

Innovations

THE UNIVERSITY OF TEXAS AT SAN ANTONIO COLLEGE OF ENGINEERING

VOL. 23 | SPRING 2017

UTSA.Engineering



Graduating seniors
take flight **14**

Purifying water with
nanomaterials **20**

Building greatness: New
science & engineering facility **26**

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ON THE COVER

Biomedical engineering senior Jasmine King conducts research in a University of Texas at San Antonio (UTSA) College of Engineering (COE) laboratory dedicated to biomedical research. King is one of two engineering undergraduate students who won prestigious National Science Foundation Graduate Research Fellowships. Read more on pages 16 and 17 in this issue of *Innovations*. (Photo by Deborah Silliman/College of Engineering)





Engineering metal art

Hunter Prinz, a junior mechanical engineering major, demonstrates the moving parts of a scorpion he made completely out of scrap metal at his home in Schertz, Texas.

“My father always worked with cars, and I was always with him. I picked up welding from him,” said Prinz. “Last year, I wanted to make one of my best friends a birthday gift. He loves music so I used some of the scrap metal we had around the house and welded him a guitar. I got a lot of positive feedback about that piece, so I started doing more metal art, including this scorpion.”

Prinz has partnered with a local company called Bracken Recycling where he now gets the majority of his scrap metal for his welding projects.

“We call it ‘upcycling’ instead of recycling,” Prinz said.

Prinz’s scorpion took about 10 days to design, three days to weld, and the piece weighs about 450 pounds, moving components and all.

Prinz said he doesn’t have a lot of time or money to design large projects like car suspensions while he’s studying at UTSA. But he has big plans for the future.

“I have a lot of ideas in my head but I can’t do them until I have the money for it,” he said. “This metal art is a good outlet for me. It is a great way to get my designs out of my head so I am not constantly overwhelmed with them. I don’t want to be constantly studying books all the time. I really like to get out and work with my hands.”

When Prinz graduates, he says that his dream job is to work in the automotive industry or own his own company.

“I am constantly seeing things that I want to improve upon,” Prinz said. “It’s not about owning a company and making lots of money. It is about making new things, something that will help and change the world.”

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Carla Martinez is ready for anything..... 14

Carla Martinez remembers the first English word she learned. She remembers sitting at the kitchen table as an 8 year old, flipping through the pages of a dictionary and trying to figure out what every single word on her homework meant. So when the senior civil engineering major found herself in a similar situation last fall in an Urbino, Italy, post office – not understanding what she was being told and not knowing how to communicate what she wanted – she took herself back to those moments and coached herself through the situation.

Using nanomaterials to purify water..... 20

Heather Shipley, chair of the Department of Civil and Environmental Engineering and Burzik Professor in Engineering Design at UTSA, and Kelly Nash, associate professor of physics, have received a \$65,000 grant from the National Science Foundation to develop a nano-material that can do the work of a water treatment plant.

Predicting tumor growth..... 22

A new study by Yusheng Feng, professor of mechanical engineering and director of the Center for Simulation, Visualization, and Real-Time Prediction at UTSA, describes an algorithm that can predict the growth of cancerous tumors. The algorithm could help medical professionals determine the best treatment options for patients.

Building greatness 26

Design plans are underway for a new state-of-the-art building on UTSA Main Campus. The Science and Engineering Building will be constructed in a grassy area off Bauerle Road and Key Circle and will house classrooms, study spaces, teaching laboratories and research facilities for Science, Technology, Engineering and Mathematics.

University Excellence Awards27

Every spring semester, UTSA faculty and staff members are invited to celebrate employee excellence at the annual University Excellence Awards Ceremony. This year, two College of Engineering faculty members received university recognition: Mehdi Shadaram received a President’s Distinguished Achievement Award in Community Engagement and Krystal Castillo received a President’s Distinguished Achievement Award in Research Achievement.

Researcher. Inventor. Professor..... 30

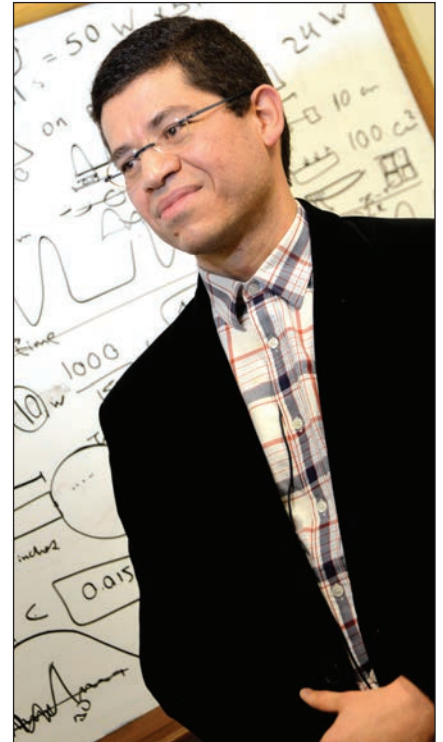
David Akopian, professor of electrical and computer engineering, has been named a Fellow of the National Academy of Inventors. He is the second NAI Fellow from UTSA, following the appointment of C. Mauli Agrawal in 2015. The honor places Akopian among an elite group of professionals that includes presidents and senior leaders of research universities, Nobel laureates, National Inventors Hall of Fame inductees and National Academies members.

Dessouky named ASCE Fellow

Samer Dessouky, associate professor of civil and environmental engineering, was recently named a Fellow by the American Society of Civil Engineers (ASCE) Board of Direction. With more than 18 years of experience in highway construction materials, sustainability, and safety, Dessouky is actively engaged in research and teaching. His research projects are sponsored by the City of San Antonio, Texas Department of Transportation, U.S. DOT, Federal Highway Administration, Idaho Transportation Department, NASA, Southwest Research Institute, Michelin America, and Tensar International.

He received the Most Innovative award in the Green Engineering category of ASCE's first Innovation Contest in 2016, won the best paper award from ASCE in 2015, and the Grant Mickle best paper award from the Transportation Research Board in 2006. He is the author of more than 90 refereed publications on bituminous materials, computational micromechanics of asphalt mixtures, pavement reinforcement with geogrid, pavement management, energy harvesting from roadways, and motorist safety. He chairs numerous sessions at national and international conferences and has given keynote addresses to present the current state of practice in pavement sustainability.

Dessouky serves as a board member on the bituminous committee of the ASCE Construction Institute and the Middle East Society of Asphalt Technologists. He sits on the editorial boards of both the Transportation and Transit Systems and MAYFEB's Journal of Civil Engineering, and he serves as associate editor for the International Journal of Engineering. He is also a professional engineer in Ohio and Texas.



HEB, Rackspace support iTEC Scholarships

The College of Engineering's interactive Technology Experience Center (iTEC) has received funding to provide partial scholarships for students to attend iTEC downtown summer programs.

"We are thankful to our program sponsors, HEB and Rackspace, who have generously donated funds toward our 2017 Downtown summer camp program," said Roberta Luukkonen, K-12th S.T.E.A.M. program manager.

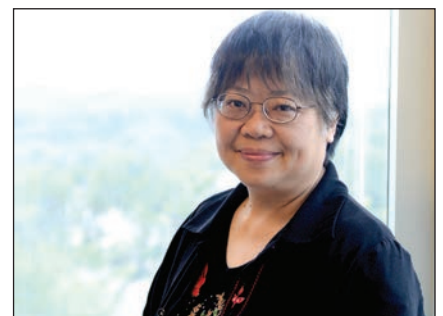
According to Luukkonen, scholarships will cover 50 percent of camp fees and will be awarded on a first-come, first-served basis to students who currently attend a school in one of the following school districts: San Antonio ISD, Edgewood ISD, Harlandale ISD, Southside ISD, Southwest ISD, Somerset ISD, Ft. Sam Houston ISD, Lackland ISD and East Central.

Scholarship awards are available for students who will be entering kinder up to 12th grade in fall 2017. Funds are limited and demand for camp is high, so qualifying for a scholarship does not guarantee a scholarship award.

COE staff member wins inaugural award from Graduate School

The College of Engineering's LiPing Bien, senior program coordinator for graduate programs, is one of the first recipients of the Graduate Excellence Award, a new honor given by the UTSA Graduate School. She was selected to receive the award for her contribution to sustaining a level of excellence in graduate education and the UTSA graduate student community. The award is presented to individuals who go above and beyond expectations to ensure that graduate students are supported and excel at every level.

Bien received her award at the Graduate Student Appreciation Week Awards Ceremony and Reception that took place earlier this spring semester.



COE professor creates chat-bots to promote healthy living

David Akopian, professor of electrical and computer engineering, and his team of talented students have created a series of automated messaging systems that can simulate human conversation, known as “chat-bots,” with the intention of promoting smoking cessation and healthier living.

It’s estimated that cigarette smoking kills 480,000 American every year, with smoking-related illnesses costing Americans more than \$300 billion a year. Akopian believes the chat-bots could aid thousands of smokers all over Texas to quit smoking through guided communications.

“We’re taking out the middleman,” Akopian said. “Someone might pick up a pamphlet about smoking cessation or some other form of literature, but why give them the chance to just set it aside? This way, you’re learning and getting answers and encouragement through conversation.”

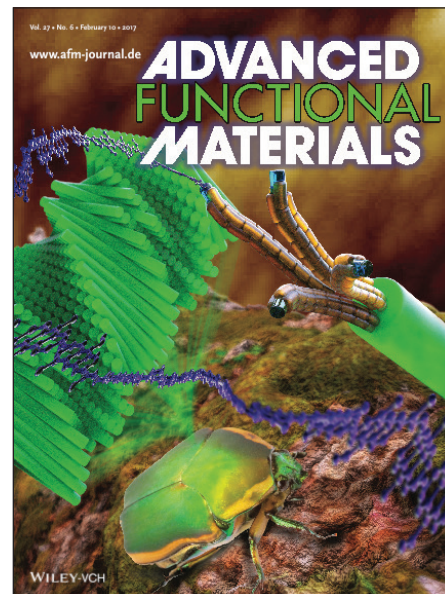
Akopian worked in collaboration with health promotion researchers at UT Health San Antonio, the University of Texas at Austin, the YMCA, and Kansas University to tailor messaging solutions for supporting healthy living.

One of his recent systems uses the automated smoking cessation protocol Quitxt, which was developed at UT Health San Antonio. The chat-bot is interactive and is able to engage in realistic conversations with people who are considering or who are in the process of quitting smoking. It provides support, tips, educational messages, music, and video links to help smokers quit.

Akopian is especially proud that the chat-bot is bilingual. It speaks English and Spanish, with the ability to expand into other languages. The project began gaining momentum after chat-bots were widely praised as being a leap forward in technology in several publications in 2016.

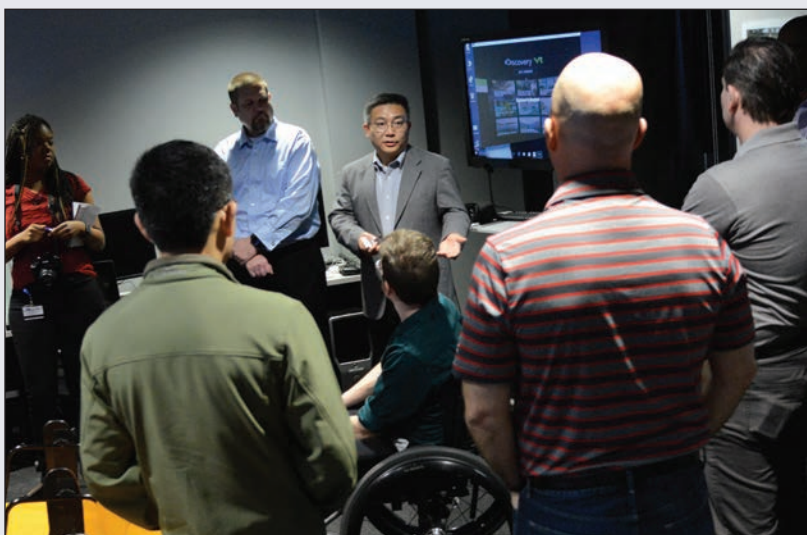
“We’re now able to operate over various messaging channels, including plain texting and instant messaging channels similar to Facebook or WhatsApp messengers,” he said.

The expanded platforms make it possible for Akopian and his collaborators to communicate with people in several ways. They’ve started integrating their solutions with Google and other popular environments to create even more avenues for people to use their chat-bots.



Professor’s article featured on cover of prestigious journal

The article *Exoskeletons: AFM Identification of Beetle Exocuticle: Bouligand Structure and Nanofiber Anisotropic Elastic Properties* by Wei Gao, assistant professor in the Department of Mechanical Engineering, was featured on the February cover of *Advanced Functional Materials*, one of the top journals in materials research. In the piece, Gao and collaborators from Northwestern University, University of Nebraska-Lincoln, and University of California, Riverside, examined the design principles of helicoidal stacking in beetles.



USAA, UTSA explore possible collaborations

This spring semester, the UTSA Research Computing Support Group with the Office of Information Technology hosted a tour for the United Services Automobile Association (USAA) to explore potential collaboration in the areas of data analytics and visualization. USAA was invited by the UTSA Center for Simulation Visualization and Real-Time Prediction to initiate a collaborative effort. The tour involved USAA’s Vice President of Enterprise Data & Analytics Michael Kozub, along with eight other USAA high-level executives. COE’s Yusheng Feng led a tour of the SiVIRT Center and VizLab, which were initially established through a National Science Foundation award in 2009.

New chip extends battery life of electronics

Ruyan Guo, Robert E. Clark Endowed Professor of Electrical and Computer Engineering at UTSA, has received a \$50,000 I-Corps grant from the National Science Foundation to commercialize a chip that can make lower power electronics, like cell phones, work more efficiently.

Guo's team developed the technology, which is about the size of a pin's head, with UTSA researcher Shuza Binzaid in the UTSA Multifunctional Electronic Materials and Devices Research Laboratory alongside graduate student Avadhood Herlekar.

"The purpose of this grant is to better identify the commercial opportunities for technology created at universities," Guo said.

Guo and Binzaid are currently working with marketplace experts, as well as UTSA technology and IP management specialist Neal A. Guentzel, to understand the needs of consumers so they can determine which industry their chip is best suited for. It's an odd problem to have, since the device is applicable to several different uses, from every day electronics to medical apparatuses.

"This chip can be used with anything that runs on a battery," said Binzaid. "It manages power so that the device can last longer."

Cell phone users in desperate need of a charge, for example, put their devices on low power mode and reduce regular functions to extend the battery life. This chip, however, can keep a phone working at top functionality with much less power. Moreover, it facilitates the use of smaller batteries, since the object itself is so small.

The chip also tackles another common annoyance for electronics users: how hot devices get when they're being used for several minutes.

"The heat is a result of a lot of power being used," Guo said. "It's a nuisance, but with our device there is less power consumption, which means the heat will be much less of an issue."

Guo noted that as the "Internet of Things" becomes more integrated into the average person's daily life, battery power will continue to become a valuable resource. Beyond lower-power devices such as cell phones, the chip could be used in fire sensors, fitness monitors, and even medical apparatuses.

"We hope to make a significant leap forward in defibrillators and pacemakers," she said. "Invasive surgeries to replace medical devices that are running out of power could become much less frequent."

For now, Guo's team is focusing on developing the chip for customized sensors, with more possibilities on the horizon.

UTSA student-led team receives NSF grant to develop vein-finding medical device

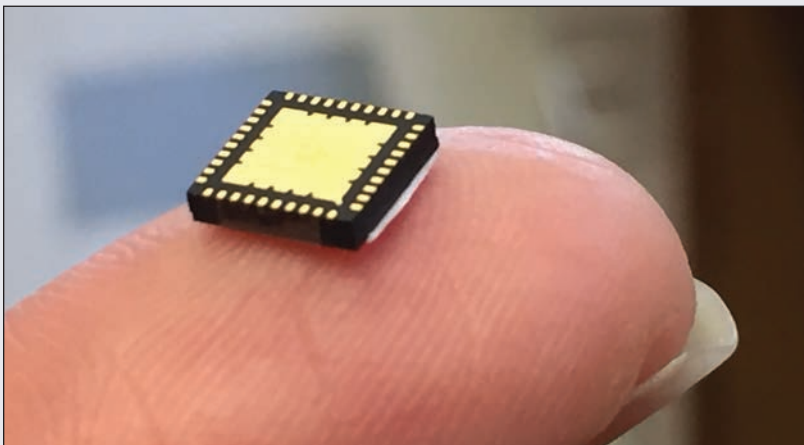
A student-led team from UTSA is the beneficiary of a \$50,000 grant to UTSA's Center for Innovation, Technology and Entrepreneurship (CITE) program from the National Science Foundation (NSF) to support the continued development of their infrared medical camera, InfraVein, which makes simple work of finding veins. As a result of the NSF I-Corps grant, the team headed to Boston this spring to test the business model of InfraVein and explore how to market the device.

"With this opportunity in Boston, I hope to experience how to interact with different customer segments and to use their feedback in order to develop our technology further," said Sanjiv Patel, a team member and masters student in biomedical engineering.

The students attended the NSF I-Corps seminar series, which supports the entrepreneurship that leads to the commercialization of technologies previously supported by NSF-funded research.

The original team of engineering and business undergraduate students included Kristen Hamalainen '16, Sanjiv Patel '16, Andrew Shiels '16, Kreg Zimmern '16, Rachel Loeffler '16, Cody Baker '16, Alexis Morales '16, and Ileana Gonzales '16. The group won the top prize at the CITE \$100K Student Technology Venture Competition in spring 2016. The competition is a collaboration between the UTSA Colleges of Engineering and Business.

"It's always exciting to see students who succeeded at the competition continue growing their ideas and expanding their business," said Cory Hallam, director of CITE and UTSA's chief commercialization officer. "These are entrepreneurs who are getting their start as undergraduates, and this is just one of many examples of students taking advantage of a great opportunity and making the most of it." The idea to create a device that could help medics locate veins came about while the biomedical engineering students were working on their senior design project. The idea to help military medics came about because San Antonio has a strong connection to the military.



UTSA, COE students flourish at the Undergraduate Research and Creative Inquiry Showcase

It is UTSA's largest annual show-and-tell. On April 20, more than 100 students from all disciplines presented their research and creative works at the fourth annual Undergraduate Research and Creative Inquiry Showcase, organized by the UTSA Office of Undergraduate Research (OUR). The showcase highlights interesting and engaging undergraduate research and creative endeavors. Nearly 1,000 students and faculty attended to support one another.

"Our mission is to give all UTSA undergraduates the opportunity to engage with a formal research experience, whether it's a lab placement, externship, scholarship or research opportunity, ideally in their first year," said Thomas Coyle, the new director of the UTSA Office of Undergraduate Research. "The showcase is a great introduction to undergraduate research at UTSA. We encourage all students to drop by and see what their peers are doing, get inspired, and get involved in research. We're here to help and facilitate those connections."

Three College of Engineering students were recognized as award winners at the showcase: biomedical engineering student Grecia Gonzalez for her research on the synthesis of silk scaffolds for biomaterial applications; electrical and computer engineering student Aires Ngunza for his research on creating polymer infiltration toughened hydroxyapatite biomaterial hybrids using bio-inspired materials design; and mechanical engineering student Stephanie Meier for her research on characterizing entrainment and mixing in density currents using flow visualization.

Faculty mentors play a critical role in the academic and professional development of student researchers. The Office of Undergraduate Research (OUR) recognized four faculty members who are exceptional mentors, including COE's Teja Guda, assistant professor of biomedical engineering. Guda has developed the undergraduate curriculum and manages the internship program for his department. He has also mentored two winning student-led CITE teams (2016 and 2015) and an NSF I-Corps student-led team. He also supervised nearly 30 undergraduates, many of them winning scholarships.



Biomedical engineering student Grecia Gonzalez receives her award from Interim Vice President for Research Bernard Arulanandam.



Electrical and computer engineering student Aires Ngunza receives his award from Interim Vice President for Research Bernard Arulanandam.



Mechanical engineering student Stephanie Meier receives her award from Interim Vice President for Research Bernard Arulanandam.



Goldwater Scholars Competition names UTSA awardees

Travis Kotzur, a UTSA Honors College and biomedical engineering student, has been awarded an honorable mention by the distinguished Barry M. Goldwater Scholarship and Excellence in Education Foundation.

“My education and experiences at UTSA have played a critical role in receiving this honor,” said Kotzur. “If it was not for the enormous push for research and the huge assistance of the faculty, I never would have been prepared to apply for such an award.”

The scholarship is widely considered the nation’s most prestigious honor for undergraduate math and science students. Kotzur conducts research in UTSA Assistant Professor Brian Hermann’s biology laboratory where they’re studying a drug that could prevent infertility in cancer patients. The Barry M. Goldwater Scholarship and Excellence in Education Foundation, named in honor of the late Arizona Sen. Barry Goldwater, awards scholarships in the amount of \$7,500. These competitive scholarships are offered each year to 240 junior and senior undergraduates pursuing mathematics and science degrees across the U.S.

Peggy Goldwater Clay, chair of the foundation’s Board of Trustees, announced that the Trustees awarded 240 scholarships for the 2017-18 academic year to undergraduate sophomores and juniors from the United States and 307 nominees were named Honorable Mentions. UTSA College of Science student Sara Dibrell was named a 2017 Goldwater Scholar, and COE student Cory Nguyen also received an Honorable Mention.

“To have all three of our applicants recognized is truly an amazing accomplishment,” said Sean Kelly, dean of the UTSA Honors College. “This testifies to the great work of our students, the commitment of their advisers and mentors, and the high quality of our programs.”

UTSA student org, Lackland Air Force team win competition

A little initiative can go a long way. The Advanced Robotics Club at UTSA found that out first hand when they began reaching out to the United States Air Force to assist in Science, Technology, Engineering, and Math (STEM) events. The collaboration ended up in a big win for both the student org and Joint Base San Antonio-Lackland when their team of Air Force professionals and engineering students won the Commander’s Challenge, an annual Air Force competition focused on finding solutions for various real-world threats the military faces each year.

Robert Lucio, an electronics engineer in the Air Force, said it was the Advanced Robotics Club that first reached out to him about working together during STEM events.

“It was the president of the Advanced Robotics Club (Denise Guerra) who first contacted us,” Lucio said. “She called and asked if students could volunteer to assist with Air Force STEM events. I’ve been working with these students for two and a half years now and that began through STEM work.”

The hard work of the student volunteers impressed Lucio from the beginning.

“They built the trust we have in them,” Lucio said. “They reached out and showed us they were reliable. They were up early on Saturdays when most people would rather be sleeping.”

After the Advanced Robotics Club put on a successful outreach event with the help of the Air Force, Lucio decided to move the relationship with UTSA forward and invited the club to help Lackland Air Force Base compete in the Commander’s Challenge. The challenge presents teams from six different Air Force bases with a scenario they need to design equipment for. The 2016 challenge was built around finding a way to safely bring down drones flying into base air space. With a budget of \$50,000 and a timeframe of six months to complete the project, Lucio set out to find a way to get UTSA students involved.

We met with Dean Browning and let her know that there were students from the Advanced Robotics Club that wanted to get involved,” said Lucio. “We assigned them to build a helper robot for the drone captures.”

Lucio’s team decided to use electronic warfare to take down the drones, as bullets could cause collateral damage. Once the drone was on the ground, the helper robot designed by UTSA students came into play. The team decided that sending in live personnel to extract the downed drones could be dangerous. The potential for chemical weapons or a bomb being attached to the drones was too great a risk to human life. So UTSA students set about designing a robot with a net gun that could be controlled via a tablet and could capture the drones.

Using a Raspberry Pi to power the robot, the students set out to design an app from scratch to control the robot. The tablet uses the app to run the motor control of the robot. The net gun is also powered from the tablet and can be fired by the user to capture the drone. Ultimately, the team with the UTSA students took 1st place.

While several clubs on campus are geared toward specific majors, the Advanced Robotics Club tries to recruit students from a variety of disciplines. Julian Salas, a computer engineering major and the vice president of the club, feels it’s important to get students from a variety of majors involved.

“We have all kinds of members,” Salas said. “We invite everybody, regardless of major, to come out. It’s important because a computer science major may bring something to the table that a mechanical engineering major would not think of.”

UTSA students gain valuable experience at Hackathon

Engineering students Ruben Asebedo, Patrick Stockton, and Kasai Omar attended the National Security Technology Accelerator (Hackathon) hosted by the MD5 division of the U.S. Department of Defense in the spring in Austin. The team competed with 26 other teams comprised of engineers and scientists from around the U.S. Only 2 of the teams were made up of students. Participants designed a solution for Humanitarian Assistance and Disaster Relief challenges; and, in the end, the UTSA team was selected as one of the top nine finalists to present in front of a distinguished panel.



Office of Undergraduate Research Student Research Scholarships Awarded

The Office of Undergraduate Research (OUR) has awarded \$1,000 scholarships to 10 students, including four engineering students, to conduct research with a UTSA mentor. The funds were disbursed at the end of the spring semester, when students had completed their projects.

Drishya Dahal

Mechanical Engineering

Trash Bot

Mentor: Pranav Bhounsule, Ph.D.

Roland Green

Electrical and Computer Engineering

Unique Architecture for Fast Multipliers

Mentor: Paul Morton, Ph.D.

Chinonso Ovuegbe

Mechanical Engineering

Aerodynamic Testing and Analysis of a Reconfigurable

Unmanned Aerial Vehicle

Mentor: Victor Maldonado, Ph.D.

Shicheng Zhou

Mechanical Engineering

How to Control a Simple Model of Legged Robot to not Fall

Down under the Influence of a Disturbing Force

Mentor: Pranav Bhounsule, Ph.D.



UTSA Steel Bridge team wins Texas-Mexico regionals

The University of Texas at San Antonio American Society of Civil Engineers (ASCE) Steel Bridge team won 1st place overall at the 2017 Texas-Mexico ASCE Student Symposium which took place this spring semester in El Paso, Texas. In May, the team headed to Nationals in Oregon where they placed in the XXX.

SPRING 2017 TECH SYMPOSIUM & CITE \$100K COMPETITION

More than 65 student teams competed in the Spring 2017 College of Engineering Tech Symposium held in the Convocation Center on UTSA Main Campus. The event, which happens in both the spring and fall semesters, gives engineering seniors a chance to show off their Senior Design 1 and 2 projects and posters, which they have worked on throughout their senior year.

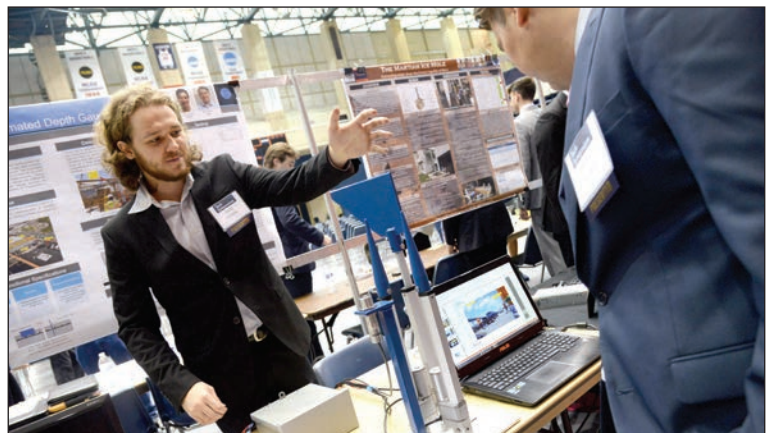
“I was so thrilled and impressed with the level of innovation and creativity our students displayed with their projects,” said Jill Ford, director of the College of Engineering’s Student Success Center. “As I was walking around viewing the projects and talking with our students, their depth of knowledge regarding their projects and professionalism in the way they presented their work and findings was evident and impressive. I felt very proud to be part of this college and the great work we are doing with our students, and I am so excited to see what our students will create next under the guidance of our senior design faculty and our corporate mentors.”

The top three teams from each of the college’s departments were recognized, and the top three college teams overall were awarded cash prizes of \$5,000, \$3,000 and \$2,000.

“It was really great to have the chance to see all the student projects from departments other than my own,” said Nick Strope, senior civil engineering major. “I really liked the fact that there was an outside area, as well as the indoor area so that there was space for the bigger projects like the treadmill and race car to be shown off.”

The UTSA Center for Innovation, Technology and Entrepreneurship (CITE) \$100K Student Technology Venture Competition was held in conjunction with the Tech Symposium. Six teams gave business presentations to pitch their innovations to a panel of professionals. Chiron, a student team that created a new type of gauze that has increased absorbency to prevent external hemorrhaging, won the top prize in the CITE competition. CITE is an interdisciplinary center in the Colleges of Business and Engineering and was established in 2006 to create a pipeline for UTSA faculty and students as well as the surrounding business community to develop new technology ventures.

Chiron was formed by UTSA students Madeleine Farrer, Hannah Jones, Brian Ruliffson, Jose Trevino, Alex Sutcliff, and William Baldrige. They found that because of an increased use of explosive devices in modern warfare, there’s also been a rise in military injury. The group set out to address the common problem of managing external hemorrhaging in combat wounds, especially traumatic amputations. Their gauze, ColdClot, uses three different methods to reduce bleeding: hemostatic gauze, super absorbent polymers, and an endothermic reaction to reduce the overall rate of bleeding across a large wound.



TOP: Mechanical Engineering Department Chair Hai-Chao Han takes a spin around the Convocation Center on one of the senior design projects developed for the Tech Symposium. **MIDDLE:** A senior engineering student takes a look inside one of the projects. **BOTTOM:** A team member who helped design an automated concrete depth gauge shows off the team’s design to a judge.



TOP: Team DentaSense demonstrates their senior design project that uses UV light-induced fluorescence to detect dental cavities. The team explained that early detection can reverse tooth decay and prevent future treatment expenses. **MIDDLE:** Team Chiron took 1st place in the CITE \$100K Competition with their innovation, ColdClot. ColdClot is a hemostatic wound bandage that combines hemostatic gauze, super absorbent polymers, and an endothermic reaction to reduce overall rate of bleeding across a large wound surface area. **BOTTOM:** Team Halberd and their Uprep Device won the overall Tech Symposium prize of \$5,000. The team developed a device that can detect and prevent the formation of pressure ulcers in immobilized patients.

SPRING 2017 TECH SYMPOSIUM WINNERS

TECH SYMPOSIUM OVERALL WINNERS

1st - Halberd/Pressure Ulcer Prevention using the Uprep Device

U-Ter Aondo Jia, Mario Hernandez, Meryem Bousfiha, Casey Whitney, Spencer Arispé
2nd - Automated Concrete Depth Gauge
 Martin Lopez, David Lindsay, Louis Hernandez, Alberto Munguia, Carlos Rodriguez, Hugo Fernandez

3rd - AmMech Engineering/Breast Intentions

Leo Drew, Evan Veregge, Briette Garcia, Gustavo Contreras

Biomedical Engineering

1st - FluoroDent/DentaSense

Daniella Bojado, Steven DeLeon, Frank DeLuna, Alan Kosub, Destanee Miller, Alexis Arteaga

2nd - ColdClot/Chiron

Madeleine Farrer, Hannah Jones, Brian Ruliffson, Jose Trevino, Alex Sutcliff, William Baldrige

3rd - abRISE

Kennedi Wilson, Katie Alex, Travis Kotzur, Jasmine King, Abbey Vela

Civil and Environmental Engineering

1st - MIDY Engineering, LLC

Dalia Nearez, Maureen Grecia Gonzalez, Ivette Gonzalez, Yajaira Costilla, Matthew Saldivar, Ilse Malagamba
2nd - Pearson-Cooper, LLC
 Pat Vargas, Vicky Sanchez, Trey Resendez, Ricky Chien, Nick Strophe

3rd - Sirius Engineering

Matthew Solum, Cody Cockayne, Matt Baker, T'Andre Smith, Anjolie Hira, Ponni Loponi

Electrical and Computer Engineering

1st - Bluetooth Audio Splitter

Leonardo Lopez, John Osborne, Michael Warmke
2nd - Wearable Multi-modal Caution and Warning System
 Carlos Aceves, Ryan Doemel
3rd - MemMigo
 Shiloh Fraijo, Hasan Tharwani, Ben Garrett, Evan Wright, Trevor Thompson, Devin Lewis

Mechanical Engineering

1st - ACME Engineering/Mobile Veterinarian Exam Table

Lilian Johnson, Maesan Carley, Cameron Reynolds, Richard Conine
2nd - United Dynamics/Adjustable Automotive Rear Mounted Airfoil
 Lukas Cotugno, Jonathan Gwinn, Clifford Labowsky, Eligio Molina
3rd - AmMech Engineering/Breast Intentions
 Leo Drew, Evan Veregge, Gustavo Contreras, Briette Garcia

CITE \$100K COMPETITION

1st Place - ColdClot/Chiron

Madeleine Farrer, Hannah Jones, Brian Ruliffson, Jose Trevino, Alex Sutcliff and William Baldrige

2nd Place - FluoroDent/DentaSense

Daniella Bojado, Steven DeLeon, Frank DeLuna, Alan Kosub, Destanee Miller, Alexis Arteaga

3rd Place - quadTECK

Kristin Steinke, Tiffany Bunnell, Erin Pollet, Carol Cordova, Tara Powers, Nicole Powers

Graduating senior

Carla Martinez

is ready for anything

Carla Martinez remembers the first English word she learned.

“Seven. Like 7-11,” she said. “I told myself, ‘OK, that’s easy to remember.’”

She remembers sitting at the kitchen table as an 8 year old, flipping through the pages of a dictionary and trying to figure out what every single word on her homework meant.

So when the senior civil engineering major found herself in a similar situation last fall in an Urbino, Italy, post office – not understanding what she was being told and not knowing how to communicate what she wanted – she took herself back to those moments and coached herself through the situation.

Martinez, who was born in San Luis, Potosí, Mexico, was the first Deferred Action for Childhood Arrivals (DACA) student to participate in UTSA’s Education Abroad program and graduated in May 2017.

“It took me back to when I was 8, being so frustrated. I couldn’t get it fast enough. I couldn’t learn fast enough, but it just



Carla Martinez shows off a tattoo she got while studying abroad in Italy. “I decided to get this tattoo because my trip to Urbino was no longer me chasing a dream, but holding on to a dream come true.”

took patience. So I told myself, ‘I could do it once, I can do it again. It just takes a little time,’” she said.

The Urbino study abroad program is curriculum-focused, meaning that UTSA civil engineering students have the opportunity to put into practice what they learn in the classroom by partnering with architecture and construction science and management studies students on a project. The UTSA College of Architecture, Construction and Planning, and the UTSA College of Liberal and Fine Arts have been sending students to Urbino since 2011.

Martinez was part of the first cohort to participate in the Urbino civil engineering program. To be the first at something and to be successful at it isn’t anything new to Martinez. She learned it at home.

She’s the oldest child in a family of six, and the first in her family to go to college. As a DACA student, Martinez is ineligible for federal financial aid so making her way through college was difficult financially, but – as is her nature to look at the bright side – she says it was a good way to build character and be grateful for those who surround and support her.

At one point, her mother juggled four jobs to help pay her tuition. When Martinez’s father was injured in an accident, he approached his daughter’s high school social worker and, together, they helped raise the money needed for tuition. Having people come alongside her to help is something she is thankful for, whether the help was coming from family and friends or faculty and staff.

“Carla is very smart and a hard-working student. She always asks me good and interesting questions. She always wants to know more and more,” said Alberto Arroyo, professor in the department of civil engineering and one of Carla’s favorite instructors.

Martinez has always pushed herself academically, making good grades while juggling an internship with the San Antonio Water System and teaching students at UTSA’s summer engineering camps.

“Carla is a very dedicated student. She has excellent orga-

“Carla is a very dedicated student. She has excellent organizational skills and works well with her classmates. She is a team player. Her involvement with the college is fantastic. She has been an ambassador.”

Manuel Diaz, professor,
Department of Civil and Environmental Engineering



Martinez interned at the San Antonio Water System while a student in the College of Engineering, and secured a job with M&S Engineering after graduation. “My internship at SAWS gave me real-life experience in the field, and helped me develop skills outside of the classroom,” said Martinez.

nizational skills and works well with her classmates. She is a team player. Her involvement with the college is fantastic. She has been an ambassador,” said Manuel Diaz, another of Carla’s professors in the College of Engineering.

When Martinez learned about the opportunity to study abroad, she looked at every obstacle as simply something to work through.

But, it wasn’t going to be easy. She would have to raise the money and as the first UTSA DACA student to study abroad, she would have to learn a new process.

“Through it all I was very unsure about how it would all turn out. I was very lucky to have people to guide me,” Martinez said.

Education Abroad and College of Engineering staff helped her, but she also sought the advice of the first UT Austin DACA student to study abroad.

To fund her trip, she held fundraisers that friends and faculty helped her with by donating, volunteering, and promoting.

And in May, she graduated with not only with a bachelor’s degree in civil engineering, but also an experience abroad she will always carry.

“Never in my lifetime did I think I was going to get to study abroad,” Martinez said. “I had all these limitations, and nothing stopped me.”

Graduating senior Alisa Isaac is an

NSF Fellowship Recipient

BY RAUL TUTIVEN/COLLEGE OF ENGINEERING

Meet Alisa Isaac. She is one of the two UTSA College of Engineering students who received a prestigious National Science Foundation (NSF) Graduate Research Fellowship. According to the NSF, this fellowship program nurtures innovation and leadership in the United States by recruiting and supporting outstanding students with high potential in science, technology, engineering, and mathematics.

“Not many undergraduate students are aware that the NSF Fellowship application is available before they are admitted into graduate school,” said Isaac. “My sister Kameel (a Ph.D student at The University of Texas - Austin) told me to take advantage of this great opportunity and I am so glad I did.”

Isaac’s parents helped her with her personal essay for the fellowship, and they were extremely proud of her once they heard the news that she was one of the winners.

“I didn’t think I was going to receive the fellowship because my GPA is not highly competitive,” said Isaac. “But my family and co-workers at the Institute of Surgical Research (ISR) encouraged me to apply. I believe it’s extremely important to apply to every scholarship that you qualify for,

because you never really know what the committees may be looking for.”

Isaac, a senior biomedical engineering student, was born and raised in Tokyo but moved quite a bit due to her father working for the Air Force. She has been living in San Antonio for 10 years and now calls it home.

Isaac was inspired to apply for the fellowship because the award could open many doors for her and help finance her research in biomaterials, applications in tissue engineering, and regenerative medicine. She hopes to make new discoveries in the biomedical field in her graduate work that will be supported by the fellowship that provides three years of financial support within a five-year fellowship period consisting of a \$34,000 annual stipend and \$12,000 cost-of-education allowance to the graduate institution.

Isaac enjoys her time at UTSA and is appreciative of the opportunities that come from being a student in the College of Engineering. She said that she notices many students take time off between their undergraduate and graduate degrees, but what keeps her going is the thought of completing her education.

“I don’t want to be in a position where I regret not continuing my education, I’d rather push on through,” she said.

Besides studying, Isaac also enjoys dancing (especially hip hop and jazz), traveling, and cooking. Isaac is involved with many organizations at UTSA: she is the president of Tau Beta Pi an engineering honor society, a UTSA Ambassador, and a member of Texas Angels which is a group of young women focused on empowerment, networking, and service. Additionally, Isaac is currently conducting research at an internship at the Institute of Surgical Research.

“I enjoy being able to be creative and analyze problems in the research environment,” she said. “Being an intern at ISR, I walk through the hospital to reach the research center and along the way I see the injured soldiers for whom I conduct research for. That helps me get through my long days!”

Isaac says that her mentor, Christine Kowalczewski, inspires her every day with her positivity, especially in the lab. Kowalczewski helped prepare her for graduate school by teaching her lab techniques and how to create experiments to address medical problems, and she also helped proof read and hone her proposal for the fellowship.

Isaac said winning National Science Foundation Graduate Research Fellowship will make it much easier for her to follow her research interests after she completes her bachelor’s degree at UTSA and she hopes that fellowship will open new doors that will make her stand out a little bit more from the other Ph.D. students when applying for future jobs.

“I appreciate that the NSF committee took the time to look through my essays and see the potential that I have.” Isaac said. “They thoroughly read my essays and provided feedback, rather than having a GPA cut-off requirement. I am so thankful for this opportunity.”

Alisa Isaac, a senior biomedical engineering student at UTSA, received a prestigious National Science Foundation Graduate Research Fellowship.



Photo by Raul Tutiven/College of Engineering

Graduating senior Jasmine King is

Pursuing her Ph.D. dream

BY JOANNA CARVER/UNIVERSITY COMMUNICATIONS AND MARKETING

Meet Jasmine King. She's a talented basketball player who has applied her passion for sports to her quest to earn a Ph.D. She recently received a sought-after National Science Foundation Graduate Research Fellowship that will help her reach her higher educational goals.

A San Antonio native, King knew from a young age that she wanted to pursue higher education.

"I was always very passionate about learning," she said. "When I got older, I knew I wanted to go into the medical field, because I found it fascinating."

King considered pursuing a medical degree or a Ph.D., keeping in mind that, no matter what, she wanted to help others. Ultimately, she decided to pursue a research career so she could have a wider impact.

"Giving back to society is very near and dear to my heart," she said. "If we want to advance as a society, we have to be willing to help each other."

Initially, King studied mechanical engineering at Southern University and A&M College, a historically black university in Baton Rouge, Louisiana. While there, she also pursued her passion for sports and joined the basketball team.

After helping lead her team to a conference championship, she eventually came to realize she wanted to earn a biomedical engineering degree instead. After learning about UTSA's biomedical engineering program, she chose to transfer.

As a student in the UTSA Honors College, King found the curriculum to be challenging, but she enjoyed the support of her professors and fellow students as she adjusted. She was also struck by the diversity of UTSA's student body.

"UTSA really embraces diversity, and I've liked learning alongside people of so many different backgrounds," said King.

Unable to give up her love for basket-

ball, King joined an intramural basketball team and led her teammates to three consecutive regional tournaments. Balancing her classes and career goals with her dedication to the team proved challenging, but it gave King a keen sense of discipline and time management.

"There's no greater lesson I can pass on to younger Roadrunners than to organize your life when you're in school and learn how to manage your time," she said. "It was a great lesson to learn as a student athlete, and I know that skill will serve me well going forward."

At UTSA, King joined the Maximizing Access to Research Careers – Undergraduate Student Training for Academic Research (MARC-U*STAR) program, which since 1981 has supported hundreds of financially disadvantaged and underrepresented minority students in their efforts to obtain a Ph.D. and pursue research careers.

"MARC-U*STAR is just one of the many programs that UTSA provides for support," King said. "I feel that UTSA's community is just very involved with their students. People are passionate about helping students find success."

Through the MARC-U*STAR program,

King joined the laboratory of Teja Guda, assistant professor of biomedical engineering, whose research focuses on regenerative medicine and tissue engineering. She's been involved in several of Guda's research projects, but most notably she's aided him in developing his scaffolds, which are bone-mimicking materials designed to help heal bone fractures.

"What has really motivated my passion in science and engineering is the possibility to help people—not just one person, but many people," she said. "I want to be able to expand the knowledge of this field and help all people of all backgrounds."

King graduated this past spring from UTSA with her B.S. in biomedical engineering and the NSF Graduate Research Fellowship will help support her future studies. She is moving on to the University of California at Berkeley to accomplish her dream: earning her Ph.D.

"The learning involved with getting to that point is so exciting," she said. "The respect that comes along with earning my Ph.D. is also just as exhilarating. I know that once I get there, I'll have everything I need to excel in my career and have the impact I've always wanted to have."



Jasmine King, a senior biomedical engineering student at UTSA, will be attending the University of California at Berkeley, with her studies being funded by her National Science Foundation Graduate Research Fellowship.

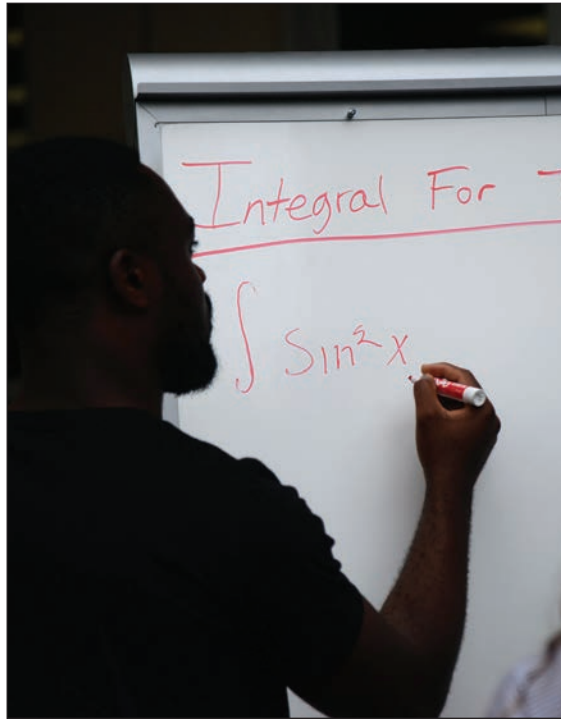
Photo by Deborah Silliman/College of Engineering

E-WEEK 2017



The University of Texas at San Antonio College of Engineering's Student Success Center hosted a number of Engineering Week events in the spring semester with the help of the college's engineering student organizations. An outdoor barbecue picnic with burgers and pulled pork, a chance to pie a professor, free t-shirt giveaways, a networking luncheon with local professional engineers, and a student organization activity fair were just a few of the events held to celebrate E-Week on the UTSA Main Campus.

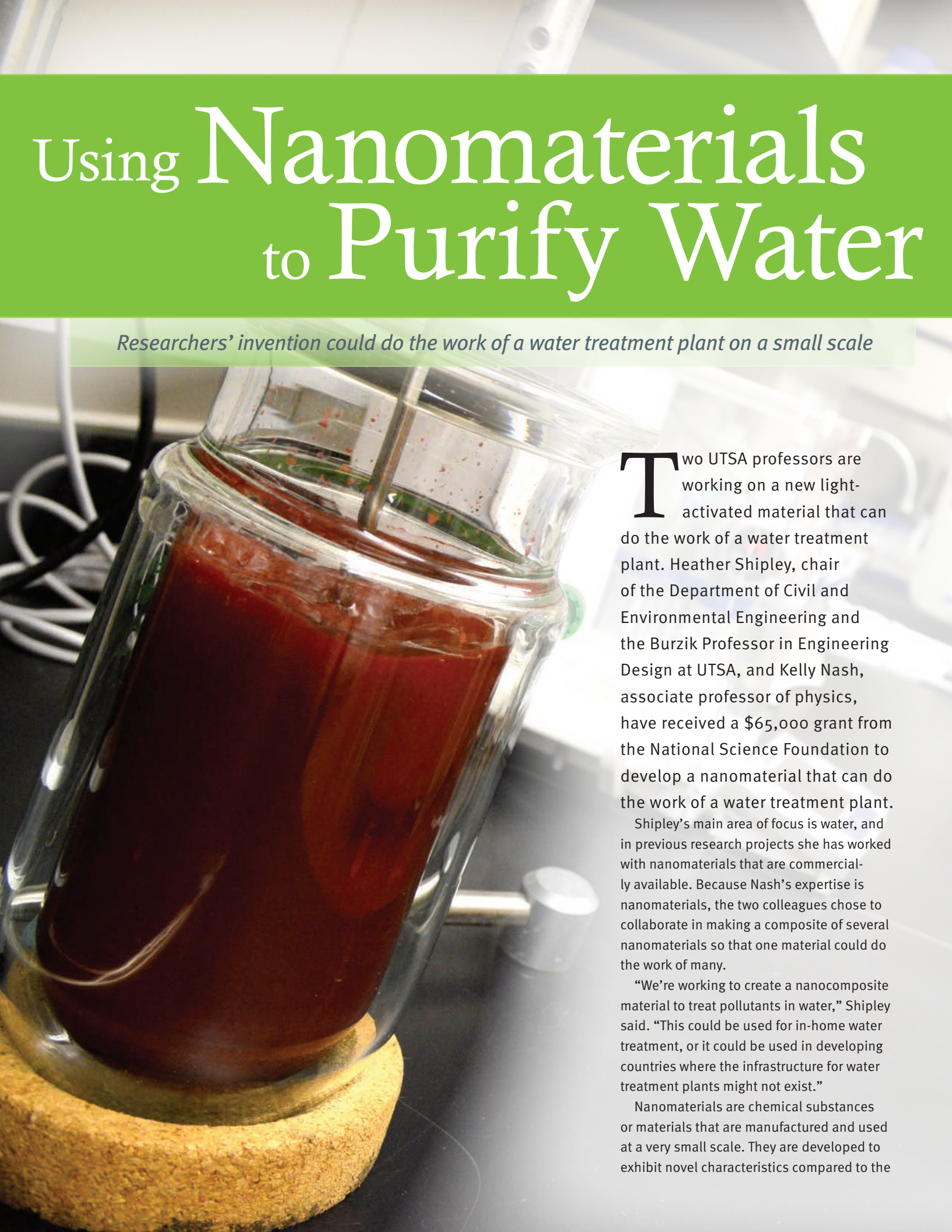




Photos by Raul Tutiven and Deborah Silliman/College of Engineering

Using Nanomaterials to Purify Water

Researchers' invention could do the work of a water treatment plant on a small scale



Two UTSA professors are working on a new light-activated material that can do the work of a water treatment plant. Heather Shipley, chair of the Department of Civil and Environmental Engineering and the Burzik Professor in Engineering Design at UTSA, and Kelly Nash, associate professor of physics, have received a \$65,000 grant from the National Science Foundation to develop a nanomaterial that can do the work of a water treatment plant.

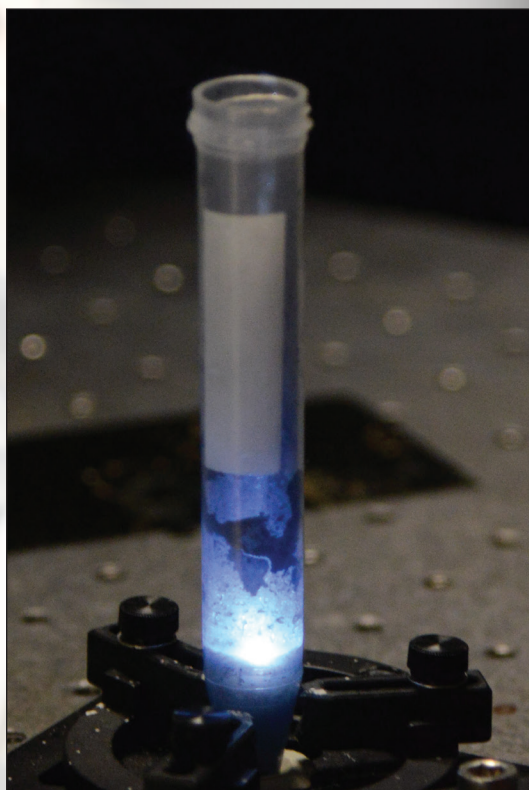
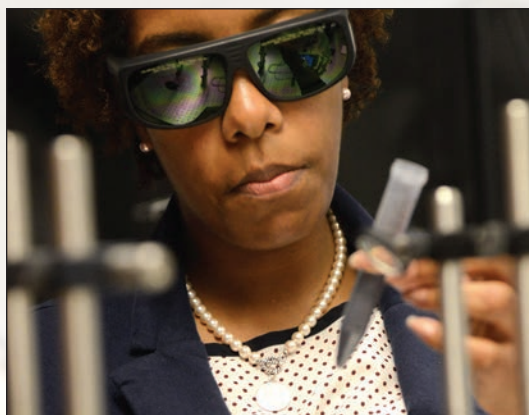
Shipley's main area of focus is water, and in previous research projects she has worked with nanomaterials that are commercially available. Because Nash's expertise is nanomaterials, the two colleagues chose to collaborate in making a composite of several nanomaterials so that one material could do the work of many.

"We're working to create a nanocomposite material to treat pollutants in water," Shipley said. "This could be used for in-home water treatment, or it could be used in developing countries where the infrastructure for water treatment plants might not exist."

Nanomaterials are chemical substances or materials that are manufactured and used at a very small scale. They are developed to exhibit novel characteristics compared to the

“We’re working to create a nanocomposite material to treat pollutants in water. This could be used for in-home water treatment, or it could be used in developing countries where the infrastructure for water treatment plants might not exist.”

- Heather Shipley, chair of the Department of Civil and Environmental Engineering and the Burzik Professor in Engineering Design



same material without nanoscale features, such as increased strength, chemical reactivity or conductivity. The material that Shipley and Nash are creating is entirely new. It’s activated by sunlight, causing organic pollutants to be removed through light reaction and heavy metals to be attached to the material and removed from water.

“It’s doing the job of a water treatment plant, but it also goes a step further,” Nash said. “In a plant, there are many processes to catch these pollutants, but when you get down into the levels of microbial and toxic metal ions, you need a nanomaterial to filter them.”

Shipley noted that water sources all over the world are polluted by industrial processes and in various other ways, which makes the water hazardous to use. Rather than focus on one specific pollutant, she and Nash wanted to create a material that could address a majority of them.

“It made sense to create an end-user type of solution instead of a new type of water treatment plant for a new city,” Shipley said. “This way, it’s accessible and much more feasible, especially in developing areas where there’s minimal water treatment.”

Shipley and Nash have now been developing the new material and are satisfied so far with its performance but are now facing a new challenge: making the material reusable.

“Once it’s activated by light, it does what it’s been designed to do, but then it’s done,” Nash said. “We don’t want to make more waste, so now we’re working on making the material regenerate so it can be used again and again.”

TOP RIGHT: College of Sciences’ Kelly Nash examines the nanomaterials that have been produced by the laser ablation method, which uses bulk materials to make nanomaterials. **MIDDLE RIGHT:** A laser hits the solution with the bulk material, creating a spark. This process is used to make nanomaterials. **BOTTOM RIGHT:** Ph.D. student Dipendra Wagle (right) and Heather Shipley, chair of the Department of Civil and Environmental Engineering and the Burzik Professor in Engineering Design, discuss results and experiments in the laboratory. The nanomaterials made in Nash’s lab are used to conduct experiments that will remove pollutants, such as arsenic, from water.

Photos by Deborah Silliman/College of Engineering

Predicting tumor growth

UTSA professor's study describes new way to predict tumor growth

BY JOANNA CARVER/UNIVERSITY COMMUNICATIONS AND MARKETING

Doctors may soon be able to determine the best treatment option for a cancer patient based on an algorithm that predicts tumor growth. A new study by Yusheng Feng, professor of mechanical engineering and director of Center for Simulation, Visualization, and Real-Time Prediction at UTSA, describes an algorithm that can predict the growth of cancerous tumors, which could help medical professionals judge the best treatment options for patients.

Feng first began researching cancer in 2004, predicting the outcomes of cancer treatments that use laser technology.

"In that project, we were using the heat of a laser to kill the cancer cells of the tumor," he said. "We had to use a computer simulation to show the amount of heat we were going to use and for how long, so we didn't damage any non-cancerous tissue."

In this project, Feng learned just how beneficial computer simulations can be when approaching treatments, especially for those cancer treatments, which regularly require surgery.

"One of the biggest advantages you can give a doctor and their patient is knowing how fast a tumor is growing and which treatment options are effective," he said. "This helps them to make the decision of not just when to treat someone, but also how to treat them."

Feng collaborated with colleagues at The University

of Texas at Austin and the MD Anderson Cancer Center to create a novel algorithm described in the study. It takes into account major biological events in the tissue and cells of the patient, as well as signals inside a cell, among dozens of other factors. As a result, the algorithm is applicable to all types of cancers, as long as doctors know the relevant biological information.

"Outcome prediction is always good, especially when it is reliable," he said. "And knowing the outcome of the treatment can be very beneficial."

Feng has plans to apply the algorithm to a computer program that can aid medical professionals in judging which treatments, if any, are appropriate for a patient's tumor based on how slowly or quickly it's growing. Moreover, the computer program may help to evaluate targeted therapies based on the prediction.

"Tumor cells are nothing but normal cells out of control, even worse they may migrate to the wrong place," he said. "That's why cancer is so hard to treat: it's your own cells."

Engineering professor
creates new

laser needle

Lyle Hood, assistant professor of mechanical engineering at UTSA, has collaborated with Christopher Rylander, associate professor of mechanical engineering at The University of Texas at Austin, to create a device that can do the work of both a cutting-edge surgical needle and a medical laser.

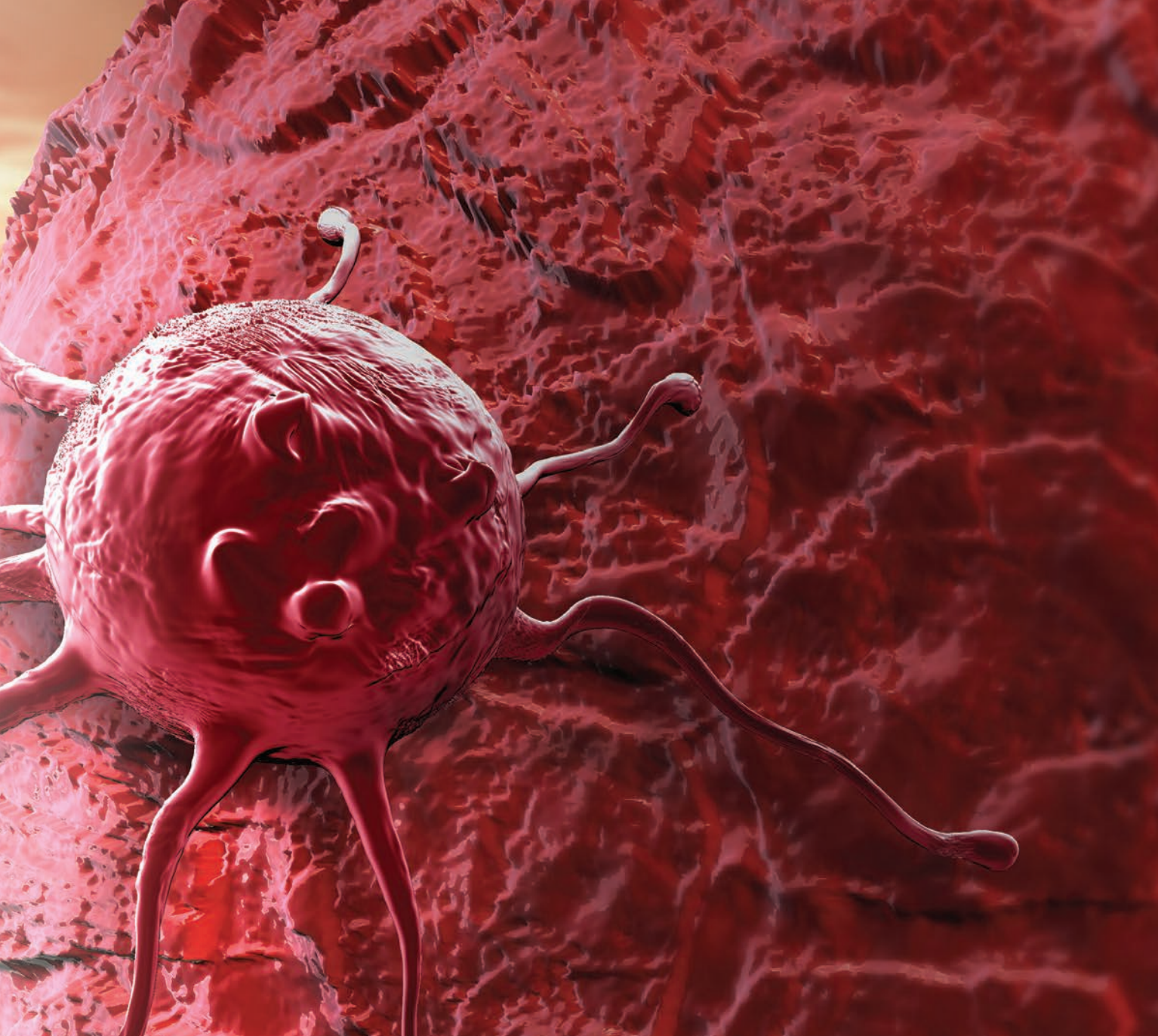
The device has innumerable applications, most notably the ability to eradicate cancerous tumors while also delivering chemotherapy drugs.

Hood originally developed the needle to treat transitional cell carcinoma, which

forms on the interior of the bladder.

"Treating cancer in the bladder is difficult if you want to preserve the organ's ability to hold fluid," he said. "The most typical treatment is to remove the bladder altogether, leaving patients with the need for a urinary bag for the rest of their lives."

To solve this challenge, Hood and Rylander created the laser needle with Mehmet Kosoglu, then a graduate student at Virginia Tech. The needle penetrates the tissue to deliver medicine while emitting laser light that kills the tumors without making a hole in the bladder.



He soon discovered that his creation could treat other forms of cancer, including brain cancer, which is challenging to treat.

“The problem is that typical chemotherapy for brain cancer involves an IV in the arm, but due to the blood-brain barrier, not enough of that concentrated medicine enters the central nervous system and reaches the tumors,” Hood said.

Another brain cancer treatment involves dripping chemotherapy into the brain through a catheter inserted through the skull. However, because the brain is a

closed fluid environment, too much medicine too quickly can cause overpressure, causing more harm than the tumor itself. As a result, not enough medicine reaches the cancer during this treatment. By using the laser needle to slowly heat the tissue during the drip, the chemotherapeutics will disperse much more rapidly and widely.

“I didn’t want patients sitting with a catheter in their head for three days, but they obviously need enough chemotherapy to kill the tumor,” Hood said. “This solves both problems.”

Hood noted that his device can even work in cosmetic surgeries; the laser can melt fat and the needle can remove it.

“If you melt the fat in place, the body just reabsorbs it, resulting in high levels in the blood,” he said. “This is why many existing laser treatments are not very healthy.”

For now, Hood is focusing on how his needle can be used to treat other types of cancer, particularly skin cancer.

“The idea is to take the creative approach,” he said. “We can go straight in and treat the problem locally without having to circulate chemotherapy.”

Research Awards

It is UTSA's vision to be a premier public research university, providing access to educational excellence and preparing citizen leaders in the global environment. We are proud of our faculty and students who strive for research excellence in UTSA's path to becoming a Tier One institution. Listed here are the projects awarded between Jan. 1, 2017, and May 1, 2017.

Akopian, David (PI)

Department of Electrical Engineering

Proposal Title: Extending GPS Operation in GPS-Denied Areas Through Cross-Correlation Jamming Cancellation

Funding Agency: University of Tennessee at Chattanooga

Amount: \$76,000

Akopian, David (PI)

Department of Electrical Engineering

Proposal Title: Improving Adherence to Endocrine Hormonal Therapy among Breast Cancer Patients

Funding Agency: University of TX HSC at San Antonio 745

Amount: \$54,840

Akopian, David (PI)

Department of Electrical Engineering

Proposal Title: ICORPS: Fast Deployment Service for Automated Business-to-Client Interactive Messaging

Funding Agency: National Science Foundation

Amount: \$50,000

Akopian, David (PI) Yin, Zenong (Co-PI)

Department of Electrical Engineering

Department of Health & Kinesiology

Proposal Title: Healthy Frio: A Rural Community Partnership to Advance Latino Obesity Research

Funding Agency: University of TX at Austin 721

Amount: \$510,382

Appleford, Mark

College of Engineering

Proposal Title: Engineer Your World - Dual Enrollment COE

Funding Agency: University of TX at Austin 721

Amount: \$72,000

Bhounsule, Pranav (PI)

Department of Mechanical Engineering

Proposal Title: Accelerated Path Teaching for Robotic Routing Using ROS Industrial Framework

Funding Agency: Southwest Research Institute

Amount: \$11,500

Cao, Yongcan (PI)

Department of Electrical Engineering

Proposal Title: PEP: Human-inspired Decision Making for Swarm Robotics

Funding Agency: UTSA VPR Office

Amount: \$19,821

Dong, Bing (PI) Xu, Jeff Qiang (Co-PI)

Department of Mechanical Engineering,

Research Vice President

Proposal Title: ICORPS: Dynamic Real-Time Energy Management System (EMS) to Improve Building Energy Efficiency and Wellness

Funding Agency: National Science Foundation

Amount: \$50,000

Guda, Teja (PI)

Department of Biomedical Engineering

Proposal Title: Biomechanical Tissue Graft Tester to Evaluate Properties For Synthetic Diabetic Wound Dressings

Funding Agency: San Antonio Area Foundation

Amount: \$30,600

Guda, Teja (PI) Hallam, Cory (Co-PI)

Department of Biomedical Engineering, Department of Information Systems & Cyber Security

Proposal Title: Infrared Camera-Based Detection of Subsurface Veins for Rapid Access

Funding Agency: National Science Foundation

Amount: \$50,000

Guo, Ruyan (PI) Binzaid, Shuza and Guentzel, Neal (Co-PIs)

Department of Electrical Engineering, Research Vice President

Proposal Title: I-Corps Team: Commercialization feasibility research on CMOS Process Dependent Near-Threshold-Voltage (NTV) Regulation Module

Funding Agency: National Science Foundation

Amount: \$50,000

Kelley, Brian (PI)

Department of Electrical Engineering

Proposal Title: Novel Developmental Broadband RF Underwater Communication Techniques in Support of Heterogeneous Underwater Network Technology

Funding Agency: Georgia Institute of Technology

Amount: \$79,961

Ong, Anson (PI)

Department of Biomedical Engineering

Proposal Title: Therapeutic Targeting of EYA2 Phosphatase in Triple Negative Breast Cancer Cells by a Novel Self-Assembled Peptide

Funding Agency: San Antonio Area Foundation

Amount: \$27,000

Shiple, Heather (PI) Nash, Kelly and Montoya Rodriguez, Arturo (Co-PIs)

Department of Civil Engineering, Department of Physics & Astronomy

Proposal Title: Understanding Interactions of Chemical Contaminants to DOE Facility Materials Using Spectroscopic Techniques

Funding Agency: Savannah River Nuclear Solutions LLC

Amount: \$286,668

Shiple, Heather (PI) Nash, Kelly (Co-PI)

Department of Civil Engineering, Department of Physics & Astronomy

Proposal Title: EAGER: Synthesis of Nano Embedded Zeolites for Water Pollutant Removal

Funding Agency: National Science Foundation

Amount: \$65,000

Wang, Xiaodu

Department of Mechanical Engineering

Proposal Title: Supplement to Multiscale Modeling of Ultrastructural Origins of Bone Fragility

Funding Agency: National Science Foundation

Amount: \$8,000

Wilkerson, Justin (PI)

Center for Simulation, Visualization and Real-Time Prediction (SiVIRT)

Proposal Title: Void Dominated Failure

Funding Agency: John Hopkins University

Amount: \$95,000

College of Engineering Research in the news

spring 2017

Using 3D Printing to Build Organs

Placing 3D-printed tissue in a custom bioreactor could help biomedical engineers build solid organs.

by Melissa Fellet April 10, 2017

Alliance of Advanced BioMedical Engineering

Thousands of patients are waiting for organ transplants because there are a limited number of donors. Engineered organs could help fill the gap. Yet despite decades of research, the only engineered internal organ that's been successfully transplanted into a person is a bladder, a hollow organ made from a thin sheet of tissue.

At the University of Texas, San Antonio, Teja Guda wants to build more complex solid organs that surgeons could transplant. To do that, he and his students are studying how to combine nerves, tissue and blood vessels to build a salivary gland and a tooth. An engineered salivary gland could eventually help people who have dry mouth syndrome. Guda plans to apply the lessons learned in producing this gland to building a **pancreas** because both glands have similar structures from an engineering perspective.

NEWS MEDICAL LIFE SCIENCES

Study describes algorithm that can predict growth of cancerous tumors

April 18, 2017

A new study by Yusheng Feng, professor of mechanical engineering at The University of Texas at San Antonio (UTSA), describes an algorithm that can predict the growth of cancerous tumors, which could help medical professionals judge the best treatment options for patients.

Feng first began researching cancer in 2002, predicting the outcomes of cancer treatments that utilize laser technology.

SPECTRUM NEWS
San Antonio 9:31AM 71°

NEWS WEATHER & TRAFFIC POLITICS SPORTS SHOWS CONNECT WITH US

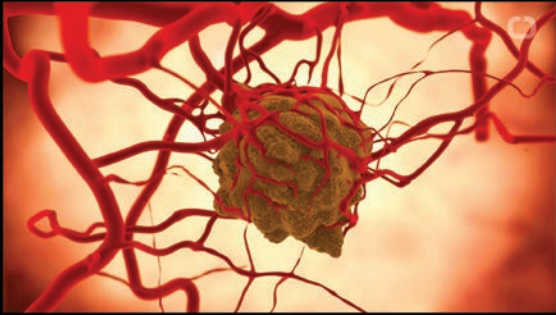
Friday, May 12, 2017

New Light-Activated Nanomaterial Purifies Water

By John Garcia
Thursday, April 13, 2017 at 05:51 AM CDT



msn | money



Researchers Create Algorithm To Predict Tumor Growth

Duration: 00:36 4/18/2017

Researchers have created an algorithm that predicts the growth of cancerous tumors. The study was conducted at the University of Texas in San Antonio. Led by Professor Yusheng Feng, the continued his research into predicting the outcomes of cancer. Professor Feng previously studied the outcomes of cancer treatments that utilized laser technology.

mySA Local US & World Business Sports Food Entertainment Lifestyle Opinion

UTSA ranked among top universities in the world under the age of 50

By Kelsey Bradshaw, mySA.com / San Antonio Express-News Published 9:27 am, Friday, April 7, 2017





Photo: Beth Owen, Staff / San Antonio Express-News

UTSA Students Develop Medical Device to Make Injections Easier

posted by Jim Forsyth · 1 month ago

1200 News Radio WOAI



A group of UTSA biomedical engineering students has developed an infrared medical camera which will help nurses find veins easier when it is time to insert injection needles, News Radio 1200 WOAI reports.

Dr. Teja Guda, the student's teacher, says the invention, called 'IntraVein' has received a \$50,000 grant from the National Science Foundation.

BUILDING GREATNESS

New Science and Engineering Building will provide more visibility to different disciplines

BY COURTNEY CLEVENGER/UNIVERSITY COMMUNICATIONS AND MARKETING

Design plans are underway for a new state-of-the-art building on UTSA Main Campus. The Science and Engineering Building will be built in a grassy area off Bauerle Road and Key Circle and will house classrooms, study spaces, teaching laboratories and research facilities for science, technology, engineering and mathematics. This will be the first new building at UTSA since the North Paseo Building opened in 2014.

The building also will be the largest construction project in UTSA history at \$95 million. The majority of funds will come from tuition revenue bonds, which the Texas legislature approved during the 2015 session.

Paul Goodman, UTSA assistant vice president for facilities, said the idea for it goes back about 10 years.

“We knew our teaching labs on campus were getting older and the university needed to start looking at ways to replace them,” Goodman said.

Currently, a number of UTSA’s STEM-related classrooms and teaching laboratories are spread out in buildings across campus. The new building will bring many of them together under one roof, engaging thousands of students from various disciplines in different areas of study.

Goodman says that one of the unique features of the building is the magnitude of exterior and interior glass. Many of the laboratories will be surrounded in glass so students and visitors walking by can see what’s going on, a concept referred to as science on display.

“The biology, chemistry, and engineering labs are going to be very visible,” Goodman said.

“Students with different majors will interact, so there’s a higher potential

for students to connect with other people who have different interests. They may even discover a new passion and switch their major. Studies show universities are more likely to retain students that way. This design also increases the likelihood that students will attend graduate school and become interested in research instead of going into the workforce.”

Students and faculty will conduct top-tier research inside the Science and Engineering Building. The 4th floor will be dedicated to brain health research and chemical engineering. Leading the brain health revolution is one of UT System Chancellor William McRaven’s “Quantum Leap” initiatives to provide Texans with the very best in higher education, research, and health care. UTSA plays an important role in this initiative.

“UTSA researchers are tirelessly working on cures for brain diseases,” said George Perry, dean of the UTSA College of Sciences. “These new state of the art facilities will provide our professors and students with the best environment, laboratories, and equipment to further their research.”

Another innovative aspect in the building will be the Engineering Maker Space, a 17,000-square-foot area where engineering students can design, test, and fabricate their capstone senior design projects. They will have access to various tools, materials, and storage space for their projects. The space was the idea of UTSA College of Engineering Dean JoAnn Browning.

“The maker space represents the culmination of an engineer’s college training, where the concepts and learning objectives from the prior three years are put into practice during senior design,” said Browning.

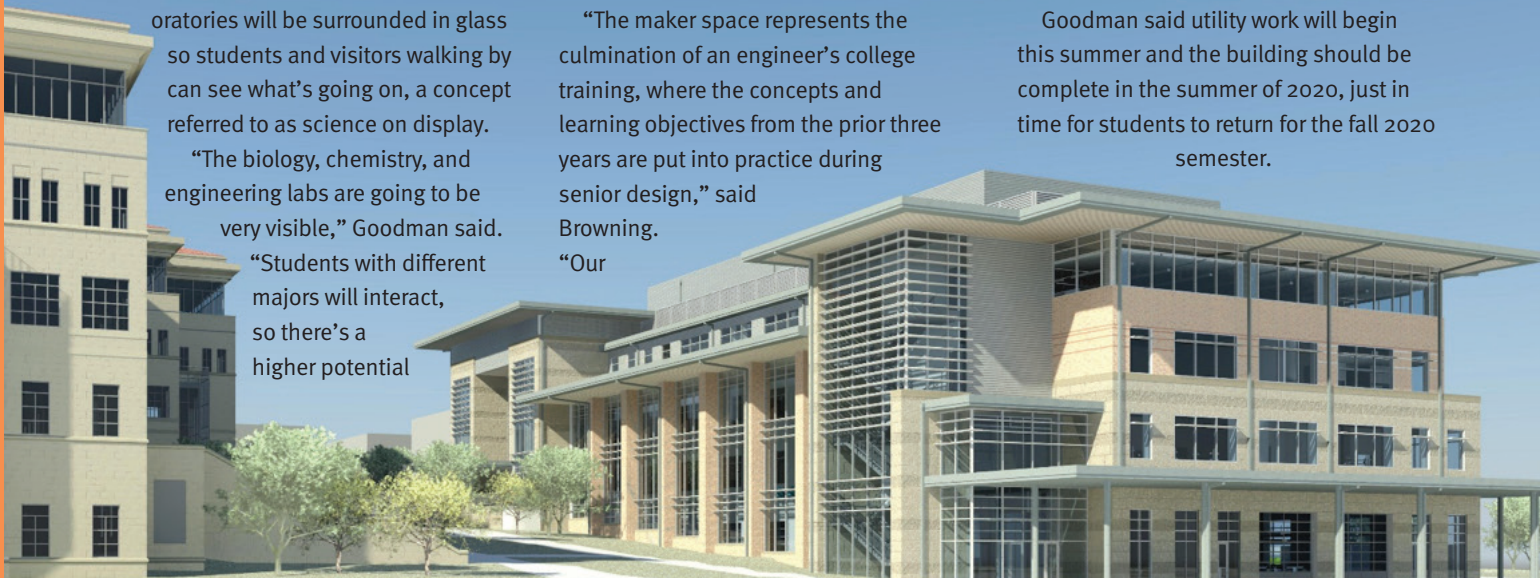
“Our

students will utilize the maker space’s features including a full machine shop, 3D prototyping facility, metrology lab, and assembly space. The maker space also has dedicated collaborative rooms for business students and sponsors to interact with the engineers and help guide a design from prototype to commercial success.”

Additionally, the new building will feature laboratories and classrooms dedicated to UTSA’s new chemical engineering degree program. Among the most anticipated features is a two-story space that will house distillation columns. In this space, students will be able to collect data and analyze the results in real-time, which reflects the type of hands-on requirements of a practicing chemical engineer at an industrial facility. To help support this program, Bill and Margie Klesse have committed a \$1 million gift from The Klesse Foundation in support of scholarships and equipment for chemical engineering, including a distillation column.

This will also be the first UTSA building using a stone and brick blend. UTSA architect and project manager Robert Espinoza worked with the campus community to choose a brick that will become the standard for future university buildings. The stone will also complement UTSA’s other science and engineering facilities: the Biotechnology, Science and Engineering (BSE) and Applied Engineering and Technology (AET).

Goodman said utility work will begin this summer and the building should be complete in the summer of 2020, just in time for students to return for the fall 2020 semester.



Celebrating young faculty

San Antonio newspaper award honors three UTSA engineering professors

Three faculty members in UTSA's College of Engineering have been selected for recognition among the San Antonio Business Journal's 40 Under 40. Pranav Bhounsule, assistant professor of mechanical engineering, Heather Shipley, Burzik Professor in Engineering Design and chair of the Department of Civil and Environmental Engineering, and Krystal Castillo, GreenStar Endowed Assistant Professor in Energy, were honored earlier this spring for their contributions to their field and their community.

"It's wonderful to see the San Antonio community honor and support the hard work and dedication that these faculty show each day as part of the College of Engineering," said JoAnn Browning, dean of the UTSA College of Engineering. "Their work is a shining example of UTSA's continued progress toward Tier One status."

Bhounsule's Robotics and Motion Lab at UTSA focuses on the design and control of legged robots. His research led to a world record, when the bipedal robot he created walked 40 miles without stopping or recharging. He teaches robotics and controls at UTSA and brings his research to the community by organizing robotics related outreach events.

"It feels great to be recognized for one's work and for contributions made to one's profession and community," said Bhounsule. "The award by the SA Business Journal to three UTSA engineering faculty this year is an indicator of top-tier research and education commitment of the college towards the South Texas region."

As a researcher, Shipley has pioneered a process that removes toxic, cancer-causing elements from

drinking water sources. As the chair of her department, she is an effective leader in reaching goals for research, teaching, and service to the UTSA community. She also created an international study abroad program for civil engineering undergraduate students as well as the UTSA Scholarship Program for Undergraduate Retention and Success (SPURS), which is sponsored by the National Science Foundation and provides mentoring and assistance to financially disadvantaged students.

"I felt very honored when I heard I had been selected for this award," said Shipley. "The other award winners are quite accomplished, and it was an honor to be included among them."

Through funding from the Department of Agriculture, Castillo serves as project director of the BioEnergy and Water for Agriculture Research and Education Network, a multi-institutional grant that aims to enhance interdisciplinary research and build a highly trained diverse workforce with strong analytical and computational skills. She is also the leader of two more projects (WE ARE and U-GREAT), which aim to accomplish comprehensive STEM reform through innovative education, research, and partnership initiatives. Her research is focused on constructing holistic mathematical models and solution procedures to design and optimize clean energy systems. Castillo's research has been supported with more than \$4M (about \$2.4 M as principal investigator) by USDA/NIFA, the Department of Energy, Environmental Protection Agency, and the Air Force Research Lab, among others.



LEFT: Krystal Castillo, GreenStar Endowed Assistant Professor in Energy and director of The Texas Sustainable Energy Research Institute. **BELOW:** Pranav Bhounsule, assistant professor of mechanical engineering. **RIGHT:** Heather Shipley, Burzik Professor in Engineering Design and chair of the Department of Civil and Environmental Engineering.





2017 University Excellence

AWARDS CEREMONY

Every spring semester, UTSA faculty and staff members are invited to celebrate employee excellence at the annual University Excellence Awards Ceremony. This year, two College of Engineering faculty members received university recognition: Mehdi Shadaram received a President's Distinguished Achievement Award in Community Engagement and Krystal Castillo received a President's Distinguished Achievement Award in Research Achievement.

"Dean Browning and others did a good job of surprising me," Shadaram said. "At first, I thought the visit was for a critical case. I was delighted when I saw the balloons and smiling faces. To me, this award means that the university, and particularly the college, value my effort to improve engineering education at UTSA and beyond."

Bernard Arulanandam, interim vice president for research, opened the program and was followed by Jude Valdez, vice president for community services, who recognized retirees and those with five or more years of service.

Interim President Pedro Reyes and Interim Provost and Vice President for Academic Affairs C. Mauli Agrawal presented the awards.

"It is a distinct honor to receive the President's Distinguished Achievement Award in Research Achievement," said Castillo. "As a faculty member, the ultimate outcome of my research endeavors is to benefit students as well as the community we serve. I am very grateful for this award and for the opportunity to lead an outstanding research group to such success during my tenure-track. There is no better way to enjoy the limelight than being surrounded by your group, students, and colleagues. I look forward to bringing more recognition to UTSA nationally and internationally through research efforts."

The ceremony included a presentation of the University Excellence Awards, President's Distinguished Achievement Awards, and Richard S. Howe Excellence Awards. In addition, 2016 service milestones and retirees were recognized.





Researcher. Inventor. Professor.

*COE professor David Akopian
named Fellow of the National
Academy of Inventors*

Story by Sarah Hada/Photo by Deborah Silliman

David Akopian, professor of electrical and computer engineering at UTSA, has been named a Fellow of the National Academy of Inventors (NAI). He is the second NAI Fellow for UTSA, following the appointment of C. Mauli Agrawal in 2015. The honor places Akopian among an elite group of professionals that includes presidents and senior leaders of research universities, Nobel laureates, National Inventors Hall of Fame inductees, and National Academies members.

“I want to congratulate David Akopian, who is extremely well deserving of this recognition,” said Agrawal, UTSA interim provost and vice president for academic affairs, who nominated Akopian for the distinction. “With 32 patents to his name, his own productivity as an inventor and researcher is exemplary.”

Agrawal added: “What is not so easily measured—and perhaps far more impactful—is [Akopian’s] legacy as a mentor to the hundreds of students who have had the great fortune of working and studying under him. Because of his industry background, he infuses a real-world, multidisciplinary perspective into his laboratory and classroom. UTSA is indeed fortunate that David Akopian has found his niche in academia.”

Akopian’s research interests are in a broad area of communication and navigation systems. He focuses on human-machine interactive mobile applications, wireless sensing, and location-finding and software-defined radio technologies. His most recent research projects have focused on mobile interactive solutions for health promotion interventions.

Akopian is the founder and director of the Software Communications and Navigation Systems Laboratory at UTSA. Since 2004, more than 80 students who trained in his lab have gone on to successful careers at a variety of companies including Apple, Google, Samsung, Cisco Systems, Amazon, Intel, and Verizon.

Over the course of his academic career, Akopian has acquired 25 issued and seven pending patents exploring various aspects of wireless localization systems, indoor wireless technologies, and human-machine wireless concepts. Several of his patents have been used in Nokia products and UTSA testbed systems serving several federal and state projects. He has received four inventor awards from UTSA and Nokia.

His research has been supported by the National Science Foundation, National Institutes of Health (NIH), USAF, NAVSEA, ONR, Texas Higher Education Coordinating Board, and CPRIT-TX, among others. Current funding comes from NIH, CPRIT-TX, San Antonio Life Sciences Institute (SALSI) and the U.S. Air Force Academy (USAFA).

Akopian is a prolific author whose research has resulted in more than 200 publications, including three book chapters, eight edited proceedings, 44 journal papers, and more than 150 invited and refereed conference papers and presentations. He served as associate editor for five periodicals, and he has chaired more than 10 mobile technology conferences.

Since 2003, Akopian has served as a senior member of the Institute of Electrical and Electronics Engineers (IEEE), where he also served as chair and vice-chair of the Central Texas Chapter of IEEE SMC Society for eight consecutive years. He is also a member of the US Institute of Navigation (ION). In 2008 his team won fourth place (honorable mention) in national AT&T’s “Big Mobile on Campus Challenge.” And, in 2015, he co-supervised the students from the UTSA College of Engineering who successfully showcased their engineering skills and solutions in the Perseus III unmanned technology demonstration held at the USAFA.

NATIONAL ACADEMY OF INVENTORS

Election to NAI Fellow status is a high professional distinction accorded to academic inventors who have demonstrated a prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development, and the welfare of society.

With the election of the 2016 class, there are now 757 NAI Fellows, representing 229 research universities and governmental and non-profit research institutes. The 2016 Fellows are named inventors on 5,437 issued U.S. patents, bringing the collective patents held by all NAI Fellows to more than 26,000.

Included among all NAI Fellows are more than 94 presidents and senior leaders of research universities and non-profit research institutes; 376 members of the three branches of the National Academy of Sciences; 28 inductees of the National Inventors Hall of Fame; 45 recipients of the U.S. National Medal of Technology and Innovation and U.S. National Medal of Science; 28 Nobel Laureates, 215 AAAS Fellows; 132 IEEE Fellows; and 116 Fellows of the American Academy of Arts & Sciences, among other awards and distinctions.

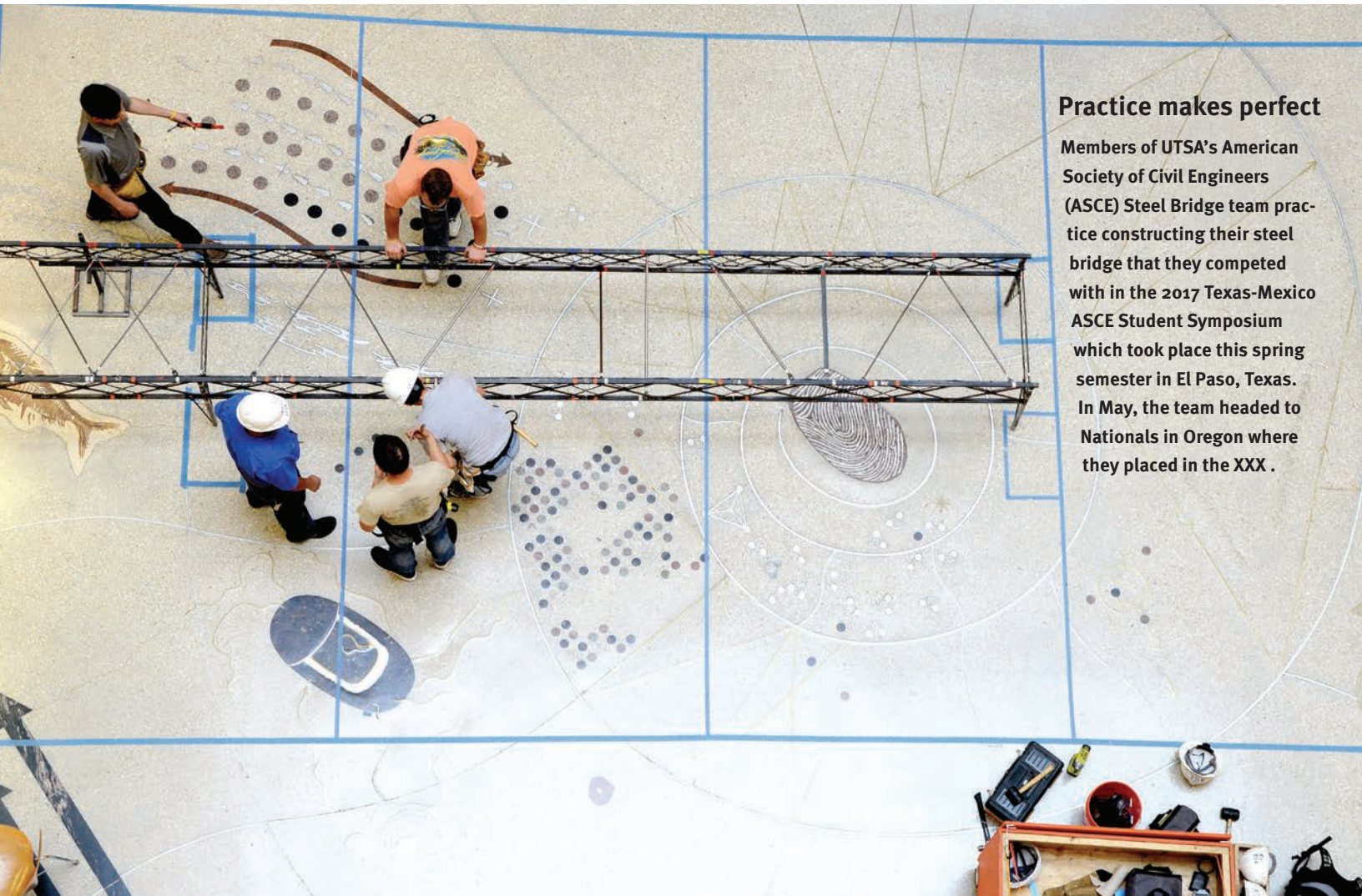
The 2016 Fellows were inducted on April 6, 2017, as part of the Sixth Annual Conference of the National Academy of Inventors at the John F. Kennedy Presidential Library & Museum in Boston. U.S. Commissioner for Patents Andrew H. Hirshfeld provided the keynote address for the induction ceremony.

UTSA Engineering

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Practice makes perfect

Members of UTSA's American Society of Civil Engineers (ASCE) Steel Bridge team practice constructing their steel bridge that they competed with in the 2017 Texas-Mexico ASCE Student Symposium which took place this spring semester in El Paso, Texas. In May, the team headed to Nationals in Oregon where they placed in the XXX .