TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College *of* Engineering™

Department of Civil, Environmental, & Construction Engineering

CECE CONNECTIONS

ISSUE 1 | SPRING 2023

What's inside?

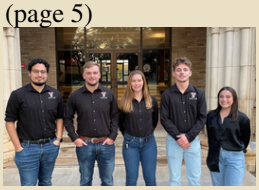
UPDATES ON WHAT OUR STUDENT ORGANIZATIONS ARE UP TO

ASCE | SEP | EWB | AGC (pages 3-4)

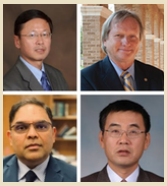
A final sand filter EWB students built for people in Panama

FACULTY AND STUDENT AWARDS

Get to know the awards received by CECE , faculty members, and students (page 5)



Associated General Contactors (AGC) Student team



Dr. Xinzhong Chen, Dr. Danny Reible, Dr. Venky Shankar and Dr. Lianfa Song

FACULTY RESEARCH

Dr. Zuo's tornado project (page 6)

Dr. Liu's automation cloud data project (page 7)

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https://www.linkedin.com/company/department-of-civil-environmental-construction-engineering/

Our Vision - The Department of Civil, Environmental, and Construction Engineering will be nationally and internationally recognized for producing well-prepared graduates, developing research programs, and advancing knowledge through public outreach and professional service.

CECE includes 360 undergraduate students, 159 graduate students, and 22 faculty members.

Chair's Welcome Message

W. Andrew Jackson, Ph.D., P.E.
Professor and Interim Department Chair
andrew.jackson@ttu.edu

Welcome to the inaugural newsletter for the Department of Civil, Environmental, and Construction Engineering. With the beginning of the TTU Centennial Celebration, I think it is appropriate to initiate a renewed relationship with our alumnus. The department has recently experienced various changes, however these changes are also a catalyst for a new era of excellence. I am sad to report that several long-serving faculty and staff members have recently retired, though I wish them the best in their next endeavors. While their presence and contributions will be missed, the department is recruiting new faculty, who will carry on the educational goals of the department while also bringing exciting new areas of expertise and research to TTU. These changes will allow CECE to continue making impactful contributions to our fields. The department continues to focus on providing an exceptional educational experience for our undergraduate and graduate students. Much has probably changed since you graduated, but I am proud to say that the core Red Raider values that were present when you were a student are still the foundation of our program today. Please take a minute to explore some of the activities and ongoing changes within the department as detailed in this newsletter. The continued success of our program is predicated on the support of our alumnae, and we hope that this and future editions of this newsletter will enable you to keep informed about all the exciting activities and successes occurring in the department. I am privileged to serve as the Interim CECE Department Chair and will strive to uphold the long tradition of leadership excellence the department has enjoyed in the past. Please feel free to reach out to me or the other faculty, or even stop in when you are in the area.

CECE Undergraduate Teaching Lab Renovation Initiative

The department is in the process of fundraising in order to renovate all of the CECE undergraduate teaching labs. Hands-on experience is a vital part of the learning process in engineering. However, most of our labs have not been renovated in decades. We are planning to update and expand the current lab spaces, as well as purchase new state-of-the-art equipment to both modernize the lab experiences and increase the number of students who can utilize the equipment. Our goal is to ensure every student gets time on each instrument and fully participates in each laboratory exercise. We are making great process in our fundraising efforts, and as an added incentive, the Interim Dean of Engineering has committed to matching the funds we raise. We hope you will consider contributing to this critical initiative.

DONATE ONLINE

In an upcoming symposium, the ASCE chapter at Texas Tech will be competing in the Concrete Canoe, Steel Bridge, Timber Strong, and Mead Paper Competitions. Previously-held steel bridge competition is shown in the photo above

CECE faculty and students at Fall 2022 graduation

Retiree's Special Mention

We thank the mentioned retirees for all their years of service and we wish them the best in all their future endeavors

Kenneth (Ken) Rainwater
Water Resources
Aug 1985 - Sep 2022

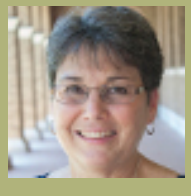
Priyantha Jayawickrama
Transportation
Aug 1990 - Aug 2022

Mukaddes Darwish
Construction
Aug 2003 - Aug 2022

William (Bill) Lawson
Ethics and Geotech
Aug 1998 - Aug 2022

Sanjaya Senadheera
Geotech
Aug 1996 - Aug 2022

Scott Norville
Structural
Jun 1981 - Aug 2022



Debbie Starcher
Unit Coordinator
April 1994 - Aug 2022

Those moving on

Venkatesh Uddameri
Water Resources
Sep 2012 - Aug 2022

Annette Hernandez Uddameri
Water Resources
Aug 2008 - Aug 2022

In Memorium

We pay respect to all those who have passed away and they will always be remembered. Our faculty members are the foundation of our community, sharing their knowledge and inspiring us with their spirit.

Dr. Ernst Kiesling
April 8, 1934 – October 14, 2021

Dr. Heyward Ramsey
May 16, 1935 - January 30, 2022

Dr. Penny Vann
September 9, 1935 - September 3, 2022

Student Organizations

The J.H. Murdough Student Chapter of the American Society of Civil Engineers at Texas Tech University aims to engage student engineers and encourage them to reach their full potential as professionals. Our ASCE Student Chapter currently has 2 faculty advisors, 19 student executive officers, and 155 student members. The goal of ASCE is to promote Civil Engineering by teaching students teamwork, leadership, and service to the community. Throughout the year American Society of Civil Engineers Student Chapter at Texas Tech University will be recruiting more members, promote joining an executive officer position, and hosting meetings where companies come present on campus to our student organization members. On campus activities include bi-weekly meetings, intramural sports, tailgates, social events, and fundraising events. We encourage members to be involved in all aspects of campus life and other engineering societies such as Texas Society of Professional Engineers, Chi Epsilon, Society of Women Engineers, Associated General Contractors, Engineers Without Boarders, Institute of Electrical and Electronic Engineers, and Society of Environmental Professionals. We firmly believe in giving back to the community through service. ASCE has several community events planned for the upcoming year. Our organization has partnered with Engineers Without Boarders to give our members more community service opportunities and give their organization more engagement with engineering students. Each year the ASCE Student Chapter participates in ASCE Student Symposium. Three of the most notable competitions are Steel Bridge, Timber Strong, and Concrete Canoe. These competitions require our teams to start in September 2022 for planning, organizing, and preparation for construction. Competition is in April 2023 of the Spring Semester. What makes all this possible to achieve? It's a recipe made complete through both our incredible work ethic and drive, combined with your support and generosity.

ASCE at Engineering kickoff day

Engineers Without Borders

(EWB) is committed to community service, providing members with volunteering opportunities at least once a week. Last year, EWB established a group of volunteers who worked regularly with Habitat for Humanity and look forward to continuing this work in upcoming semesters. With help from Dr. Fedler, they are accepting additional volunteers to maintain the new-and-improved composter unit model for the South Plains Food Bank. Additionally, EWB has set up a local contact with TTU Costa Rica to create an international volunteering project over the summer.

Students often gather together on a Saturday to help Habitat for Humanity build new homes for those needing assistance. The last home was for a veteran.

Students pulled sand from the river bed to separate by size to use in the water filtration system they designed and built for people in the rain forest of Panama where there is no electrical power. This was the first water filtration system for that community.

EWB students are in the process of installing a rain catchment system for one of the residents of rural Panama. This is used to provide healthy drinking water for this family.

Society of Environmental Professionals

(SEP) purpose is to foster and promote, among the members of the society, interest in all matters pertaining to environmental science, encourage cooperation among the members in major projects related to environmental science, promote social events, develop leadership, and provide programs for the professional development and entertainment of the members. Recent SEP events have included park cleanups in support of Lubbock Parks and Recreation, and 4 cleanups as part of a joint adopt-a-highway sponsorship with the Society for Women Engineers (SWE). Additionally, SEP has hosted a number of speakers including representatives from Kimley Horn, Cura Emergency Services, Carollo, and Tetra Tech. SEP has additionally participated in outreach including sponsorship of an activity station at TTU's STEM Core Family Night.

Adopt-A-Highway program participation

Dunbar Historic Lake cleaning event

Associated General Contractors

(AGC) mission is to connect quality students with industry-leading construction professionals. AGC accomplishes this through meetings with companies, social events, and competing in both regional and national competitions. After the organization was rebuilt over the Summer of 2021 from the impacts of Covid-19, the organization took tremendous steps in the right direction which warranted the Associated General Contractors being awarded the 2022 Most Improved Student Organization of the Year. In November 2022, AGC had a team compete in the DBIA National Student Competition which advanced from their region and competed in Las Vegas on a national platform. Earlier that year, the AGC sent two teams to the 2022 TEXO Foundation/ ASC Region 5 Student Competition in Dallas, Texas, where both teams placed in their respective divisions. In February 2023, the organization is sending teams to compete in all three divisions (Commercial, Heavy Civil, and Design Build). As the organization continues to represent Texas Tech University locally, across the state of Texas, and on a national level, its members continue to strive in their education, network, and opportunities beyond.

In 2022, the AGC placed in both divisions at the ASC Region 5 competition. The organization was also awarded the University's Most Improved Student Organization of the year.

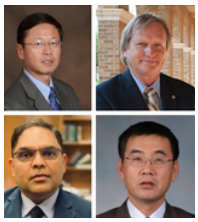
The Commercial competition team at the 2022 ASC Competition in front of the Irving Convention Center. All members pictured have full-time jobs in place prior to graduation.

Faculty and Student Awards

Dr. Moon Won Appointed as Texas Tech Center for Multidisciplinary Research in Transportation (TechMRT) Director

Dr. Danny Reible Inducted as a Fellow of the National Academy of Inventors

CECE Faculty Listed in World's Top 2% Cited Scientists in a Stanford University Study



Dr. Xinzhong Chen specializes in Wind Engineering. Dr. Danny Reible specializes in Environmental Engineering. Dr. Venky Shankar specializes in Transportation Engineering. Dr. Lianfa Song specializes in Water Systems Engineering.

AGC Student Team Wins First Place

The High Plains Design and Construction team at Texas Tech won the Design Build Student Competition Region Award (first phase) and moved to the second phase at the National DBIA Conference in Las Vegas. During the second phase, the team competed with seven other teams nationally.

Ventura was Awarded the 2022 Jack E. Leisch Memorial Graduate Fellowship from the T&DI of ASCE

Lan Ventura, a doctoral student, studies transportation safety and infrastructure resilience under climate change. Using LiDAR technology, he maps corridor objects over time and identifies critical collision zones through clustering analysis. Point cloud change detection techniques, together with climate and collision observations, provides insight into the evolving nature of collision characteristics under climate change. He is advised by Dr. Venky Shankar.

Silva Junior was Awarded the 2022 WEAT Scholarship

Luis Carlos Soares da Silva Junior, a doctoral student, researches sustainable wastewater treatment solutions merged with water resources management. His work has earned him several awards in the past year. These include the 2022 Water Environment Association of Texas (WEAT) 2022 Scholarship awarded to students doing research on critical water issues in Texas. He also was the recipient of the 2022 ASCE J Walter Porter Memorial Fellowship, awarded to a student who demonstrate outstanding ability and promise of excellence in water related engineering. Lastly, he won third place for best presentation in the 2022 Texas Water University Forum. Luis studies Pond-in-Pond (PIP) wastewater treatment systems that are sustainable and allow communities to incorporate water recycling. Luis is advised by Dr Clifford Fedler.

McKinney was Awarded Best Student Poster at the 2022 AEESP Research and Education Conference

Kaitlyn McKinney, a doctoral student, studies the specific linkages and synergy between bioaerosols and atmospheric particles. Her main study area is the role of atmospheric particles and their physiochemical properties on the viability and transmission of bioaerosols through a combination of field research, laboratory experiments, and statistical modeling. The answers revolving around these fundamental questions are critical in designing and developing cities resilient to future pandemics and airborne diseases. For her work, she received the best student poster award at AEESP (Association of Environmental Engineering and Science Professors). She is advised by Dr. Raghu Betha.

LaFond was Awarded the NSF GRFP

Jessica LaFond, a doctoral student, studies the difficult task of breaking down per- and polyfluoroalkyl substances (PFAS). These chemicals are used in applications like grease resistant food packaging and stain resistant carpets, but have also been observed to cause unintended, adverse health effects. PFAS contain strong carbon-fluorine bonds which makes them difficult to degrade. LaFond's research aims to discover enzymes that will degrade PFAS, which ultimately cab be used to remediate PFAS at contaminated sites. LaFond was awarded a prestigious National Science Foundation Graduate Research Fellowship Program (NSF GRFP) award to conduct this research, and is co-advised by Dr. Andrew Jackson and Dr. Jennifer Guelfo.

Faculty Highlights

CECE Professor Part of a $26 Million NSF Award for Novel Fertilizer Production

Kayleigh Millerick - Assistant Professor

Dr. Kay Millerick is an experimental environmental microbiologist whose laboratory research focuses on the confluence of environmental pollutants, reactive surfaces, and indigenous microorganisms

She examines microbial behavior and community dynamics in the built and natural environments, with an emphasis on biotransformation of aquifer pollutants in regions where groundwater is limited. Her vision overall is to develop sustainable, microbially-mediated water treatment strategies by studying niche environments that promote pollutant-degrading activity in bacteria. Her group receives research funding from various sources, including the National Science Foundation (NSF) and the U.S. Environmental Protection Agency, and pollutants studied include chlorinated solvents, arsenic, and poly- and perfluorinated compounds. Other research projects are not lab-based. Dr. Millerick leads efforts to increase indoor radon awareness in West Texas using data-driven approaches, and she is a co-PI on the NSF-funded TTU-ADVANCE-ADAPT, which seeks to foster gender, race, and ethnicity equity within TTU faculty. Dr. Millerick is part of the interdisciplinary team that recently won a $26 million grant from the National Science Foundation, the NSF Engineering Research Center for Advancing Sustainable and Distributed Fertilizer Production (CASFER). CASFER aims to produce and distribute nitrogen-based fertilizers from waste streams while minimizing nutrient runoff. Dr. Millerick's efforts relate to the safety of produced fertilizers, which leverages her group's previous experience with micropollutants, material characterization, and wastewater treatment. She and her students are currently working with chemical engineers and plant scientists to develop novel fertilizers with minimal impurities from municipal waste streams.

CECE Professor Receives Grant to Further Tornado Research

Dr. Delong Zuo - Professor

Delong Zuo is working toward making buildings more resilient during tornadoes.

With support from the National Wind Institute, Dr. Delong Zuo and his team have made major upgrades to the tornado simulator, VorTECH, at Texas Tech University, which is currently the largest in the United States and one of the two largest in the world. Experiments in the simulator have been used in many projects carried out by Dr. Zuo's team to study tornadoes and tornado loading on civil infrastructure.

The tornado simulator is upgrading

These include three projects sponsored by the National Science Foundation (award Numbers: CMMI 1663363, CMMI 1763109, and CMMI 2053494) and a number of projects sponsored by the Industry-University Cooperative Research Center for Wind Hazard and Infrastructure Performance (https://whipc.org/), which is supported by the National Science Foundation, and the Central Research Institute of Electric Power Industry (CRIEPI) of Japan (https://criepi.denken.or.jp/en/). The outcomes from these projects will make significant contributions to the resilience of society to tornado hazards.

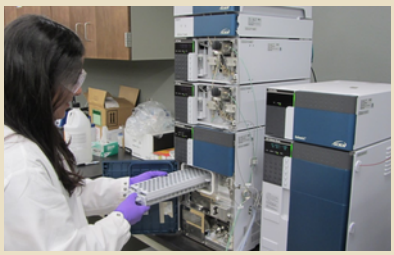
The new VorTech is simulating a tornado

Assistant Professor Studying Ways to Manage PFAS in Land-applied Biosolids

Jennifer Guelfo is a co-principal investigator on the project.

Dr. Jennifer Guelfo - Assistant Professor

Assistant professor Dr. Jennifer Guelfo began studying per and polyfluoroalkyl substances (PFAS for short) as a PhD student in 2009, and has continued this research since joining the faculty at TTU. Since joining the faculty in 2018, her research has brought in $3.5 million from the US Environmental Protection Agency, the Department of Defense Strategic Environmental Research and Development Program (SERDP), and others. Her group's research mainly focuses on evaluating how different PFAS (there are thousands!) move through environmental and engineered systems. Currently, Dr. Guelfo is working on projects that evaluate the fate and transport of PFAS in groundwater and landfills and the occurrence of PFAS in foods, pesticides, and wastewater treatment plants across the United States.



Dr. Guelfo mentoring her graduate student to analyze PFAS chemicals

The Guelfo Lab is also engaged in a joint project between TTU, the Minnesota Pollution Control Agency, and the University of Minnesota. The focus of the research is to evaluate how PFAS in biosolids can be transported through the environment, including groundwater and food crops. Biosolids are a nutrient rich byproduct of most municipal wastewater treatment plants that are often used as fertilizers for crops across the United States. There is scrutiny for how some PFAS, particularly perfluorooctanoic acid (PFOA) or perflourooctane sulfonate (PFOS), may migrate from biosolids into drinking water or crops grown using biosolids fertilizers. Results of this work will help to understand the risks associated with PFAS-containing biosolids and will help regulators and practitioners develop land application practices that will reduce risks of PFAS exposure.

Raw to fully processed LiDAR point cloud data and geolocated vehicular trajectories by Liu's group

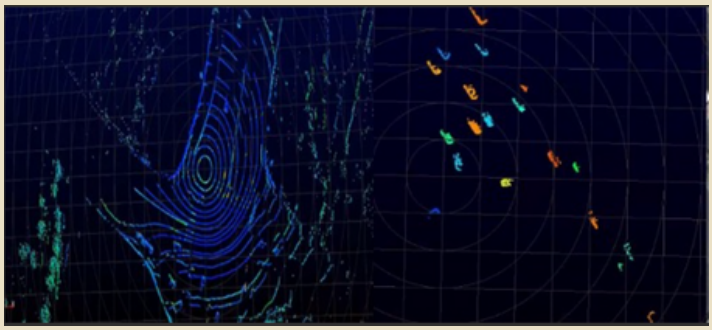
Dr. Hongchao Liu - Professor

This research centers around enhancing the infrastructure-based detection processes to support automated driving systems in vehicle

Dr. Liu's recent research has been primarily focused on using advanced sensing technologies to enhance the efficiency of existing highway systems in terms of reducing congestion and improving safety. He is pioneering the use of LiDAR (Light Detection and Ranging) technology for infrastructure-based detection and cooperative driving automation. Liu's group and collaborators at the University of Nevada, Reno are designing and testing the concept of an all-user-in-the-loop system through connected roadside detection and communication with connected and autonomous vehicles.

Georeferenced vehicular trajectories

A major focus of current research is developing and enabling data models and analytic tools, particularly, artificial intelligence and machine learning methods for the accurate processing of infrastructure-based high-resolution data with enhanced computational efficiency for real-time applications.



Unprocessed raw data and background filtered data

2022 Academy Inductees

The Texas Tech University Department of Civil, Environmental, & Construction Engineering is proud to announce the 2022 inductees into the Civil, Environmental, and Construction Engineering Academy. The Academy recognizes and celebrates the achievements of Civil, Environmental, Construction Engineering, and Engineering Technology graduates. Academy inductees have demonstrated significant achievements in professional, civic, and humanitarian activities. Nominees must have at least 10 years of professional experience, a record of outstanding achievement in their field of endeavor by promotions, awards, publications, or other recognition, have had significant influence or participation in the Department, College, or University, and have demonstrated a commitment to service and leadership to their community and their profession. The newest members were honored at an induction ceremony in September 2022. Please join us in congratulating the following newest Academy members.

Amit Armstrong, PhD, PE, PMP
Earned Degrees:
B.S. Civil Engineering, 1988*
M.S.C.E., 1994
Ph.D., 1998
Project Manager
Federal Highway Administration, Western Lands Highway Division

Aubrey Brockman, PE
Earned Degrees:
B.S. Civil Engineering, 2011
Project Manager
Kimley-Horn

Ronald C. Emmons, PE
Earned Degrees:
B.S. Civil Engineering, 1988
Senior Project Manager
Garcia Infrastructure Consultants

Ryan Hanford
Earned Degrees:
B.S. Mechanical Engineering Technology, 2003
M.B.A., 2012*
Director of Product Management
Baker Hughes

Chad Jones
Earned Degrees:
B.S. Mechanical Engineering Technology, 1999
President
Turbine Supply Company

Callie Bletsch, PE
Earned Degrees:
B.S. Environmental Engineering, 2000
M.Env.E., 2000
Senior Vice President/Co-Founder
MBCO Engineering, LLC

Jennifer Davidson, PE, CFM
Earned Degrees:
B.S. Civil Engineering, 2005
Director of Public Works/Road Superintendent
Lubbock County

Jonathan Gresham, PE, CPM
Earned Degrees:
Management, B.B.A., 1990
B.S. Civil Engineering, 1997
Retired (Jonathan Gresham was the Director of Water Utilities for the City of Amarillo and worked for the City of Amarillo for 23 years.)

George R. Herrmann, PhD, PE, PH, D WRE
Earned Degrees:
B.S. Civil Engineering, 1988
M.S.C.E., 2002
Ph.D., 2013
Principal/Owner, Desert Sky Engineering and Hydrology, PC; Instructor, Texas Tech University

Michael Ward
Earned Degrees:
B.S. Construction Engineering, 2004
Executive Vice President
Greater Metroplex Interiors, Inc.

***Degree received from another university**

Faculty and Staff Directory

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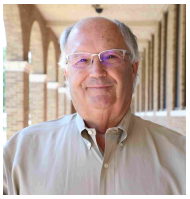

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TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College *of* Engineering™

CENTENNIAL
EDWARD E. WHITACRE JR. COLLEGE OF ENGINEERING

Dean: Dr. Stephen Bayne (Interim)

Research Centers:

- Center for Nanophotonics • Materials Characterization Center • Murdough Center for Engineering Professionalism
- Nano Tech Center (NTC) • Center for Pulsed Power and Power Electronics (P3E)
- Center for Multidisiplinary Research in Transportation (TechMRT) • Water Resources Center (WRC)
- NSF Engineering Research Center: Center for Advancing Sustainable and Distributed Fertilizer Production (CASFER)

Average Grant Amount Awarded Per Faculty Per Year:

CHE: $323,400 CECE: $176,000 CS: $68,400 ECE: $250,900 ME: $77,800 IMSE: $85,300 PE: $38,500

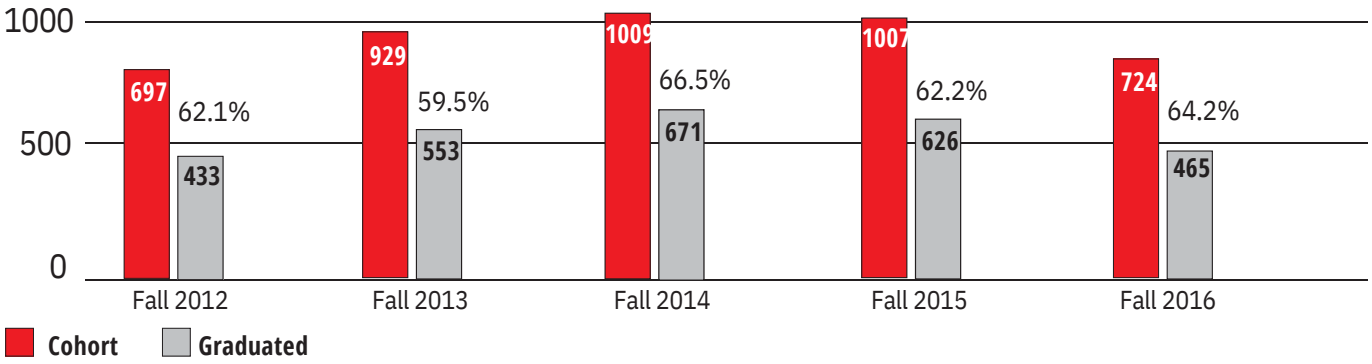
College Total Restricted Research Expenditures Per Year:

FY20: $15.1M, **FY21:** $15. 1M, **FY22:** $17.9M

Research Focus Areas:

• Energy & Sustainability • Water • Medicine • Infrastructure • Nanotechnology • Data Science and Cyber Security

Six Year Graduation Rate:



Five Year Giving History for the Whitacre College of Engineering

Support Type	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Total	Average
Major Gifts & Pledges >$25,000	$4,423,253	$5,404,849	$4,521,402	$2,210,210	$ 6,328,432	**$22,888,146**	$4,577,629
Regular Gifts & Pledges <$25,000	$1,775,524	$1,411,650	$1,983,999	$1,286,431	$ 1,677,824	**$ 8,135,428**	$1,627,086
Total Planned Giving*	$ 150,000	$2,591,864	$ 975,000	$1,150,000	$ 3,305,000	**$ 8,171,864**	$1,634,373
Private Support*	$ 498,658	$ 212,749	$ 125,007	$ 85,001	$ 136,233	**$ 1,057,648**	$ 211,530
Total	**$6,847,435**	**$9,621,112**	**$7,605,408**	**$4,731,642**	**$11,447,489**	**$40,253,086**	**$8,050,617**

**Total Planned Giving includes bequest pledges, conditional pledges, deferred insurance not owned by TTU, deferred insurance pledges, gift annuity pledges, non-binding gift intentions, retirement account pledges, and trust pledges.*
**Private support includes gifts, grants, and other revenues that are externally funded by research efforts where money has not originated from federal, state, or local funds.*

Departments Overview:

CHE:
UG: 206
Grad: 97
Faculty: 15
Chair:
Dr. Danny Reible

CECE:
UG: 360
Grad: 159
Faculty: 22
Chair:
Dr. Andrew Jackson

CS:
UG: 316
Grad: 564
Faculty: 18
Chair:
Dr. Yong Chen

ECE:
UG: 441
Grad: 145
Faculty: 24
Chair:
Dr. Brian Nutter

ME:
UG: 746
Grad: 147
Faculty: 29
Chair:
Dr. Song-Charng Kong

IMSE:
UG: 126
Grad: 174
Faculty: 13
Chair:
Dr. Bryan Norman

PE:
UG: 89
Grad: 58
Faculty: 7
Chair:
Dr. Marshall Watson