty member for 31 years in the Department of Electrical Engineering (now the Department of Electrical and Computer Engineering). Following his retirement, Strattan returned to TU for 15 years as an adjunct professor of automobile design in the Department of Mechanical Engineering.

Strattan is an alumnus of Wichita State University and Carnegie Mellon University. He is a licensed professional engineer in Oklahoma, a member of the Oklahoma and National Society of Professional Engineers, a member of the Institute of Electrical & Electronic Engineers and a perpetual advisory board member at Fab Lab Tulsa.

A.R. and Marylouise Tandy Foundation

Marylouise (BA ’44) and Alfred Randolph “Bill” Tandy were partners in a family entrepreneurial legacy that made Tandy a household name synonymous with innovation and value. Through two generous gifts to TU’s computer science program, the Tandy family lives on in the next generation of exceptional computing students. In 2011, the Marylouise Tandy Cowan Revocable Trust and the A.R. and Marylouise Tandy Foundation established the Tandy Chair in Computer Sciences Endowment Fund. Since then, three additional Tandy endowments currently fund faculty chairs in TU’s Tandy School of Computer Science.

A.R. and Marylouise Tandy, In Memoriam

The legacy of Marylouise (BA ’44) and Alfred Randolph “Bill” Tandy began with the Tandy Corporation family business, a leather wholesaler established in Fort Worth, Texas in 1919. Bill partnered with his brother to expand the company’s retail holdings and purchased the chain of Radioshack electronics stores in 1963. Under the RadioShack brand, the Tandy family established itself as a computer technology leader in the 1970s.

Marylouise earned a bachelor’s degree in fine arts from TU and was a lifelong supporter of Tulsa arts organizations. She was named a TU Distinguished Alumna in 1998.
Driven by a strong and steady work ethic, Don Hoose (BS ’59) knew he needed to further his education after graduating from Will Rogers High School. The University of Tulsa’s nationally known petroleum engineering program was just a few blocks from home. Hoose’s father and uncle, both connected to the oil industry, advised TU would be a wise decision.

“TU had the courses that were of interest to me,” he said. “I enjoyed the subject matter and professors and made friends—it prepared me for the real world.”

Hoose was one of the earliest members of the TU Sigma Nu chapter and made fond memories cheering on the Golden Hurricane football team with his fraternity brothers.

“Engineers seemed to know how to have a good time, so that was educational,” Hoose said smiling. “We all enjoyed the games.”

Later, he switched his focus from production to refining within the petroleum engineering major, a smart move that paid off while working at the former KW Anderson Co., a designer and manufacturer of direct-fired heaters used at refineries and chemical plants. A TU upperclassman and close friend who worked at KW Anderson introduced Hoose to heat transfer design.

“The nature of the work I was doing was taking advantage of the subject matter in refinery design, chemistry and heat transfer,” Hoose said. “I was coming in with a good background to blend in with the standards and directions of the company.”

A successful start in the petroleum engineering industry wasn’t the only thing he gained. Hoose met his wife, Chris, at KW Anderson where she worked as a secretary. For the past 56 years, she has accompanied him every step of his career. With her support and administrative skills, Hoose branched out on his own in 1983 to establish Tulsa Fin Tube. The company produces custom fin tubes and finned pipes to increase heat transfer rates and reduce operating costs among businesses in the petroleum industry.

“I felt like it would be more enjoyable to do what I do best and take care of my family,” he said.

From its new state-of-the-art facility in Tulsa, TFT supplies materials to the petroleum and chemical industries around the world.

“There were some learning years in the beginning,” Hoose said. “You had to prove yourself. It takes time — you don’t do it overnight.”

Hoose is retired as CEO, and his older son, Justin, has helped advance the company as president. The family prides itself on not only building a reputable product but also caring for its 50 employees. A majority of TFT’s shop equipment was built in-house by TFT personnel.

“The economy goes up and down, but you learn to wear a tight belt, be thrifty and look ahead,” he said. “If effort is put forth and you stay with it, success will follow.”

The Hooses’ younger son, Lance, excels in his profession as a chiropractor in Tulsa. In addition to their sons, daughters-in-law and four grandchildren, the Hooses fill their retirement with travel, TU events, Golden Hurricane athletics and relaxing days on the lake. They are members of the TU President’s Council, Circle Society and Golden Hurricane Club. They have supported the Tulsa Undergraduate Research Challenge as well as the Hoose Family Scholarships for the College of Engineering and Natural Sciences. He was inducted into the ENS Hall of Fame in 2007.

“It’s a wonderful feeling to see the progress that’s been made and the way the campus has changed,” he said. “TU has become much more competitive with facilities to attract good students.”

Hoose said he’s proud to be named among his alma mater’s prestigious Distinguished Alumni. The university provided him an avenue to establish a successful company. Quality faculty and TU’s outstanding engineering programs are why he and Chris remain so involved.

“TU is very important to us because of the people who are there,” he said. “We enjoy our old friends and making new friends along the way.”
How did a poor boy from Arkansas become a successful Oklahoma City businessman? He earned a degree from The University of Tulsa. A Little Rock native, Distinguished Alumnus Jim Wallis (BS ’62, JD ’65) skipped study hall one morning during his senior year of high school to talk to TU recruiter Charles Malone. He was offered a one-year, $500 scholarship.

“I don’t know whether it was my academic ability or they felt sorry for me,” Wallis joked. “In 1956, $500 was all of the money in the world, and I could not afford to turn it down.”

In August, he and his parents packed their 1951 Buick and hit the road for Oklahoma. His first Tulsa stop was John Mabee Hall where “it was like a meeting of the United Nations.” At that time, most of the students went home in the evening, and there was a small number of out-of-state or international students (who lived on campus), Wallis said. “We had boys from all over, and it was quite a learning experience.”

He switched his major from geology to petroleum engineering his sophomore year and remembers taking most of his courses in Phillips Hall. Although neither of Wallis’ parents attended college, they made education a priority for him and his sister.

“It was pretty serious business,” he said. “For me, TU was work and a great deal of effort. Passing physical chemistry was a major hurdle to graduation, and somehow I managed to pass the first time. I felt that was an accomplishment.”

Wallis worked several jobs to help with college expenses including positions with the U.S. Corps of Engineers and an entry-level position at Investors Royalty Co., in downtown Tulsa. He worked there six years while earning his bachelor’s degree and attending the TU College of Law.

“My duties gradually got a little more involved in the industry, and by the time I graduated I had several years of experience, which gave me a head start,” Wallis said.

Wallis’ career stops included a position at Goff Oil, Brookwood Oil and Apache Oil where he was recruited for an area land manager role. His petroleum engineering and law degrees proved to be a beneficial combination for the industry.

“It gives you a better understanding of overall operations within a company,” he said. “You’re not intimidated by the engineering or legal side.”

Wallis later was recruited to an independent energy company in Oklahoma City where he learned valuable lessons about financial leverage and managing a business. He worked at Anson Corp. for seven years before transitioning to the establishment of his own company, EXOK Inc., in 1979. Years later, the bottom fell out of the oil market, but Wallis’ venture managed to survive the downturn. In the late 1970s, Tulsa friends invited him to participate in founding Western National Bank. He was the company’s second-largest shareholder and served as a director.

Wallis and his partners eventually sold the bank, but EXOK continues today. He’s never had to lay off any employees in a recession; and after more than four decades in the industry, Wallis has witnessed revolutionary advancements.

“The industry now is producing several million barrels a day from rock that was not considered to be reservoir quality when I was going to school,” he said.

As the geology has changed, so has his alma mater. Wallis is amazed at how the once commuter campus now attracts some of the country’s brightest students to live in first-class residence halls.

“It’s not the same school I attended,” he said. “I’ve seen an incredible transformation over the past 10 to 15 years.”

Wallis has been a member of the TU President’s Council and Circle Society and has served on the Board of Trustees since 2001. He also founded the James W. Wallis Scholarship in Law Endowment Fund and generously supports TU’s Keplinger Hall renovation and the establishment of a canine ambassador program. He and Patricia, his wife of 39 years, have five children and enjoy the companionship of their canine friends.

Wallis enjoys quail hunting, bird dogs and clay shooting. Pat hosts the weekly local television show Dog Talk and has written several books about the family’s special canines they rescued.

Reflecting on his TU experience and fulfilling career, Wallis said his journey from Arkansas to Tulsa is one he will never forget.

“Whatever success I have enjoyed in this world has got to be attributable to The University of Tulsa,” he said. “I will forever be indebted to TU.”
The stormy climate of Oklahoma’s education system has had a grave effect on teacher retention, and school systems seek ways to boost morale. A couple of years ago, Tulsa Public Schools began participating in the Yale National Initiative™, a professional development project to strengthen teaching in America’s high-poverty public schools. TPS officials were enlivened by the program and the prospect of establishing a local institute. They asked The University of Tulsa to partner in the project with support from the Charles and Lynn Schusterman Family Foundation.

“This program provides a lifeline for motivated public school teachers,” said TU Provost Roger Blais. “It keeps them excited about their jobs.”

TPS teachers and administrators asked TU faculty for help in establishing a Tulsa branch of the Yale National Initiative institute, providing academic seminars based on current curricula for K-12 classrooms. The seminars, rooted in the humanities and sciences, support teachers in academic preparation and classroom application. TU faculty serve as seminar leaders and help teachers develop curriculum units for their own classrooms that can be shared online for free with educators nationwide. Teachers researched topics in their area of expertise before developing new curriculum units at the Yale National Initiative Intensive Session in New Haven, Conn., in July. Teachers exchange ideas, gather reference materials and write content for lesson plans.

“There’s a bonding between higher education and secondary public education,” Blais said. “Our faculty can reach out to schools. It’s the type of interaction that breaks down barriers in the community.”

Public school educators and university faculty receive a stipend for their efforts along with travel to the Yale teachers institute in New Haven. The program originated there 38 years ago, and TPS has attended for the past six years. TU’s recent involvement has elevated Tulsa’s interest in the project, and the two institutions currently are finalizing establishment of the city’s own teachers’ institute. TPS educator Krista Waldron said it is refreshing to work alongside university professors. Waldron has taught in the TPS system for 23 years and currently teaches at Phoenix Rising, a school for children in the Tulsa juvenile system and those who struggle in a traditional setting. The program has provided context and alternative methods to reach many homeless or at-risk students with unstable lives.

“I’ve benefitted from my study of writing therapy for students to write through trauma, and the new ideas have shaped my teaching style,” she said. “This is what professional development should be — intense, rewarding and challenging.”

Yale National Initiative seminars offer teachers the chance to recharge their batteries and gain access to valuable education materials, but Blais said TU faculty also benefit from the project. Teachers’ thirst for content inspires university professors and presents recruiting opportunities for TU.

“Teachers can connect students with faculty members, and the partnership helps TU magnify its role in the community,” he said.

Eight TPS educators and three TU professors attended the Yale National Initiative Institute this summer. University faculty attending were Assistant Provost and Applied Assistant Professor of Political Science Denise Dutton, Wellspring Associate Professor of Chemical Engineering Tyler Johannes and Sean Latham, Professor of English and Pauline Walter Professor of Comparative Literature. Once Tulsa’s institute is open, TPS and TU hope to host at least four seminars per year, each serving 12 to 15 teachers. Planning Director Elizabeth Smith will manage the Tulsa initiative.

TU representatives who have attended the intensive session in the past include Robert Sheaff (chemistry and biochemistry), Jennifer Airy (English) and Michael Mosher (political science) along with Blais and TU President Designate Gerard Clancy.
This summer, Abigail LaBounty began her career at a company where the number of coworkers surpasses the population of her hometown in Warner, Okla. LaBounty completed her bachelor’s degree in computer science in May, and with three Google internships on her résumé, she’s ready to take on the role of a site reliability engineer at the company’s headquarters in San Francisco.

LaBounty completed Google internships in Mountain View, Calif., New York City and Zurich, Switzerland, home to the internet search engines’ largest engineering office outside of the United States. Each opportunity previewed what it’s like to work at a worldwide technology powerhouse known for taking care of its employees.

“There’s a lot of cooperation, and you’re given the resources you need to make the best product you can,” LaBounty said. “Everyone is really supportive, especially to interns, and it makes for a great work environment.”

Training is an important part of employment at Google, and projects often are assigned to teams of engineers, rather than individuals. Vibrant, colorful offices inspire employees who are never more than 250 feet from some kind of food. Cafés, espresso machines and micro-kitchens stocked with snacks are never out of reach. LaBounty said the Mountain View office features a rock climbing wall and amusement park spinning tea cups. In Zurich, Google offers an aquarium and water lounge, and many of the locations have intramural sports teams, ping pong tables and fitness classes.

Working as an engineer at Google is quite the contrast from LaBounty’s original plan to go to medical school and become a psychologist, but she learned she enjoyed computer science as a student at the Oklahoma School of Science and Mathematics in Oklahoma City.

“I knew TU had a good computer science program, and the way it’s built on a fundamental system of logic really clicked with me,” she said. “I immediately understood it and wanted to learn more.”

LaBounty will join a growing club of TU alumni now employed at Google. Rodrigo Chandia (MS ’00, PhD ’09) began working in the Atlanta office in 2010 and has since moved to the Cambridge, Mass., location as a software engineer. He said many of the computing competitions and department extracurricular activities he experienced at TU primed him for his current position — developing new features in the Google application for hotel information.

“When people search for ‘hotels in Tulsa,’ I care that those hotels and the prices are shown in a useful way,” Chandia said. “We know in the long run, helping users makes Google better for everyone.”

He is proud of the work ethic his company represents and enjoys the camaraderie of his co-workers. With support from colleagues, he has worked on four project areas including Google Search, Google Maps and the Android Maps app.

“I can rely on them to help me do things even when I am unfamiliar with the code,” Chandia said. “When you are surrounded by very bright people, you are encouraged to produce great results like everyone else.”

Conor Fellin (BS ’15) has worked at Google in Mountain View for one year. His job involves catching fraudulent traffic on Google’s ad networks.

“TU’s chapter of the Association for Computing Machinery does a lot to prepare students for programming outside of classrooms and networking within the computer industry,” he said.

TU’s reputation as a reliable producer of respected Google engineers continues to emerge. Doctoral student Marie Vasek has received one of the company’s most prestigious awards, the Google Anita Borg Memorial Scholarship. The $10,000 award is granted to women in the computer science industry.

“Once a TU computer science graduate gets a foot in the door at a company like Google, it tends to open up a pipeline between our program and the company — they appreciate the professional and technical skills of our students,” said John Hale, Tandy Professor of Bioinformatics and Computational Biology.
In a grueling test of mental stamina, physical endurance and emotional willpower, a daring group of TU students and alumni ran a 100-mile road race earlier this year. Brothers and engineering majors Max (petroleum) and Ben (mechanical) Sinor joined electrical engineer Zack Kirkendoll (BS ’13, MS ’15), graduate student Caleb Lareau (BS ’15), Cameron Philpott (BSBA ’15) and chemical engineer Aaron Vokoun (BS ’01) in running the Prairie Spirit Trial Ultramarathon near Ottawa, Kan. Although they didn’t train together for the event, they competed with a TU connection.
There’s still something about this group that drives me to do something like this,” said Lareau, a second-year biostatistics doctoral student at Harvard University. Lareau discovered running as a hobby while conducting undergraduate research with avid runner and TU Professor of Chemistry Gordon Purser. Since then, he has completed several marathons and Ironman competitions. Lareau said TU facilitated his ability to succeed academically but also try new things and develop as an athlete.

“When you set lofty goals and push yourself, there’s a level of shared activity that allows us to develop close friendships,” he said. The competitive environment fostered among TU’s College of Engineering and Natural Sciences is mirrored in students such as the Sinor brothers who are familiar with the rigors of fitness. Max received all-state in wrestling and soccer his senior year of high school, and younger brother Ben followed in his footsteps. Regulars in the gym who previously had completed a few marathons and trail events, they kept their ultramarathon training to a minimum; the demands of their TU coursework left room for only a few long runs.

“It took Ben and me roughly 28-and-a-half hours to complete the 100-mile run,” said Max, who plans to work as a drilling or reservoir engineer after graduation. “What makes us work is really the thought of not letting the other down. The thought of me hindering Ben was probably my biggest driving factor.”

Similar in strength and speed, the brothers are extremely close and constantly challenge each other’s fitness limits. They were determined to race to the finish and not worry about time.

“I wasn’t sure what to expect when we began, but I think overall it was interesting,” Ben, a prospective structural design engineer, said “I got food poisoning from a taco at about mile 60 … never trust a bad taco, no matter how hungry you are.”

The taco incident and other memorable moments along the course provided comic relief for the TU runners including Collins College of Business graduate Philpott. He had completed marathons with Lareau in the past, but was very surprised to learn Lareau had signed him up for the 100-miler without asking. Lareau believed in his ability to finish but also wanted to share the agony of running such a long distance. The ultramarathon was one of the hardest things Philpott had ever done, but he developed a kinship with the engineering athletes and completed his first Ironman this summer with Kirkendoll, Lareau and 2016 chemical engineering alumnus Colby DeWeese.

“You’re so exhausted, but you still find a way to laugh,” said Philpott, an employee of the Grand River Dam Authority in northeast Oklahoma. “My friends push me to do crazy things, but everybody works themselves to the absolute limit.”

Each student and alumnus is working toward their own personal fitness goals, and not all of them plan to run another ultramarathon.

“This was a one-time deal,” Max said. “It’ll make for a good story when I’m older.”

The six TU runners tallied 575 miles of running in under 155 hours of comprehensive race time. Purser said the camaraderie and friendships that evolve are the most important results of events like these. Many of the guys with whom he has run the past 10 years are still some of his closest friends.

“Overcoming the challenges of these grueling events bonds us like nothing else could,” Purser said. “I am so proud of every one of these guys.”

Whether they sign up for another event or take a break, all agree TU’s well-rounded culture and strong sense of community provided each athlete with a unique opportunity to overcome their toughest physical limits.

“People at Harvard can’t believe I had time to train,” Lareau said. “Without the TU base, I couldn’t have. It’s truly a special place.”
Lying under the stars at a Girl Scout camp out, Kathleen McKee (BS ’08) discovered the wonders of nature. Her mother introduced her to science and math as a preschooler in Dallas, and she remembers visiting Johnson Space Center with her troop.

“Being outdoors was something I wanted as a component of my life,” she said. “I was a Girl Scout until age 18, and having science and technology all around are part of something I really loved.”

McKee developed a fascination with geology. When the TU Department of Geosciences recruited her to Tulsa, she seized an opportunity to arrive early the summer before her freshman year to participate in a six-week internship. Under the advisement of Associate Professor Bryan Tapp, she studied brine scars at the Tallgrass Prairie Preserve.

“TU had great advisers who taught us you can do anything you put your mind to,” she said. “I received support and inspiration from Dr. Tapp.”

After graduating in 2008, McKee earned a master’s degree in geology from Michigan Technological University while serving in the Peace Corps. Living abroad in Peru allowed McKee to learn about other elements of her field and participate in community development projects. She worked as a trained water and sanitation volunteer, teaching hand washing and water treatment methods, building latrines and organizing a library in cooperation with local schools and community leadership. McKee returned to Michigan Tech after the Peace Corps to finish research for her degree. She said volunteering abroad was invaluable: “It was very fulfilling, living in another country and culture and learning the language.”

McKee found a way to incorporate science with her passion for humanitarian service during a volcano seismology class in grad school. By producing rivers of lava and suffocating showers of ash, volcanoes directly affect human life. McKee decided to specialize in volcano geophysics as a doctoral student at the University of Alaska Fairbanks. She and her adviser study and use infrasound, low frequency sound below human hearing, to better detect, locate and characterize volcanic activity. When volcanoes erupt, they generate sound as gas and ash are ejected into the atmosphere. If this thrusting of gas and ash is sustained, it produces a vibration similar to the sound of jet flow from a rocket or airplane engine but inaudible to the human ear. McKee hopes to solve many of the mysteries of volcanic activity through application of jet acoustics.

“The massive flow coming out of a volcano disturbs the atmosphere in a very similar way,” she said. “The shape of sound waves from rockets and jet engines is the same. We’re just shifting to lower frequencies.”

McKee spent the summer of 2015 collaborating with local scientists to record sound waves at Aso Volcano in southern Japan. She positioned six microphones at the crater rim to record the sound produced by a small vent at the bottom of the crater. Known as a fumarole, the vent releases hot gas in a volcanic environment and can sound like an airplane.

“If we can determine how much gas is coming out and how fast, we can better predict the hazards,” McKee said.

Equations have been empirically derived to determine jet flow parameters, such as velocity, from the recorded sound, but she said those methods don’t hold true for volcanoes. The study of volcanic jet noise has additional complexities and challenges such as the presence of solids within the jet flow, complex vent geometry and limited recording opportunities and locations. McKee is analyzing last summer’s data in hopes the sounds from the small vent will prove to be jet noise. Gas-jetting fumaroles could serve as natural laboratories in future studies to develop new equations for volcanic jet flow.

A geology journey that began in Tulsa has taken McKee around the world, and she expects to complete her doctoral thesis next summer. Following her degree, she hopes to continue research at a volcano observatory in the United States — maybe even in Alaska.

“There’s amazing geology here right in your face,” she said. “It isn’t easy, but the wilderness is an adventure in itself.”
When Antonio Pietri stepped off a plane in 1982, it was his first visit to Tulsa and he spoke little English. He had graduated from high school early in Valencia, Venezuela, and wanted to continue his father’s tradition by attending The University of Tulsa. He spent the next four months learning English before beginning his bachelor’s degree in chemical engineering.

Pietri graduated in 1987 and continued his education at the University of Houston with an MBA. He launched his career in the advanced automation field in Houston, working for ABB Simcon and Setpoint Inc., which later was acquired by Aspen Technology in 1996. With more than 30 offices on six continents, AspenTech is the world’s leading software supplier of optimization solutions for the process industries. It is a publicly traded company on the NASDAQ exchange and generates $500 million a year in revenue.

After more than two decades at AspenTech, he advanced from sales account manager to president and CEO in 2013. In addition to relocating on international assignments to England, Singapore and China with his wife and two daughters, Pietri has traveled the globe, providing vision as a role model for younger engineers.

“I enjoy having the opportunity to give them that first insight into what the corporate world is like and what it takes to have a successful career,” he said.

TU is one of 800 universities, including Columbia University, MIT and Virginia Tech, to implement AspenTech software in its teaching curriculum. Headquartered in Bedford, Mass., the company’s products and solutions are used around the world, and its 1,400 employees serve these global customers, leveraging their domain expertise.

“We build software to optimize the design, operations and supply chain of refining and chemical businesses. All major oil, chemical and engineering and construction companies use our technology to improve their return on capital employed and drive operational excellence.” — Antonio Pietri

AspenTech has signed similar agreements with other countries and companies to support the ongoing development of talent for the process industries. The firm strives to prepare engineers for the process industry workforce, much like TU prepared Pietri for his fulfilling career.

“I studied under some of the same professors my father had,” he said. “TU gave me the confidence to go out into the real world.”
Faster than a speeding bullet

Community supercomputer managed by TU alumnus

It’s one of the most powerful supercomputing systems in the state operating at a speed of 250 to 300 times faster than today’s desktop machines. The Tandy Supercomputing Center (TSC) at Tulsa’s Oklahoma Innovation Institute (OII) accomplishes complicated and daunting tasks in a matter of hours that would normally take weeks. The supercomputer completes three to four projects a day for members of the private, commercial and academic sectors such as TU’s College of Engineering and Natural Sciences. Other partners include Northeastern State University, Oklahoma State University, Oral Roberts University, Tulsa Community College and the University of Oklahoma.
It’s unusual to have a multi-institutional center, but that’s what makes us different,” said George Louthan (BS ’09, MS ’11), director of TSC. “We also have a good relationship with other supercomputing centers in the state.”

Managed by three of OII’s 12 employees, the supercomputer was established in 2013 through the citywide planning effort Step Up Tulsa. The Tulsa Community Foundation facilitated the campaign, which focused on creating and improving quality-of-life initiatives.

“We thought Tulsa could do a better job of accessing economic tools, sharing community resources and converting research to high-impact jobs,” Louthan said.

The city was searching for a way to best leverage advanced computing resources that could benefit Tulsa residents.

“It became clear that OII and the need for more computing power were a very good match,” he said.

The steady, low hum of more than 100 servers greets the computer scientists and technicians cleared to visit the supercomputer’s chambers in City Hall. Louthan said TSC has proven its worth time and time again, supporting dozens of projects at TU, in Tulsa and around the state.

“In just the physics department alone, we’ve worked on a certain project for two-and-a-half years to provide the equivalent of 100 to 200 personal computers in constant use for that whole time,” he said.

TSC assists TU Professor of Physics Sanwu Wang and his Quantum Mechanical Computations team with molecular dynamic research.

“The Tandy Supercomputer has made it possible for my group to perform large-scale parallel quantum-mechanical calculations and simulations for a variety of research projects in physics, chemistry, materials science and nanotechnology,” Wang said. “The computations have provided fundamental understanding of catalytic reactions involving biofuels, conductivity of polymer electrolytes, phase transitions of nanosized white graphite and graphene as well as electronic and electromechanical properties of lead-free piezoelectric materials and relaxor ferroelectrics.”

Physicists, biologists and other scientists who seek the supercomputer’s power are taught how to effectively use its “tool chest of research skills” for study and development in the Tulsa community. Louthan said the center is a low-cost option for small-to-medium-sized companies and universities who otherwise cannot afford to conduct maximum computing tasks. Some services also are offered free to startups and entrepreneurs.

“It’s an unbroken chain of transferring research to technology and helping startups become enterprise,” Louthan said. “No day is ever the same as the next, and I get to support more research than most people ever get the chance to work on.”

But TSC has set a goal to change and provide more research opportunities for Tulsa entities. The center is ideal for industry engagement, offering services to private sector users that drive economic development. Users interested in technology transfer, such as the Oklahoma State University Center for Health Sciences in Tulsa, sought TSC’s help in developing a proof of concept for signal analysis of EKG readings with real-time results. OSU hopes to commercialize the product.

“The supercomputing center lends itself to not only impacting Tulsa economically but also to improving the health of all Tulsans and Oklahomans,” Louthan said. “We ask clients to tell us what they’re pursuing and what they would like to do that they can’t. It’s fun to learn what our users are doing.”

A National Merit Scholar finalist, Louthan studied computer science at TU and conducted research at the university’s Institute for Information Security. In addition to his TSC leadership, he is OII director of information technology and a member of the OneOklahoma Cyber Infrastructure Initiative, a statewide group of universities and organizations that manage supercomputing systems.

“It’s a really great community that we’re a part of,” he said. “We make sure researchers are plugged into Oklahoma’s supercomputers.”

TSC’s purpose and mission are deeply rooted in Tulsa’s economic ambitions and the interests of its residents. Louthan’s TU background serves him well as he and OII strive to provide research tools that give Tulsa a competitive edge in computing while improving Oklahomans’ quality of life.

“We’re on track to have over 100 new individual users this year, including faculty members, research students and private companies,” Louthan said. “We’ve created a new supercomputer model by taking pieces from what we think others do very well and developing a shared system that benefits the entire community.”

For more information about TSC, please contact Louthan at george.louthan@oklahomainnovationinstitute.org.
Behind the glass door of a restricted laboratory in Oliphant Hall, Akhtar Ali, associate professor of virology, is conducting exclusive research in virus prevention and treatment. He is the only biologist in the state to study animal, human and plant viruses.

“Viruses are usually considered the ‘bad guys,’ but all viruses aren’t bad,” Ali said. “Studies usually focus on how viruses affect plants or humans, but my research looks at the complete opposite — how to use a virus as a biological agent to control fungal diseases.”

Ali holds bachelor’s and master’s degrees in plant pathology from Khyber Pakhtunkhwa Agricultural University in Peshawar, Pakistan, along with a doctorate from the University of Adelaide in Australia. After conducting post-doctoral research in Australia, Japan and at the Samuel Roberts Noble Foundation in Ardmore, Okla., he brought his diverse expertise to TU in 2007 and built a laboratory from the ground floor.

“We’re taking virus research in a new direction for grad students and faculty in the department,” Ali said. “Viruses are used to cure diseases, secure crop yields and protect the world’s food supply. Our projects will determine the causes and effects of how viruses establish in the host and spread to other hosts.”

Since joining the TU Department of Biological Science, Ali has received 14 external grants from the U.S. Department of Agriculture, state agencies and private organizations and industry and has conducted more than 70 conference presentations around the world. His success in virus research earned him a Fulbright U.S. Scholar award earlier this year. The accolade will support advanced investigations at the University of Okayama, Japan, beginning in fall 2017.

In the meantime, his lab is a popular learning environment among biology students. He has worked with more than 30 undergraduates along with several graduate students. Ali also serves regularly as a mentor for Tulsa Undergraduate Research Challenge scholars. While most choose to specialize in fungal or bacteria research, he teaches human virology to undergraduates focusing on diseases such as hepatitis, HIV and cancer.

“Working with plant viruses is easy, and some of the data could be extrapolated to human viruses,” Ali said. “The techniques for molecular characterization of viruses are the same whether they infect human, plants or animals but just with a different host.”

His applied biology research extends from the wheat fields of western Oklahoma to strawberry patches in the southern part of the state. Ali said his lab is the only one in the United States to conduct virus studies in cotton with a grant from Cotton Inc. He has trained 50 state extension agents about virus symptoms in the field and treatment.

The obvious challenge in working with plants is that they can’t talk and provide information on pain or symptoms like humans would, Ali said. However, this is beneficial for virus research in the long run.

“Working with plants is more safe,” he said. “We can’t get a virus, such as the flu, from plants. When you work with humans, you have to do so at a very high level of biosecurity.”

Another benefit of researching human viruses in plants — Ali said each investigation reveals new information critical to protecting U.S. crops and sustaining the nation’s food supply.
Dust events, which can reduce visibility to nearly zero, contribute to chain reaction traffic accidents and property damage every year in the Southern Plains states. However, motorists currently do not receive any type of notice that conditions are favorable for such an event. In Arizona from 2008 to 2013, blowing dust was responsible for 566 collisions, 394 injuries and 14 fatalities. In 2016, dust-related injuries and fatalities were reported in California, Kansas and Arizona. On April 10, 2016, 11 were injured in accidents during a dust storm in Lawrence County, Arkansas. This is the first report of dust-related injuries east of Oklahoma.

Remote sensing and field observations show areas of dust emissions typically are localized, but the science behind spatial and temporal patterns of emission hot spots and how they correlate with blowing dust is a mystery.

“This is a matter of life and death to some travelers,” Li said. “There is very little research in this area, so we are identifying sections of highways that are particularly vulnerable to dust.”

Li and geosciences graduate student John Blackwell are collaborating for the two-year investigation with researchers at Texas Tech University and the University of Texas-El Paso. This summer, Li and Blackwell visited locations that are particularly sensitive to wind erosion. Using remote sensing and field observations, they identified locations where dust emissions occurred in the past 10 years and then determined factors that may contribute to wind erosion such as wind speed, soil and vegetation growth. The data will be used to develop an integrated modeling and monitoring system highway managers can use to make informed and timely decisions. An advanced alert system could lead to temporarily closing stretches of highway or posting warnings for motorists.

“This will enable us to generate a series of maps that show hot spots where there might be a high risk of dust, whether it’s close or far away from the highway,” Li said. “We’ll use modeling to set a number of standards for what weather and surface conditions may trigger a dust storm.”

Li said the study’s urgency will grow as projected global changes in climate, land use and land cover likely will cause more frequent and extreme dust emissions.

“Dust will pose a serious threat to transportation safety in the coming decades, particularly for the Southern High Plains where climate is projected to become drier and warmer,” Li said.

Results from the DOT study will be available for land and highway managers to improve regional transportation safety. In the future, Li said he hopes to conduct a follow-up study on the impact of weather and climate conditions on transportation infrastructures throughout the United States.

Settling the dust

Oklahomans are familiar with tornado warnings, but in the entire southwestern region, warnings about blowing dust on roadways could be just as effective. Assistant Professor of Geosciences Jimmy Li has received a grant from the U.S. Department of Transportation to identify hot spots that cause dust to cloud highways in New Mexico, Oklahoma and Texas. The results will help develop an early warning system to save lives.

Graduate student John Blackwell (left) and Professor Li.
Professor Harrington Wells has studied the decision process of bees since the 1980s and conducted experiments in countries as far away as Turkey, Japan, Colombia, India, Pakistan and Mexico. With a team of TU biology graduate students and undergraduates, he often collaborates with other scientists at national and international universities. Wells said bees are a wonder of the insect world, and understanding their decision process provides applications for both agricultural production and the development of artificial intelligence. Despite tiny brains, they have the ability to navigate more than a mile.

“The overarching question I am interested in is how an organism with a relatively simple nervous system can solve complex foraging problems,” Wells said.

A set of experiments pitted reward differences against varying work regimens associated with the rewards. As a general rule, Wells said when dealing with just reward differences, bees are energy maximizers. When reward is not a factor, they are work minimizers.

“Research showed when high reward was coupled with high work, uniformity of response across individuals surprisingly vanished,” Wells said. “Different individuals from the same colony solved the same problem in different ways. Yet, behavior for each bee fell into one of just three categories.”

This experimental model has since proven successful in understanding the role of neuromodulator chemicals when making decisions, as well as behavioral differences observed among races of the honey bee.

These protocols help Wells and his colleagues study the effects of drugs as diverse as alcohol and pesticides on the decision process of insects. While solving some types of problems are highly affected, others are not, and this contributes to a pollinator crisis.
The gritty wind blows Stafford’s long brunette ponytail across her face as she crouches down with her glove to anticipate the next pitch. A sophomore utility player and first baseman for the Golden Hurricane softball team, she is a fierce opponent on the field and an even stronger competitor in the classroom.

After visiting TU for a summer softball camp during high school, Stafford fell in love with the campus and its academic programs. An offer to play softball at the collegiate level was icing on the cake.

“TU’s class sizes suited my need for intimate studies and the ability to develop relationships with the professors, so I could get help anytime,” Stafford said. “I knew they would remember my name and give me a great opportunity to succeed later in graduate school.”

With an ultimate goal of becoming a pharmacist, Stafford understands the enormous amount of dedication her education will require during the next few years. She’s always enjoyed math in school and wanted a career where she could use science to help people. Stafford said pharmacy is her calling.

“I want to connect with people and be the bright moment in their day,” she said. “They can leave the store with a smile on their face and the hope things will get better.”

Until pharmacy school, Stafford’s biochemistry classes and softball schedule will keep her busy. Although she said it can be difficult to keep up with homework while traveling to games, the team’s academic adviser helps everyone stay focused. Stafford is experienced at handling pressure and keeping a meticulous routine.

“I like doing anything that involves competition,” she said. “My main goal in life is to inspire people and change lives.”

When she’s not playing softball, taking guitar lessons or participating in residence hall government activities, Stafford has her nose in the books preparing for the future. Although biochemistry is historically dominated by males, she’s not intimidated.

“You feel smarter because you are a girl, and you’re in all of those classes,” she said. “I can say ‘I’m as smart as him,’ and let that be a confidence builder.”

Stafford is one of the many diversified and ambitious students blazing trails not only in biochemistry, but all the science fields. As a student-athlete, she skillfully juggles the demands of softball and academics in preparation for her pharmacy career.

“With the right attitude and persistence, we can achieve anything in life,” she said. “If people can believe that, my goals will be met.”

Thirty of the 36 freshmen in the Department of Chemistry and Biochemistry during the 2015-16 academic year were female, including Tori Stafford, a biochemistry major from Van Buren, Ark. She is among a growing number of women joining core science fields.
When mechanical engineering major Alyssa Hernandez arrived at TU in the fall of 2014, she looked for a way to connect with fellow students who were studying engineering, but TU’s Society of Hispanic Professional Engineers (SHPE) had fallen inactive. With the help of a small group of determined students, she started from scratch. Hernandez and another TU student attended the National Institute for Leadership Advancement (NILA) at Facebook headquarters, networking with employers and learning how to further the SHPE mission.

“The SHPE organization is more than just empowering Hispanics to overcome the obstacles of higher education, but to diversify the workforce and create more of an inclusive community,” she said.

SHPE members brought their new ideas back to Tulsa, facilitating social events and career and study sessions. They attended national and regional conferences, volunteered alongside regional chapters at a Habitat for Humanity site and homeless shelter and helped host two Noche de Ciencias events where students from low-income areas participate in science, technology, engineering and mathematics (STEM) activities.

During the past two years, Hernandez said the chapter has grown from six to 15 members and gained corporate support from Chevron. Thanks to SHPE networking opportunities, she has received her first engineering internship and inspired other minority groups to become more active.

“SHPE has been extremely helpful in mentoring our young organization,” said Donovan Adesoro, a petroleum engineering junior and president of the National Society for Black Engineers. “We owe a large part of our success to them.”

Much like SHPE, NSBE was virtually nonexistent until it was revived in 2015 with seven members. Since then, the group has doubled in size while striving to increase the number of culturally responsible black engineers. With support from companies such as Chevron and ConocoPhillips, the NSBE participates in professional development workshops and job fairs.

“They allow us to network with industry professionals who work at Fortune 500 companies,” Adesoro said. “Unfortunately, these job fairs will be one of the few in their lifetime when they interview with employees who all look like them.”

While making lifelong friends and preparing for a career, Adesoro said giving back to the community is his favorite part of NSBE. After graduating from a high school where 80 percent of the students received free/reduced-price lunches, he understands the importance of college preparation. NSBE eventually hopes to establish a junior member program that pairs high school students with a TU faculty member for summer research.

“I can relate to a lot of the local high school students who aren't sure what an engineer even does or the difficulties of paying for a college education,” he said. “The “NSBE Jr. program will enable us to overcome that.”

TU’s newest engineering club is the American Indian Science and Engineering Society, reinstated in March 2016. It regularly collaborates with AISES junior programs and Native American clubs.

“I have seen first-hand that Native American children are not reaching their full potential because of cultural norms or a lack of funding,” said group president and mechanical engineering student Amanda Hooper. “I do not want to sit idly by as my people struggle.”

Although each club will strive to achieve its own goals in the 2016-17 academic year, they plan to partner for activities that promote inclusion within all engineering and science industries.
Manning named Mr. Homecoming

Frank Manning is an institution at The University of Tulsa. For the past 48 years, he has mentored and taught thousands of students as a faculty member in the Russell School of Chemical Engineering. Alumni stop by his office on a regular basis to say hello and show their appreciation for how he influenced their engineering careers. Earlier this year, a group of chemical engineering graduates committed funds to name a Keplinger Hall classroom in his honor.

“That’s what impresses me the most,” Manning said. “Their success is mind-boggling, and their loyalty is second to none.”

Successful graduates inspire Manning to continue teaching after five decades in higher education. He is a native of Barbados, West Indies, and holds a bachelor’s degree from McGill University and three graduate degrees from Princeton University. He served nine years on the faculty at the Carnegie Institute of Technology before joining TU’s chemical engineering program. Manning said he felt an immediate connection to his Tulsa colleagues.

“It didn’t take but five minutes to figure out Dean Guerraro was somebody I could talk to, and Paul Buthod became a valuable colleague,” he said. “He is why I became a practical engineer instead of just a theoretical engineer.”

While at TU, Manning’s research has specialized in industrial pollution control, surface processing of petroleum and fired heaters. He has been a principal investigator or co-investigator in more than 40 research grants or contracts as well as written three books and more than 70 articles. A member of the American Society of Engineering Education and the American Institute of Chemical Engineers, Manning has stayed current with industry trends and also heeded the advice of his late twin brother who worked in the chemical engineering industry.

“He always told me his engineering stories,” he said. “You’d be surprised how much you can learn if you’re willing to learn it.”

Manning spent many summers traveling around the world teaching short courses on oilfield processing and industrial pollution. A self-proclaimed workaholic, Manning said his children, Helen, and Frank (BS ’88) and wife, Ardis, (MA ’71) are very supportive of his lifelong devotion to education. Although Manning could have joined the industry, he chose to stay in academia because “teaching is a wonderful job.”

“The students keep me young,” he said.

After nearly half a century at TU, Manning’s recognition as Mr. Homecoming 2016 is fitting for someone who has become a pillar of the university.

“TU has been very good to me, and it’s comforting to know I’m considered worthy of this award,” he said. “I’m very appreciative to the university.”

Outstanding Teacher Award

Tyler Johannes, Wellspring Associate Professor of Chemical Engineering, was named one of TU’s three Outstanding Teachers for 2016. The award is especially meaningful because it must be initiated by a student’s nomination, and winners are selected by colleagues on TU’s faculty affairs committee of the Faculty Senate. Honorees receive a stipend along with a medal and recognition at May Commencement.
Physics doctoral student wins DAAD scholarship

Physics doctoral student Juan Wang is The University of Tulsa's latest recipient of the prestigious German Academic Exchange Service (Deutscher Akademischer Austausch Dienst-DAAD) scholarship. She was accepted to the Research Internship in Science and Engineering Professional program in spring 2016.

The DAAD is a self-governing organization of higher education institutions in Germany that promotes international academic relations.

Wang completed a three-month internship at the research institute Helmholtz-Zentrum Berlin for Renewable Energies and Materials. She investigated the spectroscopic surface and interface characterization of energy-conversion devices and studied the chemical and electronic structure of interfaces in ferroelectric/semiconductor heterostructure.

“This internship was a great chance for me to strengthen my research abilities and work with top research teams in Germany,” Wang said.

She holds a bachelor's degree in agronomy from China Agricultural University and a master's degree in physics from China University of Petroleum in Beijing.
TU competes in PetroBowl championship

TU’s PetroBowl team defeated 27 other North American teams in March to win first place in the 2016 PetroBowl North American Regional competition in Austin, Texas. The team advanced to the international contest at the Society of Petroleum Engineers Annual Technical Conference and Exhibition in Dubai, Sept. 26. The regional team included petroleum engineering students Ryan Erickson, Chandler Losing, Jayanth Nair, Shyam Sajeev and Alghheelan Sella Thurai.

The PetroBowl features four-member student teams challenging each other in a quiz-style trivia game. Questions focus on technical aspects, history, current events, industry statistics and calculations. In April, TU’s SPE student chapter hosted an internal PetroBowl competition for the first time on campus.

“We wanted to spread the word about how the PetroBowl is a prestigious competition,” said Tomas Fernandez, petroleum engineering senior and SPE chapter president. “It’s a way to scout for new talent on the team.”

Led by captain Jayanth Nair (MS ‘13), a petroleum engineering doctoral student, TU’s team includes four members and an alternate.

“Some of the team have met for more than a year,” Nair said. “We meet three times a week over the summer and twice a week during the semester.”

The PetroBowl is an opportunity to strengthen industry knowledge and help students market themselves to potential employers. The team relies on the guidance of their coach Auzan Soedarmo (MS ‘15), a petroleum engineering doctoral student and member of TU’s 2014 International PetroBowl Champion team.

“We study and practice, but he puts a lot of work into researching and writing questions for us,” Nair said. “We like to give a lot of the credit to him.”

For an update on how the team finished in Dubai, go to engineering.utulsa.edu.

Cyber defense team fourth at nationals

A group of computer science students won the southwest regional Collegiate Cyber Defense Competition and placed fourth in the national contest April 22-24 in San Antonio, Texas.

Gavin Bauer, Kyle Cook, Michael Frohlich, Matt Hruz, Ryan McCarthy, Thomas Shaw, Jack Thompson, Duc Tran and adviser Andrew Kongs were tasked with protecting computer networks against simulated real-world cyber threats that infiltrate major retailers, corporations, social networks and financial institutions. Teams were required to secure and maintain servers and workstations, manage data, administer users and perform common business-related and administrative tasks while fending off attacks from a live opposition team.

“It’s one thing to practice in a classroom where there is no stress or deadlines, but it’s another to repair a broken server while making it secure and not taking it offline,” Bauer said. “It’s extremely difficult.”

The competition provides hands-on learning opportunities that support exciting and challenging cyber careers. Each member of TU’s team specialized in certain areas of cyber security such as firewall, website and email server. As a fun source of inspiration, TU computer science Professor John Hale had “trading cards” created for each team member that highlighted his specialties and included spoof photos.
MADE at TU projects benefit community

Projects supporting TU’s Make a Difference Engineering (MADE at TU) initiative are ongoing in the College of Engineering and Natural Sciences. The program is open to all ENS students and encourages engagement with service organizations in the Tulsa community. In April, a team of mechanical engineering seniors designed and built a mobility device for members at the Center for Individuals with Physical Challenges. The facility provides social, cultural and recreational opportunities for persons with physical disabilities.

The TU group consulted with therapists and members at the center to build a device known as the Swift Lift. It assists individuals from a seated to standing position and provides support for the person to utilize his or her own arm strength to walk. The walker benefits adults who are rehabilitating after a stroke, spinal cord injury or orthopedic injury as well as some amputees.

“We’ve worked really hard the past eight months, and it’s very exciting to see the effect our project can have,” said team member Katy Riojas (BS ’16) as she and the Swift Lift team delivered the finished product on April 28.

“The total material cost for what we developed was only $1,800 compared to the commercial models that are over $5,000, so we helped provide a low-cost solution to their need.”

Other recent MADE at TU projects include a portable enclosure for Tulsa’s Little Light House called the Quiet Room. Designed for children on the autism spectrum, the space provides a visual, aural and tactile sensory environment that can be altered to suit a child’s individual needs. TU has partnered with Little Light House on similar projects for more than a decade.

Also, students in the Tandy School of Computer Science have established relationships in the community by building computer games for students enrolled in the Tulsa Symphony Orchestra summer program. One game educates children about how music connects to world history. The other supports curriculum for the orchestra’s Sound of Science program.

Kuttal recognized at conference of HCI

A research paper published by Assistant Professor of Computer Science Sandeep Kuttal received a best paper award at the conference for Human-Computer Interaction in May in San Jose, Calif. Kuttal collaborated with researchers at Oregon State University to write “Foraging among an Overabundance of Similar Variants.” Of the 2,325 submissions, only 23, less than 1 percent, earned a best paper status.

Physics department witnesses history

Students, faculty and staff from the Department of Physics gathered on Feb. 11 to watch a live webcast of the first detection of gravitational waves from a binary black hole system. During the watch party in Keplinger Hall, members of the Laser Interferometer Gravitational-wave Observatory announced the momentous discovery. The detection is the strongest evidence in support of Einstein’s Theory of General Relativity.

Grad student awarded PSIG scholarship

Mechanical engineering graduate student Peyman Zahedi has received the Orin Flanigan Pipeline Simulation Interest Group Scholarship. The $5,000 scholarship is awarded to students conducting pipeline simulation research. Professor of Mechanical Engineering Siamack Shirazi presented Zahedi’s work on his behalf at the PSIG conference in May in Vancouver, Canada.
Embeddtech to commercialize Virtuoso software

Tulsa technology company Embeddtech, Inc., has launched a campaign to accelerate the commercialization of its Virtuoso software, a virtual device framework targeting professional and student designers of custom electronics. The product is set for official release in 2017. Embeddtech is expected to debut photo-realistic real-time 3D virtualization to embedded software development using Unreal Engine, a powerful game engine developed by Epic Games.

Electrical engineer Jonathan Torkelson (BS 04, ME 04) is president of Embeddtech and a member of the Department of Electrical and Computer Engineering advisory board.

Rake places at IEEE conference

Mechanical engineering graduate student Nathanael Rake (BS '15) was awarded second place in the best poster competition at the IEEE RAS & EMBS International Conference on Biomedical Robotics and Biomechatronics in June in Singapore. The poster is based on the paper “Modeling and Implementation of a Simplified Human Tendon Structure in a Robotic Finger,” which is expected to appear on IEEE Xplore. Rake was a Tulsa Undergraduate Research Challenge scholar 2013-14.

Papa, Nivethan receive paper award

Associate Professor of Computer Science Mauricio Papa and computer science doctoral student Jeyasingam Nivethan (MS '13) received a best paper award for their research publication “Dynamic Rule Generation for SCADA Intrusion Detection.” The paper was presented in May at the 2016 IEEE International Symposium on Technologies for Homeland Security in Waltham, Mass.

Sills is outstanding senior

Devon Sills (BS '16) received the Robert H. Parks, Sr., Petroleum Engineering Outstanding Senior Endowed Award in March. Sills graduated with a 3.5 grade-point average and began her career at Chevron this summer.

TURC student presents in Singapore

A research paper written by TURC scholar and mechanical engineering senior Spenser Pulleyking was selected for oral presentation at the IEEE RAS & EMBS International Conference on Biomedical Robotics and Biomechatronics in Singapore. Pulleyking’s paper, “Simplified Robotic Thumb Inspired by Surgical Intervention,” was chosen for presentation from more than 300 submissions. He conducted research this summer on anthropomorphic grippers with active sensing at Sungkyunkwan University in Suwon, Korea.

Pulleyking is researching the Open Source Robotics Foundation’s Robot Operating System to develop a new type of six-axis force sensor and achieve compatibility with robots worldwide. He is the first TU student to participate in the International Tulsa Undergraduate Research Challenge, a program offered by TURC and TU’s Office of Global Education.

Evans wins Phi Kappa Phi fellowship

Austin Evans (BS ’16) is a 2016 recipient of the Marcus L. Urann Fellowship, awarded by the Phi Kappa Phi Honor Society. Evans is among 51 students nationwide to receive $15,000 of academic support for his first year of graduate or professional study. The fellowship is named in honor of Marcus Urann who founded Phi Kappa Phi in 1897 as a student at the University of Maine. Evans is pursuing a doctorate in materials science at Northwestern University.
Faculty awarded research grants

John Hale, Tandy Professor of Bioinformatics and Computational Biology, and Peter Hawrylak, associate professor of electrical engineering, have received a grant from the National Science Foundation to conduct the research project “TWC: Small: Scalable Hybrid Attack Graph Modeling and Analysis.” Hale and Associate Professor of Computer Science Roger Mailler have received U.S. Department of Defense research funding to purchase equipment under the Defense University Research Instrumentation Program. Hale also won an NSF Major Research Instrumentation Program award to support the acquisition of research tools.

ChE students promote water conservation

A group of chemical engineering students presented information on a water conservation and awareness presentation to students at Kendall-Whittier Elementary School earlier this spring. The students are developing a wireless device to monitor water usage in hotel showers. The project won funding through the Environmental Protection Agency’s People, Prosperity and the Planet grant.

Farrior, Millspaugh recognized by OSPE

Tulsa-area high school teacher Laura Millspaugh (BS ’03) and TU Visiting Professor of Mathematics Donna Farrior were given Tex Richardson Guidance Awards at an Engineer Week breakfast in February. The event, hosted by the Tulsa chapter of the Oklahoma Society of Professional Engineers, recognizes teachers and engineers who demonstrate exceptional service in guidance activities.

Millspaugh received a teacher award for her work as director of STEM/Robotics at Tulsa’s Cascia Hall. Established five years ago, the program has grown to include FIRST Tech Challenge and FIRST Robotics Competition teams. Millspaugh earned her TU degree in chemical engineering. She teaches AP chemistry and physics at Cascia Hall.

Farrior was honored with the collegiate teacher award for her dedication to the Tulsa Girls’ Math Circle and Tech Trek Tulsa. She founded TGMC in 2014 to encourage math learning among middle school girls. Farrior also has codirected Tech Trek Tulsa, a weeklong summer immersion camp for area girls.

For more information on the TGMC, please visit http://tgmc.utulsa.edu/.

Jackson honored by SWE

The Society of Women Engineers recognized Christina Bishop Jackson (BS ’05, PhD ’10) with the Region I Invigorating Award in March. Jackson is the senior engineering manager for the Systems Group at Callidus Technologies. She also will receive the 2016 SWE National Emerging Leader honor at the association’s national conference in Philadelphia in October.

Clifford Will delivers Hulings Lecture

Physicist Clifford Will discussed “Black Holes, Waves of Gravity and Other Warped Ideas of Dr. Einstein” at the Norman M. Hulings Memorial Lecture March 4. Will is Distinguished Professor of Physics at the University of Florida and the author of more than 200 scientific articles and three books. He met with TU faculty and students prior to his keynote at Gilcrease Museum. Pictured are (left to right) Assistant Professor of Physics Scott Noble, Will and students.
TU partners with U.S. Navy for iSEC training

TU’s Division of Continuing Engineering and Science Education is partnering with the Institute for Information Security to present the Risk Analyst Boot Camp for members of the U.S. Navy. The inclusive program features 10 instructional modules of distance-learning short courses on the 4016A instructional standard.

The training provides fundamental knowledge and skills needed to analyze, assess, control, determine, mitigate and manage risk within a federal management and acquisition framework. The program is vital for federal interest computer systems that store, process, display or transmit classified or sensitive information. Specific focus is directed toward identifying, implementing and integrating management, acquisition and administrative risk methodologies for securing critical and sensitive information infrastructures. Participants learn how to establish standards for protecting the confidentiality, upholding the integrity and ensuring the availability of critical organizational computing resources.

The 10 modules are IA principals; risk management; risk assessment; enterprise system security; information system security evaluation; certification and accreditation; automated information systems; threat, vulnerability and attack analysis; audit services; and a capstone project. The material is developed and presented by Tandy School of Computer Science faculty Rose Gamble, John Hale and Mauricio Papa, as well as CESE contracted instructor, Nathan Singleton.

IPEC Conference set for November

The 23rd International Petroleum Environmental Conference will be held Nov. 8-10 in New Orleans, La. The event welcomes industry professionals from around the world to discuss environmental issues and solutions in exploration, production, refining and distribution of petroleum. Plenary speakers and lectures include:

- **Jeri Sullivan Graham**, Ph.D., Chemical Diagnostics & Engineering Group, Los Alamos National Laboratory, Los Alamos, N.M.  
  *Leaping Hoops and Hurdles — Overcoming Regulatory, Policy and Physical Constraints to Achieve Beneficial Uses with Produced Water*

- **Terry C. Hazen**, UT/ORNL Governor’s Chair Professor, Director, Institute for Secure and Sustainable Environments, The University of Tennessee, Knoxville, Tenn., and Bioscience Division, Oak Ridge National Laboratory, Oak Ridge, Tenn.  
  *Oil Biodegradation Potential in Deep Marine Basins Worldwide*

  *Bureau of Offshore Energy Management Water and Air Quality Programs for Offshore Oil and Gas Environmental Assessment, Management and Research*

- **Markus G. Puder**, Ph.D., The Honorable Herbert W. Christenberry Professor of Law, Loyola University College of Law, New Orleans.  
  *The Paris Climate Agreement and Bederman’s Six Myths About International Law.*

Visit cese.utulsa.edu/conferences.php for more information.

CESE attends URTeC

CESE representatives attended the Unconventional Resources Technology Conference (URTeC) Aug. 1-3 in San Antonio, Texas. URTeC is organized by the Society of Petroleum Engineers, The American Association of Petroleum Geologists and the Society of Exploration Geophysicists. CESE connected with many current industry professionals and clients as well as TU alumni.
‘Tis the season for political cartoons, campaign ads and promises of change. In an election year, voters mark their ballots to participate in American democracy.

As alumni, you can shape the future of students in the College of Engineering and Natural Sciences. Contributions to the TU Annual Fund create once-in-a-lifetime opportunities for math majors who track trends and tabulate results and computer scientists who keep the political machine running.

Whether you’re red or blue, please vote for TU with a donation to the Annual Fund.

utulsa.edu/giving