



TEXAS TECH UNIVERSITY

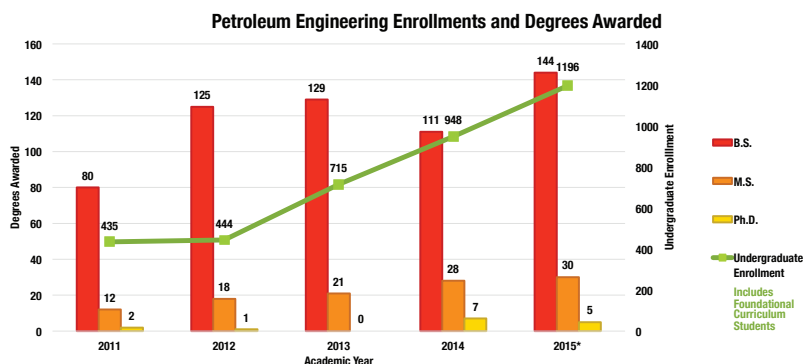
Bob L. Herd Department of Petroleum Engineering™

Fall 2014

Texas Tech University - Edward E. Whitacre Jr. College of Engineering

Message from the Chair

What an incredible past year this has been with the completion of the new building, finalizing our new curriculum and realizing that if we include all students who are interested in a petroleum engineering degree, we are among the largest departments in the world. This fall, we have 683 students in the college's Foundational Curriculum who want to study petroleum engineering, 513 bachelor's students, 45 master's students, and 35 doctoral students. We expect up to 50% of the Foundational Curriculum students to make it into the department in the next year.



The new building was completed and we moved in at the end of February of this year. Construction and installation of facilities, as noted above, are still going on today. We welcomed the arrival of our drilling simulators in mid-October. We are hoping the equipment ordered for our visualization lab in our new building will arrive in the coming weeks. Construction is already underway of a horizontal wellbore model to demonstrate multiphase flow in various horizontal well configurations. Another model will demonstrate pump installations and packer forces. Many other models are currently being constructed for the visualization lab, also known as the Apache Upstream Research Center.

We have increased our faculty by four professors since last year in various specialties such as drilling, reservoir, and production facilities. We're still in the process of raising funds for our East campus to give us the ability to give students hands-on experience with oilfield equipment. Since our last newsletter, we've had two sets of geological field trips to the Arbuckle Mountains comprising of some 350 students. These trips have been extremely successful from giving students hands-on learning regarding structural and sedimentary geology plus the art of camping and making s'mores. While in the Arbuckle Mountains, students were exposed to multiple shale reservoir examples such as the Woodford Shale. Students were able to see the effects of rock mineralogy on natural and hydraulic fracturing. One of the geological stops was an exposed oilfield where oil is actually seeping out of the rocks. This is one of my favorite classes because I can explain production and drilling engineering aspects as well as structure and sedimentary geology to the students.

If you have not read the October issue of the JPT you should. Our own Dr. Herald Winkler was named a "Legend in Artificial Lift," along with our past department chair, James Lea. The same issue featured Dr. Mohamed Soliman's work on Unconventional Reservoir Fracturing and an article by Dr. James Sheng, who also was just awarded over \$1 million from the DOE for his work in shale EOR.

I hate to end this letter on a sad note but, one of our best students, George Mutua, who just graduated this past May and went to work for Chevron, passed away in a car accident on his way to work in the oil fields north of Midland. Our thoughts and prayers are with his family.

Marshall C. Watson, Ph.D., PE.
Roy Butler Chair and Department Chair



Watson



Atrium of the new Terry Fuller Petroleum Engineering Research Building

The New Terry Fuller Petroleum Engineering Research Building

In February, the department celebrated the grand opening of the new \$22.8 million petroleum engineering research facility, the Terry Fuller Petroleum Engineering Research Building. Named in recognition of lead benefactors and Texas Tech graduates, Terry and Linda Fuller, this 42,000 square foot building has set the national benchmark for petroleum educational facilities.

Named Facilities in the New Building

- The Herald Winkler Auditorium
- Apache Upstream Research Center
- Occidental Petroleum Enhanced Oil Recovery Laboratory
- Anadarko Unconventional Technology Center
- Michael Herd Fracturing and Production Laboratory
- Pioneer Natural Resources PVT Laboratory
- Chevron Drilling Simulation Center
- Chevron Reservoir Simulation Center
- LINN Energy Student Lounge
- David G. Wight Courtyard
- Harvey L. Ratliff, Jr. Department Chair Suite
- Walter Exploration Company Conference Room & Graduate Suite
- Stephen and Andra Heitzman Conference Room
- McGraw Family Graduate Student Office
- Gary L. Stone Family Faculty Office
- Byrd Operating Company Faculty Office
- Heidi and Jason Hilliard Family Faculty Office
- Guthrie Family Adjunct Faculty Workroom
- Marshall and Angela Watson Group Study Room
- Phil Johnston Group Study Room

Students utilizing the \$1.25 M software provided by IHS for senior design projects in the new geological and reservoir simulation lab.



Student News

Rezaei Wins Poster Competition at Fracturing Impacts & Technologies Conference

Ali Rezaei, a doctoral student, won the poster competition in the Fracturing Impacts and Technologies Conference that was held in Lubbock in September 2014. The poster was the result of a study using the hydraulic fracture simulator which was recently developed in the Bob L. Herd Department of Petroleum Engineering.

His research effort investigated critical factors such as stress anisotropy, fluid pressure, stress interference, fracturing pressure, and other factors on hydraulic fracture behavior.

American Association of Drilling Engineers, Educates, Grows, and Reaches Out



AADE Members Volunteering at the South Plains Food Bank

In the last year, the Texas Tech student chapter of the American Association of Drilling Engineers (AADE) has seen growth and provided key complements to the department's curriculum. The organization held four technical information sessions, including a presentation titled "Well Control and Risk Management," given by Josh Beaver of Wild Well Control. After the annual Engineering Kick-off Event, 50 new members were recruited from a variety of engineering disciplines.

The organization also launched a new website (www.ttuaade.org), reconstructed the leadership, and released an updated and comprehensive constitution to govern its affairs. AADE has also been active in the community with a variety of organizations such as the Salvation Army and the Boys and Girls Club. The academic year was finished out with three field trips, one organized by Oxy with the help of AADE's faculty advisor, Alberto Giussani.

Society of Petrophysicists and Well Log Analysts Growing in Numbers

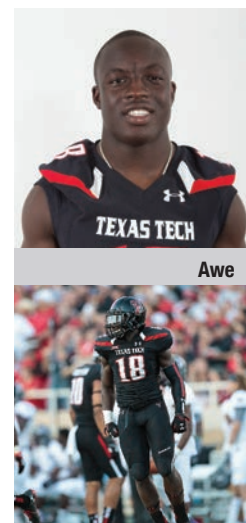
The Texas Tech student chapter of the Society of Petrophysicists and Well Log Analysts (SPWLA) has grown in size, with 29 members at the end of the Spring 2014 semester. This growth, which is three times its original membership count, was made possible by Halliburton, which sponsored the membership dues for students.

Awe Balances Football and Petroleum Engineering Studies

Micah Awe, an undergraduate petroleum engineering major, has been a linebacker for the Texas Tech Red Raider football team since 2012.

His father graduated from the University of Texas at Arlington, and his mother received a Master of Science in molecular microbiology from Texas Tech.

Awe played football at Mansfield Summit High School in Arlington, Texas where he was named to the All-State Second Team. His hobbies include producing football highlight videos, playing ping pong with friends and teammates, and watching the History and Science Channels. He is interested in the history of the Holocaust, Chinese imperialism, and the beginning of modern day science. He aspires to play in the NFL and then work in the petroleum industry, eventually owning his own oil company.



Awe

New Women's Group, "Ladies in Petroleum" Makes Impact on Female Petroleum Engineers



Hilary Carter (Oxy), Angela Watson, and Katelin Filip (Energen) present at the L.I.P. Event

A new, unofficial organization, Ladies in Petroleum (L.I.P.), was recently founded in the department by Angela Watson, the wife of department chair Dr. Marshall Watson. The group held its first annual event in October.

The organization was created to empower women in the historically male-dominated field of petroleum engineering. L.I.P. gives female junior and senior petroleum engineering students a perspective of what it is like to work in this type of industry and what to expect when joining the workforce.

This ladies-only event featured recent female alumni as inspiring speakers who shared their own experiences while working in the field and the office. The content of the presentations were topics that are generally not addressed in the classroom including: advice on interviewing, developing confidence, importance of communication skills, how to dress in the field and office, and many other issues. The format presented an opportunity for female students from the department to connect, share stories, ask questions, and even included lipstick door prizes.



Drs. Sunison and Andrews explain conglomerate deposits on the Arbuckle Mountains field trip.

Society of Petroleum Engineers Earns Gold Standard Award

The Texas Tech student chapter of the Society of Petroleum Engineers (SPE) has earned the Gold Standard Award for 2014 in recognition of its exceptional programs in industry engagement, operations and planning, community involvement, professional development and innovation. This is the third consecutive year that the chapter has been recognized with the Gold Standard Award by SPE.

SPE plans to expand their community service efforts this year and begin working with Habitat for Humanity and the local area food banks. The leadership within the organization aims to be as involved as possible — not only at Texas Tech — but in the community of Lubbock as well. Officers of SPE also attended several student organization fairs this summer to recruit new members and were able to give general advice to incoming and prospective students on what SPE has to offer. The organization is one of the largest on the Texas Tech campus, and remains extremely active in field trips, visiting with alumni and engineers, and building a passion for the discipline.

Health, Safety, and Environment Initiative Launched by SPE

The Texas Tech student chapter of the Society of Petroleum Engineers (SPE) has launched an initiative this year to promote Health, Safety, and Environment (HSE) awareness in the organization and the department. The organization's goal is to certify as many members as possible in HSE areas.

The effort began with a presentation by Roland Monreau, who recently retired from ExxonMobil as the Safety, Security, Health, and Environment Manager. He discussed many areas of safety including computer safety, vehicle safety, and job safety, and he placed an emphasis on an emerging topic, the Social License to Operate.

SPE is committed to this initiative and is also collaborating with the Red Cross and other oil and gas companies to provide CPR training, H₂S safety training, and Wild Well Control, along with other programs.

Faculty News

Heinze Recognized with SPE Regional Distinguished Achievement Award

Dr. Lloyd Heinze, a professor of petroleum engineering, was presented with the Society of Petroleum Engineers (SPE) Regional Distinguished Achievement Award for Petroleum Engineering Faculty at the SPE SW North American Regional Awards Banquet in Midland in May.

Bateman Named Honorary Member of SPWLA for Lifetime Service

Richard Bateman, an associate professor of practice, was awarded honored by the Society of Petrophysicists and Well Log Analysts (SPWLA) for lifetime service and achievements. He was named a Permanent Perpetual Honorary Member and received the award in June.

Research News

Soliman Initiates Patents, Edits New Journal on Hydraulic Fracturing

Dr. Mohamed Soliman, George P. Livermore Chair and professor of petroleum engineering, has, along with his graduate students, filed four patents on fracturing techniques, fracture placement optimization, vertical well placement optimization and optimization of multi-lateral wells.

Soliman has accepted the position of co-editor-in-chief of the Hydraulic Fracturing Journal (HFJ). This journal is a new magazine completely dedicated to publication of peer reviewed articles on hydraulic fracturing related issues. The magazine is released quarterly and the fourth issue is expected to be released in October.

Ettehadtavakkol and Watson Begin CO₂-EOR Performance Assessment

During the summer of 2014, Dr. Amin Ettehadtavakkol, an assistant professor of petroleum engineering, and Dr. Marshall Watson jointly defined a research project sponsored by the Apache Corporation. This project centers on CO₂ enhanced oil recovery (CO₂-EOR) performance assessment of Slaughter Field leases, namely Mallet, East Mallet, Woodley and W.A. Coons. The field-scale performance of the CO₂-EOR operations in these leases is modeled by using the production-injection history, well logs, and geological maps.

The objective is to provide a comprehensive model of the field connectivity and predict the oil production performance under various scenarios. In addition, the project provides recommendations to improve the CO₂-EOR performance, including infill and/or horizontal drilling, work-over and completions, profile modifications, stimulation, conformance control, and injector-producer conversions.

New Faculty Members

Dr. Amin Ettehadtavakkol

Dr. Amin Ettehadtavakkol joined the Bob L. Herd Department of Petroleum Engineering as an assistant professor in January. His main research interests include unconventional reservoir modeling, field-scale assessment of shale reservoirs, shale reservoir simulation and well test analysis, core-scale shale characterization, CO₂-EOR and sequestration, and field-scale modeling and design optimization. He previously worked as a postdoctoral fellow and reservoir engineer at the Bureau of Economic Geology.



Ettehadtavakkol

Ettehadtavakkol earned a Bachelor of Science in petroleum engineering and a Bachelor of Science in industrial engineering and systems analysis from the Sharif University of Technology in 2007. He earned a Master of Science in 2009 and Doctor of Philosophy in 2013, both in petroleum engineering, from the University of Texas at Austin.

Dr. Ekarit Panacharoensawad

Dr. Ekarit Panacharoensawad joined the Bob L. Herd Department of Petroleum Engineering as an assistant professor in July. Previously, Panacharoensawad was a postdoctoral research associate in The University of Tulsa paraffin deposition research group. He co-advised doctoral and master's level students on wax-related research topics. His research interests are in the fields of multiphase flow assurance, multiphase fluid flow and heat transfer, and high viscosity oil multiphase flow hydrodynamics.



Panacharoensawad

He earned a Bachelor of Science in physics from Chulalongkorn University in 2005, a Master of Science in petrochemical technology from The Petroleum and Petrochemical College at Chulalongkorn University in 2007, and a Doctor of Philosophy in petroleum engineering from The University of Tulsa in 2012.



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Keeping in Touch

The Texas Tech Bob L. Herd Department of Petroleum Engineering would like to know what is happening in your professional life. Visit the following website to update your information or let us know about your accomplishments: www.coe.ttu.edu/info

New Instructors

Dr. Hossein Emadibaladehi

Dr. Hossein Emadi joined the Bob L. Herd Department of Petroleum Engineering as an instructor in September. His main research interests include wellbore integrity, cementing and hydraulics in horizontal wells, and fracturing in unconventional reservoirs.

Emadi earned a Bachelor of Science in petroleum engineering from Petroleum University of Technology Ahwaz in 2003, a Master of Science in drilling engineering from Petroleum University of Technology Tehran in 2006, and a Doctor of Philosophy in petroleum engineering from Texas Tech in 2014.

He also worked as a drilling engineer in the office and on both offshore and onshore drilling rigs for five years. He worked in the cement and drilling fluid laboratory at the Research Institute of Petroleum Industry in Tehran, Iran as a researcher for six months.



Emadibaladehi

Dr. Talal Gamadi

Dr. Talal Gamadi has joined the Bob L. Herd Department of Petroleum Engineering as an instructor in September. He has had a passion for teaching since he was a graduate student. He previously worked as a teaching assistant and taught Introduction to Engineering, Math Fundamentals for Engineering, and Reservoir Simulation. He is also interested in developing and improving techniques to enhance oil recovery from conventional and unconventional reservoirs such as shale oil and gas reservoirs.

Gamadi earned a Bachelor of Science in petroleum engineering in 2004 from Sirt University in Libya. He worked as a field engineer for two years before finishing his graduate studies. In 2011, he earned a Master of Science in petroleum engineering from the University of Louisiana at Lafayette. In August 2014, He earned a Doctor of Philosophy in petroleum engineering from Texas Tech.



Gamadi