

REACH OUT > ENGAGE > TRANSFORM



TEXAS TECH UNIVERSITY
University Outreach
& Engagement™

October 2019

We are very proud to present to you the first edition of “**Reach Out, Engage, Transform,**” a publication showcasing some of the outstanding engagement work of Texas Tech’s faculty, staff, and students. Texas Tech engages with communities across the region, state, and the world to help address local needs or larger societal issues. Connecting the university’s knowledge and resources to the needs of West Texas citizens and beyond has been part of university’s history since its beginning in 1923. This history was first recognized nationally in 2006 when Texas Tech was among only 72 public institutions in the country and, at the time, the only one in Texas to receive the newly created “Community Engagement” classification from the Carnegie Foundation for the Advancement of Teaching.

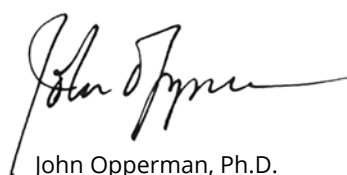
Texas Tech has continued its tradition and dedication to community engagement, committing to “**Transform lives and communities through strategic outreach and engaged scholarship**” as one of three strategic priorities in its 2025 Strategic Plan, **A Foundation for the Next Century**.

Our faculty, staff, and students are building strong, mutually beneficial partnerships with business and industry, non-profit and government agencies, health organizations, K-12 schools, citizens’ groups, and other communities. Anchored in the rigor of scholarship, they readily share their knowledge and resources to help find sustainable solutions to real-world problems in collaboration with communities. Oftentimes, their engagement results in research outcomes that are not only relevant and meaningful to communities, but also enrich the university’s scholarship and research, as well as enhance the curriculum and student success.

Today, this work is stronger than ever as demonstrated by the results of the university’s annual assessment of faculty and staff engagement activities. For highlights of the most recent campus-wide *Raiders Engaged* assessment, see pages 32 and 33 of this booklet. The work that engages our faculty, staff, and students beyond campus borders with external communities comprises a spectrum of activities, ranging from one-directional outreach to engaged scholarship.

This booklet brings to life a sample of the engagement projects and activities that are taking place across teaching, research/creative activity, and service at Texas Tech. We hope that you will enjoy reading about them and be inspired to reach out, engage, and transform.

Sincerely,



John Opperman, Ph.D.
Associate Vice President,
University Outreach and Engagement



Birgit Green, Ph.D.
Director,
University Outreach and Engagement

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We wish to thank Texas Tech’s Office of Communications & Marketing and Office of Research & Innovation for the courtesy of using material from some of their news archives.

ACADEMIC YEAR 2019 IN REVIEW

BACKGROUND AND MISSION

University Outreach and Engagement (UOE) was established in fall 2015 under Texas Tech’s Office of the Provost to provide innovative, collaborative, and strategic leadership and support for the university’s strategic priority of engagement with communities across the region, state, nation, and the world.

UOE strengthens Texas Tech’s ability to achieve excellence in outreach and engaged scholarship by serving as a catalyst, collaborator, and connector.

EVENTS AND ACTIVITIES

➤ UOE hosted the following programs and events:

- **Perspectives and Practices in Engaged Scholarship.** On November 8, 2018, over 80 Texas Tech administrators, faculty, staff, and graduate students attended a panel discussion by **Col. Dave Lewis**, Director of the TTU Institute for Peace and Conflict; **Tom Arsuffi**, Director of the Llano River Field Station; and **Tanya Karp**, Associate Professor of Electrical and Computer Engineering. The panelists discussed their experiences, strategies, and best practices in outreach and engaged scholarship.
- **Regional Engaged Scholarship Symposium.** On April 10, 2019, UOE hosted its second Regional Engaged Scholarship Symposium under the theme, “**The Future of Higher Education: Redesigning Teaching, Research, and Service to Remain Relevant.**” Over 160 attendees from Texas Tech and other Texas universities attended the event, which featured 36 faculty, staff, and student presentations that highlighted strategies for integrating engagement into teaching, research, and creative activity. **KerryAnn O’Meara**, Professor of Higher Education at the University of Maryland, was the keynote speaker, addressing the topic of “Valuing Engaged Faculty Work and Scholarship in Tenure and Promotion.”

➤ UOE met with the superintendents and their deputies of Lubbock-Cooper, Frenship, and Lubbock ISD to identify needs and discuss ways that Texas Tech University can become engaged. As a result, UOE fostered the implementation of middle school mentoring programs at Frenship and Lubbock-Cooper ISDs, involving up to 80 students from the College of Education beginning in fall ‘19.

➤ UOE held three community forums with Lubbock community leaders to identify critical community needs and discuss partnership opportunities. Participants included a total of 32 representatives from non-profit agencies such as the Lubbock United Way, YWCA, the Volunteer Center of Lubbock, Voice of Hope, and others; the Mayor of Lubbock as well as City Council Members; the Chamber of Commerce; the Lubbock Economic Development Alliance; the CH Foundation; child service providers; health care organizations; as well as neighborhood groups.

AWARDS AND RECOGNITIONS

➤ In fall 2018, Texas Tech’s **East Lubbock Promise Neighborhood** (ELPN) was named a Regional Winner of the **W.K. Kellogg Community Engagement Scholarship Award** which is sponsored by the Association of Public and Land-Grant Universities (APLU) in collaboration with the Engagement Scholarship Consortium (ESC). The award recognized the significant impact the project has had on the East Lubbock Community, faculty scholarship, curriculum, and student success. As a Regional Winner, ELPN qualified as a finalist for the prestigious **C. Peter Magrath Community Engagement Scholarship Award**, sponsored by APLU.

➤ In 2018, UOE launched the **President’s Excellence in Engaged Scholarship Awards** as well as the **President’s Emerging Engaged Scholarship Awards** programs to publicly recognize and reward individual TTU faculty and teams of faculty from all disciplines who demonstrate exemplary and sustained commitment to engaged scholarship. In spring 2019, the following individuals were recognized for the impact of their work on both communities and the university:

- **President’s Excellence in Engaged Scholarship Award: Rona Pogrund**, Professor of Special Education, TTU College of Education: “Stakeholder Partnership to Impact Educational Services for Children with Visual Impairments.” **Steven Presley**, Professor and Chair, Environmental Toxicology, TTU College of Arts and Sciences: “Engaged Scholarship to Ensure Multiple Aspects of Public Health Communities.”
- **President’s Emerging Engaged Scholarship Award: Lisa Gittner**, Associate Professor of Political Science, TTU College of Arts & Sciences; **Nathaniel Wright**, Assistant Professor of Political Science, TTU College of Arts & Sciences; **Jeff Dennis**, Assistant Professor of Public Health, TTU Health Sciences Center: “Lubbock County Justice and Mental Health Initiative.”
- **Exemplary Program Award: Melissa Currie**, Assistant Professor of Landscape Architecture, TTU College of Agricultural Sciences and Natural Resources: “Regional Planning in Rockport.” **Allison Whitney**, Associate Professor of Film & Media Studies, TTU College of Arts and Sciences: “Sexism|Cinema.” (Other TTU collaborators include: **Elizabeth Sharp**, Professor of Human Development and Family Studies; **Dana Weiser**, Assistant Professor of Human Development and Family Studies; **Don Lavigne**, Associate Professor of Classics; Michael Borshuk, Associate Professor of English; **Jessica Smith**, PhD Candidate in English).



THE INTERCONNECTIONS OF WATER, LAND, AND AGRICULTURE

Texas Tech University faculty, staff, and students enhance the university's reputation as a national research leader by engaging with communities around issues related to water, land, and agriculture. These partnerships combine disciplinary research and discoveries with the knowledge and expertise of the community to effectively address environmental threats, mitigate the effects of climate change, and preserve or build upon the world's precious natural resources, thereby ensuring economic vitality and growth.

» CONSERVING WATER FOR FUTURE GENERATIONS

THE ISSUE Despite experiencing severe drought conditions, Texas continues to lead the nation in many agricultural enterprises. The Ogallala Aquifer (which spans Texas, Colorado, Kansas, Nebraska, New Mexico, Oklahoma, Dakota, and Wyoming) supports one-fifth of the total annual U.S. agricultural harvest. However, agricultural and urban water consumption reduces this underground water reserve at a rate faster than it is replenished. Its loss would have a devastating economic impact on the region; therefore, conservation of this resource is vital.

THE APPROACH The Texas Alliance for Water Conservation (TAWC) project at Texas Tech University strives to identify, demonstrate, and quantify water-saving agricultural production practices and technologies that reduce the depletion of groundwater on the Texas High Plains. The goal of TAWC is to extend the life of the Ogallala Aquifer while maintaining the viability of local farms



"Our mission is to conserve water for future generations by identifying those agricultural production practices and technologies that, when integrated, will reduce the depletion of ground water while maintaining or improving agricultural production and/or economic opportunities." [TAWC]

and communities. By linking research with on-farm sites, water-saving practices are being implemented that maintain profitability for local farms and communities while preserving their most valuable resource. TTU faculty members such as Chuck West, Rick Kellison, and Phil Brown work directly with producers to study, demonstrate, and test the best water conservation practices.

THE PARTNERS TAWC cultivates mutually beneficial relationships with industries, crop consultants, universities, and government organizations. Its director, Chuck West, notes that community engagement is central to the success of the project. "We partner with 20 core producers, whose production-related decisions are based on sources from a variety of agricultural practices spanning over 6,000 acres of project field sites in Lubbock and surrounding counties."

While community partnerships are integral to the success of TAWC, so are the university's students. Students work alongside Texas Tech faculty and community partners to translate research into usable tools. By fostering relationships with area producers, they develop an understanding that extends beyond the classroom.

THE IMPACT TAWC exemplifies the limitless benefits available to the university and the community through strategic partnerships. Rapid water depletion rates affect all water users, and efforts by TAWC offer water-management options that are timely, flexible, and cost-effective. The professional works, media programs, and field demonstrations produced by faculty and students have advanced not only scholarship, but also the agricultural industry. Data gathered over the past 14 years of the TAWC project have been used to develop free online, decision-making tools that producers can access to enhance irrigation management.



PROTECTING THE WATERSHED OF THE UPPER LLANO RIVER

The Texas Hill Country is one of America's most treasured landscapes and one of the only rare areas like it on Earth. Threats to the Hill Country revolve around water, especially iconic groundwater/surface water connections we know as springs. Springs are disappearing, as are flows of rivers and streams due to aquifer mining, population growth, invasive water sucking plants, land fragmentation, climate change, pollution, and poor land management practices.

Texas Tech's Llano River Field Station (LRFS) uses a watershed approach embedded with environmental education to address these myriad issues in a holistic and sustainable manner. Located in a large rural area in the Hill Country, LRFS conducts research and engages in a comprehensive spectrum of partnerships focused on recognizing, understanding, and finding solutions to regional water problems. LRFS, Texas A&M, Llano River Watershed Alliance, City of Junction, county judges, mayors, state agencies, ranchers, and landowners partnered to proactively address threats and maintain healthy watersheds that preserve the economic and ecological benefits they provide.

The locally-driven stakeholder process involved public meetings and a coordinating committee composed of key representatives who together identified watershed issues, desired conditions, and measurable goals. These partners prioritized management practices and needed education programs to address and mitigate problems. Researchers and staff at LRFS provided scientific research and technical expertise to aid in decision-making. The Upper Llano River Watershed Protection Plan became the nexus for these efforts. After formal acceptance by the U.S. Environmental Protection Agency, the Plan now represents a strategic systems approach to conserving healthy watersheds, protecting high-quality waters and preventing future water pollutants. It currently serves a five-county area of 50,000 people, and the stewardship practices at the headwaters also influence water quantity and quality downstream to the city of Austin with over one million people.

» WORKING WITH U.S. NAVY TO LIMIT SEDIMENT CONTAMINATION

SEEING THE ISSUE Water contamination can come in many forms, whether from industrial waste, rusted pipes, or Mother Nature. When natural disasters such as hurricanes and floods happen, the water from those storms collects contaminants, such as oil from parking lots or pesticides from lawns. Contaminated water can empty into oceans, lakes, rivers, or water reservoirs, thus polluting them.

FINDING SOLUTIONS Danny Reible of Texas Tech's College of Engineering leads a team that is currently working with the U.S. Navy and Geosyntec Consultants to find ways to solve the sediment contamination issue, especially on Department of Defense (DOD) bases. The project is funded by a one-million-dollar grant from the DOD. "For this project, what we're doing is looking up in what we might call a 'storm shed,'" Reible said. "It's the equivalent of a watershed, an area of land that separates waters flowing to different rivers, etc., but we're looking at where the storms are making the most impact and giving rise to the storm water that's being generated. How do we better understand and manage the practices we currently use to control storm water?"

The Navy is interested in Reible's research because most naval bases reside in coastal cities. "The Navy has two concerns," Reible explains. "One is the storm water itself. It is a discharge just like an industrial outfall. So, just like the waters that leave from a wastewater treatment plant, these storm waters are also a source of contamination. They pick up contaminants when the water runs across parking lots and lawns. The second part of their problem is the Navy still has legacy contamination. Almost all of our old industrial harbors have some legacy contamination due to past practices. The key question about how to deal with them is: do we clean up the sediments at this point, or do we still have sufficient ongoing sources that whatever we do is going to be reversed in just a couple of years?"



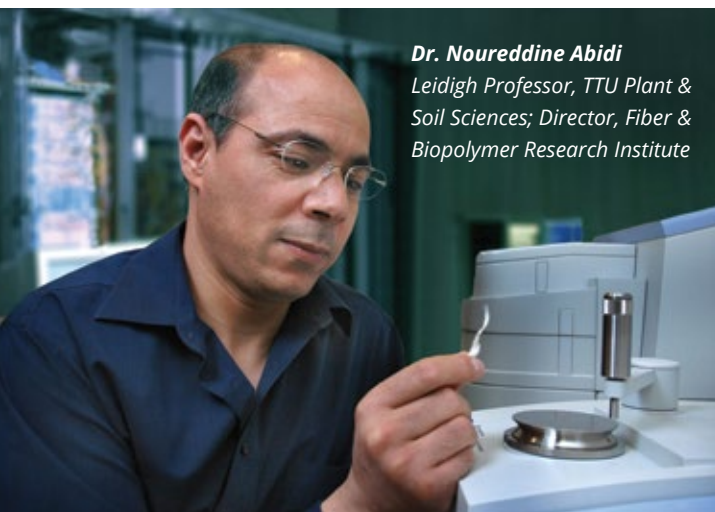
Dr. Danny Reible, Donovan Maddox Distinguished Engineering Chair and professor in Texas Tech University's Department of Chemical Engineering and Department of Civil, Environmental, and Construction Engineering within the Edward E. Whitacre Jr. College of Engineering

RECOGNIZING THE BROADER IMPACT Though Reible is working on this project to help the Navy clean up its bases, the research can be used by any city or business. In his words, "Any facility, industry or municipality that has an issue with storm water that's running off into a body of water could make use of this information, and that's basically every major city in the U.S."

» FIBER AND BIOPOLYMER RESEARCH AND PRODUCER ENGAGEMENT

MAKING A DIFFERENCE IN THE WAY THE WORLD TALKS ABOUT FIBER QUALITY The Fiber and Biopolymer Research Institute (FBRI) in the Department of Plant and Soil Science at Texas Tech University is committed to serving the needs of manufacturers, cotton breeders, and public agencies. Its research is changing the way the world talks about fiber quality. Located six miles east of the university's main campus, FBRI occupies 110,000 square feet of space, allowing Texas Tech researchers to conduct testing and evaluation from the raw fiber stage to the finished textile product.

Working with cotton breeders across the country, FBRI uses scaled-down versions of commercial cotton ginning equipment found in gins across Texas. It processes and gins cotton breeder/research



Dr. Nouredine Abidi
Leidigh Professor, TTU Plant & Soil Sciences; Director, Fiber & Biopolymer Research Institute

samples for turnout and fiber quality testing, while educating undergraduate and graduate students on the inner workings of the various machines. By putting cotton through the stress of the full ginning process, researchers are able to see where adaptations can be made to maintain the quality of the cotton fiber.

In line with its fundamental longstanding mission to add value to natural fibers in Texas, FBRI's Biopolymer Research Group aims to increase knowledge and understanding of cellulose and other biopolymer structures, explore the links between polymer structure and physical properties, and functionalize surfaces such as textiles and bioplastics to add new properties. This is also an integral part of a growing collaboration with plant geneticists and biotechnologists.

USING WEST TEXAS COTTON FOR BIODEGRADABLE TOWEL TO CLEAN OIL SPILLS

Two Texas Tech students, Ronald Kendall Jr. and Luke Kitten, brought an idea out of the lab and into U.S. markets that is the first of its kind: a cloth made of engineered cotton to clean up oil spills in various-sized bodies of water. It is an affordable, nonwoven fabric that is durable and biodegradable with the ability to hold up to 15 times its weight in oil. The product takes advantage of the durability and absorbency of cotton fibers that are normally used to make textiles. The young entrepreneurs have been working on this project since high school with Texas Tech professor Seshadri Ramkumar from the Nonwovens and Advanced Materials Laboratory in the Department of Environmental Toxicology. Kendall majored in Energy Commerce and founded the company E Innovate, LLC, to continue researching and producing environmentally friendly solutions for complex contamination problems.

The product is naturally hydrophobic, made with no chemical treatment or additives, and is able to float on water. It is highly effective for remediating oil spills, as it absorbs oil while remaining afloat on water's surface; and unlike synthetic absorbents on the market, this specially engineered cotton cloth does not shed small bits of micro-plastic fibers.

"They started a company out of Lubbock that has translated their product into the marketplace. That product is going to save a lot of lives—particularly marine life—as well as protecting people from toxic spills and chemicals."

Dr. Seshadri "Ram" Ramkumar
Professor of Advanced Materials,
TTU Dept. of Environmental Toxicology



» REGIONAL PLANNING IN ROCKPORT



BUILDING A MUTUALLY BENEFICIAL PARTNERSHIP Rockport, Texas is the site of the August 25, 2017 landfall of Hurricane Harvey. The Category 4 storm caused significant damage locally, with catastrophic rainfall totals across Houston and southeast Texas. Many homes, businesses, and crafts (boats and airplanes) across Aransas County were lost or significantly damaged. This included Rockport City Hall and Rockport-Fulton High School. "Regional Planning in Rockport" involved a university-community partnership between Dr. Melissa Currie's 2018 Regional Planning Studio in the Texas Tech Department of Landscape Architecture and the City of Rockport, Texas. Students of landscape architecture functioned as consultants to the city, providing planning and design services that assisted in the city's rebuilding process following the hurricane.

ENGAGING WITH THE COMMUNITY Thanks to partial funding from the Texas Tech Center for Transformative Undergraduate Experiences (TrUE), Dr. Currie, one graduate student assistant, and 34 undergraduate students were able to travel to Rockport, visit numerous hurricane-affected sites, and meet with city and county officials to better understand their needs. They also talked with residents and business owners, while developing a deeper appreciation of the work to be done. Early in the collaboration, city planner Amanda Torres expressed a desire to have a set of guidelines for low-impact development and green infrastructure that could be used by developers in current and future planning efforts. A charrette held in October 2018



Dr. Melissa Currie’s “Regional Planning in Rockport” partnership received an Exemplary Program award as part of Texas Tech’s newly launched President’s Emerging Engaged Scholarship awards program.

with municipal and other leaders from involved community organizations provided a platform to express the community’s needs to the class. Areas prone to flooding, commercial development zones, special areas for preservation, and other important community assets were identified to highlight areas the class would focus on.

ADDRESSING A REAL-WORLD ISSUE Natural disasters, such as hurricanes and extreme flooding, are increasing not only in number, but also in magnitude and severity. They can no longer be thought of as the exception, but as the norm. The Rockport project gave the students experience in interacting with public officials, and it created an enduring connection to the people and places for whom they were designing. Dr. Currie observed that many students’ projects displayed a greater degree of thought, investigation, creativity, and sophistication than what was produced during previous assignments. The partnership provided students with a transformative educational experience that applied their classroom knowledge and skills to real-world problems they will likely encounter in their future careers as landscape architects.

» THE TEXAS TECH CLIMATE CENTER

GLOBAL IMPACT FOCUSED ENGAGEMENT AT ITS BEST The Climate Center at Texas Tech University conducts interdisciplinary research to address the effects of climate variability and long-term trends across the South Central United States. Twenty-nine Texas Tech faculty members collaborate to provide the science, tools, and information that link past trends with current climate conditions and future projections. These in turn inform real world decision-making and planning that can be used to best anticipate, monitor, and adapt to projected climate change.

The center serves as the regional hub on climate change, providing expertise on linking regional climate projections to soil processes, plant productivity, patterns of biodiversity, conservation initiatives, ecosystem services, water policy and planning, agricultural production, rural economic preparedness, and the sustainability of natural and agroecosystems. It engages with numerous stakeholders to develop and apply this knowledge to critical, climate-related issues affecting economic and human conditions in the Southern Plains.

MEET THE FOUNDERS AND CO-DIRECTORS:

Katharine Hayhoe is an atmospheric scientist who studies what climate change means in the places we live, and how it affects everything from agriculture to water and health. With over 125 peer-reviewed publications, she has served as a lead author for the Second, Third, and Fourth U.S. National Climate Assessments and has partnered with organizations from the City of Chicago to the Federal Highway Administration to help them prepare for the impacts of climate change. To educate the general public about climate change and its effects, Dr. Hayhoe co-produces a PBS Digital Series, *Global Weirding*, with KTTZ, is active on social media, and has written and served as a guest editor for magazines ranging from *Wired* to *Good Housekeeping*. She has participated in a number of documentaries and television programs from *Amanpour* to the Emmy award-winning *Years of Living Dangerously*. In 2018 she was awarded the eighth Stephen H. Schneider Award for Outstanding Climate Science Communication and named a YWCA Woman of Excellence in Science.



John Zak is a soil microbial ecologist whose research seeks to understand how climate variability and human disturbances regulate the diversity and activity of soil microbes that play a vital role in our ecosystems. From the cotton fields of West Texas to the Chihuahuan Desert in New Mexico, Dr. Zak conducts research to understand what’s happening in our soils, thus developing critical insights to ensure such systems are sustainable for future generations. He engages with a broad range of stakeholders, such as the United States Department of Agriculture-Agricultural Research Services Cropping System and Cotton Incorporated, to help them maintain healthy soil. He was instrumental in founding Texas Tech’s Citizen Science Grower’s Group, whose collaborations with local farmers to quantify the benefits of regenerative agriculture and no-till farming are featured in the Anthropocene exhibit of the brand-new Fossil Hall in the Smithsonian Museum of Natural History.

» VITICULTURE PROGRAM PLAYS VITAL ROLE IN WINE INDUSTRY GROWTH

WINE AND GRAPE-GROWING IN WEST TEXAS Grape-growing and winemaking industries have taken off in the South Plains over the last decade. Warm and dry springs and summers, moisture content, and cool summer nights make West Texas a highly suitable location for cultivating grapes.

“The advantages we have out here are the high elevation, the clear skies, and we get lots of sunlight and heat,” said Ed Hellman, professor of viticulture in the Texas Tech Department of Plant and Soil Science. “We get that combination of sunlight and heat that makes the vines very productive, but also, the quality of fruit is high out here.”

FACILITATING INDUSTRY GROWTH Hellman also shared, “When I came to Texas Tech in 2001 there were 46 wineries in the state, and now there are over 400.” That growth in grape-growing and winemaking has been good for the College of Agricultural Sciences & Natural Resources, which not only conducts extensive research in viticulture, but offers degree concentrations in viticulture and enology for students as well. Also offered are viticulture and winemaking certification programs for wine industry entrepreneurs and prospective vineyard managers seeking to extend their knowledge of commercial grape production practices.

The undergraduate viticulture concentration began in 2010, and its graduates are starting to populate vineyards and wineries throughout the state. The viticulture certificate program began in 2007, and the winemaking certificate program started five years later, with Texas Tech making a major impact on the growth of the industry in a short amount of time.

“We’ve gotten more attention from people in the industry or people who are interested in getting into the wine industry, and they’re looking at Texas as a pretty significant state,” Hellman said. “They’re paying attention to us.” In response, the department also developed continuing education programs, helping advance the business side of the viticulture industry as much as the agricultural side. Furthermore, Texas Tech launched a new degree specialization in local food and wine production systems, the first of its kind at a university in the U.S. The program will be located at both the Hill Country University Center, the university’s Fredericksburg campus, and the main campus in Lubbock.



“We have had a huge impact on the growth of the industry in having so many of those new entrepreneurs go through our program. With the influx of interest by second-career professionals, we are able to really facilitate the growth of the industry by giving these entrepreneurs the basic training and education they need.”

Ed Hellman
TTU Professor of Viticulture



ENERGY PRODUCTION, DISTRIBUTION, AND UTILIZATION TECHNOLOGIES

Texas Tech faculty, staff, and students are discovering, testing, and implementing innovative technologies and practices to respond to changing environmental conditions, limited natural resources, and increasing energy needs. They are engaging with communities at the local, state, national, and global level to help secure the resources and infrastructure that promote the well-being, prosperity, and resilience of humankind.

» THE NATIONAL WIND INSTITUTE

LOCAL TRAGEDY SPARKS GLOBAL ENGAGEMENT Texas Tech's National Wind Institute (NWI) is based on a strong foundation of more than 40 years of research and education regarding the impact of wind on structures and human life. Wind research and education at Texas Tech began after an F5 tornado in 1970 claimed 26 lives in Lubbock, Texas. Since then, the program has evolved into a regional and global system of partnerships that addresses the destructive as well as the productive power of wind. The university established NWI in December 2012, merging its Wind Science and Engineering Center and Texas Wind Energy Institute to better support the interdisciplinary research, commercialization, and education in wind science and engineering, as well as wind energy.

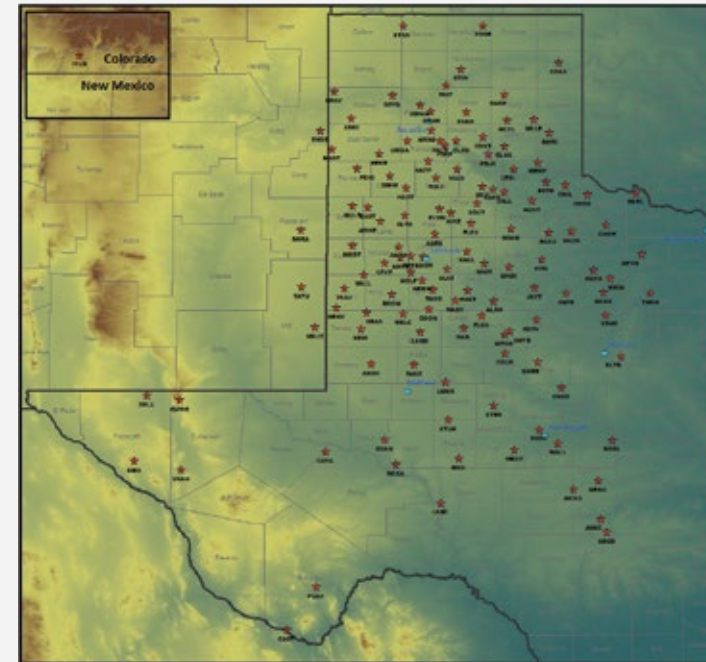
EDUCATION, SAFETY, AND TECHNOLOGY NWI engages with communities, business and industry, higher education institutions, and government agencies across the country. Its research draws on multiple engineering areas, atmospheric science, economics, business, and law (among others) to address the nation's energy needs and continue to mitigate the damage to lives and structures from severe weather events. Texas Tech faculty and their partners have co-developed international standards for storm-safe home construction, created new degrees and certificates in wind energy, developed the nation's only Ph.D. in Wind Science and Engineering, and launched energy-producing research



wind farms in West Texas. Collaborative research projects span from wind turbine research to debris impact testing to provide solutions for wind related problems.

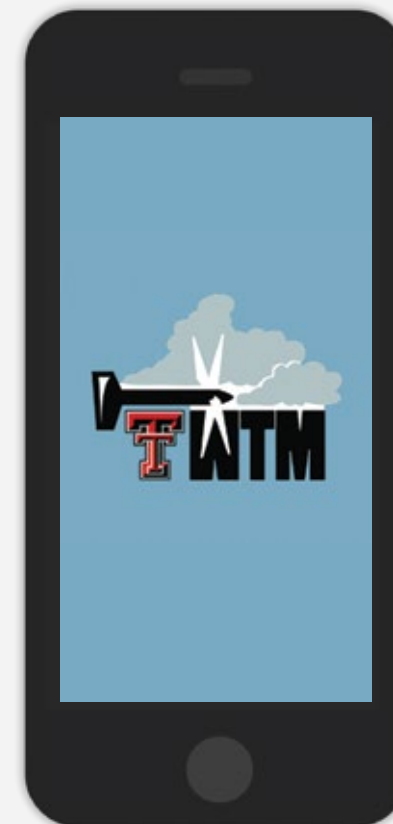
IMPACTS NWI's engagement is directly impacting communities across the world, as well as hundreds of companies and critical national agencies. Through contributions to FEMA's non-technical guidelines on storm readiness and safe room design, and the National Weather Service's tornado-rating Enhanced Fujita Scale, educational opportunities and safety outcomes for citizens in storm-prone areas across the United States and around the world have significantly increased. Through NWI's degree and professional development programs, the rapidly growing wind industry is gaining a workforce equipped with the critical knowledge and skills to address the nation's current and future energy needs.

» WEST TEXAS MESONET MOBILE APPLICATION



PROVIDING PRECISE WEATHER AND AGRICULTURAL INFORMATION 24/7 One innovative technology development coming out of the National Wind Institute is a mobile application designed to help producers and consumers become more versed in forecasting the weather and its agricultural impacts. The West Texas Mesonet mobile application, which uses information from the institute's 120 mesonet stations across West Texas, eastern New Mexico, and southwestern Colorado, provides precise weather and agricultural information 24/7. The app is available for download on Apple iOS and Android Google Play devices and was recently updated to a 2.0 version, which includes a variety of new features.

"This new edition of the app provides new information to the user, including the calculation of heat units for cotton," says John Schroeder, Senior Director of the NWI. "It represents a partnership with the Plains Cotton Growers and the Texas Alliance for Water Conservation, and it is another step forward in our continuing effort to better serve our region."



The app gives users easy access to information in plain language on temperature, wind speed, wind direction, wind gusts, pressure, dew point, soil temperatures, leaf wetness, cotton heat units, humidity and precipitation, along with weather maps based on the GPS location of a phone or tablet. It also provides daily and weekly weather forecasts from the National Weather Service.

"This new app and its predecessor are great examples of how the National Wind Institute has put research to work, serving the needs of diverse communities throughout the state of Texas."

Joseph Heppert
Vice President, Office of Research and Innovation

» WIND ENERGY IN NICARAGUA

PREPARATION FOR THE PROJECT In the spring of 2018, a group of Texas Tech wind energy students traveled 2,000 miles to Nicaragua to help provide access to clean drinking water for local residents of Jinotega. Seven weeks before the project, students were given dimensions for a sixty-foot well that had already been drilled at the site. They were tasked with designing an off-grid (self-sustaining power) water pump and filtration system, and spent the progressing weeks designing, fundraising, and gathering donated materials for the project. The pumps were required to be repairable by parts available in Nicaragua, which challenged students to think outside the box. Led by Instructor Andrew Buchock of the National Wind Institute at Texas Tech, the team of twenty students gathered their designs and flew to Nicaragua to complete the water pump installations that provided fresh, clean water to the community.

AFTER ARRIVAL IN NICARAGUA The students and faculty faced numerous challenges upon arriving at the well site, but used their ingenuity and problem-solving skills to come up with solutions. Members of the team also traveled to



The drinkable water supply in some areas of Nicaragua has become contaminated due to infectious diseases and farming techniques, which use fertilizer and insecticide. The infant mortality estimation is extremely high, and most experts believe that a lack of clean water is the primary reason. Some Nicaraguan citizens do not have access to electricity in remote areas of the country or the technology to pump water from below ground past a certain depth. For many of these homes, clean water is approximately 60 feet below the surface.



other sites in the area to complete projects including installing a microgrid on a school, which uses solar energy to supply power. The result of their efforts provided valuable resources to local residents and left Texas Tech students feeling proud of their hard work and accomplishments, as reflected in the following testimonials by the students involved:

"We got the job done, and we were really proud as a team for what we did." – TTU Student

"It's been awesome to be part of something bigger than yourself – to really apply things that you've learned in school in a real-world application for people who actually need it. I think that's the whole reason that we decided to go into technical degrees, to actually make a difference in the world where it's needed." – TTU student

» GLEAMM - GLOBAL LABORATORY FOR ENERGY ASSET MANAGEMENT AND MANUFACTURING

Modernizing the outdated electric grid infrastructure is a key national and local priority for industry and consumers. In Lubbock, Texas, a collaboration of university innovators, industry leaders, and for-profit testing, certification, and manufacturing facilities focuses on advancing new university innovations and certifying the next generation of industry technologies to protect, enhance, and manage our nation's electricity transmission and distribution.



GLEAMM includes the world's only real-world field-testing platform of its kind, drawing upon capabilities and research expertise in wind, solar, battery storage, weather and energy forecasting, cyber security, phasor measurement units, silicon carbide design and manufacturing, and more.

IMPACT THROUGH PARTNERSHIPS GLEAMM combines the research and commercialization expertise of Texas Tech University with the field testing, certification, and development of the for-profit energy development company, Group NIRE. In partnership with Group NIRE, Texas Tech works to test, certify, research, develop, and support the manufacturing of new electrical grid technologies and next-generation power electronic devices for public and private partners. Much of this testing and certification takes place at the Reese Technology Center, a shared field-testing site between Texas Tech and Group NIRE, located just west of Lubbock.

GLEAMM developed a solar test facility to maximize solar generation and support of distributed energy and microgrid opportunities. As part of this project, Texas Tech University's solar array was completed and commissioned on May 9, 2017. It is located at the Reese Technology Center.



**The 2019 figure is derived from real data over the first two quarters of 2019 and a projection for the final two quarters of 2019. The projection was calculated using quarterly data collected over the previous three years' quarterly reports.*



HEALTH, WELL-BEING, AND QUALITY OF LIFE

An institution's success is credited by the caliber of its researchers and educators. Texas Tech is fortunate to host many whose care for society drives their success in promoting and growing the community's health, well-being, and quality of life physically, mentally, and emotionally. Whether the incentive is to combat disease, improve society's physical health, enhance education, or foster mental wellness, Texas Tech is motivated to find quality solutions to existing issues.

» ENGAGED SCHOLARSHIP TO ENSURE PUBLIC HEALTH

ADDRESSING MOSQUITO-TRANSMITTED DISEASES The West Nile Virus has been found in mosquito populations every year in the Lubbock area since 2002. Identifying the virus in mosquitos and informing public health authorities at local and regional levels is critical to controlling the spread of disease. Dr. Steve Presley is Professor and Chair in Environmental Toxicology at Texas Tech. He and his team have been consistently engaged with local, regional, and statewide public health and emergency response communities for more than sixteen years to address the recurrent issue of human diseases transmitted by mosquitoes and other arthropods. Their community partners include the city of Lubbock, Lubbock County, the South Plains Association of Governments, and the Texas Department of State Health Services. More than thirty graduate students have been mentored through the program, each of them participating in collecting, identifying, and testing mosquitoes for various arboviruses, including the West Nile Virus. The data collected is shared with health authorities across the region and state and published in peer-reviewed journals to aid in planning and responding to emerging vector-borne disease outbreaks. Dr. Presley and many of his students have provided lectures and hands-on training to vector control technicians and public health authorities on mosquito biology and identification, as well as new and effective mosquito collection and control technologies.

COMMUNITY PARTNERSHIPS AND PUBLIC BENEFIT Dr. Presley's team has developed more efficient and effective arthropod vector collection and testing methodologies as a direct result of various long-term collaborative relationships and partnerships with public health communities at all levels. They have also gained a greater capacity for conducting research to achieve a better understanding of the environmental and anthropogenic factors that influence pathogen transmission and insecticide resistance in potential vector populations. The direct engagement with public health and emergency response communities has also led to dozens of media interviews and public service announcements related to emerging disease threats, as well as effective methods of protection against vector-borne diseases. Overall, the most significant impact has been an increased awareness and understanding of emerging and arthropod-borne zoonotic diseases in the region.



In Spring 2019, Dr. Presley's work was recognized with the TTU President's Excellence in Engaged Scholarship Award.

» OUTDOOR LEARNING ENVIRONMENTS (OLE!) TO PROMOTE CHILD HEALTH AND EDUCATION

In the state of Texas, over thirty percent of children ages two to four are either obese or overweight. A key component in the ongoing fight against childhood obesity is giving children a safe, innovative, and fun place to play. In some instances, that can be a struggle. Outdoor Learning Environments (OLE!) Texas has been aiming to change that. The initiative promotes outdoor learning environments for childcare centers throughout the state to increase physical activity, food awareness, and enhance education in more natural outdoor spaces. It is based on nearly fifteen years of research conducted by the Natural Learning Initiative (NLI) undertaken by the Department of State Health Services (DSHS) as an early intervention strategy for combating childhood obesity in Texas.

BENEFICIAL COLLABORATIONS The goal of the OLE! Texas initiative has been to create outdoor learning environments through research, teaching, implementation, collaboration, and feedback as a means toward healthier physical and emotional lifestyles. Texas Tech faculty members Dr. Kristi Gaines, an associate professor in the Department of Design; Dr. Charles Klein, an associate professor in Landscape Architecture; and Dr. Malinda Colwell, a professor in Human Development and Family Studies, have been working with OLE! Texas to implement the concept locally. This faculty team provides a valuable facet to such an impactful project. Dr. Klein and Dr. Gaines are the only designers on the state-wide leadership team, and Dr. Colwell's expertise in multidisciplinary work brings together food safety, nutrition, agriculture, and early childhood developmental science.

Constituting the Texas Tech Coalition for Natural Learning in the Lubbock/High Plains/West Texas region, the team specializes in offering technical advice to childcare centers and landscape design training to designers interested in expanding their skills to create inviting outdoor learning environments where children can play, discover, and connect with nature. The team continues to work with DSHS to develop the local coalition, partnering with agencies such as AgriLife Extension, Texas Workforce Childcare Services, and the City of Lubbock.



Charles Klein and Kristi Gaines collaborate together on the OLE! Texas project.



"This is a great opportunity for Texas Tech to partner with state agencies, other universities, and professional organizations to promote child health," said Kristi Gaines.

LONG-TERM IMPACTS The development of OLE! Texas in Lubbock builds upon the "learning by doing" concept started by DSHS and NLI. The project not only enables the transfer of knowledge and materials to improve childcare centers, but it advances evidence-based design practices, teacher training, and information strategies to help early learning childhood centers meet outdoor learning environment standards that promote physical activity and healthful living. The long-range goal is to expand outreach and engagement opportunities beyond the city of Lubbock to other West Texas communities, and beyond. Expansion into outdoor environments other than childcare centers, such as public schools and parks, is also under consideration.

Texas Tech offers an exceptional location for conducting this project, given the commitment by the university to its Obesity Research Institute, whose mission is to achieve national leadership and recognition in interdisciplinary obesity research and education. This campus-wide initiative seeks to develop interdisciplinary basic clinical and community translational research to prevent and treat obesity, along with its related complications, using innovative collaborations and strategic partnerships. Texas Tech's Coalition of OLE! Texas and its project partners are an integral part of this initiative.

» OBESITY RESEARCH INSTITUTE

ADDRESSING CRITICAL HEALTH ISSUES Obesity is a growing problem in the United States. According to the latest estimates from the National Institutes of Health (NIH), more than one-third of American adults are obese, and that rate has been rising steadily for decades. Dr. Naima Moustaid-Moussa, FTOS, FAHA, is Professor in Nutritional Sciences and Founding Director of the TTU Obesity Research Institute (ORI). She has grown the ORI into an interdisciplinary collaboration involving faculty in many diverse fields who conduct research ranging from basic science to clinical studies and community-based nutrition research. ORI research teams are engaged in collaborative transdisciplinary and translational research. They also coauthor publications and grants funded by federal agencies and foundations.

FUNDING AND SUPPORT Moustaid-Moussa's research is funded by the National Institutes of Health, USDA, and the American Heart Association to help understand the link between diet, genetics, adipose tissue function, obesity, and metabolic diseases.

With new funding of \$500,000 from the United States Department of Agriculture (USDA) and National Institute of Food and Agriculture for the 2019 Agriculture and Food Research Initiative, Moustaid-Moussa's team moves forward in its research mission to find solutions to society's critical health issues.



Dr. Naima Moustaid-Moussa

STRATEGIC OUTREACH AND ENGAGEMENT IN THE COMMUNITY

ORI is involved in several outreach activities and community-based engagement and research. Each year, ORI organizes an annual meeting related to obesity research. The most recent one was held in May 2019 and focused on rural health. It hosted speakers from Texas A&M AgriLife Extension, USDA Agricultural Research Service Grand Forks Human Nutrition Research Center, Texas Tech University Health Sciences Center (TTUHSC) in El Paso, and the F. Marie Hall Institute for Rural and Community Health at TTUHSC in Lubbock. These events have been co-sponsored by the College of Human Sciences and the Office of Research and Innovation at Texas Tech.

ORI is engaged in and actively pursuing collaborations with the The Center for Integrative Health at TTUHSC Lubbock, the Diabetes Center at TTUHSC Permian Basin, and TTUHSC El Paso Center of Emphasis in Diabetes and Metabolism.

Members of the ORI conduct community-based research both internationally and locally in areas of food insecurity, obesity prevention, nutrition, and health promotion.

» STAKEHOLDER PARTNERSHIP TO IMPACT EDUCATIONAL SERVICES FOR CHILDREN WITH VISUAL IMPAIRMENTS

A NEED FOR SERVICES A major concern in the field of education of students with visual impairments is how to determine the appropriate type and amount of service students should receive. These students are primarily served by specialists who travel to local schools where the students attend. As a member of the Texas Action Committee for Education of Students with Visual Impairments, Dr. Rona Pogrud, Professor of Special Education in the Texas Tech College of Education, developed and led a subcommittee on service intensity comprised of representatives from Texas Tech University, Texas School for the Blind and Visually Impaired, Regional Education Service Centers 4, 10, and 11, local school districts, and Stephen F. Austin University to address this issue. The efforts of this collaborative group over multiple years led to the development and validation of two service intensity scales: the *Visual Impairment Scale of Service Intensity of Texas (VISSIT)* for TVIs and the *Orientation and Mobility Visual Impairment Scale of Service Intensity of Texas (O&M VISSIT)* for orientation and mobility specialists.

IMPACT ON THE COMMUNITY AND UNIVERSITY The impact of this partnership on both the community and the university has been significant. The use of the scales by practitioners is changing the amount of services that children with visual impairments are now receiving across the United States. At the University, the engagement has created a research focus that has been published in peer-reviewed journals and presented at professional conferences and webinars at the state, national, and international levels. Former and current doctoral students have been involved as co-presenters and co-authors of the project. The tools have been introduced into courses in the sensory impairment programs at Texas Tech and are required to be used during the internship phase of the programs. They have also become a part of other visual impairment personnel preparation programs across the nation. Graduate students and teacher certification candidates are now leaving the program with the knowledge and experience of how to determine service intensity with their future students who are visually impaired.



In Spring 2019, Dr. Pogrud was recognized for her work with the President's Excellence in Engaged Scholarship Award.

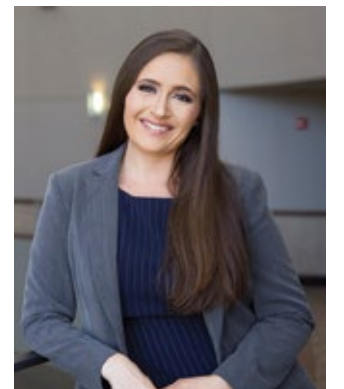
» TEXAS TECH SCHOOL OF LAW INNOCENCE CLINIC

The Innocence Clinic provides legal services to inmates who maintain their innocence for crimes of which they have been convicted and whose appeals process has run its course.

Students in the Innocence Clinic at the Texas Tech School of Law perform as true lawyers, working to secure the release and exoneration of those falsely convicted. As part of the Innocence Project of Texas (IPTX), Lubbock attorney and clinic director Allison Clayton and her third-year law students take on appellate cases from around the state, with each student handling about ten cases per year, just as a practicing attorney would. It is an intense and demanding learning environment that pushes students to act and perform just like they would as part of a law firm. Since taking over in 2016, Clayton has developed the clinic into one with significant impact on the community, thanks to its intensive, hands-on, and practical approach.

"It appears to me as though a lot of the other clinics utilize law students by giving them tasks better suited for paralegals. I fear some may even be simply putting papers from one pile and putting them into another, without actually doing any litigation. That's not what we do," Clayton said. "These students are not in school to be paralegals, they're in school to be lawyers. In our clinic, they are expected to do things and act just like licensed attorneys. It could not be more hands-on."

"The Innocence Clinic at Texas Tech has provided me with real-world experience, enhanced my writing and researching skills and allowed me to interview and speak with real clients."
- Megan Soliz, Third-Year Law Student



Allison Clayton



The OLE! Initiative and Obesity Research Institute work together to support and promote common initiatives. Drs. Moustaid-Moussa and Dr. Oak Hee Park from the Obesity Research Institute (ORI) actively participate in local OLE! coalition meetings. The ORI also promotes the OLE! initiative at conferences, provides information in newsletters such as *Live Smart Texas*, and has been helpful in recommending valuable funding opportunities.

» VETSTAR: TRANSITIONING VETERANS SERVICE DELIVERY

FACING CHALLENGES Upon returning home, many veterans' transitions are stalled due to factors such as post-traumatic stress disorder (PTSD), substance abuse, sexual trauma, traumatic brain injury, or moral injury. Some veterans struggle with family challenges, homelessness, or suicidal thoughts. Traditional methods of justice, social work, and mental health are not always effective because of the need for cultural competencies associated with a veteran population. Thanks to a partnership between Texas Tech's Department of Political Science and numerous government, health, and community organizations, veterans in the Lubbock region now have many options to address stalled transition issues and have a greater opportunity to become productive citizens in their communities.

THE LAUNCH OF A PARTNERSHIP The partnership began its formation in 2011 when the Local Mental Health Authority approached Colonel Dave Lewis, Director of the Strategic Studies Graduate Program at Texas Tech University, with the need to implement and execute a Department of State Health Services grant for a veterans peer program. As the partners collectively recognized the need for veterans in the community, more grant funding was secured, and eventually eighteen full-time positions were established. Additional partnerships were developed with the Lubbock County Detention Center, Lubbock Police Department, Lubbock County Office of Dispute Resolution, Lubbock Sheriff's Department, South Plains Homeless Consortium and several contracted mental health providers. Other organizations such as the U.S. Department of Veterans Affairs (VA) and Veterans Serving Organizations were recruited as well. This engagement ultimately resulted in the creation of VetStar, which became the veterans division of StarCare Specialty Health Systems.

The gradual refinement of veterans service delivery procedures ultimately resulted in the creation of the FASTRR (Find, Assess, Stabilize, Treat, Reassess & Reintegrate) service delivery strategy. It has enabled struggling veterans to reintegrate in the community, thus becoming successful students, employees, and engaged productive members of their communities. The model is now nationally recognized and has been briefed to the U.S. Congress House Veterans Affairs Subcommittee on Economic Opportunity.

IMPACTS ON VETERANS AND COMMUNITY The impacts of the engagement partnership and FASTRR on veterans and the community have been significant. It has enabled over 4,000 military veterans in the Texas South Plains and Panhandle regions to gain access to resources during their transition from military to civilian life. Over 250 homeless, or at risk of becoming homeless, veterans and families have been housed in a thirty-county area. Over 2,000 justice involved veterans were identified, and approximately 700 were approached for services through a 20-county area. Of those who accepted offered services, a six percent recidivism rate was documented. Veterans who self-identified



Col. Dave Lewis, who served in the Air Force for 29 years, stands in front of an F-16 like the one he flew in Iraq.

“When I retired from the Air Force after twenty-nine years of service, I began to see the gaps in services and benefits for our returning warriors. I started ‘turning over rocks,’ and found there was much to be done in the community. Most veterans transition without any problems, but some of our veterans face a new battlefield when they come home – one they were not trained for. We know how to help them.”

Col. Dave Lewis
Director of the Strategic Studies Graduate Program at Texas Tech University and former Director of VetStar, StarCare Specialty Health System

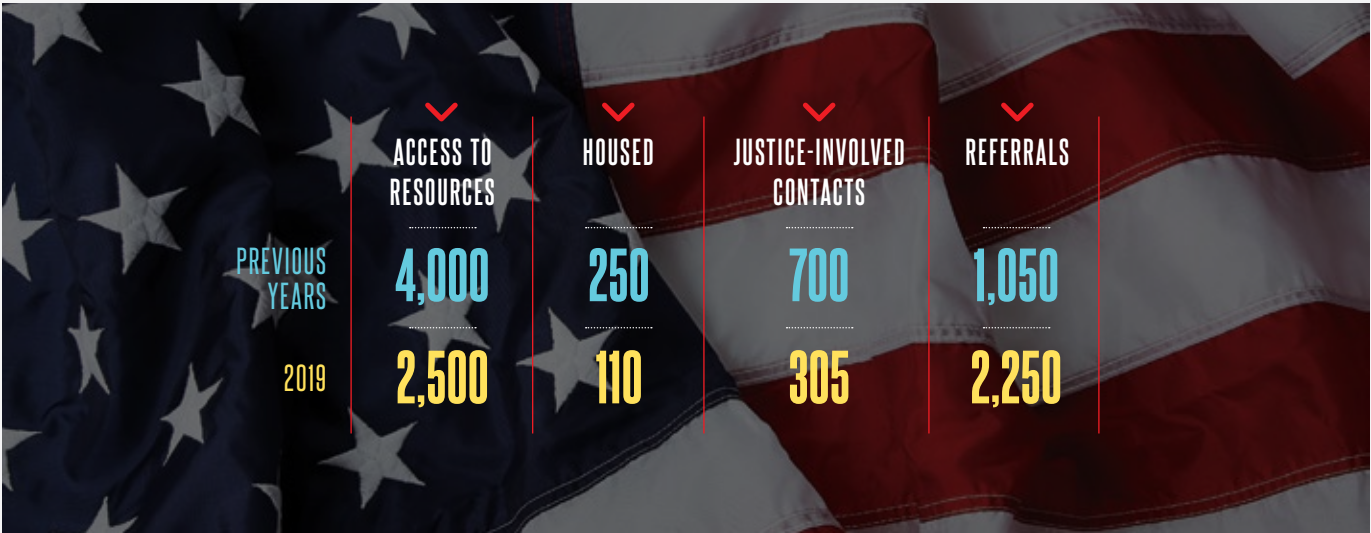
with substance use issues used to wait months before treatment; now, VetStar tracks the number of open beds in the VA system and frequently transports veterans directly from detention centers to treatment. One of the greatest improvements has been the result of suicide prevention measures for veterans. Over fifty total interventions have been made, and there have been zero suicides by veterans who have been treated through the VetStar program. Over 1,000 veterans have received emergency financial assistance and nearly fifty low-income and disabled veterans and families have received housing repairs and modifications. The Housing First Model has expanded into a thirty-county service area including Lubbock and Amarillo.

IMPACTS ON THE UNIVERSITY University impacts were significant as well. As a result of the knowledge gained from the “boots on the ground” perspective in the community, the Texas Tech Institute for Peace and Conflict created new undergraduate and graduate coursework for Veterans Cultural Competency, which is the foundation for a new Graduate Certificate in Veterans Studies, the first of its kind in Texas. The Certificate Program will bring additional culturally-competent mental health and social workers into the workforce as society continues to face challenges in transitioning veterans into families and communities. Moreover, undergraduate and graduate social work practicum students are being trained at VetStar and graduate student internships are occurring as well.

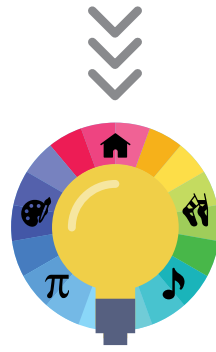
The largest gap identified throughout this project involved the lack of treatment options for over 400,000 traumatic brain injury (TBI) affected warriors, and efforts are now underway to incorporate advanced healing techniques, such as hyperbaric oxygen treatment and neuroplasticity, to address these challenges. Efforts are underway on both the Texas Tech University and TTU Health Sciences Center campuses to recruit researchers interested in successfully addressing the TBI challenge. Combined with clinical research in PTSD, both initiatives have the potential to significantly alter mental health treatment for veterans and their families.



The scholarship and service delivery model developed under this partnership has garnered the attention of several large national-level consortiums (America's Warrior Partnership, Veterans Treatment Alliance, VetCV, and TreatNow.org), as well as state-level interest from Health and Human Services Commission, Texas Veterans Commission, Texas Commission on Jail Standards and the Texas Jail Association. The House Veterans Affairs Subcommittee on Economic Opportunity is looking to incorporate much of the knowledge gained in this project in its revamping of the warrior transition process through partnership with the U.S. Department of Defense, Veterans Affairs, and Department of Labor.



*data based on 2018-19 VetStar Annual Report



CREATIVE INQUIRY AND EXPRESSION ACROSS THE ARTS, HUMANITIES, AND SCIENCES

Creativity, in its various forms of expression, can be a powerful tool to inspire, motivate, teach, and transform. Whether it is used in interactive education, urban development, art, medicine, or science, Texas Tech faculty and students push the limits to think outside the box.

» ARTS IN MEDICINE

THE INITIATIVE In the fall of 2015, the Talkington College of Visual and Performing Arts (TCVPA) established an interdisciplinary research program, the Arts Initiative in Medicine (AIM), to generate inquiry into the use of the arts in the realms of healing, wellness, and critical clinical needs. The project now facilitates research collaborations among faculty across Texas Tech University, the Texas Tech Health Sciences School of Medicine, and the Texas Tech Health Sciences School of Nursing. Through the extension of the arts into the medical community via collaborative research, practices, and therapies, TCVPA seeks to advance Texas Tech's priorities in education and drive forward the transformation of lives and communities through well-documented impacts of the arts on health and wellness.

Bolstered by a \$100,000 grant from The CH Foundation, as well as seed money from the university and federal funding, AIM has seen steady growth from a small group of interested faculty to a thriving interest group with programs on both campuses and with partners across the country. "I'm happy to say this group has grown exponentially over the past year or so now," TCVPA Dean Noel Zahler said.

AIM's research crosses disciplines as diverse as neurobiology and music, physics and dance, speech pathology and the art of singing, and the communication sciences and visual art. In 2019, the TCVPA was awarded a National Endowment for the Arts (NEA) Research Lab, one of only four granted each year nationwide. The lab will expand and augment the seed funding

"We now have 16 multidisciplinary research teams working on different projects. Almost every college in the university has been tapped so that these are robust teams doing an enormous amount of work together."

Noel Zahler

Dean, TTU Talkington College of Visual and Performing Arts

and research scope of the initial AIM program, providing key support and an enhanced, national-level profile for the innovative research underway. This grant represents the first NEA award to Texas Tech in the university's history.

PROJECTS AND PARTNERSHIPS Projects influenced by AIM expand into almost every health area - from stroke victims, to breast cancer, autism, Alzheimer's, palliative care, and endoscopy. Partnerships include Covenant Children's Hospital, University Medical Center, and the TTU Burkhardt Center for Autism Education and Research. A partnership between TCVPA, the Burkhardt Center for Autism, and the Center for Performing Arts Medicine at Houston Methodist Hospital includes plans for development of a "music4everyone" program, an arts-based curriculum aimed at using music to address cognitive and behavioral challenges for special populations. TCVPA has incorporated methods of music instruction into various classes taught through the Theatre and Dance in the Community class, and the partnership continues to teach best methods of assessing growth for those who are on the autism spectrum.

OTHER AIM PROGRAMS INCLUDE:

The TCVPA's Performing Arts Research Lab (PeARL), which is directed by Texas Tech School of Music professors David Sears and Peter Martens, uses musical stimuli to treat aphasia. The project works in collaboration with the Department of Psychological Sciences in the TTU College of Arts and Sciences, the Texas Tech Health Sciences Center, and the College of Behavioral and Social Sciences at the University of Maryland.

Distinguished Horn Professor of Music Dr. William Westney and professors Michael O'Boyle of the TTU College of Human Sciences, James Yang of the Whitacre College of Engineering, and Cynthia M. Grund of the University of Southern Denmark Department of Philosophy are working together on an interdisciplinary research collaboration about the mirrored neuron activations of musicians and non-musicians.



Faculty from the TTU College of Human Sciences and School of Art take part in a research collaboration to study the effects of the arts on hospital design with a focus on wayfinding music, dance, theater performances, and art exhibits in a hospital setting to enrich the lives of patients.

» THE TEXAS LIBERATOR PROJECT: REINVENTING THE TEACHING OF HISTORY

EXPERIENCING HISTORY In April 1945, American soldiers witnessed unspeakable atrocities as they liberated prisoners from Nazi concentration camps. Decades later, an interdisciplinary team of Texas Tech researchers is sharing with a new generation the stories of a group of these soldiers who came from Texas, known as the "Texas Liberators." The Texas Liberators Project began when Peter Berkowitz, former chairman of the Texas Holocaust and Genocide Commission (THGC), approached Dr. Aliza Wong, Associate Professor of History and Associate Dean of the Honors College at Texas Tech, to develop

a resource for high school students and teachers that would provide valuable and comprehensive education of the Holocaust. The original concept for the project was a "digital textbook" that would contain educational material from THGC supplemented by recordings from the Institute for Oral History at Baylor University, which featured oral histories of Texas veterans who participated in the liberation of concentration camps during World War II.

AN ENGAGING VIRTUAL EXPERIENCE What began as an initiative to improve the teaching of World War II history in high schools has grown into a preservation project dedicated to remembering and honoring not just victims of the Holocaust, but also the liberators who witnessed the atrocities. Dr. Wong and a team from five different Texas Tech colleges (College of Media & Communication, J.T. and Margaret Talkington College of Visual & Performing Arts, College of Arts & Sciences, College of Architecture, and Honors College) created a desktop and mobile application to guide students through Dachau, a German concentration camp that held approximately 33,000 prisoners. The app was developed with the hope of using a medium to connect students to the study and fundamentals of history in a unique and engaging way.



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BRINGING STORIES TO LIFE The app, set in a virtual reconstruction of Dachau, allows students to interact with different historical documents and learn more about the Holocaust and liberation periods. The virtual scene was carefully constructed to ensure accuracy in every detail. It shows key buildings that played a role in the life of a Texas Liberator. Much like a video game, students using the app must complete missions to move throughout the camp from the perspective of a Texas Liberator. In the virtual scene, students interact with prisoners and other American soldiers. Testimonies spoken by American soldiers within the story are real oral histories gathered from nineteen recorded interviews that were documented by Baylor University in 2012. The accompanying education website features interactive maps, an honor roll of more than 480 veteran liberators, a 360-degree virtual tour of the exhibit, bibliographies, filmographies, and teacher resources including research projects, discussion questions, quizzes, and other materials.

“Using gaming as a portal to further an educational experience is a new concept in the classroom. If you ask a classroom of high school students how many have played ‘Call of Duty,’ most hands will go up. That is a mode of entry, a mode of engagement that a lot of students are comfortable with and excited about.” – Aliza Wong, TTU Associate Professor of History

More and more advances have been made to teach students by way of technology, which initiated the idea to provide students the opportunity to learn through virtual simulation of a historical event. Robert Peaslee, Associate Professor and Chair of Texas Tech’s Department of Journalism and Creative Media Industries, and Ian Love, a master’s student in the College



of Media and Communication, led the production team who created the video that appears upon launching the app. “It is our hope that the immersive experience will inspire empathy,” said Peaslee. “If you can have a sense of what it would have been like to arrive in one of these camps, it might make it easier to empathize with the people rather than seeing them as a number on a page.”

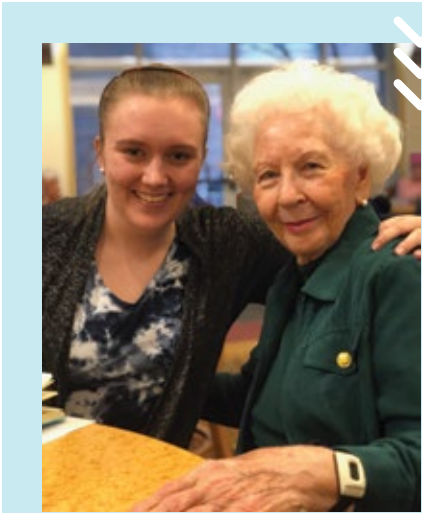
AN EXHIBIT AND A BOOK The Museum of Texas Tech University also hosted an exhibit, “The Texas Liberator: Witness to the Holocaust” from August until December 2017, which went on to be featured at various significant locations across the state of Texas throughout 2018. In fall 2019, the travel exhibit will be featured at the National Museum of the Pacific War in Fredericksburg, Texas, and in 2020, the full exhibit will be featured in the Ackerman Center for Holocaust Studies at the University of Texas at Dallas, as well as the Jefferson Historical Society in Jefferson, Texas.

Dr. Wong, in collaboration with local photographer Mark Umstot, also published a book about the Texas Liberators through Texas Tech University Press.

» INTERGENERATIONAL ENGAGEMENT THROUGH MUSIC

A MUSICAL PARTNERSHIP The Texas Tech University Flute Choir, directed by Lisa Garner Santa, Professor of Flute in Texas Tech’s School of Music, has created a partnership program with Carillon Life Center entitled “Music and You.” Students work directly with Carillon Life Center residents to explore the relationship between performer and audience, develop knowledge of musical programming for specific populations, and learn about successful implementation of logistics behind musical productions. The audience of Carillon residents provide inspiration for musical programming, and Texas Tech Flute Choir students create and produce concerts specifically for Carillon residents.

RESEARCH OBJECTIVES It is common knowledge that medical research supports positive correlations between music and the aging mind, as well as the positive impact of integrating aging populations with younger ones. The mutually beneficial, reciprocal partnership between Texas Tech and Carillon corroborates existing medical



On January 28, 2019, the TTU Flute Studio hosted a cake social at Carillon, following an evening dinner. Students interviewed residents to learn how music had enriched or articulated periods of their lives, and then created new arrangements and compositions for the flute choir based on information provided by the Carillon residents.

research, thus supporting student learning while enhancing the lives of those at Carillon. It may potentially lead to insights that could open future research avenues. Two significant research objectives include a publication of the qualitative findings of the project and a publication of the arranged music (written for the TTU Flute Choir and dedicated to Carillon Life Center residents), making it available to any flute choir in the country.

» SUSTAINED COMMUNITY ENGAGEMENT AND SCHOLARSHIP THROUGH COLLABORATIONS IN DANCE



FORMING PARTNERSHIPS TO MEET A NEED In 2010, Texas Tech Dance Professor Ali Duffy co-founded the Flatlands Dance Theatre (FDT), a nonprofit community dance company and an affiliated apprentice company comprised of Texas Tech students, to answer the need for professional dance in Lubbock. In collaboration with Texas Tech faculty and students, FDT has developed multiple long-term projects and partnerships in and with the community over the past decade, including children’s dance workshops, free public performances and lectures, guest artist residencies, and internship opportunities for TTU students.

One significant education initiative – the Young Dancers Workshop – was launched in 2014. At the time, Ali Duffy and her faculty colleague, Kyla Olson, perceived a gap in dance training in the Lubbock community and an underserved population of children who could not afford the limited training that was available. Based on the needs expressed by community members,

CREATIVE INQUIRY AND EXPRESSION ACROSS THE ARTS, HUMANITIES, AND SCIENCES*



*data based on the Academic Year 2018 Raiders Engaged assessment (as reported by TTU faculty and staff)

“I am very proud of the ways FDT invests in our community by creating chances for Lubbock families to explore dance and highlight collaborations with other artists and organizations in our region. FDT has a major impact on Texas Tech students who witness faculty members choreographing and performing in the company, and on students who perform and tour with FDT as apprentices.”

Ali Duffy
Co-Founder and Artistic Director of Flatlands Dance Theatre

they developed an expanded version of the workshop in partnership with the Louise Hopkins Underwood Center for the Arts (LHUCA). Texas Tech student apprentices serve as teaching assistants, gaining invaluable experience in community engagement and early childhood dance pedagogies outside of the classroom. Professor Duffy also began a research project about dance educational engagement in underserved communities.

Funding from the Helen Jones Foundation and the Texas Tech Scholarship Catalyst Program has helped offset the costs of the workshop and provides scholarships to young students who cannot afford to pay the registration fee. “The possibilities for reaching children who could not otherwise afford dance training is a critical component of the workshop that greatly motivates us to continue expanding it,” said Duffy.

CREATING OPPORTUNITIES FOR MUTUAL BENEFIT The engagement with the community benefits Texas Tech faculty members by offering opportunities to enhance interdisciplinary creative research, pursue community-based goals, and continue performing and choreographing outside of the university setting. It benefits students by offering opportunities for viewing dance and performing outside of the university setting and experiencing aspects of the professional field not explored in degree programs and courses.

For the Lubbock community, the benefits include access to seasonal dance productions, free and reduced-price performances in the community, performances created specifically for families and children, affordable and scholarship-based dance education activities for underserved populations in Lubbock, and opportunities for witnessing and taking classes from prestigious guest artists whom FDT commissions.

» COMMUNITY VISION AND ACADEMIC COLLABORATION IN EL PASO

RECOGNIZING A NEED El Paso offers a unique learning laboratory with historical buildings designed by the nation’s leading architects, a robust arts environment, and unique historical background embracing El Paso del Norte, “the pass to the north.” However, for more than twenty years, the El Paso architecture community struggled with a significant problem: less than three percent of the nation’s architects were Hispanic, and the closest architecture program to El Paso was more than 300 miles away.

OPENING PATHWAYS After conducting a needs assessment, El Paso architects and members of the local American Institute of Architects (AIA) chapter approached El Paso universities and colleges. In response, El Paso Community College (EPCC) created a lower-division architectural studies programs, and in 2007, Texas Tech opened an upper-division degree program in architecture at EPCC. Working closely with regional architecture firms, the AIA, and individual architects, the academic partners proposed a 2+2 degree pathway that included requirements for curricular alignment with the National Architecture Accrediting Board. The institutional partners co-created new curriculum, student support, mentoring, internships, and student-led community engagement activities. In



2010, they received a \$5.9 million grant from the U.S. Department of Education to support co-location of facilities and curricular alignment.

BUILDING STRONG PARTNERSHIPS The City of El Paso collaborated with Texas Tech and provided space in the historic and architecturally significant Union Depot, which was

designed by the renowned U.S. architect, Daniel Burnham. In 2011, Dr. Robert Gonzalez, TTU Professor of Architecture, became the director of the College of Architecture program in El Paso and has served as the project director for the partnership. In this role, he has convened a diverse set of partners who have remained committed to the vision of increasing access and strengthening the pipeline of Hispanic architecture students and professionals.

In 2016, the partnership was honored by the Texas Higher Education Coordinating Board (THECB) as a finalist for the Texas STAR award. The partnership also influenced the creation of the THECB “field of study” for architecture. In August 2018, a new building that was partially funded by the grant was opened on the EPCC Valle Verde campus to support the growing number of architecture students. Dr. Valerie Paton, former Texas Tech Vice Provost and Co-PI on the project, said, “Our relationship with a diverse set of partners has allowed us to plan for the future.”

» URBAN TECH ENGAGEMENT STUDIO

PLANNING REDEVELOPMENT UrbanTech was established in 2010 with support from six downtown Lubbock businesses and a grant from the J.T. & Margaret Talkington Foundation. Its purpose is to strategically plan and promote the redevelopment of downtown Lubbock. Before, the city of Lubbock did not have a space in which to collaborate on such a project. UrbanTech has been partnering Texas Tech University’s resources with civic needs and engaging architecture graduate students in the process. As a result, it has directly impacted the vision for downtown Lubbock, and students have experienced learning via real-life scenarios and interaction with the community.

PARTNERING UNIVERSITY RESOURCES WITH CIVIC NEEDS Since its founding, UrbanTech has addressed a variety of community issues through partnerships with public and private organizations such as the Lubbock Homelessness Coalition, Parkway Summerville Centers, and the Louise Hopkins Underwood Center for the Arts (LHUCA). Under the leadership of David Driskill, TTU Professor of Architecture, UrbanTech has hosted numerous community forums around civic issues and held input sessions involving city staff, Lubbock City Council, the mayor, and other community leaders. It has facilitated tours to Oklahoma City and San Antonio, and it has hosted a design charrette with a private architecture firm, which set the foundation for non-profit organizations’ work with Lubbock’s homeless population.



The Urban Stage project, planned and produced by UrbanTech in 2014, transformed Avenue J between Main Street and

The engagement between Texas Tech University, El Paso Community College, the city and community of El Paso, and the architecture industry has made important contributions to broadening the diversity of perspectives in the field of architecture and supporting the workforce in El Paso and other communities. In response to the success of this partnership, the Hispanic Association of Colleges and Universities has recognized Texas Tech’s College of Architecture as one of the top ten programs for Hispanic Architecture students in the country. Through community initiative and investment, the partnership has become a seminal and replicable degree pathway which holds the promise of changing the preparation pipeline for architecture in the United States.



Broadway into a desired urban setting. This act of “temporary urbanism” brought seven public events to the street over a ten-day period. Sidewalks were expanded, tables installed, a pocket park stage was built, and 300 trees and plants were brought to the site while the Texas Tech Climate Science group conducted site experiments to measure the impact of the plants and environment on thermal comfort and carbon dioxide immobilization.

ENGAGING STUDENTS WITH COMMUNITIES Urban Tech’s work is accessible during the First Friday Art Trail in Lubbock each month, where the studio hosts between 150 and 300 members of the public. Graduate students serve as guides, allowing an opportunity to interface and discuss community issues. UrbanTech has offered a public venue for Texas Tech faculty and students ranging from graduate research posters, art exhibitions, and musical performances, including Texas Tech Mariachi. It is the recipient of multiple grants from local foundations, Civic Lubbock Inc., non-profit organizations, local businesses, the Texas Commission for the Arts, and the American Institute of Architects. UrbanTech funds graduate and undergraduate student assistants and offers engaged scholarship opportunities to more than twenty graduate students annually.

» THE ART AND SCIENCES OF LIGHTNING

BUILDING THE COLLABORATIVE Meteorologists do not yet fully understand where lightning originates within a cloud or how it acts once it has formed. Dr. Eric Bruning, Texas Tech Associate Professor of Atmospheric Science, has been chasing storms to find answers to this mystery for several years. Bruning believes that understanding how lightning works can help scientists predict where and when a massive thunderstorm can turn dangerous, a prediction that could save lives on the ground.

In 2014, Bruning received a prestigious CAREER Award from the National Science Foundation. But his grant application was not all science; he turned to an artist to help make his work appealing and understandable. The artist was none other than Tina Fuentes, Professor of Painting in the Texas Tech School of Art.

"I think my charts and graphs and videos are pretty interesting, at least to me and other scientists," Bruning said, "but Tina's art demonstrates what lightning looks like when it fills a cloud in a very different way than my charts. She has stripped away the normal scientific trappings and captured the essence of the storm, and I think that's a very effective way to convey to the public what I as a scientist might not be able to get across in my ordinary scientific communication style."

THE ART With Fuentes on board, Bruning was awarded funding for a five-year project, and it was time for the artist to enter the world of science. Fuentes attended meetings, sat in on Bruning's students' presentations, and even went storm chasing with them.

"I have looked at the heavens more than I ever have before. I bet I've taken more than 1,000 photos of cloud formations."



Tina Fuentes, Professor of Painting, TTU School of Art



Eric Bruning's research focuses on understanding how lightning works within a thunderstorm and how that could help scientists predict when a storm will turn dangerous.

Fuentes hit upon the idea of using cotton as a background to simulate clouds. She visited Texas Tech's Fiber and Biopolymer Research Institute of the Department of Plant and Soil Science, which provided several bags of cotton that were used to construct panel backdrops. Using green-screen technology, Fuentes removed herself from a video of her painting so that all that remained was the image of her paint strokes overlaid on cotton.

THE SCIENCE Bruning is one of few meteorologists who studies lightning. "Everyone has seen lightning coming from the bottom of the cloud, but there is probably ten times more lightning inside the cloud that you don't see," he said. "I'm looking at how the turbulence in the cloud ends up making very small flashes when it's really turbulent, and very large flashes when it's smoother inside the cloud." The result of Bruning's work could combine with the radar images scientists use now to predict severe storms and improve public safety warnings.

A BRIGHT FUTURE In addition to an exhibition at the Museum of Texas Tech University that combined Bruning's science with Fuentes' art, the two made presentations to high schools in the South Plains area that involved Bruning's graduate students. Fuentes hoped the exhibit and presentations would reach students in a new way and inspire some to look more seriously at the research within the arts. For Bruning, the collaboration proved to be a valuable recruiting tool for graduate students.

Both the artist and the scientist hope their collaboration inspires new partnerships.



PRE-K THROUGH 12 SOCIAL AND ACADEMIC ENGAGEMENT

Texas Tech aims to give young members of the community the resources they need to thrive and be successful while engaging them in an environment where learning becomes an interactive, meaningful experience. Some face personal challenges, and the university addresses these issues by bridging the gap between university and community, connecting college students in addition to faculty and staff with children and young teenagers for the mutual benefit and success of Pre-K through 12 and college students.

» BURKHART CENTER TEACHER TRAINING INSTITUTE

A POWERFUL TESTIMONY Lindsey Gurley did not know what to expect when her supervisor sent her an application to the Teacher Training Institute (TTI) at Texas Tech University's Burkhardt Center for Autism Education and Research. Gurley, a special education teacher in the Shallowater Independent School District who had not had this type of training, said it seemed like a good opportunity, so she applied.

Two years later, a letter from a student's mother showed Gurley the importance of that training. Referring to her son, the mother wrote, "I thank God for you and the staff so much and for everything you have done for our family." As to the student's progress, Gurley shared, "In the beginning of his eighth-grade year, this student would have tantrums at least once a week lasting about 45 minutes. After the training, I was able to speak to my supervisor and look at the student's behavioral data. We figured out the function of his behavior was escape and came up with an intervention plan." Within three weeks, they saw improvement. "Now, he was asking us for breaks and completing his work with no complaints," Gurley said. "I think that right there shows the impact applied behavior analysis can have on our little community."

ADDRESSING A NEED This one-of-a-kind program offered by Texas Tech's Burkhardt Center is designed to train educational professionals from rural and underserved school districts as autism spectrum disorder experts, behavioral coaches, and board-certified behavioral analysts. Applied Behavior Analysis (ABA) is just part of the training educators receive at the TTI as they learn how to teach and support children with autism spectrum disorder (ASD).

Typically, a board-certified behavior analysts (BCBA) is considered the highest-level practitioner for a student with autism. Dotson said there are roughly 1,900 BCBA's in Texas, but there are more than 85,000 children with autism under 21 who need their expertise. The shortage of BCBA's is further compounded by the facts that 1) not every BCBA provides services to children with autism, and 2) the overwhelming majority of BCBA's who do so practice within 100 miles of Dallas, Austin, and Houston, leaving large geographic areas of the state underserved.

In 2018, there were 71,951 students with ASD in K-12 education in Texas. There were an estimated 15,000 more children with ASD under the age of 3 during the same period. Special education teachers, especially those serving autism and behavior, have been consistently rated as being of critical shortage by the Texas Education Agency, meaning there is a struggle to fill even the available teaching positions to work with those populations.

In addition to a shortage of BCBA's in public school districts across the state, studies have shown that educators without training are unaware of or do not use practices identified as being successful for students with autism in their classes. Fewer than 10 percent of Texas children with autism receive

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“Ultimately, the most important impact of the program is that the students with autism served in our participants’ classrooms, schools, districts and communities experience a higher quality of education, an increased ability to benefit from positive and effective supports and an increased capacity to live independent and successful lives because their school programs better meet their needs.”

Wesley Dotson, Director, TTU Burkhardt Center for Autism Education and Research

specialized support for their needs before age 7, and even after age 7, many do not have access to educational personnel with training in evidence-based practices in autism or positive behavioral supports.

All of this means that children who live in lower-income homes or who can only access services through public schools often do not have consistent access to specialized support. Children in rural communities tend to be even more underserved. This is where TTI comes in. Established in 2015, the program provides educators the chance to complete a master’s degree in special education. When the training is complete, educators return to their districts with a better understanding of how to work with and support children with autism. They also help their fellow educators do the same.

SEEING THE CHANGE In Poth, a town of fewer than 2,000 residents located about 35 miles southeast of San Antonio, behavior coach Judy Ortiz said the training she received from the Burkhardt Center has allowed her to become a better advocate for her students and positively change how people think about what students with disabilities can accomplish. “I work in a very rural school district that has limited resources,” Ortiz said. “Many parents do not have the time or the resources to provide ABA services for their children on their own. Having this training helps bring ABA techniques to their child during the school day and provides in-home training to build consistency between time at school and time at home.”

MOBILE AUTISM CLINIC TO SUPPORT FAMILIES AND CAREGIVERS The Burkhardt Center launched a mobile autism clinic to bring assistance to underserved, rural communities in West Texas. Called Mobile Outreach Clinic for Autism (MOCA), the initiative aims to improve treatment of children with autism spectrum disorder (ASD) by offering training and support to families and caregivers. The clinic primarily offers support to families through parent-directed intervention, which involves a child’s parents or legal guardians providing various interventions under regular supervision by trained professionals. Parents may learn skills to improve communication or play, pre-vocational training, and strategies to decrease problem behavior.

MOCA is funded by a grant from the Texas Higher Education Coordinating Board (THECB). A separate grant, also from THECB, has allowed the expansion of a series of autism training workshops to the 20 regional education service centers across Texas.



“The Burkhardt Center succeeds because of the strength of its partnerships,” said Wes Dotson, Director of the Burkhardt Center. “We work with more than 100 university and community partners across the state to provide resources and support to our families and the professionals who serve them. These grant programs represent some of the most important work we do in our goal to serve as a clearinghouse of information, referrals and support for the West Texas autism community.”

» MAKING A PROMISE AND KEEPING IT!

BUILDING A NETWORK OF PARTNERS The East Lubbock Promise Neighborhood (ELPN) has brought together Texas Tech University and more than 75 regional partners to revitalize the East Lubbock community, one the poorest and most underserved neighborhoods in the state. Promise Neighborhoods are federally-funded, community-based initiatives that seek to improve educational access and outcomes for community members in distressed neighborhoods. The program seeks to provide neighborhood residents with a “cradle-to-career” continuum of services, programs, and support that span the gamut of health and wellness, workforce development, and educational opportunities.

ELPN was launched with a \$24.5 million grant from the U.S. Department of Education. The total investment in the community more than doubled over the life of the six-year grant thanks to more than \$28 million in matching donations. The College of Education initiated and led the project. It was joined from the start by colleges and groups from all over Texas Tech, including the College of Human Sciences, the Talkington College of Visual and Performing Arts, and the College of Arts and Sciences. This initial university coalition also included the Office of Community Engagement and the Texas Tech Health Sciences Center’s School of Nursing. The College of Media and Communications and the Texas Tech-sponsored PBS station (KTTZ) later joined as key participants.

The partners sought to build capacity in East Lubbock so that residents could realize their potential for improving long-term health, safety, and economic outcomes for their community. A community-based, collaborative approach was used to guide research and identify the needs of the East Lubbock community.

DEVELOPING EVIDENCE-BASED SOLUTIONS The origins of ELPN date to 2012, when a group of university, school, and community leaders met regularly for nearly a year. The group discussed and developed a plan to radically improve available educational opportunities for children in East Lubbock. These initial discussions grew into a partnership between Texas Tech University, its sister health sciences center, community businesses, the region’s largest school system, non-profit organizations serving the community, and community groups and residents. Partners included Lubbock Independent School District (ISD), the city of Lubbock, United Supermarkets, educational non-profit Advancement via Individual Determination (AVID), Covenant Health System, South Plains Food Bank, United Way of Lubbock, the South Plains P-20 Council, and over 30 other service providers that had long been in



East Lubbock. Governance committees were made up of representatives from these partners and met weekly, monthly, or tri-annually to share project progress and outcomes. These meetings included regular public presentations to community members to solicit critical feedback. Challenges were triaged to determine the appropriate level of review, and respective partner teams authentically pursued solutions.

IMPACT ON THE COMMUNITY The cornerstone for ELPN has been the partnership developed between Texas Tech and Lubbock ISD to improve instruction and provide services at six East Lubbock schools that serve more than 2,100 students each year. The group of schools is made up by Estacado Early College High School, Dunbar College Preparatory Academy, and Alderson, Ervin, Harwell, and Hodges elementary schools. The ELPN partners established services and support including tutoring, college readiness programs, and after-school enrichment. The offerings evolved and grew as the partners determined the best way to address students’ educational needs. This work culminated in the establishment of the Estacado Early College High School (EECHS) in 2016, allowing students to earn up to 60 credit hours from Texas Tech without having to pay any tuition and fees, and to enter college as sophomores or juniors. EECHS currently enrolls about 300 students in grades nine through 12, and recruitment indicators suggest enrollment will continue to grow in the coming years. So far, students have earned over 1,600 credit hours. The first cohort of EECHS students graduated this year.

Outside of the formal school setting, ELPN started early literacy initiatives such as the Family Academy. The program focuses on building school-readiness skills through activities like reading, singing, dancing, and crafts. It also provides fellowship and support for parents. ELPN has also sought to improve access to healthcare by working with community health providers to offer extended clinic hours.

These combined efforts have had a very positive impact on East Lubbock students. The student mobility rate in the area declined from 67 percent to 27 percent, indicating that a dramatically higher percentage of students have benefited from a stable educational home. High school graduation rates have increased dramatically, rising from 67 percent in 2013 to 93 percent in 2017.

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IMPACT ON THE UNIVERSITY The impact of ELPN on the university has been profound. Lubbock ISD and Texas Tech implemented the AVID curriculum at EECHS as a common instructional framework to ensure that students were being equipped with the skills for success in college-level coursework. AVID provides an academic framework to support students in the increased rigor of dual-credit classes. Lubbock ISD and Texas Tech made limited use of the AVID framework prior to ELPN. The improvements from the expanded implementation has led the College of Education to further integrate the curriculum directly into its educator preparation programs.

ELPN has also enabled administrators and faculty across the TTU campus to become engaged with each other and with the greater Lubbock community (including non-profit agencies, community health clinics, and Lubbock Area United Way, among others). It has provided an opportunity to scale up service-learning projects, resulting in collaborative efforts from multiple Texas Tech colleges. For example, the early learning initiatives have involved faculty from both the College of Human Sciences and the College Education to promote pre-school literacy for young children and their parents. Faculty from the Talkington College of Visual and Performing Arts and the Department of Exercise and Sports Science have collaborated on after-school and summer programming for students at ELPN schools.

Equally, ELPN has significantly impacted Texas Tech students by offering service-learning opportunities connected to faculty-initiated programs. Students from all five partner colleges have provided after-school and summer programs in arts, dance, theatre, nutrition, exercise/sports sciences, literacy, and other topics. The College of Education's Early Literacy in the School Setting course, for example, provides teacher candidates with practical experiences working with preschool students at an East Lubbock elementary school. This has been a positive experience for teacher candidates and led some of them to specifically seek employment in an East Lubbock school after graduation. The college also sponsors an early childhood education "jumpstart program" that places student volunteers in ELPN pre-school settings. Graduate students are also involved in coordinating and overseeing after-school programs, serving as tutors, and supporting classroom teachers.



In total, over 60 faculty members and 850 undergraduate and graduate students have actively participated in ELPN activities, whether developing curriculum, teaching classes, facilitating enrichment programs, or providing tutoring and mentoring services. To date, it has resulted in over 40 presentations, 11 peer-reviewed publications, and two dissertations.

THE FUTURE At the core of ELPN has been collaboration and community buy-in. ELPN has engaged community members and a network of partners to address a long history of systemic obstacles and limited opportunity that contributed to economic distress and low achievement in East Lubbock schools. It has been able to connect community organizations, residents, and members of the university to create an environment where people with similar goals can find effective solutions to issues facing East Lubbock, resulting in lasting positive change for this community. The extensive network of community partnerships ensures that there are hands to take over the labor now that the grant has ended. The East Lubbock Community Alliance, for instance, has formed to organize participating community organizations into a unified body. ELPN now serves as a model for communities across the state and the nation.

» LITERACY CHAMPIONS – IMPROVING P-12 STUDENTS' WRITING ACHIEVEMENT

COLLABORATIVE EFFORT FOR IMPROVEMENT According to the most recent National Assessment of Education Progress data, only one quarter of U.S. students in eighth and twelfth grades can write proficiently. Lubbock Independent School District (LISD) provides education to nearly 30,000 students in the Lubbock area, and one particular school within the district realized their students were in dire need of writing development. Four years ago, administrators from LISD reached out to the College of Education at Texas Tech University for help to come up with a solution. This led to a partnership with Assistant Professor Julie Smit, Associate Dean Mellinee Lesley, and Instructor Dawn Burke of the Texas Tech College of Education, who are leaders in the field of literacy. Together, they

created Literacy Champions, a collaborative effort to improve P-12 students' writing achievements. Literacy Champions began collaborating with district instructional coaches to develop district-wide professional sessions, school-wide professional learning communities, teacher planning sessions, and vertical alignment meetings.

POSITIVE IMPACT "Our research assistants and doctoral students are actively engaged with us in our work as Literacy Champions," said Smit. "They are currently in classrooms working with students and teachers, and they are engaged in the College of Education's application experience initiative to develop research in meaningful contexts with real-world implications." The four different research teams involved in Literacy Champions plan to combine research and experience into a book that describes what students perceive as meaningful writing and how it aligns with high school and early college expectations.

The goal for the future is to provide school districts with a structure that ensures lasting impact on the pedagogy of teachers and the writing achievement of students. By using a writing rubric created by LISD teachers to measure writing growth, it has been observed that students' writing achievement has improved significantly since the partnership began. This is especially true for students who struggled the most. These students are now more engaged in their writing and demonstrate more stamina. They are also setting metacognitive goals for themselves.



» MENTORING OUR FUTURE LEADERS

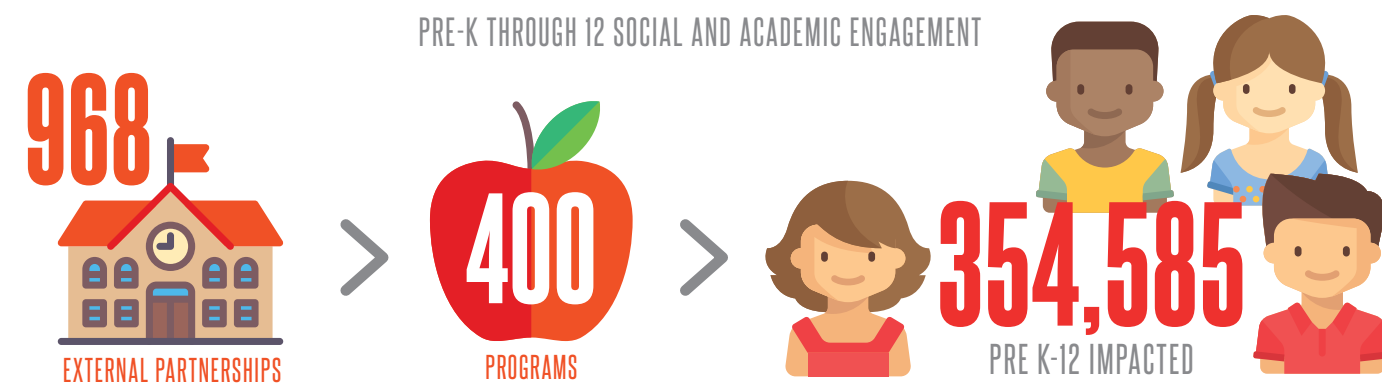
BUILDING STRONG RELATIONSHIPS United Future Leaders (UFL) is an after-school mentoring program based in the Center for Adolescent Resiliency at the Texas Tech College of Human Sciences that focuses on civility, ethics, and leadership for fifth and sixth grade students as they transition to middle school. The goal of the program is to help adolescents build strong relationships with peers, mentors, and other role models that prepare and equip them for high school, college, and adult responsibilities. Participants gain a strong foundation for individual growth and self-awareness that becomes a springboard for servant leadership throughout the secondary school years and beyond.

ENGAGEMENT WITH LOCAL SCHOOL DISTRICTS UFL currently engages with more than 300 youth at 14 host campus sites in Lubbock, Brownfield, Meadow, and Shallowater. Community partners include Independent School Districts in these towns, Family Promise of Lubbock, Lubbock Dream Center, AgriLife 4-H Extension, and Communities in Schools on the South Plains. Program opportunities include annual service training, monthly service events, and professional leadership development for participants and adults. Texas Tech staff, graduate assistants, student assistants, and student volunteers all help to make this program a reality.



"Our goal is to continue to help adolescents build strong relationships with peers, mentors, and other role models that prepare and equip them to be great leaders in our world."

Gloria Gonzales, Director of United Future Leaders, TTU Center for Adolescent Resiliency



*data based on Academic Year 2018 *Raiders Engaged* assessment (as reported by TTU faculty and staff)

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MUTUALLY BENEFICIAL PARTNERSHIPS The mentoring model promotes a mutually beneficial relationship among all program stakeholders, particularly the undergraduate and graduate students, whom UFL employs as mentors. Texas Tech student mentors often report the positive influence that their participation in UFL has had on their own lives and future career goals.

Incorporating mentorship within the mission and philosophy of a program can positively contribute to the development of higher expectations for leadership, ethics, and civility among all involved. These universal qualities are then transferred to the personal and professional roles each person will fulfill in their future, extending the impact well beyond the scope of the program.

“UFL has helped me believe in myself and believe I can do things outside of my comfort zone. UFL showed me how to use my leadership strengths inside and outside of the program, like at school and other groups I’m a part of. I also use my strengths to serve the community in service projects which can help better other people’s lives.”

Chelby Brown, Student of Heritage Middle School-Frenship ISD

UFL continues to make significant strides in retention and engagement of the after-school program participants with 85% of students continuing throughout the transition from elementary to middle school. While the program has a major impact on the community, the benefits are not one-way. As a part of the program activities, UFL staff conduct research on the program’s effectiveness about the development of adolescent participants. The data has resulted in numerous conference and invited presentations, as well as two book chapters. Plans are in the works for journal articles.

» HONORS COLLEGE BAYLESS ELEMENTARY MENTORING PROGRAM

FINDING YOU OWN CALCUTTA After Michael San Francisco was named Dean of the Texas Tech University Honors College in 2014, he spent many hours thinking of opportunities to engage Honors College students in the Lubbock community. During this time, Dean San Francisco read a story about a young woman who had worked with Mother Teresa, and whose townspeople in the United States wanted to move to Calcutta and work alongside the patron saint to love and care for those persons society often overlooks. Mother Teresa responded by saying, “Stay where you are. Find your own Calcutta. Find the sick, the suffering, and the lonely right where you are.”



Dean Michael San Francisco

Upon reading this quote, Dean San Francisco began reflecting on his involvement for a brief time as a volunteer at Bayless Elementary when he first moved to Lubbock in 1990, and suddenly he knew: “Bayless is our Calcutta.” He then, with Lead Administrator of Honors Scholarships Stacy Poteet, approached the principal and reading intervention specialist at the elementary school, and the Honors College Bayless Elementary Mentoring Program was born.

FACING THE CHALLENGES Bayless Elementary is a Title I school in the Lubbock Independent School District. The school has an approximate enrollment of 730 students, with 91 percent of students qualifying for free or reduced lunch. Bayless faces several challenges, including a mobility rate of nearly 33 percent, as well as 27 percent of the population identifying as at-risk. There are also several students each year identified as homeless. The purpose of the Bayless Mentoring program is to meet the needs of these students through the participation of the Honors College students, not only academically, but as positive role models as well.

ADDRESSING THE NEED Dean San Francisco, Ms. Poteet, and ten Honors College students were selected as the Bayless Board to oversee the program. They work directly with the volunteer coordinator at Bayless and the Bayless administration, and collaborate to meet the needs of Bayless each year. Though mentoring is first priority, the Honors College has also provided school supplies, teacher supplies, science fair poster boards, supplies for art projects, socks for the Honors College annual Socktober drive, and hygiene products. In the spring of 2019, when a Bayless family lost their possessions in a house fire, students generously gave from their own wallets, donating \$600 to be presented in the form of a gift card to the family.

Thirty Honors College students mentored during 2014-2015, the program’s inaugural year. In the 2018-2019 academic year, over 100 students served as mentors at Bayless. Each mentor spends one class period per week with the mentee. Dean San Francisco and Ms. Poteet also mentor once a week. The program continues to grow each semester. The impact is being felt not only at Bayless, but by the mentors as well.

“My favorite experience being a Bayless mentor is coming to Lunch Bunch and getting to be greeted by all the fourth-grade girls, their smiling face, and some hugs. I know that a lot of them might have had a rough week, and to see the joy I bring them makes me so grateful to mentor.”

Karla de la Garza, (Class of 2022)



In 2018, Dr. Tanja Karp received the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring for her work mentoring K-8 students, teachers, and undergraduate students in Texas Tech’s GEAR program. Al Sacco, Dean of the Whitacre College of Engineering, notes, “What makes her truly unique is she is the college’s strongest advocate for an integrated approach to undergraduate and K-8 STEM education and combines this with hands-on engineering to bring the fields of science and engineering alive. She uses a service-learning project in her Introduction to Engineering class to expose K-8 students to engineering problem-solving and design strategies using Lego robotics. The service-learning course supports her annual Get Excited About Robotics (GEAR) challenge.”

» WHITACRE COLLEGE OF ENGINEERING ROBOTICS PROGRAM

LAUNCHING STEM EDUCATION In 2005, Tanja Karp, an associate professor of electrical and computer engineering at Texas Tech’s Whitacre Jr. College of Engineering (WCOE), and her colleague, Richard Gale, also a professor of electrical and computer engineering, applied for a grant from the Texas Workforce Development Program aimed at helping high school and engineering students to be better prepared for success in engineering.

We came up with the idea to create a robotics program because robotics is a hands-on application of STEM,” Karp said. “There’s programming, but there’s also problem-solving involved. It creates excitement. It seemed like a good idea at the time, and we were awarded a three-year grant. That’s how the GEAR program got started at Texas Tech.”

With funding in hand, the Get Excited About Robotics (GEAR) program officially launched in 2006 as a pilot project. Now in its 13th year, GEAR has grown to three sites: Texas Tech, Frenship Independent School District in Wolfforth, and Alamo Junior High in Midland. Sponsored in partnership with SM Energy, the program uses the platform of robotics competitions to both educate and cultivate an interest in STEM studies and careers. Public schools are not the only organizations able to participate in the GEAR program. It is also open to 4-H clubs, the Boys & Girls Club of Lubbock, Boy Scouts, Girl Scouts, homeschoolers, and private schools, to name a few. “I’m really big on inclusion, so everybody gets this opportunity to learn early on what STEM careers could look like and also try them out and see if it’s something for them,” Karp said.

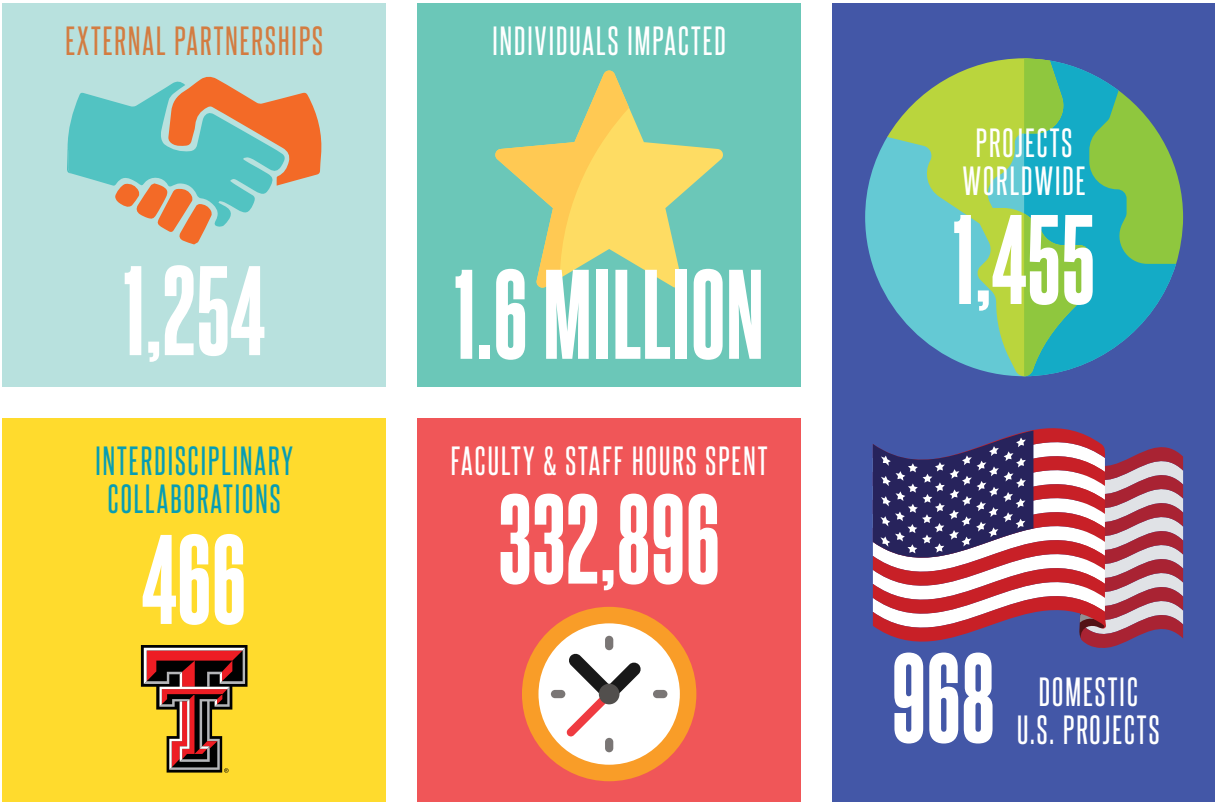
TEXAS TECH STUDENT MENTORS FOR K-12 In addition to GEAR, which serves grades K-8, WCOE’s other robotic-centered learning and competition-based experiences include Boosting Engineering Science and Technology (BEST) for grades 6-12, and First Tech Challenge (FTC) for grades 7-12. To provide support for K-12 students and classroom educators, WCOE undergraduate and graduate students mentor teams in the areas of team building, robot design, construction techniques, programming, control systems, and safety. One specific network of support available to schools and the community are the RoboRaiders. These Texas Tech engineering students serve as ambassadors for the WCOE Robotics Program and work to promote robotics and STEM education within the community.

SERVING RURAL COMMUNITIES As the GEAR competition grows on the South Plains every year, Karp’s desire is to see it continue to reach kids who otherwise wouldn’t have the chance to experience something like it. “What’s important for me is offering it to rural communities in the South Plains, the Panhandle, or even south of the Permian Basin and the whole country because they don’t have that many opportunities,” she said. “There are other Lego robotics competitions in metropolitan areas, so there are enough opportunities out there, but working with the rural areas and offering something particularly for the kids who may not be that interested in athletics, that’s my main focus.”

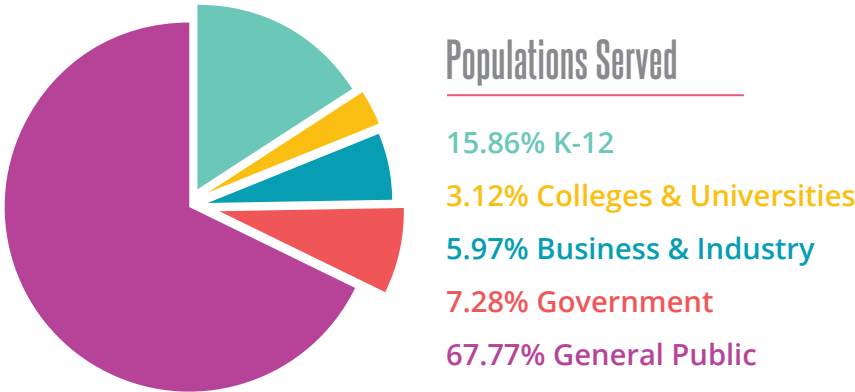
Texas Tech Outreach and Engagement
BY THE NUMBERS!

Administered by the Office of University Outreach and Engagement in collaboration with the Office of Planning and Assessment at Texas Tech, the Raiders Engaged instrument gathers data about the outreach and engagement activities of Texas Tech faculty and administrative staff. Data is self-reported, and participation in the annual survey is voluntary. During the most recent assessment in fall 2018, a total of **332 individuals** participated in *Raiders Engaged*, providing information on their Academic Year 2018 outreach and engagement activities. The number of projects reported, which covered the realms of teaching, research, creative activity, and service increased by **52.73%** between AY 2017 and 2018. They generated **\$30.7M** in external funding and impacted over **1.6M** individuals from communities in all 50 U.S. states and 89 countries. Community partners included non-profit and government agencies, business and industry, Pre-K and K-12 schools, community organizations, civic groups, and others.

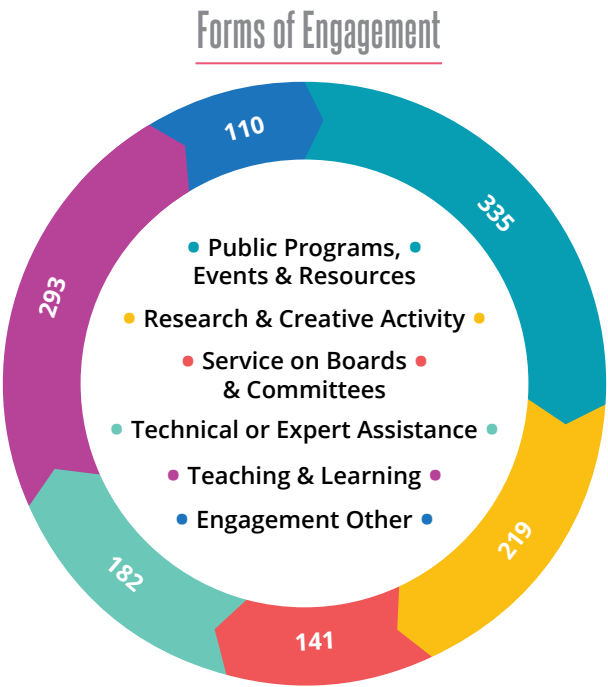
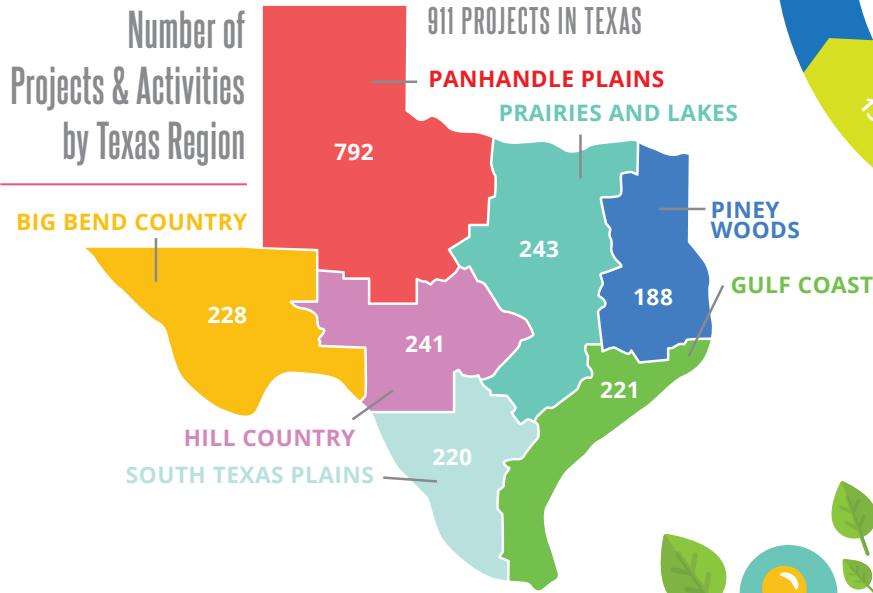
The following provides a snapshot of data encompassing projects and activities conducted between September 1, 2017 – August 31, 2018. It is supplemented by data of designated service learning classes that Texas Tech students participated in during the same time period. To view the full *Raiders Engaged* report, visit: www.depts.ttu.edu/opa/oe_raidersengaged/outreach_engagement.php



OUTREACH refers to the provision of programs, services, activities, or expertise to those outside the traditional university community. It typically involves a one-way relationship with Texas Tech faculty, staff, and/or students providing educational, consultancy or other services and the community being the recipient. (Activities might include non-credit classes, distance education, performances, lectures, public programs and events, K-12 programs, and others.)



ENGAGEMENT involves Texas Tech faculty, staff, and/or students in mutually beneficial relationships with communities (individuals or organizations) outside of the university for the purpose of addressing a specific community need or larger societal challenges. The two-way process leverages the academic expertise and resources of the university with the knowledge and experiences of the community partners. (Activities might include experiential or service learning, applied research, community-based research, need assessments, commercialized activities, clinical services, performances, demonstration projects, and others.)





TEXAS TECH UNIVERSITY

University Outreach & Engagement™



The Office of University Outreach and Engagement promotes and supports faculty, staff, and student outreach and engagement in the following ways:

- > Connect academic interests and expertise with community needs.
- > Develop partnerships with individuals and organizations outside of the university (i.e. business & industry, non-profit agencies, civic organizations, government, two- and four-year colleges, K-12 public schools, and others).
- > Connect faculty across campus to facilitate multidisciplinary engagement projects.
- > Identify and convene relevant internal and external stakeholders.
- > Consult on the design, implementation, and assessment of engagement activities.
- > Serve as liaison between the university and community partners.
- > Identify external funding sources and support the development of collaborative grant proposals.
- > Offer professional development in the theory and practice of engaged scholarship.
- > Highlight and recognize faculty, staff, and students for excellence in engaged scholarship.
- > Provide competitive seed grants for promising engaged scholarship projects or activities.
- > Share resources and tools to promote engaged scholarship.