

TEXAS TECH Whitacre College of Engineering

### NEWSLETTER



### MESSAGE FROM THE CHAIR

Happy winter 2025 as we got record cold temperatures throughout the Southeastern US along with record snowfall. Is everyone enjoying this global warming? I just received my fall 2024 Cornell newsletter. In it, they noted that they are embarking on a revolution prompted by the National Science Foundation on how to teach the next generation of engineers. They're going to develop more hands-on education and put theory into immediate practice. I would say we are a little ahead as we started doing all of that in 2014. We have been working to modernize our curriculum and apply those same principles noted in the Cornell newsletter to our coursework. We have succeeded thanks due in part with generous donations from our alumni in building a state-of-the-art facility on campus and our unique Oilfield Technology Center (OTC). This time each year I review students' comments about their courses in the process of my annual faculty evaluations and a common thread in these comments is the appreciation of our efforts to give them hands on learning opportunities. I am asking you all to help by answering the questionnaire noted in this newsletter so that we can continue to improve our curriculum to produce the best prepared graduates to enter the workforce.

Our faculty's research efforts continue to achieve new heights in CCS, hydrogen, water, artificial lift and geothermal. Be sure to read about these achievements in this newsletter by our great faculty. Last year I helped wrap up the rewrite of the SPE's Storage Resource Management System (SRMS) document and anticipate a release this year. Dr. Leggett and I are working with a committee to write similar document for geothermal (GRMS). I also was part of the Texas Produced Water Consortium established on June 18, 2021 by Senate Bill 601, and is housed at Texas Tech University with the purpose of bringing together information and resources to study the economics and technologies related to beneficial uses of Produced Water focused primarily in the Permian Basin. In September we published a report you can read in the following link: https://www.depts.ttu.edu/research/tx-water-consortium/TXPWCFINALDRAFT. pdf. In April, I will be leading, as president of the Petroleum Engineering Department Heads Association, a group to Washington DC to meet with congressional leaders and the new administration to present our requests for new research funds in traditional oil and gas. I am optimistic that with the new administration, we can show how our research can add to our Nation's Oil & Gas energy production and enable operators to operate wells more efficiently.

Our undergraduate enrollment now ranks #3 in the US behind UT and A&M. We're close to finalizing agreements with South Plains College (Levelland, Texas) to create the Texan to Red Raider Engineering Academy. We are currently in discussions with Kilgore College to follow up with the Ranger to Red Raider Engineering Academy. More to come!!! These academies give junior college students perks that our students enjoy such as access to our scholarships, job fair opportunities and mentorship as they will be dually enrolled at Texas Tech.

# CONTENTS

# WHAT'S INSIDE!

Football season was a blast with Texas Tech finishing strong. We would have been stronger with a little less "help" from refs in the Colorado game! A big thank you goes out to Terry and Linda Fuller for providing the students with great tailgates all season long and also providing us with "refreshments"! I also thank the companies that provided great cookouts at the tailgate as well.

I hope the New Year is going well for all and I look forward to many successes in our department!



Chair's Welcome



Faculty Research



Newest Members



Tailgate Successes



Landman



Conferences



Academy Dinner



PIAB Report



Upcoming Events

### Faculty

#### Research



#### **#2 Gas Lift Test**

This fall, Dr. Leggett, Denny Bullard, David Bishop, and their student team completed construction of the Red Raider #2 Gas Lift Test well. This initiative is part of the Texas Tech Gas Lift Consortium, a joint industry project aimed at advancing late-life gas lift technologies. Switching from continuous to some form of intermittent gas lift can increase or maintain production rates while reducing required lift gas by 50%. The implications to reduce CAPEX. OPEX, and compressor emissions are enormous considering that there are over 10,000 wells on gas lift in the Permian Basin alone. The project supports three graduate and two undergraduate student researchers, while also providing a gas lift demonstration pad for artificial lift and production engineering classes.

#### Graduate Seminar Series Revamped

Thanks to a generous donation from the Southwestern Petroleum Short Course, the weekly seminar series was restarted as the James F. Lea Graduate Seminar Series. Speakers hailed from industry, academia, and national labs, including Oxy Fellow and 2020 SPE President Shauna Noonan. Seminar topics included oilfield corrosion, chemical tracers, hydrogen from hydrogen sulfide, offset frac mitigation, geomechanics, and progressing cavity pumps.



#### PE Department Faculty Partnering with DiagnaMed Holdings Corp. for in-situ, Clean Hydrogen Production from Petroleum Reservoirs

Dr. Qingwang Yuan, TTU's Office of Research Commercialization, and DiagnaMed Holdings Corp. proudly announces the new partnership to commercialize the ground-breaking technology (WO2023044149A1) for in-situ, clean hydrogen generation and extraction from petroleum reservoirs. This technology, i.e., the in-situ electromagneticassisted catalytic heating, was invented by Dr. Qingwang (Kevin) Yuan in 2021 to convert hydrocarbon to hydrogen in situ. Downhole hydrogen membrane is then used to extract hydrogen, thus enabling a carbon-zero hydrogen source, i.e., no carbon emitted to the atmosphere.

A new carbon-zero energy source is desperately needed to address the challenges in climate change and global warming. Achieving net-zero carbon emissions economy by 2050 requires transformational advances in energy technologies. The

technology invented by Dr. Yuan provides a new approach for clean hydrogen production by leveraging the abundant oil and gas resources in the USA and all over the world. The estimated cost of hydrogen is as low as \$0.86/kg hydrogen according to the technoeconomic assessment conducted by the Argonne National Laboratory (ANL). The partnership between Texas Tech University and DiagnaMed Holdings Corp. aims to advance and eventually enable this technology through a pilot test in the coming years.

Thanks note: We would like to express our sincere gratitude to the funding from the U.S. Department of Energy, National Science Foundation, ACS Petroleum Research Fund, and the CH Foundation.



#### Continuous Undergraduate Education Improvement

To address rapid changes in the oil and gas industry, identify new areas of employment for our students, and adequately prepare them, a survey encompassing two areas: academic skills, and soft skills, was prepared by the department's Continuous Undergraduate **Education Improvement Committee** using the inputs from all the faculty and advisory board members. The survey will be sent out to the alumni and the results will be gathered and analyzed to prepare a comprehensive plan to improve our undergraduate curriculum.



### Newest Members



Dr. Stella Eyitayo Instructor

I am an instructor specializing in Advanced Reservoir Engineering, Pressure Transient Analysis, and Geo-energy & Carbon Management.

I earned my PhD in Petroleum Engineering from Texas Tech University, where I had the opportunity to work on CCS Injection Strategies optimization, Carbon utilization, and beneficial reuse of produced water. I hold an MSc. in Petroleum Engineering and Project Development from the Institute of Petroleum Studies, an affiliate program of the University of Port Harcourt and École du Pétrole et des Moteurs (IFP) in France. During this time, I collaborated with leading researchers and industry experts, which solidified my interest in Petroleum Engineering. My academic journey began with a Diploma in Chemical Engineering Technology from Lagos State Polytechnic, where I first discovered my love for problemsolving in energy systems, followed by a BSc in Petroleum

and Gas Engineering from the University of Lagos.

I was drawn to Texas Tech for its reputation for academic excellence and the sense of community it fosters. From the moment I stepped on campus, it felt like home-a place where innovation thrives and collaboration is encouraged. I love being part of a team that works on solving global energy challenges while mentoring the next generation of engineers. Texas Tech's emphasis on putting people first and creating a culture of belonging resonates deeply with my values. It's where I can teach, inspire, and grow alongside talented colleagues and students.

While I'm immersed in engineering by day, you'll often find me experimenting with new recipes or crafting the next chapter of a romance novel by night! I also enjoy blogging about women's health, wealth, and wellness—a creative outlet that keeps me balanced.

I love mentoring students and engaging in community outreach to inspire young women to pursue careers in STEM fields. Watching students grow and succeed is one of the most fulfilling aspects of my career.



Kathryn Faicloth Adminsitrative Assistant I have an M.A. in Interdisciplinary Studies TTU

I wanted to return to Tech to help students have a successful experience during their academic studies by supporting department operations. The Petroleum Engineering department has a great reputation for guiding students as they enter a challenging field with integrity and expertise.

I enjoy rock hounding and puns. My rock collection holds so much sedimental value; and when you can't tell the difference between a ruby and a sapphire, it's a corundum.

PAGE



### Tailgate

### Successes



# SPE

The Society of Petroleum Engineers Texas Tech University Student Chapter had a remarkable fall semester, filled with impactful events and opportunities for members.

This semester, SPE, with the help of the SPE Permian Basin Section, proudly sponsored 24 students to attend the ATCE (Annual Technical Conference and Exhibition) in New Orleans, providing invaluable exposure to industry trends and networking opportunities.

Additionally, the chapter hosted numerous info sessions, hiring events, and resume workshops, equipping students with tools to advance their careers. SPE also brought the Red Raiders spirit to life by hosting tailgates for every home football game this season. Another major highlight was the Clay Shoot fundraiser, held at Jake's Clays in Midland, which was a tremendous success. The SPE TTU Student Chapter extends heartfelt gratitude to its sponsors—Diamondback Energy, Flowco, Renegade Wireline, Levare, Cudd Energy, Ensign Energy, and Workstrings-for their generous support in making the tailgates and Clay Shoot fundraiser possible.



## ARMA

The American Rock Mechanics Association student chapter had a successful fall semester full of many great and informative events. ARMA would like to send a spcial thank you to Manhard Consulting for sponsoring one of their tailgates Fall 2024.

The events ARMA proudly took part of were:

- Sharing of ARMA Future Leader Webinar with our members.
- Welcome back Pizza Party
- Tailgates outside the Department of Petroleum Engineering
- Info-session on the first day of classes by Xtreme Tank Technologies, a facilities-based company located in Midland TX, August 22nd, 2024.
- Seminar by Dr. Sheldon Gorell on September 5th, 2024.
- Info-session by Exxonmobil in IMSE building on September 16th, 2024.
- Info-session by Relevant Drilling Fluids on September 19th, 2024.
- Info-session by CUDD Well Control on October 10th, 2024.
- Seminar by Dr. Med Kamal former SPE 2023 President on
- October 24th, 2024.
- Tailgate sponsored on
- November 9th 2024 by Manhard Consulting.
- Retirement session by Dr. Sheldon Gorell on November 22nd 2024.



# AADE & IADC

The American Assoiciation of Drilling Engineers & International Association of Drilling Contractors student chapter tailgates this year were an absolute success! Many professionals and students were very pleased with the turn outs the students had throughout the school semester and are excited to continue them again next year.

The student organizations had great success in acquiring new student members and connections with professionals through tailgate not to mention the monetary success of their merchandise available at their tents.

Overall, tailgating is meant to be a fun and casual way to socialize and bond with industry people who are football fans and the students are happy to say that they accomplished exactly that.

A new event they introduced in Fall 2024 was the "Pre-Tailgate Parties", of which they had two. Those were major successes with the purpose of them being to strengthen the culture between engineering students and to be another fun, casual event to socialize at. They are excited to continue the tailgate events next year and to continue growing the bond they have with students and professionals!



# Petroleum Engineering Department Chair Helped Prepare Crew of 'Landman' Series

### Just as the actors and crew of Taylor Sheridan's "Yellowstone" attended cowboy camp, his latest series, "Landman," required oilfield training from Texas Tech experts.

Marshall Watson was sure he received a spam phone call.

As the department chair of the Bob L. Herd Department of Petroleum Engineering, it isn't often he is contacted by Paramount Pictures to assist with an upcoming production. His expertise lies far outside the film industry.

"The closest I've come to show business is all the videos we've made in the department and on campus," he mused.

But with a green light from the Edward E. Whitacre Jr. College of Engineering leadership, Watson accepted an offer to help with "Landman:" a Paramount+ series that depicts the challenges of the oil business in West Texas.

Watson hadn't heard of the show, but he was familiar with its creator, Taylor Sheridan, from his appearance in the 2023 Presidential Lecture & Performance Series. He learned not only about Sheridan's previous series, "Yellowstone," but that he owns and operates two Texas ranches, including the 6666 Ranch that spans 260,000 acres.

"Yellowstone" is a Western drama that has been filmed at the 6666 Ranch outside Borger and other Texas Panhandle spots. It tells the story of a family that owns the largest ranch in Montana, constantly having to defend their land.

To prepare the actors of "Yellowstone" to embody the cowboy lifestyle, Sheridan sent them to "cowboy camp," which actor Luke Grimes describes as a three-day pack trip into the middle of nowhere – sleeping in tents, resting their heads against saddles and working together through the unexpected.

It seemed "Landman" would require the same sort of training, but this time it was an immersion into the world of oil rig workers.

"They said Sheridan is very meticulous and pays close attention to details," Watson remembered the crew members telling him. "He wanted it as realistic as possible."

In came Watson's expertise in the oil and gas industry, which he has shared with passion since he arrived at the Texas Tech campus in 2004 (first for a master's degree, then a doctoral degree and faculty position). Prior to that, he racked up 23 years of experience with both major and independent oil companies, beginning with Shell Oil Company working as a production and reservoir engineer in the Permian Basin.

Watson explains the oil and gas business is more high-tech than most give it credit for. Over the years, he has had the opportunity to share his viewpoints across many generations through the Oilfield Technology Center (OTC): from elementary students, to incoming first-year students, to congressmen.

Watson believes the OTC is how the "Landman" staff knew to contact him in the first place. The unique educational facility made news headlines in spring 2023 when it made history with the first full-scale operational oil rig on a university campus in the nation.

The OTC is designed to serve both research and teaching needs, as well as third party workforce development training. Or, in this case, those pretending to be members of said workforce, as Watson led the crew through the center in November 2023.

"I kind of gave them oilfield 101," he recalled, "and then they wanted to come back again."

That time, Watson took them on a field trip to the oilfields just north of Lubbock near Shallowater, where industry workers were actively drilling wells.

A few months later, Watson was asked to serve as an on-set adviser in Fort Worth. He agreed to one day of presentations



to crew members gathered in a conference room followed by a visit to a drilling rig, but he didn't feel comfortable spending any more time away from the Texas Tech campus.

From there, Watson recommended further questions go to a Texas Tech alumnus and Whitacre College distinguished engineer: Terry Fuller. Fuller is not only the president and founder of Phoenix PetroCorp, Inc., an independent oil and gas production company, but he lives in the Dallas-Fort Worth area.

"They wanted to know all the realistic issues that could happen," Watson said. "We went through several scenarios, but the problem is the realistic things were too difficult to get an audience to understand."

While Watson mainly met stunt doubles and others who work behind the scenes of the production, Fuller was around Sheridan and the actors – including the main character of "Landman," Billy Bob Thornton.

Watson was eager to see if Thornton would channel the antics he used for his leading role in "Bad Santa," but to find out, he had to wait until the show premiered Nov. 17, 2024.

#### **Red Raider Reveal**

When Watson watched the first episode of "Landman," he was met with explosive scenes that meet the standards of engaging content, infiltrated with much more drama than he ever experienced during an average workday in the oilfield.

"Hollywood is Hollywood," he resolved. "Blowing up stuff is a lot less boring to watch than gas hissing, or something like that."

Another unexpected element of the show delighting many Red Raiders are the Texas Tech cameos, such as a tattoo on a character's bicep and a mention about contacting the National Wind Institute for information on wind turbines.

Even the son of Thornton's character, who is played by Jacob Lofland, is seen wearing the Double T on his hat as a wrestler who dropped out of the university. Lofland was quoted referencing how Texas Tech prepared him for his role as he learned the science of the industry and then spent four days on drilling rigs.

"There's no way to act like you know what you're doing in this business without having to do it," he explained.

Just as doctors watch movies based in hospitals with a technical eye, Watson finds himself in the same position when a new "Landman" episode airs each Sunday. Although it may not always translate on screen, Watson assures safety is the highest priority of the oil and gas industry, with special equipment and measures in place to prevent accidents like the ones that occur on the show.

Whether or not the show will lead to an increased interest in the industry is undetermined for now. In the meantime, Watson will continue his educational endeavors to ensure the next generation of petroleum engineers are ethical, professional, responsible and ready to provide solutions that will impact the world.

"I'm very interested in teaching about the oil and gas business with people that have not heard of it or are not knowledgeable about it," he said. "That is what we're really trying to do. We're not bad people and there's so many misconceptions about the industry. So, when I have the opportunity to share how it works, it's always a pleasure to do that."

Grotegut, Ashlyn. Petroleum Engineering Department Chair Helped Prepare Crew of 'Landman' Series. Texas Tech Now, December 9, 2024, https://www.ttu.edu/now/ posts/2024/12/petroleum-engineering-department-chairhelped-prepare-crew-of-landman-series.php

Photo: Billy Bob Thornton





### **Conferences** Attended



We are happy to announce we had a great semester of attending confernces.

These conferences are important as they are a great way for us to build connection, network, and present papers.

We have complied a list of conferences attended by the staff, faculty, and students of the Bob L. Herd Department of Petroleum Engineering during Fall 2024.

- Texas Tech Gas Lift Consortium and SPE Artifical Lift Conference - Houston, TX - August 20th
- Geothermal Energy from Oil and Gas Demonstrated Engineering Conference - Houston, TX - September 10th
- Mix and Mingle Red Raider Conference Houston, TX -September 11th
- SPE Annual Technical Conference and Exhibition New Orleans, LA September 22nd
- Permian Basin Artifical Lift Forum Conference Midland, TX - Novemebr 5th
- American Geoscientists Union Conference Washington D.C. - December 9th
- Midland CO2 Conference Midland, TX December 11th

### **In Loving Memory**

We give our heartfelt condolences to the Rogers family. Robert "Chip" Quillman Rogers III. His remarkable attitude, professionalism, leadership, and unwavering spirit left a lasting impression on all who knew him. As President of the Society of Professional Petroleum Engineers, he guided with integrity, compassion, and a dedication to making a positive impact on those around him. His legacy of kindness, hard work, and inspiring leadership continues to be cherished by his peers, faculty, and all who had the privilege of working alongside him. He will be greatly missed.



PAGE 8

# Academy Dinner

#### **2024 Academy of Petroleum Engineers Inductees**







# Mirick CoxBill PardueHarrison ReeseHISTORY OF THE ACADEMY OF PETROLEUM ENGINEERS

On April 7, 1994, Texas Tech University and the Bob L. Herd Department of Petroleum Engineering initiated the Academy of Petroleum Engineers. It began with 17 charter members, and today, the academy has 124 members.

#### The Purpose of the Academy of Petroleum Engineers is threefold:

- To recognize Petroleum Engineering graduates and other petroleum industry professionals who have made significant contributions to the profession and who, in doing so, have brought recognition to the Bob L. Herd Department of Petroleum Engineering at Texas Tech University.
- To encourage and inspire the Petroleum Engineering program and students to achieve success in their selected fields of endeavor.
- To assist and support the Bob L. Herd Department of Petroleum Engineering in its efforts to seek and develop excellence in its programs.



# **Alumni Update**

Juan J. Nevarez of Dallas, Texas, is the Executive Vice President of Scout Energy Partners and is a registered professional engineer in Texas. He has over 28 years of experience in upstream oil and gas.

The most amazing thing about Juan is his ability to overcome adversity at a young age. He came to Amarillo, Texas from Mexico when he was 15 years old to work and help his parents financially back home. Fortunately, his Godmother saw his potential and encouraged him to go to school instead. She adopted him and gave him an opportunity to go to high school at Tascosa High. His Godmother was a person of limited means as a housekeeper and Juan would go with her to help clean houses. One of the houses belonged to an independent geologist who first introduced Juan to what the oil industry was about. His love and enthusiasm for our

industry encouraged Juan to seek a Petroleum Engineering Degree at Texas Tech University.

Currently, Juan is an executive member of the Texas Tech University System Foundation Board of Directors, Texas Tech Engineering Dean's Council, Texas Tech Petroleum Industry Advisory Board, Professional Engineer Exam Committee, Society of Petroleum Engineers, and ADAM Energy Forum. He also volunteers with Dallas CASA (Court Appointed Special Advocates), serving both as a volunteer working with children in the foster care system and as a member of CASA's Board of Directors.

While Juan was an executive member of the PIAB, he served on the capital campaign committee organizing multiple fundraisers that ultimately raised \$4,000,000 for the endowed Winkler Chair in Petroleum Engineering. He was one of the most active members, never missing a meeting.

Most recently Juan was appointed to the Texas Higher Education Coordinating Board by Governor Greg Abbott. If that isn't enough, he has also taken a new role at Scout as the President of Scout Development Company that focuses on the development of unconventional resources in Utah.



# Petroleum Engineering Future at TTU Remains Strong!



#### The Petroleum Industry Advisory Board (PIAB) is thrilled to share that the future of Petroleum Engineering at TTU remains as robust and promising as ever.

Over the last year, the PIAB has been working closely with the Department and University leadership. We have received strong support for the Petroleum Engineering program from the highest levels of the University after engaging them over the last year to align the path for the department.

The PIAB would like to welcome two new members:

- Jack Lewis, Director of Acquisitions & Divestitures & Development Design, Denbury Inc.
- Kyle Poelske, Consulting Petroleum Engineer, Fallen Leaf Energy LLC

Looking ahead, the key priorities for the PIAB will be to continue department support in critical areas, such as faculty staffing for current and future needs of the department and providing more scholarships to maintain competitiveness with other Petroleum Engineering programs.

We are incredibly excited to announce the launch of a new fund-raising campaign with a target to raise \$4 million for scholarships! We are off to great start with \$250,000 raised so far. The Future of Excellence in Petroleum Engineering Scholarship program has the following goals:

- Directed scholarships to candidates with less support, especially for Freshmen and Sophomores, Junior College transfers.
- Attract more candidates to TTU Petroleum Engineering.
- Increase TTU scholarship competitiveness with other PE Departments that often provide full scholarships even for underclassmen and transfer students.

How can you get involved in supporting TTU Petroleum Engineering?

- Alumni Relations Assistance in planning social / fundraising events this year in key cities (DFW, Houston, Midland, OKC, or a city near you)
- Research PIAB members provide support in establishing Consortiums or Research programs with your company
- Capital Ramp up fundraising for Future of Excellence in Petroleum Engineering \$4 million target for scholarships
- Curriculum Help reviewing existing courses (PETR 2322 Thermodynamics up next), and sit in on Senior Project Reviews

#### Thank you for your unwavering support and dedication to our program. Your contributions have been instrumental in our growth.

We invite you to join us in this exciting endeavor and help us reach our campaign goals.



It's an exciting time for Petroleum Engineering at TTU, and we look forward to continuing this journey with the best Advisory Board in the Industry!

Sheldon Burleson Chairman TTU Petroleum Industry Advisory Board



# **UPCOMING EVENTS**

#### **Short Course**



### THE 71ST ANNUAL SOUTHWESTERN PETROLEUM SHORT COURSE

#### April 21-24, 2025 • Lubbock, Texas

**PRE-CONFERENCE COURSES** 

Monday, April 21 • Corrosion Monitoring: Importance of Analytical Testing • Plunger Lift School • Fundamentals of Sucker Rod Lift • Sucker Rod Design • Adding Value Through Operations School (The Operator's Perspective)

Tuesday, April 22 • Basics of Hydraulic Fracturing in Horizontal Wells

#### SWPSC CONFERENCE AND EXHIBITS Wednesday and Thursday, April 23-24

with Chemical Solutions • Remedial Acidizing • Sucker Rod Pump Analysis and Optimization • Ugly Pump Cards Caused by Mechanical Friction - Analysis and Troubleshooting of Dynamometer Surface-Pump Cards

• Oilfield Operational Challenges Managed

Monday and Tuesday, April 21-22 • Gas Lift • Unconventional Well Production Using Jet Pump • Facility Design

 The SWPSC Conference will include 45 or more papers/presentations on artificial lift, drilling and well completion, production handling, stimulation and workover, reservoir operations and environmental issues. Topics will be presented by industry representatives from many companies throughout the industry.

The SWPSC exhibits will be in the Exhibit Hall where registrants can browse through them at their convenience. The buffet luncheons on Wednesday and Thursday will also be held in the Exhibit Hall for greater exhibit exposure. Door Prizes will be given away each day of the conference. You must be present to win!



JEFF MCCULLEN, 2025 GENERAL CHAIRMAN MARTIN LOZANO, 2025 PROGRAM CHAIRMAN

EVERYTHING IS BETTER ON THE APP! The schedule of events, papers and exhibitor listings will all be made available via our Events App, Whova. DOWNLOAD TODAY!



PAGE 11





# **Calling all Alumni!**

Please take some time to fill out our survey. We want to rapid changes in the oil and gas industry, identify new areas of employment for our students, and adequately prepare them for their careers. The survey encompasses two areas: academic skills and soft skills. Thank you for your help!



Bob L. Herd Department of Petroleum Engineering 807 Boston Ave Lubbock, TX 79409

> Phone: 806.742.3573 Email: pe@ttu.edu

www.depts.ttu.edu/pe

