



**UT Permian Basin™**

**College of Engineering**

**College of Engineering**

**NEWSLETTER | SPRING 2020**



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# FALCON ENGINEERS ARE ANYTHING BUT AVERAGE

**100% OF UT PERMIAN BASIN STUDENTS PASS THE FUNDAMENTALS OF ENGINEERING EXAM – A RATE NEARLY 21% HIGHER THAN THE NATIONAL AVERAGE.**



# WELCOME FROM THE DEAN

Dear Colleagues and Friends,

I hope you and your family are doing well during this period of global crisis. Stay Safe! It is no secret that the COVID 19 pandemic has disrupted our normal way of life. The interruptions in education, socio-economic, and health care systems are apparent. The lack of personal protection equipment (PPE) in hospitals and clinics endangers our health care workers. I am very proud of our students and faculty efforts to address the shortage of PPE in our regional hospitals.

A few weeks ago, we joined the West Texas 3D COVID-19 Relief Consortium, a regional initiative that brought together academic institutions, organizations, businesses and individuals to innovate, design, develop, and provide personal protection equipment to our health care workers on the front lines of COVID-19 pandemic. We fabricated face shield

accessories and assembled hundreds of face shields. We also manufactured splitters for ventilator's to enable the use of a single ventilator in multiple patients. In partnerships with business, we designed and fabricated drive-through, and walk-up testing booth, which protects both nurses and patients for COVID-19 testing.

Another global crisis, and one of the grand challenges of the 21st century, is access to clean water. We will be launching a multi-disciplinary Water Institute with the goal of developing produced (oilfield) water quality database, testing and characterization of water, and development of energy-efficient and cost-effective technologies for water treatment. Our water lab funded through external grants is outfitted with advanced instrumentations such as scanning electron microscopy with energy dispersive spectroscopy and inductively coupled plasma-optical emission spectrometry to provide opportunity for students to engage in high-impact practices.

The high-impact practices of weaving research into teaching has resulted in several national recognitions. Our students were awarded 1st, 2nd, and 3rd places in the 2020 Permian Basin Water In Energy Conference Poster Competition. Seven mechanical engineering students that took the Fundamental of Engineering (FE) Exam in the first-half of 2019, passed the exam, giving the University a 100% pass rate. This put UT Permian Basin at 21% above the national average for graduates passing the FE exam. Additionally, US News & World Report ranked our Petroleum Engineering program as #1 for highest paid graduates in the nation.

Our faculty members are relentless in integrating hands-on experience and research into teaching to meet the needs of industry. We currently have \$3.1 million in externally funded projects to conduct cutting-edge research and to prepare students to address global challenges. We are one of 33 academic institutions in the nation that received competitive federally-funded grant money from the Nuclear Regulatory Commission to enhance recruitment and retention of students in the nuclear track, to help meet expected future workforce needs, and to provide support to economically disadvantaged students through scholarships, faculty and peer mentoring and socialization activities.

We have implemented several recruitment and retention initiatives to help in meeting our goal of 1000 students by 2025. Among these are the Semester Undergraduate Research in Engineering, Freshman Innovative Research program, Explore Engineering, XTO Energy Summer Engineering, First Tech Robotics Challenge, and the UT Permian Basin Engineering and Community College Partnership that creates a seamless pathway for co-enrollment at two institutions. These efforts have resulted in a 3.5% increase in enrollment.

Our new graduate degree program in the College of Engineering, Master of Science in Mechanical Engineering, is scheduled to start in Fall 2020, pending final approval by Texas Higher Education Coordinating Board. The program will offer advanced training in mechanical engineering through a curriculum that provides both depth and breadth to traditional students and practicing engineers.

We are very honored and excited about our new state-of-the-art Engineering building. All the engineering departments moved into the \$57 million building in fall 2019. This 105,000 sq. ft. facility is uniquely designed to accommodate student collaborative spaces, research and teaching labs, and design studios. We hope that these initiatives as well as others shared in this newsletter, will offer you reasons to be proud of the impact that we are making. Thank you for your support and friendship.

Sincerely,

George Nnanna, Ph.D., P.E. ASME Fellow  
Dean, College of Engineering



# RESEARCH

## MULTI-MILLION DOLLARS IN RESEARCH FUNDING

### High Performance Computing in the Deep Learning Arena | Dr. Mohsin M. Jamali, Electrical Engineering, \$500,000

This research explores avenues through which the computational aspect of Deep Learning can be sped up. There are two computational stages for Deep Learning; the first is learning or training the data and the second is algorithm computation. Because Deep Learning is inherently parallel in nature, computations can also be performed in parallel. The research into high performance computing in the deep learning Arena can be divided into three main categories. In the first category computational algorithm is parallelized, in the second the memory access time is shortened, while in the third word length is strategically reduced. Our High-Performance Computing Laboratory has acquired DGX workstation from NVIDIA for computation on GPUs and we are currently in the process of acquiring FPGA based development systems. This work is funded by The University of Texas System STARS program.

### Water Energy Research Institute | Dr. George Nnanna, Dean College of Engineering, \$500,000

Oil production usually results in co-production of large volumes of water, averaging 5 barrels of water per barrel of oil. Managing this produced water is challenging, particularly with recent emphasis on producing oil from unconventional tight low permeability plays. This project proposes a multi-disciplinary and multi-institutional Water Energy Nexus Institute to assess energy efficient approaches to treat produced water, and generate water for re-use/recycling in hydraulic fracturing, and for agricultural and municipal use. The objectives are to develop: (1) novel approaches to treat, reuse, and recycle produced water by harvesting solar and wind energy to partially drive the treatment process; (2) treatment techniques for immobilized activated carbon-membrane-enabled solar evaporation; (3) multifunctional heterogeneous nanomaterials immobilized on membranes substrates to absorb pollutants such as total dissolved solids, salts, microbes; and (4) nano-photocatalyst for advanced oxidation/reduction processes. Initial funding for this project was from The University of Texas System STARS Program and support from the industry.

### Carbon Dioxide Life Cycle from Well to Wheel | Dr. Sepehr Arbabi, Chemical Engineering, \$300,000

Carbon dioxide (CO<sub>2</sub>) is a major component of Green House Gas (GHG) produced by power plants and oil/gas operations. The utilization of CO<sub>2</sub> as an Enhanced Oil Recovery (EOR) agent in storage, sequestration and production during hydraulic fracturing and shale plays affects global economics and environment. This project proposes to study various technical issues related to CO<sub>2</sub> in this lifecycle. The general objectives are: (1) to improve current understanding of the feasibility of CO<sub>2</sub>-EOR in production from Permian Basin including Residual Oil Zones (ROZ); (2) develop practical models for associated storage and sequestration of CO<sub>2</sub>; (3) propose novel ways to reuse CO<sub>2</sub> emission for CO<sub>2</sub>-EOR technology to reduce environmental footprint of GHG. Initial funding of this project was from The University of Texas System STARS Program.

### Integrated Research and Education Developmental Activities for the Mechanical Engineering-Nuclear Track Students and Faculty at UTPB, PI | Essam A. Ibrahim, Ph.D., P.E., Co-PI: Forrest W. Flocker, Ph.D., P.E., Co-PI: Ramiro H. Bravo, Ph.D., P.E., Co-PI: Luis Trueba, Jr., Ph.D.

The proposed project is aimed at enhancing recruitment, retention, and preparation of the mechanical engineering-nuclear track students and faculty at UTPB through multi-faceted research and educational developmental activities in areas relevant to Nuclear Regulatory Commission (NRC) mission. The research training component of the project will be accomplished by involving undergraduate students in the research activities of the faculty investigators. This research endeavor will contribute to augmenting students' technical reading comprehension and communication skills, in addition to enriching students learning experience and appreciation of scientific knowledge. As a result, students will be more poised to pursue and succeed in challenging careers and advanced studies. A myriad of proven instructional methodologies will be implemented to improve students' comprehension and grasp of course subject matter. The pedagogical approaches will focus on aspects of critical thinking, collaborative, and inductive learning. The main goals of the proposed research and educational efforts are to widen the pool of graduates from underrepresented groups who are qualified to assume positions in nuclear industry, support faculty development to achieve academic excellence and research competency, and to disseminate knowledge.



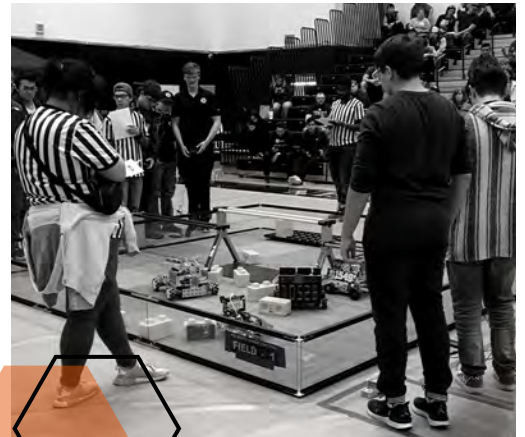
# STUDENT INVOLVEMENT

## EXPLORE ENGINEERING WITH HIGH SCHOOL STUDENTS

The University of Texas Permian Basin College of Engineering has partnered with local high schools to bring engineering to high school students through an Explore Engineering Event. For this event we invite the students who are interested in engineering, to come and tour the new Engineering Building at our Midland campus. The students will have an opportunity to speak with professors from each department and even hear a few words from our Dean Dr. George Nnanna. The College of Engineering also does school visits, with professors and current engineering students and Engineering Ambassadors come out to the high school classroom to give a presentation.

## COLLEGE OF ENGINEERING HOSTS 2ND ANNUAL ROBOTICS COMPETITION

The College of Engineering organized the second annual Tech Challenge regional championship on February 1st, 2020 at the UT Permian Basin Gym Building. This student-centered championship program was aimed at testing the autonomous and operated robots designed by students in grades 7-12. The robots were tested and evaluated in the following categories: design, build, program, and test. A total of 28 teams from Midland, Odessa and surrounding communities competed at the championship. Each team had about 6 students. The event was fast-paced and exciting, and offered opportunities to design and build real-world engineering systems, connect theory with practice, engaged in experiential learning, and network with other teams and industry.



## WATER IN ENERGY CONFERENCE 2020

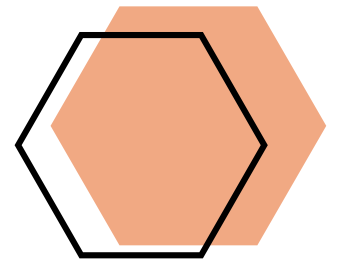
The 3rd Annual Permian Basin Water in Energy Conference took place with more than 600 people attending over the 3 day conference this year. The conference draws its attendees from around the world and "During this conference, UT Permian Basin is proud to partner with experts and leaders who are willing to share what they've learned as we all discuss 'what's next' for water in energy. Our plan at UT Permian Basin is to be responsive to the needs of our community and have a significant impact. This water conference is a great example of that commitment," University of Texas Permian Basin President, Dr. Sandra Woodley said. The conference also held its annual undergraduate student competition where UT Permian Basin students received 1st, 2nd, and 3rd place.





# SCHOLARSHIP OPPORTUNITIES

- Ortloff Engineers Ltd
- The Giovanni Castelazo Scholarship
- QEP Education Foundation Petroleum Engineering Scholarship
- Partners Scholarship/Pickering
- PBIOS Scholarship - Engineering
- ConocoPhillips Scholarship
- Robert L. Jackson, Jr. Memorial Scholarship
- RL Hamm, Jr. Memorial Book Scholarship for Petroleum Engineering
- Chevron Legacy Scholarship
- Buddy West Memorial Endowed Scholarship
- Jack D. Ladd Memorial Endowment
- API Sour Crude Endowed Scholarship
- Green Family Endowed Scholarship
- SPEE Jack Ladd Memorial Scholarship in Petroleum Engineering
- Women Energy Network Scholarship
- Permian Basin Association of Pipeliners (PBAP)



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## SCHOLARSHIP AWARDS

### STUDENTS EARN OVER \$105,086.74 IN SCHOLARSHIPS

The UT Permian Basin College of Engineering awarded \$105,086.74 in scholarships to 51 engineering students for the spring 2020 semester. With 17 different scholarships that were funded by private donors, individuals, corporations, and foundations. A new scholarship this year was the Permian Basin Association of Pipeliners (PBAP) Scholarship that PBAP started with \$10,000.

The Permian Basin International Oil Show Scholarship helps to educate the workforce needed to drive the Permian Basin economy. Furthermore, it is one of the ways PBIOS is giving back to the community. The QEP Scholarship helps to educate the next generation of energy professionals. It offers financial support to eligible engineering students in energy-related fields. QEP is committed to creating partnerships that have a positive and meaningful impact to communities. Both the PBIOS and QEP scholarships will help to lessen the financial stress on students and the burden on parents to pay for their education. With this scholarship, students may be able to focus more on their studies to achieve scholastic excellence instead of juggling between work and school.



# STUDENT PROFILES

## CHEMICAL ENGINEERING



### STEPHANIE SILVA

Stephanie Silva has been attending The University of Texas Permian Basin since the Fall of 2016. Currently, she is a senior majoring in Chemical Engineering with a Petroleum Geology minor. She has had the privilege of not only seeing the UTPB Engineering department grow as a whole, but also witnessing and experiencing the creation of the Chemical Engineering department. She, along with her classmates, moved from the small classrooms in the Industrial Technology Building, to the larger classrooms at the CEED building, to now the spectacular Engineering Building. She is certain that we will continue to see the Engineering Department flourish. As a fourth year student, she spends most of her time studying. The abundant study rooms, coffee station, dedicated professors, and countless computers make studying on campus effortless. Thanks to the UTPB Internship Seminar, she was given the opportunity to work for a company as a Chemical Engineering Intern. This opportunity has given her invaluable industrial experience, while still allowing her to study full time. Aside from this, she is also involved in the Engineering Department as the Treasurer of the Tau Beta Pi Engineering Honor Society at UTPB.

"Without a doubt, choosing The University of Texas Permian Basin has been one of the best decisions I have ever made."

## ELECTRICAL ENGINEERING



### ENRIQUE MACO

Enrique Maco was born in Lima, Peru, but he grew up in Atlanta, Georgia, and has lived in Odessa for the last 10 years. Enrique is the oldest child of three and transferred to The University of Texas Permian Basin from Odessa College, where he completed most of his general education/ associate arts level classes.

He chose to pursue a bachelor's degree in electrical engineering at UTPB because of his great interest in science and technology. "Since I was a little boy; I was always very curious on how things and machines work and my curiosity and interest have grown over the years. In our daily lives, we are immersed in a world of computer, apps, mobile devices, hybrid and electric cars and equipment, cellular and satellite communication networks, autonomous and automated systems, renewable energy generation and distribution and the internet. For example, just to specifically point to the most famous these days: the upcoming 5G network. Without any doubt the world is changing thanks to these evolving technologies in the electrical field. Many new jobs will be available for people who are qualified in these evolving and new technologies, and I want to be part of this bright upcoming future."



# STUDENT PROFILES

## MECHANICAL ENGINEERING



### HUNTER BISHOP

Hunter Bishop is a mechanical engineering senior at The University of Texas Permian Basin. Hunter has been a student athlete all four years. She comes from Austin, TX and chose UTPB because of the swim and dive program as well as a great engineering program. She says that juggling both swim and school is a challenge but is setting herself up for the real world. Being able to get an education in a new engineering building excites her with all the new technology and advancements moving forward in her career. Hunter will be the first female on the UTPB swim and dive team to graduate as an engineer after 4 years. She is a student worker at the new engineering building helping with everything she can and showing her smiling face to everyone who walks through the door. She is very active in volunteering for both the school and community. She will be graduating in May 2020.

## PETROLEUM ENGINEERING



### GELILA KASSAYE

Gelila joined The University of Texas Permian Basin as a transfer student in Fall 2018. She is a senior studying Petroleum Engineering. Beyond its affordability, its location in the middle of the oil boom is what convinced her to transfer here. Growing up math and physics were her two favorite classes. She enjoys the process of finding solutions and from a young age knew she wanted to major in Engineering. UTPB has helped her surpass all of her educational expectations and encourages her to strive for more. The Professors' enthusiasm for teaching the classes as well as their willingness to go above and beyond to assist students leaves no doubt in her mind that she chose the right school and major. UTPB's location in the hub of the oil boom has allowed for her and her classmates to have a more practical educational experience. She is currently involved in a research program led by the Dean of Engineering, Dr. Nnanna. The research is mainly focused on characterizing produced and flow back water using various techniques (SEM EDS, ICP-OES, IC, TOC etc).



# ALUMNI PROFILES

## RACHEL HARRIS



### **Engineering Graduate Receives Air Force Scholarship, Credits UTPB for her Success**

"Engineering is not for everyone but the engineering program here at UTPB is absolutely solid," said Rachel Harris, UT Permian Basin alumnus. Rachel Harris graduated with a degree in Mechanical Engineering from The University of Texas Permian Basin in 2016.

"The instructors we have here are extremely professional. They are just top notch." For Rachel, going into the engineering program was not originally in her cards. She transferred to UT Permian Basin from Midland College, taking every math class they had to offer. "I guess I fell in love with how Dr. Flocker spun engineering. It was applicable. It was relevant. It was something that I could use all of the math that I learned and just apply it to the engineering program."

Rachel is currently working on a PhD in mathematics. But it's her UTPB degree that's helped her solidify her future in the Air Force. "I got into a program called SMART, Science for Mathematics and Research Transformation. It's a program that funds your graduate years and then you commit to working the same amount of years. When they looked at my degree and my resume they thought the mathematics were great but there are a lot of candidates that have mathematics but my engineering background really drew them in."

It's easy to see why Rachel is a big advocate for UT Permian Basin. She said this University prepared her for a graduate degree and her career. Most of which she credits to the relationships she built with her professors and fellow classmates.

"The small class sizes like the classes here at UTPB and that connection with the instructors was so pivotal to how I grew. At a larger university you're really missing out on that connection with your instructor, or your class members. The fact that you can take two lectures and watch everyone give a presentation, that's something that you don't get everywhere."

The UT Permian Basin College of Engineering is truly a place where opportunity meets excellence and the success our graduates have is all the proof you need. "The quality of UTPB program is just exceptional. It's like a diamond in the middle of the desert."



By Alexa Dunson, Communications Manager





## NOLAN HINES



### **Engineering Fall 2019 Senior Reflects on time spent at UT Permian Basin ahead of Graduation**

Hines said after his time at UT Permian Basin, he feels confident to go into the workforce and become a successful engineer.

For Senior Nolan Hines choosing UT Permian Basin was a no-brainer. "I looked at several schools in the state but UTPB offered swimming, engineering and very competitive tuition prices."

Nolan has taken full advantage of his time at UTPB. Spending four years on the Men's Swimming and Diving team and entering into the engineering program. "Being student athlete really gave me a family to be a part of and to get involved with the community" Most students in college aren't sure what path to take but that wasn't the case for Nolan.

He knew early on, what the future would hold. "When I was 16 I overhauled my dad's old truck. I took out the engine, stripped it down, re-boarded all of the cylinders and put it back together and that's the truck I drive today. That whole process really opened my eyes. I wanted to know how it all worked. That was my defining moment when I knew I wanted to be an engineer."

That moment is part of what brought Nolan to the Permian as in. He's getting to spend his last semester as a Falcon in the brand new Engineering Building. It's an opportunity Nolan said he's taking full advantage of.

"When I heard the announcement for the building I was so excited. I am so grateful for this semester that I get to spend in it because it just shows how UTPB is growing and engineering is just flourishing in this part of the state." More importantly than the new, shiny building Nolan is passionate about UTPB and the quality education he has received.

"I think every one of my professors knows me by my first name. I can go and have conversations with any of them whether it's about school or not. I've developed really good relationships with these professors. I call them friends and I plan on keeping in touch with them after I graduate. I want to give back to the University in the future as well." Nolan said he feels ready to enter the workforce with his University of Texas Permian Basin Mechanical Engineering degree in hand. And hopefully, one day down the line, he will land his dream job: owning his own company in the energy industry.

"I feel really Confident coming out of UTPB as an engineer. One of the things that was highlighted recently was the 100% pass rate on the Fundamentals of Engineering exam. That's incredible! All of the students that took the exam, I know them. I'm no different from them. I'm getting the same curriculum and learning from the same professors. That makes me feel confident to go take that exam, enter into the workforce and become an actual engineer."



By Alexa Dunson, Communications Manager

# LATEST NEWS

## Colleges of Engineering gets involved to address shortage in protection and ventilation equipment due to COVID 19.

One of the ways that the College of Engineering can help our community during this period is to use 3D printing to produce Personal Protection Equipment and replacement parts for ventilators. Possible products include: face masks, N95 filtration masks, and ventilator parts (potentially for different ventilators).

The whole process from start to finish takes about 6 hours according to Jim McPherson who is the laboratory technician working with the 3D printer. The Process starts with 3 hours and 47 mins in the 3D printer to create the masks followed by a 2 hour bath in sodium hydroxide.



## Congratulations to Dean Dr. Nnanna



George Nnanna was named American Society of Mechanical Engineers (ASME) Fellow. Designation as an ASME Fellow recognizes “exceptional engineering achievements and contributions to the engineering profession.” The title of Fellow has been awarded to only about two percent of over 130,000 ASME members.

# LATEST NEWS

## UT PERMIAN BASIN ENGINEERING GRADUATES ACHIEVE 100% PASS RATE ON FE EXAM

The University of Texas Permian Basin College of Engineering is proud to announce the success of our graduates. The University has just achieved a 100% pass rate for the Fundamental of Engineering Exam (FE).

FE is one of two exams that engineers must pass in order to become a licensed professional engineer in the United States. The 100% pass rate is 21% higher than the national average

The exam, administered by the National Council of Examiners for Engineering and Surveying, covers fifteen different subjects. Students have 6 hours to complete the test, which consists of 110 questions. The results prove that the UT Permian Basin College of Engineering provides a superior quality education with dedicated faculty members who successfully educate future engineers.

In addition to the success rate of our graduates, US News and World report has ranked UT Permian Basin as #1 in the nation for the highest-paid petroleum engineering graduates.

By Alexa Dunson, Communications Manager



## PROGRAMS THAT LEAD TO THE HIGHEST STARTING SALARIES

10 Colleges With Highest-Paid Petroleum Engineering Grad Four of these 10 schools are in Texas, a state that dominates crude oil production in the U.S

College graduates with a specialty in engineering are in high demand. Those who study petroleum engineering are especially sought after and can expect to be well compensated. For students interested in pursuing this field of study, here are the colleges where petroleum engineering graduates earn the most. Earnings were calculated based on PayScale data, which lists the median starting salary for alumni of these programs with three years of postgraduation work experience and whose highest degree is a bachelor's.

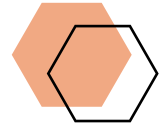
1. University of Texas of the Permian Basin: \$119,500
2. University of Wyoming: \$111,500
3. Texas A&M University—College Station: \$110,200
4. University of Texas—Austin: \$109,600
5. Texas Tech University: \$108,800
6. University of North Dakota: \$108,700
7. Colorado School of Mines: \$107,000
8. University of Alaska—Fairbanks: \$107,000
9. Marietta College: \$105,100
10. University of Tulsa: \$100,100

- University of Texas of the Permian Basin.
- U.S. News rank: 88 (tie), Regional Universities (West)
- Median starting salary of alumni who majored in petroleum engineering: \$119,500
- Median starting salary of alumni who majored in engineering: \$84,440
- 2018-2019 tuition and fees: \$7,124 (in-state), \$8,274 (out-of-state).



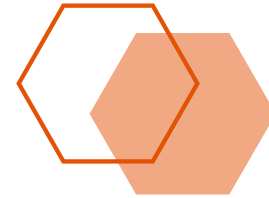
By Delece Smith-Barrow and Josh Moody

# LATEST NEWS



## WATER LECTURE SERIES

The UT Permian Basin Water Lecture Series. The purpose of the Lecture Series is to: A) create a learning environment where industry, academia, and government agencies can network, discuss the state-of-the-art treatment technologies, challenges and opportunities with current oilfield water management strategies; and B) educate, engage, and broaden community participation on the techno-socio-economic and environmental benefits of reusing and recycling oilfield water.



### JOSHUA A. ADLER

#### FOUNDING CHIEF EXECUTIVE | SOURCEWATER

Sourcewater gathers data from the Sourcewater.com water marketplace, proprietary satellite imagery analytics, government databases, outbound market research, and IoT sensors in the field to create the industry's only current, holistic view of oilfield water sourcing, logistics, and disposal markets, showing where every drop of oilfield water comes from and goes to in the Permian Basin and other key regions.

Sourcewater was founded as a spinout from MIT's Energy Ventures program in 2014. Today over 1,000 companies and over 1 billion barrels of water, recycling and disposal capacity are active on Sourcewater.com. Sourcewater recently acquired the assets of Digital H2O from Genscape, bringing even more oilfield water data analytics and visualization to its platform.

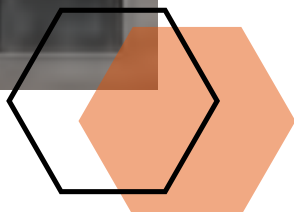


### DUANE GERMENIS

#### DIRECTOR OF BUSINESS DEVELOPMENT VEOLIA WATER TECHNOLOGIES

With the evolution of hydraulic fracturing in the Oil and Gas business over the last several years, there has become an increasing awareness of the potential uses for the produced water that comes with the increased flow of oil and gas production. No longer is produced water looked at as just a waste stream for deep well disposal.

In order to treat the produced water effectively, this presentation will look at a few standard technologies currently used today as well as novel new technologies emerging in the market. Discharge technologies as well as recycle/reuse technologies will be explored. The presentation will address produced water treatment systems developed by service companies, research organizations, universities, and start-up businesses.



# LATEST NEWS

## WATER LECTURE SERIES



**BRIDGET SCANLON PH.D.**

**SENIOR RESEARCH SCIENTIST, BUREAU OF ECONOMIC GEOLOGY, JACKSON SCHOOL OF GEOSCIENCES, THE UNIVERSITY OF TEXAS AT AUSTIN**

Unconventional oil and gas production plays an increasingly important role in U.S. production, accounting for 60% of oil and 70% of gas production in the U.S. in 2018. However, there are increasing concerns about adverse environmental impacts related to water management, including water depletion, induced seismicity, and water contamination.

Results show that water use for hydraulic fracturing is highest in the Permian Basin because of the much larger number of wells drilled and high water use per length of well lateral. Hydraulic fracturing water use increased by 10 times in the Permian Basin since 2011. Outlooks, considering varying oil and gas prices, show that water demand in the Permian and Marcellus will reach a maximum in the early 2030 and remain high for decades.

## PARTNERSHIP WITH LOCAL COMMUNITY COLLEGE

UT Permian and Midland College continue to strengthen a partnership that creates clear pathways for students to earn their degrees.

Midland College and UT Permian Basin have created an innovative and dynamic partnership to make a seamless transition for engineering students. While enrolled at Midland College, students can begin coursework at UT Permian Basin. Students who wish transfer from MC to UT Permian Basin would get guaranteed admission to the University and can receive up to \$2,500 in scholarships. They would also have the opportunity to take one engineering course per year at UT Permian Basin.

"This partnership comes at the perfect time. Because engineers are in such high demand in our thriving economy, we must provide opportunities to earn a bachelor's degree quickly and fill critical workforce gaps. Working closely with Midland College on this pathway, and many others, supports the next generation of professionals in this region and beyond," said UT Permian Basin president Dr. Sandra Woodley.

"Engineering is a critically important program to the community of Midland and to the mission of Midland College," said Dr. Steve Thomas, president of Midland College. "The collaboration between Midland College and UTPB will empower students interested in pursuing an engineering degree to develop the knowledge and skills to thrive in an evolving energy field. At a time when many families in our community worry about the cost of college, this new partnership will provide students a high quality, cost effective educational opportunity."

The partnership was announced inside the new UT Permian Basin Engineering Building that is set to open to students in the fall 2019.

By Tatum Guinn - Communications Manager

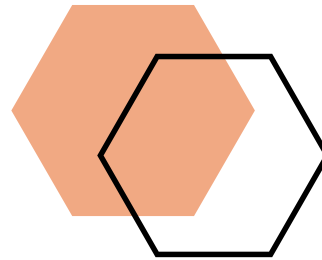


# NEW FACULTY MEMBERS



**DR. OMAR BEG**

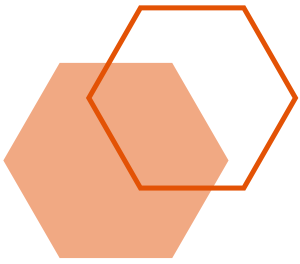
Dr. Omar Ali Beg is an Assistant Professor in the Department of Electrical Engineering at the College of Engineering. Previously, he was with the University of Texas at Arlington as an Assistant Professor of Research where he worked on projects funded by the Office of Naval Research. He earned his Ph.D. degree in electrical engineering from the same school. His research interests include formal verification, cyber-attack detection, and resilience in cyber-physical power systems using formal methods and artificial intelligence. He was a recipient of the U.S. Air Force Research Laboratory Summer Research Fellowship in 2015. He is also the recipient of the Rising STARS (Science and Technology Acquisition and Retention) grant by the UT System. This STARS grant will help establish a research laboratory at UT Permian Basin to promote research and education on smart grids and resilient cyber-physical microgrids.



**DR. RAJIB MUKHERJEE**

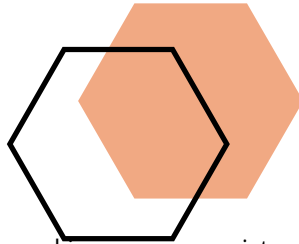
Dr. Mukherjee is an Assistant Professor in the Department of Chemical Engineering. He holds the Dean's Faculty Fellowship (DFF). He received a \$300,000 grant from the UT System STARS Program for developing water-energy nexus laboratory and high-performance computing laboratory for process systems engineering. Rajib Mukherjee earned Bachelor of Technology from Andhra University College of Engineering, India and Master of Technology from Indian Institute of Technology Kanpur (IITK), both in Chemical Engineering. He holds a Ph.D. in Chemical Engineering, graduated from the Process Systems Engineering Laboratory at Louisiana State University (2010). He conducted postdoctoral research at Tulane University, Center for Computational Science, United States Environmental Protection Agency (US EPA) as an ORISE postdoctoral fellow, University of Illinois Chicago/Vishwamitra Research Institute as a Research Engineer and visiting assistant professor at the department of Mechanical Engineering, Texas A&M University (TAMU).

# NEW FACULTY MEMBERS



DR. BIBIAN OGBUJI

Dr. Bibian Ogbuji is a postdoctoral researcher at the Water-Energy Nexus Institute in the College of Engineering at The University of Texas Permian Basin. The emphasis of her research is on development of database, and application of data analytics and machine learning to predict the spatiotemporal variability of contaminants in oilfield water otherwise referred to as produced water. These predictive analytic models will enable development of treatment technologies for produced water. Dr. Ogbuji areas of expertise includes machine learning, data analytics, programming, big data, platform implementation evaluation, digital strategy, database development, data processing, and visualization. She holds a Ph.D in Computer Science from Brunel University London and M.Sc. in Strategic Information Technology Management from London South Bank University both in the United Kingdom. Dr. Ogbuji has over 8 Years of professional experience in teaching, research, and industry. She has conducted an extensive scholarly work on social media strategy (SMS) and developed SMS framework using Practice theory to provide insights into the platform evaluation process. This work resulted in a book and conference proceedings publications.



DR. MD SALAH UDDIN

Dr. Md Salah Uddin is currently working as an assistant professor in the Department of Mechanical Engineering. He received his Ph.D. in Mechanical and Energy Engineering from the University of North Texas, Denton, Texas in 2016. Dr. Uddin received his Bachelor's in Mechanical Engineering from Bangladesh University of Engineering and Technology (BUET) in 2011. Dr. Md Salah Uddin worked as a visiting assistant professor in the Department of Mechanical Engineering at the Georgia Southern University and as a computer-aided designer for Kuba-Tech Industries. His research interest includes computational materials science, multiscale modeling, molecular dynamics simulations, drug delivery sustainable energy, computer-integrated manufacturing design, (computer numerical control-CNC and 3D printing), mechanical design, and mechanics of cellular solids. He bridged the gap between a nanoscale model with molecular dynamics and a continuum model of polymeric materials and predicted mechanical, viscoelastic, thermal, and shape memory properties. Dr. Uddin has experience in processing polymers/composites and their characterization for mechanical and thermal properties. He has different sort of industrial experiences in multiple sectors such as steel, packaging, polymer and wood industries.



# DONOR IMPACT

## XTO Energy Partnership to Inspire Future Engineers

Students will learn all things STEM during the summer program. The University of Texas Permian Basin and XTO Energy are working to catch the attention of future engineers at an earlier age.

With the support of XTO, UT Permian Basin's College of Engineering will host an engineering summer program. The camp is split into two sessions, one for middle school students and the other for high school students.

"It's important to us to inspire young minds to think big when it comes to their future," UT Permian Basin President Sandra Woodley said. "This partnership is education and energy uniting to support students and the future success of the region."

"XTO is committed to supporting K-12 and higher education initiatives," said Courtney Wardlaw, XTO Energy Public & Government Affairs Advisor. "This summer program at UT Permian Basin allows us to ensure that the next generation of engineers is ready to continue the momentum the Permian is experiencing right now".

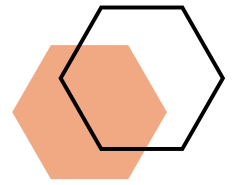
Students will learn all things STEM – from computer design and building robots, to getting a taste of what it's like to be an engineer in any field. "There are opportunities for students to take classes and learn concepts that can be applied to chemical, electrical, mechanical and petroleum engineering," Dr. George Nnanna, the dean of The College of Engineering said.

By Tatum Guinn





## PERMIAN BASIN WATER IN ENERGY CONFERENCE INVESTS IN UTPB



The PBWIEC Advisory Board has gifted the University a generous \$100,000.

The Permian Basin Water in Energy Conference has made a significant investment in The University of Texas Permian Basin after its second annual conference. The PBWIEC Advisory Board has gifted the University a generous \$100,000 to be used to further the University's mission.

"We are thankful for the support of the Permian Basin Water in Energy Conference," President Dr. Sandra Woodley said. "We at UT Permian Basin understand the value of water in our region and the importance of preserving and protecting it. This conference helps our professors and students not only present their energy research, but it exposes them all to the latest technologies for the future of water exploration and its usage across all facets of the energy industry."

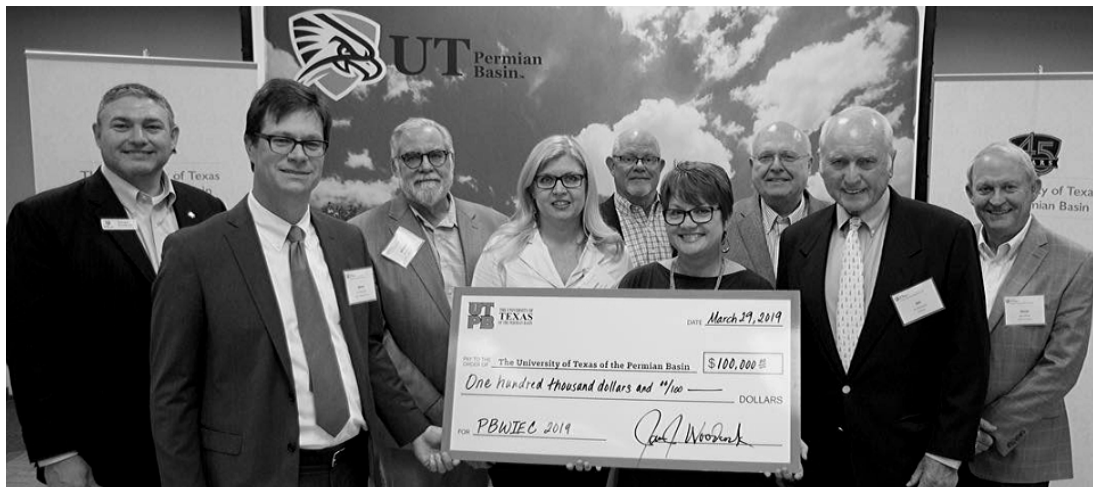
This year's PBWIEC, which was co-sponsored by UT Permian Basin and its Business Advisory Board, featured experts from across the country representing all aspects of the oil and gas industry, from land owners to seismologists, to speakers from the legal and regulatory side for both New Mexico and Texas.

PBWIEC's Year Two speakers included more than 44 business leaders, landowners, oilfield operators, policymakers, researchers and academic leaders discussing best-practices, issues and solutions that support water usage and conservation in the energy industry to PBWIEC's over 500 registered attendees.

"This conference is important because it is a collaborative academic and industry-related event that looks at real and potential water in energy impacts and considers future solutions regarding how to best conserve, use and manage our precious and finite water resources, Jonna Smoot, PBWIEC – Event Chair said. "Having a well-planned approach to information flowing from UTPB to industry and the community at-large on critical and timely topics, like water in energy, was PBWIEC's main goal. Our almost all volunteer led organization is proud to partner with UT Permian Basin on this annual conference and we are looking forward to an even better Year Three Conference in 2020."

"The idea of starting this kind of conference flowed from the UT Permian Basin Business Advisory Board who felt they needed to be and could be more involved with discussing and solving current and pressing Permian Basin issues. The need for water in the oil and gas industry is huge and the impacts of our usage will be felt for years to come if we do not begin to understand and better manage this resource," said Jim Woodcock, one of PBWIEC's founding board members and Conference Chair. "Just look at the number of wells that are slated to be drilled here. With so much of the world's oil drilling activity occurring in the Permian Basin, we couldn't sit by and not begin exploring ways to find solutions regarding how to best use and manage water in energy for the future of Texas and our nation."

The 3rd annual Permian Basin Water in Energy Conference is scheduled for February 18-21, 2020 at the Midland Horseshoe Complex



By Tatum Guinn



# ENGINEERING ADVISORY BOARD

## SPOTLIGHT

### 46 Advisory Board Members STRONG - from local Industry and Partners

Pioneer Natural Resources; Henry Resources; SwiftWater Energy Services; Legacy Reserves; Dickson Process Systems; Independent Engineer; Summit Engineering Services; Rex-Tac LLC; Surge Energy; O'Ryan Oil and Gas; Oncor; XTO Energy Inc.; TSPE; Crown Quest Operating; Saulsbury Industries; Laredo Petroleum; Waid Environmental; Anadarko Petroleum Corp; H2O Midstream; Petro Growth; Westech Seal, Inc; Orloff Engineers Ltd.; URENCO, USA; Newman cubed; Conoco-Phillips; Nicholas Consulting Group, Inc; Southwest Machine Products; Hy-Bon; Halliburton; Air Compressor Solutions; Trey Resources; Permian Basin Petroleum Assn.; Sivals, Inc; Slater Controls Inc; Diamondback Energy; Cudd Pumping Services; Chevron; Parsley Energy; SCAL, Inc.; SPE - Bill Webb Inc.; Schlumberger (Software); Williamson Petroleum Consultants.

The Engineering Advisory Board is the primary connection between the University and industry. The board has All-Board Meetings in the fall and spring. There are three subcommittees:

#### 1. Education and Workforce Development Initiatives (EWDI)

The purpose of the EWDI Subcommittee is to promote experiential learning through internships, design competitions, and support K-12 outreach activities. Roles include promoting and linking students to internship opportunities, and serving as mentors to students. Students would begin professional development by applying what they learn in the classroom to real world activities.

#### 2. Strategic Research Initiatives (SRI)

The SRI Subcommittee will have two goals. The first is to work with industry partners to identify projects for the Senior Design class. This would include arranging industry speakers and serving as mentors on projects. The second goal is to work with industry to identify research opportunities. This would include surveys on research needs, serving as an industry advisor on projects, and other collaboration. This will be of particular importance with the creation of engineering graduate programs.

#### 3. Strategic Finance Initiatives (SFI)

The SFI Subcommittee will work with the Engineering Department to identify program needs such as building and space naming, purchase of laboratory equipment, and establishing a machine shop. The SFI would also be involved in fundraising in coordination with the University's Advancement Office for endowments, scholarships, and other department needs.

