



TEXAS TECH UNIVERSITY

Department of Chemical Engineering



Chair's Message

Dear Colleagues, Alumni, and Friends,

Warm regards from the Chemical Engineering Department at Texas Tech University. This past year has been a difficult time for all of us, but I am encouraged by the resilience and determination of our faculty, students, and staff. We continued with our commitment to excellence in education as classes moved to alternative modalities (online, hybrid, and face to face) and graduated our largest class in the history of the department this past spring semester, 103 undergraduate students. Now more than ever, we are learning how impactful the Red Raider community is to our success. Our path for excellence in engineering, discovery, and innovation is stronger every day. This year we continued our record in undergraduate students' graduation, had records in PhD student's enrollment, our faculty received significant research awards from multiple funding agencies, and continued making an impact in research and innovation. Enjoy the newsletter for our exciting news, including the following achievements:

- Welcome new faculty in our Department (Dr. Jay Lu, Assistant Professor).
- Doubled our number of research awards.
- Established record enrollments for our graduate and undergraduate students.
- Kept pride of our experimental learning approach while maintaining safety for our students, faculty, and staff.
- Contributed to state-of-the-art research and service to the community to help fight the COVID-19 pandemic.
- The \$1.2 M Morrow Energy Pilot Plant is now operational with experiments currently being run.
- Texas Tech AIChE Student chapter was awarded the 2019-2020 Outstanding Student Chapter Award.
- Undergraduate and graduate students received recognition for their excellence, including undergraduate students Elizabeth Antohi who received the AIChE 2019-2020 Donald F. Othmer Sophomore Academic Excellence Award, Andrew Gregory who received the AIChE 2019-2020 Freshman Recognition Award, and Ph.D. student Sheik Tanveer recognized by the AIChE Journal for his paper contribution.
- One Hundred Three B.S. students graduated in May 2020! Kudos to these new alumni!
- Record of 88 PhD students enrolled in our department.
- Our faculty received grants from multiple agencies such as the National Science Foundation National Institute of Health, US Department of Energy, National Aeronautics and Space Administration, AIChE RAPID, among others.
- Faculty were recognized by several awards including Fellow of the Society of Rheology (Dr. McKenna), TechConnect Innovation Award (Dr. Botte), and several internal teaching and research awards (Drs. Marston and Vanapalli).
- Our department continues to grow, we have multiple faculty positions available at all levels.

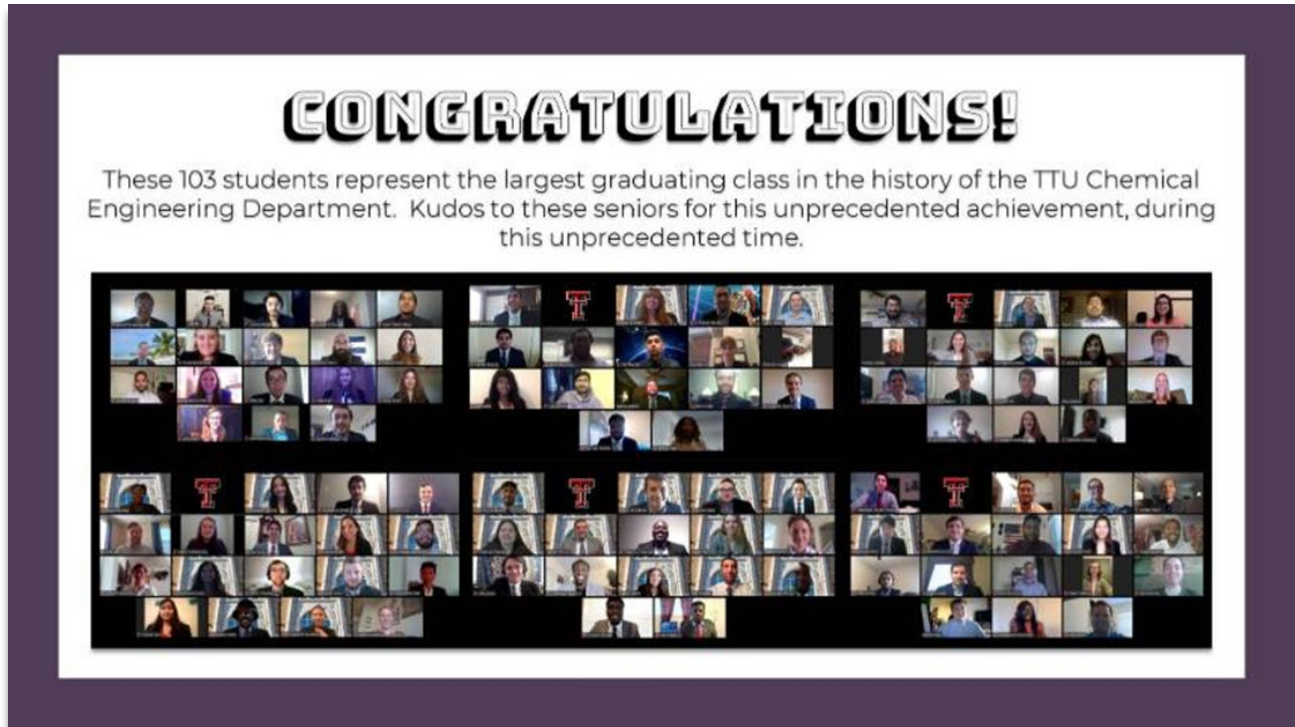
Dr. Gerri Botte,

Professor and Whitacre Department Chair

Student's News

Spring Graduation

One hundred three B.S. students graduated in May 2020, a record high for the department! Kudos to these new alumni!



In the year 2020, we established a new tradition for our graduates, the Red Raider Hard Hat Ceremony (R2H2). Graduates receive a TTU Chemical Engineering Hard Hat to take with them on their journey through their career and future educational endeavors. With this gift, students will always remember where it all started, and the virtues instilled in them by being a part of this community.





During the Senior Celebration organized by the Department, Rene Wickham Wade (a ChE Alumna) was honored as the guest speaker. Rene graduated in 1983 with her B.S. in Chemical Engineering from TTU. After graduation, Rene has gone on to have a long and successful career working at prestigious companies such as 3M, Mary Kay, and Lululemon Athletica.

Texas Tech AIChE Student Chapter
Congratulations to the TTU AIChE Student Chapter for being selected as the Outstanding Student Chapter for the 2019-2020 year. This student chapter was also selected to receive this award last year!



Elizabeth Antohi
Class of 2022

Elizabeth was awarded the AIChE 2019-2020 Donald F. Othmer Sophomore Academic Excellence Award. The Sophomore Academic Excellence Award is presented to one active AIChE undergraduate student member in each student chapter who has attained the highest scholastic grade-point average during his/her freshman and sophomore years, on recommendation of the Student Chapter Advisor.

Sheik Tanveer
Ph.D. Student

Congratulations to Sheik, who is currently in our Ph.D. program, for being recognized by the AIChE Journal for having a “Top-Tier” contribution article. Sheik’s paper titled: “A Comprehensive Thermodynamic Model for High Salinity Produced Waters” was selected for this recognition.



Andrew Gregory
Class of 2023

Andrew was awarded the AIChE 2019-2020 Freshman Recognition Award. The Freshman Recognition Award is presented to one active AIChE undergraduate student member in each student chapter who has been the most active in their student chapter during his/her freshman year, on recommendation of the Student Chapter Advisor.

Dana N. Thalman
Class of 2020

Dana, Chemical Engineering undergraduate student, has been awarded the NIH Postbac IRTA (Intramural Training & Education award). This program is for recent graduates and provides the opportunity to spend one to two years performing full-time research at the NIH. Dana will be working with Dr. Gustavo Pacheco at the NIH office in Bethesda, Maryland. Additionally, Dana was also selected to receive one the University’s prestigious 2019-2020 Student Leadership Awards.





Nathan Wilson
Class of 2020

Awarded NASA Fellowship, project “Biomass-Based Polymer Electrolytes for Electrolyzers”.

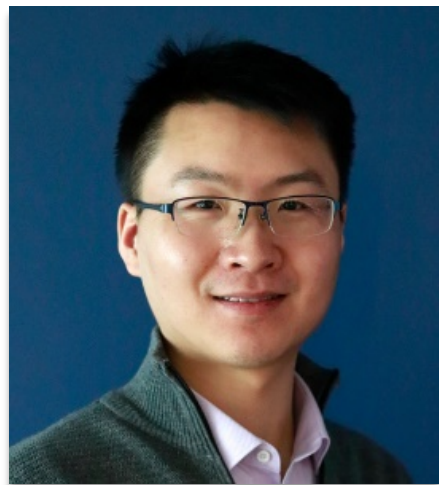
Nathan Wilson has been awarded a fully funded graduate fellowship totaling 225K over 4 years. Wilson, one of Texas Tech's own Chemical Engineering undergraduate students (who graduated May 2020) will be fully funded for his Ph.D. in this exciting project that deals with using in-situ resources from Mars to fabricate advanced electrolytes for CO₂ reduction to support deep space exploration and Mars missions. As part of the project, he will be performing research every summer at NASA Glenn. Wilson is pursuing his Ph.D. under the direction of Dr. Botte. Congratulations, Nathan,

from the Whitacre College of Engineering, the Department of Chemical Engineering, and Texas Tech University!

Faculty News

Faculty Welcome

We are delighted to welcome Dr. Qiugang (Jay) Lu to the TTU Chemical Engineering Department! Dr. Lu joins the department as an Assistant Professor, bringing expertise in areas such as data analytics and machine learning. Earning both his undergraduate and Master's degrees from the Harbin Institute of Technology, Dr. Lu then completed his Ph.D. in Chemical Engineering from the University of British Columbia. For the Fall semester, Dr. Lu taught Process Control and co-taught the Unit Operations Laboratory.



Dr. Qiugang (Jay) Lu:

- *B. Eng., Control Science and Engineering, Harbin Institute of Technology, 2011*
- *M.Sc., Control Science and Engineering, Harbin Institute of Technology, 2013*
- *Ph.D., Chemical Engineering, University of British Columbia, 2018*

Research: data analytics, machine learning, and process control.

Faculty Promotions

Congratulations to both Dr. Wei Li & Dr. Jeremy Marston who have been promoted to Associate Professors.



Dr. Wei Li, Associate Professor

Research: The research in the Li laboratory combines cutting-edge microfluidics, soft materials, and high throughput nano-assembly techniques to develop novel functional polymer surfaces and microdevices for biological, energy and optical applications. Using these techniques, he has developed creative technologies to tackle practical problems in isolation of rare cancer cells from blood, cell-surface interactions, electro-active polymers, and color-change nanofilms. He has studied several fundamental aspects of layer-by-layer (LbL) assembly of polyelectrolyte films and investigated new applications of responsive LbL films, organ-on-a-chip microdevices, and hydrogel materials for biomimetic 3D cell culture and soft robotics.



Dr. Jeremy Marston, Associate Professor

Research: Innovative drug delivery methods are highly sought after by pharmaceutical companies, especially those focusing on novel biological drugs such as nucleic acid vaccines, but also for those seeking to challenge the status quo by improving delivery efficiency, increasing patient compliance and reducing overall costs of healthcare. Aligned with these market drivers, Dr. Marston established a laboratory at the interface between fundamental fluid dynamics and biomedical applications.

He is currently focusing on a number of key areas of applied research: 1) delivery of injectables (liquid drugs delivered through the skin) using needle-free jet injectors and tattoo devices; 2) ophthalmic drug delivery (liquid drugs delivered to the eyeball) using discrete drop and jet impact; 3) evaluating the tissue counter-pressure during injection, and 4) developing simulation techniques to model injection dispersion patterns in different tissue types.

Faculty Awards



Dr. Sindee Simon

Horn Professor

NSF Award

Dr. Sindee Simon received a four-year National Science Foundation grant for \$580k to support the project entitled, Relaxation of Slow Glassy Interphases in Polymeric Systems. Dilatometry and ultrafast scanning calorimetry will be used to study the rigid amorphous fraction in semicrystalline poly(ethylene terephthalate) and the immobile glassy layer at the particle interface in polymer-grafted silica nanoparticles.



Dr. Chau-Chyun Chen

Professor and NAE Member

DOE RAPID Award

Dr. Chau-Chyun Chen received a \$1.1 million grant from the Rapid Advancement in Process Intensification Deployment (RAPID) to work on transforming the design of chemical plants through modular chemical process intensification and advanced process simulation to increase their energy efficiency.



Dr. Mahdi Malmali

Assistant Professor

DOE RAPID Award

Dr. Mahdi Malmali's team received a \$1.55 million grant from the Rapid Advancement in Process Intensification Deployment (RAPID) Manufacturing Institute to work on designing a modular membrane-based process to treat produced water resulting from hydraulic fracturing.



Dr. Wei Li

Associate Professor

NSF and NIH new Awards

Dr. Li received a 3-yr \$425k grant from the National Science Foundation. The grant will be used for a project in collaboration with Dr. Yang Jiao, from Arizona State University, and Dr. Rob Bright from TTUHSC. Together, they will work to understand the fundamental aspects of hyper uniform structured microchips and their application in cancer research.



Dr. Sheima Khatib
Assistant Professor



Dr. Josh Howe, NSF Award
Assistant Professor

Dr. Sheima Khatib (PI) and Dr. Josh Howe (Co-PI) received a three-year National Science Foundation grant for \$509k to support the project entitled Integrated Experimental and Theoretical Endeavor for Fundamental Understanding of Processes in Methane Dehydroaromatization.

Dr. Gerri Botte, Professor and Whitacre Department Chair was elected Third Vice President of the Electrochemical Society and received the TechConnect Defense Innovation Award for Ultra-fast COVID-19 Diagnostics Sensor. The Electrochemical Society (with over 10,000 members worldwide) is the premier organization dedicated to advance theory and practice at the forefront of electrochemical and solid-state science and technology, and allied subjects. As the third Vice-President, Dr. Botte is in her path to become President of the Society.



The TechConnect Defense Innovation Award recognizes the top 15% Innovations of more than 500 inventions submitted at the Fall 2020 summit. The awardees are selected by a panel of independent judges based on the potential positive impact a product could have. Dr. Botte's innovation is an electrochemical sensor that enables the detection of COVID-19 within less than 1 second. The technology is currently being commercialized by EviroTech, a start-up company founded by Prof. Botte.



Dr. Harvinder Gill

Associate Professor, Whitacre Endowed Chair of Science and Engineering

Dr. Harvinder Gill has been at the forefront of TTU's response to the COVID-19 pandemic. Producing 107,000 viral transport media vials for the State of Texas during the pandemic with additional 30,000 scheduled for production.

Dr. Jeremy Marston

Associate Professor

Dr. Jeremy Marston received a Distinguished Teaching and Research Award from the TTU Chancellor's Council. This award honors outstanding faculty members who provide exceptional opportunities for students both in and out of the classroom.





Dr. Al Sacco Jr.

Dean of the WCOE

During the COVID-19 pandemic, Dean Sacco has led the West Texas 3D COVID-19 Relief Consortium. The Consortium is a collaborative group of faculty from Texas Tech and the Texas Tech University Health Sciences Center who have joined forces to create 3D-printed face shields and face masks for health care workers in hopes of fighting the spread of the coronavirus. The Consortium is a joint effort utilizing a collaborative community involving several departments at TTUHSC, Texas Tech, the University of Texas-Permian Basin, Odessa College, local businesses, concerned citizens and aviators.

Dr. Siva Vanapalli

Professor and Bill Sanderson Faculty Fellow

Dr. Siva Vanapalli was named Bryan Pearce Bagley Regents Chair in Engineering. As a recipient of this chair, Dr. Vanapalli possess an outstanding research and teaching record. Additionally, as an endowed chair holder, the Dr. Vanapalli has developed academic offerings to equip engineering students for business aspects of engineering practice. Dr. Vanapalli has developed externally funded programs in research and scholarship.



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