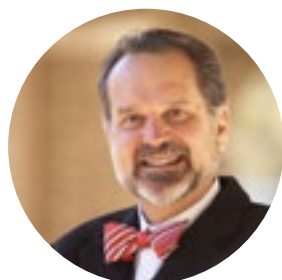


Chair's Welcome: **DR. MARSHALL WATSON**



It has been quite some time since our last newsletter and a lot of events have transpired, most notably, COVID-19, an oil industry crash followed by \$100 oil. Not only did we weather the pandemic, but we were also one of the first departments to go back to face-to-face instruction in the fall of 2020, and undergraduate classes were 100% face-to-face the following spring.

In the Spring of 2020, we received a generous donation from Patterson for a drilling rig to be constructed at our Oilfield Technology Center (OTC). Unfortunately, due to the pandemic, new restrictions, and red tape, we are just now able to raise the derrick. We hope this will be completed in the next few months. This will be the only one of its kind in both industry and certainly in academia. The rig will

be fully operational and will allow our students to have an opportunity to observe firsthand the operation of the rig. A big "thank you" goes out to Denny Bullard who has tirelessly pushed administration officials for all the clearances and bids needed to get the rig in the air. The OTC is being used on an almost daily basis for education, research, product testing or workforce development. We continue to receive inquiries about the use of the facility from industry.

Undergraduate class sizes have yet to respond to \$100 oil as it usually takes a year or two to see the response. Currently, we have approximately 100 students (sophomore through seniors) in the program. We are combating the negative press and outlook that the incoming students are being told, often by high school counselors. The good news is that we have a great student-to-faculty ratio of 12:1, which compares to that

of Ivy League schools. Petroleum student job placement shortly after graduation was near 100%.

We wish the best for Dr. Lloyd Heinze and Dr. Habib Menouar in their retirement from Texas Tech. Dr. Heinze has been with the department since 1992 and will certainly be missed. Dr. Stephen Bayne is the new Interim Dean of the College of Engineering. We want to wish Dr. Al Saaco all the best and appreciate all he did for Petroleum Engineering. He was instrumental in the planning and execution of the new building. Dr. Bayne has been involved with our department for quite some time in both research and instruction. He was instrumental in aiding us with our new electrical engineering for petroleum engineers' course and have discussed forming a multidisciplinary electronics lab for undergraduates. We look forward to working with him in his new position. *(next page)*



Drilling Rig - Painting in progress



Dr. Habib Menouar (left) and Dr. Lloyd Heinze (right)

We have a few new faces as well. Glenda Wylie joined in the Fall of 2019 and leads efforts in the online Master of Science in Interdisciplinary Studies (MSIS) in Energy and Texas Tech’s Energy Institute. This program gives students, with and without an engineering background, knowledge in all aspects of energy, both fossil and renewables and has been certified by AAPL. Dr. Qingwang (Kevin) Yuan joined our faculty in January 2020 and has a research interest in hydrogen generation and storage. Dr. Yuan also heads up our educational efforts on programming and data analytics.

produced water, wellbore integrity, carbon storage, and cementing.

We are sad to announce the passing of notable alumni Mr. Bob L. Herd in January 2020. Mr. Herd was a cornerstone in our department’s undergraduate education’s success with his endowment. The endowment not only aided in the construction of our new building but also supports the continued development of the Oilfield Technology Center (OTC). We also remember Mr. Curtis Mewbourne who received the Herald W. Winkler Distinguished Lifetime Achievement Award in 2021, and Mr. Arnal Nall who

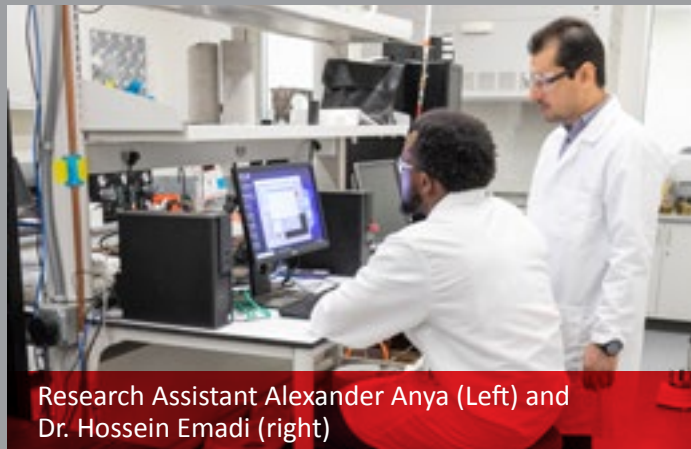
Dr. Smith Leggett joined our faculty in September 2022. His research interests include fiber optic sensing, hydraulic fracture completions, and production engineering.

Research productivity has risen as well. We received multiple industry and DOE grants in the last few years in the areas of

will be inducted posthumously into the Academy of Petroleum Engineers in October 2022. Mr. Cloyce Talbott, inducted into the academy in 1998, passed away September 2022.

In 2019 and 2020 I was president of the Petroleum Engineering Department Heads Association (PEDHA). Not PEDHA!! During my term, we hosted the annual meeting in 2019 where department heads from around the world came to Texas Tech and we were able to showcase our department. I just attended a PEDHA meeting in Golden Colorado where we discussed ways to promote Petroleum Engineering. We were in general agreement that we should not abandon the name but needed to modify the curriculum to reflect the current climate. The Bob L. Herd Department of Petroleum Engineering has already acted on most of these suggestions.

We have integrated subject matter in Carbon Storage (CCUS), Geothermal, and hydrogen. We also have a class in programming and data analytics using Python, plus we utilize Python from the freshman through senior level courses.



Research Assistant Alexander Anya (Left) and Dr. Hossein Emadi (right)

CEMENT CONSORTIUM

DRS. WATSON AND EMADI CREATED THE OIL AND GAS WELL CEMENT CONSORTIUM THIS PAST YEAR.

This project focuses on designing a cost-effective, less than \$65 per sack of cement, lightweight cement slurry of 9 lbs./gal with acceptable compressive strength, rheological properties, stability tests, and proper thickening time. The main objective of this project is to solve an intermediate

casing cementing operation problem that has been a serious problem for the past several years. Poor cement quality and/or lack of cement behind the intermediate casing result in severe long-term wellbore integrity problems, possibly serious environmental-related issues, and costly remedial cement jobs. We would like to thank Apache and ConocoPhillips for funding this project.



SPE DISTINGUISHED MEMBER

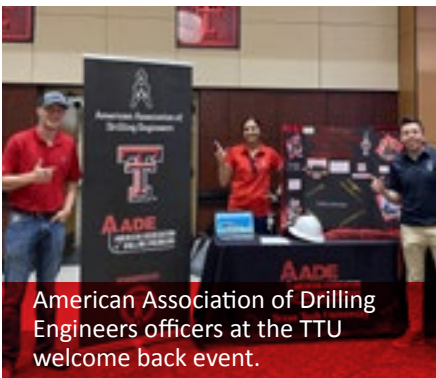
THE SOCIETY OF PETROLEUM ENGINEERS (SPE) RECENTLY HONORED DR. MARSHALL C. WATSON

with SPE Distinguished Membership at SPE’s Annual Technical Conference and Exhibition held in Dubai. Watson is being recognized for his tireless work for the profession, his huge impact in moving Texas Tech’s petroleum engineering department forward, for leading the US Petroleum Engineering Department Heads and for his service on numerous SPE committees.

Dr. Marshall Watson (right) and
Mr. Tom Blasingame (left) 2021 SPE President

Professor to Lead Pathway TOWARD GLOBAL ENGINEERS PROGRAM AT JIMMA UNIVERSITY

Lloyd R. Heinze and Stephen Ekwaro-Osire received a five-year grant to help increase the capabilities of the undergraduate engineering program at Jimma University in Ethiopia. This grant was motivated by the pandemic disruptions, and there are two objectives: One is to increase the capabilities of the undergraduate engineering students from Jimma University. The second is to increase the capacity – meaning the faculty, the facilities, everything – to offer high-quality engineering programs. Lloyd and Stephen will work with professors and administrators at Jimma University as well as local industry members and stakeholders during this process.



American Association of Drilling Engineers officers at the TTU welcome back event.



PE student intramural baseball team.



Society of Petroleum Engineers Officers.

CARBON STORAGE (CCUS)

Drs. Emadi and Watson received the Illinois Storage Corridor grant. The current, but limited, ISGS electronic database will be enhanced for the area of study for each CO2 storage site by adding additional attributes from all the existing scanned and paper documents submitted by owners/operators to the ISGS. The wells in the enhanced database will be categorized into 3-5 relative risk groups using different wellbore characteristics so that the higher risk wells can be identified and studied to further substantiate the perceived risk. Also, the results will help identify high-risk wells and take preemptive actions. There is a patent pending for the risk characterization method that was developed. In addition, Dr. Watson has co-authored the Storage Resource Management System (SRMS) and SRMS application document. These are SPE-sponsored.



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Texas Produced
Water Consortium

Bringing Texas-Sized Solutions to Protect Public Health and the Environment

The Texas Produced Water Consortium (TxPWC) in which Dr. Watson is part of a three-member board, was established by Senate Bill 601 with the purpose of bringing together information and resources to study the economics and technologies related to beneficial uses of produced water, including environmental and public health considerations.

The consortium will also develop an economic model for using produced water in a way that is economic and efficient and protects public health and the environment. The consortium will provide guidance for establishing produced water permitting and testing standards and will suggest changes to law and administrative rules to better enable the use of produced water. For more information on the txpwc@ttu.edu.

Methane Detection

Dr. Hossein Emadi and Mr. Denny Bullard are currently working on methane detection research projects. So far, they have received two industry-sponsored projects which address methane detection. They are currently collaborating with Schlumberger and Kuva systems, to enhance methane detection techniques and compare the existing technologies with the developing ones. Two different technologies, fixed

sensors, and Optical Gas Imaging (OGI) cameras are being tested and studied at OTC. The plan is to analyze the generated data to thoroughly evaluate the technologies and make recommendations for future usage depending on the application. Also, in an unrelated project, they are working on a model currently used which uses surface load measurements to more accurately calculate downhole loads in a sucker rod string.

FULBRIGHT U.S. SCHOLAR

James Sheng traveled to Canada to research the feasibility and potential of oil recovery of carbon dioxide sequestration in oil reservoirs.

There are several carbon capture and storage and utilization (CCUS) projects: the Aquistore project, the Weyburn-Midale international collaborative project, and the carbon capture from the Boundary Dam Power Station. Dr. Sheng studied the utilization of capture CO2 to enhance oil recovery in heavy oil reservoirs.