MSEC MATTERS

Materials Science, Engineering, and Commercialization Program

TEXAS STATE UNIVERSITY
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In This Issue

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Cover Page:

Raw reclaimed fly ash particles (edited version) imaged by JEOL SEM, Acquired and Edited by Aamar Danish, MSEC student

Student and faculty data submitted to MSEC staff between July 2024 through June 2025 is included in this issue.

Letter From the Director

Dear MSEC Alumni and Friends,

As the enrollment in the Materials Science, Engineering, and Commercialization (MSEC) program at Texas State University continues to set new records, I am grateful for the support of the University, fellow faculty members, and our outstanding staff that has enabled our tremendous growth over the past three years. I am especially thankful for the expansion of the MSEC leadership team.

This past year we welcomed Professor Tania Betancourt as Assistant Director of MSEC, with Professor Anthony Torres taking on a new role as Associate Director. Together, we are charting a course for MSEC that will bring us to new heights, not just in size but also in innovation and impact in materials research. One recent change concerns how students can become part of MSEC; we no longer require a prior MS degree for admission to the program. As we open up the MSEC to more PhD students, we are also exploring ways to make MSEC accessible to students who want to pursue a terminal MS degree.

All of these changes are in response to the growing role that materials research plays in the industries that are driving current advancements and shaping future possibilities, in areas from electronics to construction, energy to healthcare and more.
In this latest issue of MSEC Matters, you will see that our faculty and students have been recognized nationally and internationally with grants and awards for their outstanding contributions to research and innovation. The growth in MSEC includes welcoming new faculty, who are highlighted here.

We are especially proud of our alumni, who continue to excel and serve as the best ambassadors for MSEC. I hope you enjoy reading about their latest accomplishments, and I encourage all to share your news with us.

We look forward to hearing from you!

Dr. Sean Kerwin, MSEC Director

FACULTY SPOTLIGHT

Dr. Tania Betancourt

Professor
Director of the PREM Center for Intelligent Materials Assembly

We are honored to spotlight Dr. Tania Betancourt, whose unwavering dedication and tireless work ethic have made a lasting impact on the Department of Materials Science, Engineering, and Commercialization. As Assistant Director, Dr. Betancourt plays a pivotal role in driving both innovation and excellence across research, mentorship, and program development. Her leadership has helped foster an environment of curiosity, resilience, and forward-thinking that continues to elevate the department to new heights. With an extraordinary record of research, Dr. Betancourt consistently pushes the boundaries of scientific discovery.

Her contributions to the field of materials science not only advance our understanding but also bridge the gap between engineering innovation and real-world application. Whether in the lab or in the classroom, she brings an unmatched level of commitment and passion that inspires both her peers and the next generation of scientists.

Dr. Betancourt's presence is a true asset to our department. Her vision, expertise, and drive embody the core values of our mission, and we are proud to recognize her continued contributions to the success and growth of our community.

Have you Heard?

Dr. Tania Betancourt was:

- Inducted into National Academy of Inventors
- Selected as one of American Institute of Medical and Biological Engineers (AIMBE) Inaugural Emerging Leaders

tania.betancourt@txstate.edu

FAREWELL DR. MARK HOLTZ!

"I am pleased to inform you of my retirement beginning September 1, 2025. It has been my great privilege to work with members of the Department of Physics, MSEC program, and university community. During my career and time at Texas State University, I enjoyed working with so many outstanding faculty, staff, postdoctoral researchers, and students. I was honored to serve as University Chair of MSEC from 2013 through 2024.

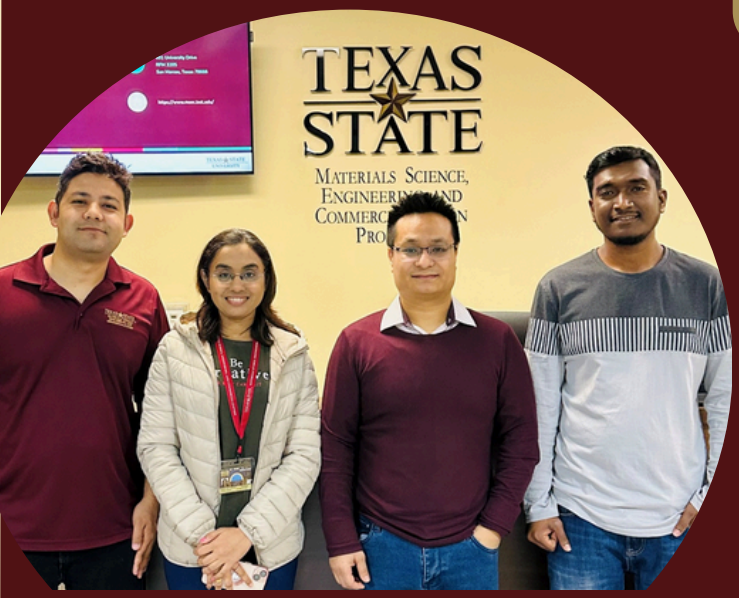
As department chair, from 2014 until 2023, I am especially gratified to have been part of department growth in outstanding tenure and nontenure track colleagues, and their advancement through the academic ranks. The collaborative successes we have enjoyed, in building the best department at Texas State University, are worthy of deep, collective pride. Many thanks are due to our administration for their support.

It is not possible to individually recognize everyone who had so much of an impact on my career and for their friendship. At Texas State University, I would like to express my sincere appreciation to Eddie Piner for our numerous collaborations and successes in conducting competitive research. It has been a pleasure to collectively advise so many outstanding postdocs and students. I look forward to a few more journal papers! I also express my sincere appreciation to Dave Donnelly for his devotion and dedication to the department that proved so indispensable during my time as chair. Lastly, let me thank Juan Gomez and Casey Smith for their tireless efforts in advancing the technical opportunities available to our students at all levels.

Needless to say, I could not have enjoyed such a fulfilling career without the support of my wonderful family.

My best wishes to all in the department and program for continued success!"

MSEC Student Club



From left to right: Mr. Sushmit Sharma Bhattarai (President), Ms. Gauri Ravikant Mahajan (Vice President), Mr. Rujan Kayastha (Secretary), and Mr. Tarek Aziz (Treasurer).

The MSEC Student Club is a welcoming community where MSEC students come together to learn, grow, and support each other on their academic journeys. In 2024-2025, the MSEC Student Club built on the successes of previous years by offering new and exciting activities for all members. Last year, instead of just focusing on career development, we explored some of today's most interesting topics in technology and data science. We invited a Senior Analyst and Prompt Engineer from AVANADE to give us an early look at Generative AI and how it is shaping the future. We also hosted a special presentation from Dr. Tahir Ekin, Director - TXST CADS- Professor - Endowed Chair - Department of Information Systems and Analytics, who explained how machine learning can help detect healthcare fraud and how data is collected and used in these systems.

To help everyone feel connected, we organized a lively potluck with fun games, giving students and faculty a chance to relax, share food from different cultures, and get to know each other better. Through these events, the MSEC Student Club continued its mission to inspire, inform, and bring together. We are proud of how much we accomplished in 2024/2025 and look forward to welcoming even more students to join our supportive and dynamic club in the future. If you're interested in joining the MSEC Student Club or running for a position, please reach out to Sushmit Sharma Bhattarai at hsy4@txstate.edu for further details.

MSEC Innovation, Commercialization & Entrepreneurship Bootcamp

The Spring 2025 MSEC Innovation, Commercialization & Entrepreneurship Bootcamp operated like a rigorous clinical residency for entrepreneurial minds. With precision workshops, diagnostic feedback, and high-stakes pitch "surgeries," this two-day event served as a treatment center for transforming academic ideas into viable, market-ready ventures.

Day one focused on preparing participants for the big investor pitch. It began with a "grand rounds" style of learning, featuring insights from seasoned practitioners of the startup craft. Russell Hinds, an angel investor, shared how to recognize fundable symptoms and administer the right investment dosage. Robert Reeves, a founder turned serial entrepreneur, discussed detailed case studies on company formation, scaling strategies, and navigating entrepreneurial trauma. Aaron Perman of S3 Ventures explained how VCs assess founder "vital signs" like team chemistry, traction metrics, and problem severity. Lastly, Nike Dominguez, a startup veteran, shared his "surgical scars" and clinical wisdom from running his current venture, Aply.com.

The afternoon clinical skills workshop, led by Mark Paz, a communication instructor at Texas State, focused on developing "bedside manner for business"—training students to communicate clearly and confidently under investor pressure, answer tough questions, and deliver high-stakes pitches.

Day two introduced the surgical pitch theater. The day opened with one more session of expert startup and fundraising advice from VC investor Craig Cummings of Moonshot Ventures. Then, 22 Ph.D. students "scrubbed in" and presented their ventures in a fast-paced pitch competition, including a final round judged by a panel of expert evaluators: Russell Hinds, Anthony Marfisi, and Art Olbert.

The 2025 award winners were:

- 1st place went to Md Ibrahim Khalil Tanim for TopoAI, an AI-based software that optimizes 3D drawings for solid structures with reduced material waste.
- 2nd place went to Rayhan Sarker for Smart Diabetic Footwear, offering shoes and a mobile app that detect and help prevent ulcers on patients' feet.
- 3rd place went to Sakib Hossain Bhuiyan for HydroCare, a hydrogel-based drug delivery injection that targets cancer cells without harming healthy ones.
- The Student Choice Award went to Mitchell Myhre for G3 Biotherapeutics, developing a new synthetic molecule that targets DNA structures for personalized cancer treatment.

The Spring 2025 MSEC Entrepreneurship Bootcamp proved to be more than just a bootcamp—it was a teaching hospital for commercial innovation. Participants left with refined techniques, actionable feedback, and meaningful new networks—ready to enter the entrepreneurial field as doctors of disruption, capable of diagnosing business problems and prescribing startup solutions that make a real-world impact.

We're excited to track these ventures as they go from startup trials to, hopefully, globally successful businesses.

National Academy of Inventors

The National Academy of Inventors (NAI) inducted Dr. Eddie Piner as NAI Fellow at their 14th Annual Conference in Atlanta, GA for his extraordinary achievements in innovating the fundamental materials that enabled commercialization of the multi-billion dollar III-Nitride on silicon power electronics industry. Dr. Sean Kerwin, Dr. Tania Betancourt and Dr. Jelena Tesic were also inducted as NAI Senior Members for producing technologies that have brought real impact on the welfare of society.

NAI is a member organization comprising U.S. and international universities; governmental agencies; and non-profit research institutes. It recognizes and encourages inventors with U.S. patents, enhances the visibility of academic technology and innovation, encourages the disclosure of intellectual property, educates and mentors innovative students, and creates wider public understanding of how its members' inventions benefit society.

Welcome New MSEC Faculty

Dr. Anandi Dutta

Assistant Professor
Ingram School of Engineering
Ph.D. in Computer Engineering from University of Louisiana at Lafayette

Dr. Rachel Rolfe

Assistant Professor
Department of Health & Human Performance
Ph.D. in Sports Medicine from University of Virginia

Dr. Witten Steven

Associate Professor
Department of Chemistry and Biochemistry
Ph.D. in Biophysics from Johns Hopkins University

MSEC Faculty Receiving Tenure and Promotion

Dr. Yoichi Miyahara
Assistant Professor to Associate Professor
Department of Physics

Dr. Andrea Banzatti
Assistant Professor to Associate Professor
Department of Physics

Dr. Rachel Rolfe
Assistant Professor to Associate Professor
Department of Health and Human Services

Dr. Sangchul Hwang
Associate Professor to Professor
Ingram School of Engineering

Dr. Keisuke Ikehata
Assistant Professor to Associate Professor
Ingram School of Engineering

Dr. Eduardo Perez
Associate Professor to Professor
Ingram School of Engineering

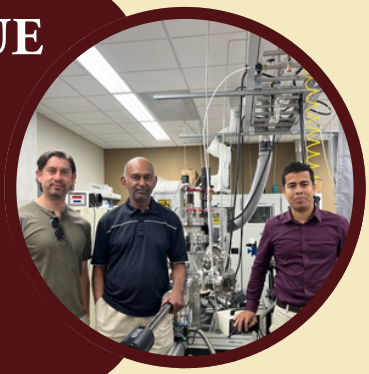
FACULTY SPOTLIGHT AWARDS & ACHEIVEMENTS

DR. ANTHONY TORRES

Dr. Anthony Torres was awarded the Teaching Award of Honor from Texas State University's Alumni Association. This prestigious award recognizes, encourages, and rewards superior Texas State classroom teachers, including professors, lecturers, associate professors, assistant professors and instructors.

DR. RAVI DROOPAD & DR. ARIFUL HAQUE

Dr. Ravi Droopad & Dr. Ariful Haque have been awarded a $1M grant from the U.S. Army to advance next-generation semiconductors such as diamond and emerging ultrawide bandgap oxides. This innovative project will focus on material integration, growth, characterization, and AI-driven modeling to enable high-performance electronics for future defense technologies.



STUDENT SPOTLIGHT ACHEIVEMENTS

RAHUL SHELEY

Won first place for the 2025 SAMPE Student poster session in Indianapolis. This award was presented by Dr. Germán Reyes-Villanueva who is the President of SAMPE North America This prestigious event provides an exciting platform for students to showcase their research to a highly engaged community of experts and innovators in the field. It's a valuable opportunity to gain exposure, receive professional feedback, and connect with leaders shaping the future of advanced materials and manufacturing.

EUNICE BABATUNDE & MARIA SULTANA

MSEC students Eunice Babatunde and Maria Sultana received the P.E.O. International Peace Scholarship. Eunice won the scholarship for the 2024–2025 academic year, and Maria won it for 2025–2026. The P.E.O. International Peace Scholarship (IPS) provides up to $12,500 to international female graduate students at all levels and in all disciplines. IPS awardees intend to pursue professional careers in their home countries and improve the quality of life for citizens, particularly women and girls.

Student Achievements

Alam Khorshed

- Presented his poster titled, “Direct Bandgap Emission and Absorption in Dilute GeCSn Alloy” at UTMRSEC Industry Day.
- Presented his research titled, “Structure and Performance of High-energy Ball Milled Iridium-Titanium Oxide Oxygen Evolution Electrocatalysts” at the Southwest Regional Meeting of the American Chemical Society.

Ayesha Tasnim

- 2024 Samsung Scholarship
- 2025 Graduate School of Science and Engineering scholarship

Ayush Subedi

- 2024-2025 Student Government Scholarship
- 2024-2025 Graduate College Scholarship

Babatunde Eunice

- 2024-2025 International Peace Scholarship

Beng Wei Chong

- Presented reserach titled, “Utilization of Waste Eggshell as a Limestone Alternative for High-Volume Incorporation in Portland Cement” at the American Ceramic Society’s 15th Advances in Cement-Based Materials.
- Fall 2025 Graduate College Scholarship
- Received the Outstanding Graduate Student Award from TXST College of Science and Engineering.

Das Malay

- Presented poster titled, “Calcium-Dependent Chemiluminescence Catalyzed by a G-Triplex DNA from the c-MYC Promoter” at the 2024 American Chemical Society organized SWRM.
- Presented his poster titled, “Kinetic and Thermodynamic Insights into G-Triplex DNA Stabilization by Porphyrin TMPyP4” at the 2025 TXST GSRC and the 2025 NSF PREM CAMPS
- Graduate College Scholarship
- First-Time Author of a Peer-Reviewed Technical Publication award for PREM CIMA
- TXST PREM CIMA summer grant

Farah Najdawi

- Presented her poster titled, “Sustainable and Reliable Solar-Based EV Charging Infrastructure: A Strategic Framework” at the 2025 TechConnect World Innovation Conference.

Fatema Tuz Zohra

- Graduate College Doctoral Research Support Fellowship

Fereshteh Rahmani

- Presented poster titled, “Characterization of shale mechanical properties via Nanoindentation scratch test” at the 2025 Geotechnical Frontiers Conference.
- Presented research titled, “ “Impact of Shale Anisotropy on Reservoir Characterization” at the 2025 TXST STEM Conference.
- Graduate College Scholarship
- 1st place in the TXST STEM Conference

Ganesh Aryal

- Fall 2025-Spring 2026 Dissertation Completion Fellowship

Student Achievements

Gauri Mahajan

- Presented research titled, “Quantification and Prediction of Pavement Flushing Using Surveying, Texture, and Traffic Data” at the 2025 Road Profile Users’ Group.
- Presented research titled, “Precision Assessment of Automated Pavement Condition Data Collection Using Annual Rating Data” at the 104th Annual Meeting, Transportation Research Board.
- Presented research titled, “Precision Assessment of Automated Pavement Condition Data in Pavement Management” at the TXST College of Science and Engineering (CoSE) Annual Advisory Meeting.
- 2025 Graduate College Scholarship
- 2025-2026 International Peace Scholarship

Gholami Hossein Abadi

- Presented her poster titled, “Optimizing Binder Content for extended Durability on Performance-Based Concrete Overlay” at the 2025 TXST STEM Conference

John Miracle

- Presented poster titled, ‘Improving P-Type Cadmium Telluride Via Arsenic Doping” at the 2025 UT-MRSEC Annual Meeting.
- Presented research titled, “Characterization of PbTe/CdTe(211) Crystal Structure Using X-ray Diffraction.” at the 2024 MRSEC All Student Meeting.
- Presented research titled, “Cadmium Telluride Based Solar Cells” at the 2025 PREM Thrust 2 Research Meeting.
- Summer 2025-Spring 2026 Dissertation Completion Fellowship
- Spring 2025 Doctoral Retention Scholarship

Jihyeon Yun

- 2nd place in the TXAPA Asphalt Road-Eo Competition.

Junaid ur Rehman

- Presented poster titled, “Electroactive Polymer Nanofibers for Photocatalytic Water Purification” at the 2024 Materials Research Society Fall Meeting & Exhibit (NSF PREM Research Scholars Summit.
- Presented his poster titled, ““Intrinsically Conductive Polymer Nanocomposites for Visible Light Driven TiO2 based Photocatalysis” at UT-MRSEC Annual Meeting.
- Presented his poster titled, “Electroactive Polymer Nanocomposites for Visible-Light-Driven Photocatalytic Water Purification” at the 2025 ACS National Meeting & Exposition.
- Presented his poster titled, “Electroactive Polymer Nanofibers for Photocatalytic Water Purification” at the MRS Fall Meeting and Exhibit.
- 2024-2025 Graduate School Retention Scholarship
- 2024-2025 Graduate School Retention Scholarship
- Honorable Mention Poster Award for PhD Research at SPE Polyolefins Conference
- Department of Engineering (DOE) Symposium Scholarship Award
- SPE Member Scholarship Award

Keegan Bailey

- Presented his poster titled, “Electrochemical Energy Conversion Materials” at the CHESS meeting.
- Presented his research titled, “Structure and Performance of High-energy Ball Milled Iridium-Titanium Oxide Oxygen Evolution Electrocatalysts” at the Southwest Regional Meeting of the American Chemical Society.

Keya Das

- Presented poster titled, “Photothermal Therapy of Cancer-Mediated by Conductive Polymer Nanoparticles” at the 2025 High Energy X-ray Techniques workshop.
- Presented poster titled, “Synergistic Effect of Differentiation Inducing Retinoic Acid and Conductive Polymer Nanoparticle-Mediated Hyperthermia in Neuroblastoma Cells at the 2025 NSF PREM CAMPS.
- Graduate College Scholarship
- TXST PREM CIMA summer grant

Student Achievements

Lillian Eliaz

- Presented poster titled, “Dissecting the Interrelationship Between BRCA1-BARD1 and ZGRF1 Helicase in Homologous Reconbination and Pathological R-loop Resolution” at the 2025 Graduate Student Research Conference.

Maria Sultana

- 1st place in the 3MT Competition.
- 2025-2026 International Peace Scholarship
- Finalist of three-minute thesis competition at Conference of Southern Graduate Schools
- TXST Ingram School of Engineering Industrial Advisory Board graduate student award
- 2025 Graduate College Scholarship
- Presented research titled, “High-Performance ε-$(In_{0.15}Ga_{0.85})_2O_3$/AlN Heterojunction Band Discontinuity Study” at the Electronic Materials Conference.
- Presented poster titled, “Band Alignment Analysis of $(In_xGa_{1-x})_2O_3$/AlN Interface via X-ray Photoelectron Spectroscopy” at the GOMACTech-25 conference.
- Presented research titled, “Band Discontinuity Study of Ultra-Wide Bandgap -$(In_xGa_{1-x})_2O_3$/AlN” at the 59th annual meeting of the Texas Society for Microscopy.
- Presented research titled, “Band alignment of ultra-wide bandgap $(In_xGa_{1-x})_2O_3$ and AlN heterojunction: An XPS analysis” at the Materials Research Society Fall Meeting & Exhibit, Boston, Massachusetts.

Md Anisul Islam

- Presented paper titled, “Magnetic Field-Induced Thermal Behavior and Sedimentation of Strontium Ferrite-PDMS Composites for Actuator Applications” at the 16th Joint Conference on Magnetism and Magnetic Materials (MMM) and Intermag.
- Spring 2025 Graduate College Scholarship
- Spring 2025 Student Government Scholarship
- Spring 2025 Doctoral Retention Scholarship

Md Ibrahim Khalil Tanim

- 2025 Graduate College Scholarship
- 1st place at the MSEC 7302 Bootcamp 2

Md Mahamudujjaman

- Presented poster titled, “Stability Investigations of Triple Halide Perovskite: A Detailed Study Using Angle Resolved XPS” at the 2025 Materials Research Society Spring Meeting.
- Graduate College Scholarship

Moriom Afiza

- Presented poster titled, “Exploration of the ability of photothermal therapy mediated by conductive polymer nanoparticles to induce immune responses for cancer treatment” at the Conference Across MRSEC and PREM Schools.
- Presented poster titled, “Photothermal Therapy of Cancer-Mediated by Conductive Polymer Nanoparticles”. at the 2025 High Energy X-ray Techniques (HEXT) workshop.
- 4th place in 2025 Bobcat Innovation Challenge.

Palleb Kumar Sarkar

- 2024-2025 Graduate College Scholarship
- Presented research titled, “A Novel Interlayer for Diamond Integration with (U)WBG Semiconductors for Thermal Management” at the 2025 GOMAC Tech Conference.
- Presented research titled, “Optimizing SiC interlayers for thermal management in diamond /β-GA2O3 heterojunction devices” at the TSM Meeting.
- Presented research titled, “Structure and Interface Analysis of Diamond on β-Ga2O3 Utilizing SiC Interlayer Grown by RF sputtering” at the 2024 INBRE.

Student Achievements

Rajendra Rai

- Presented poster titled, “Effect of Thermal Annealing on Electrical Property of Platinum Nanowires Deposited by Focused Electron Beam Induced Deposition” at the AVS 70th International Symposium & Exhibition.
- Presented research titled, “Enhancing Conductivity of Focused Electron-Beam Induced Deposition (FEBID)-Deposited Platinum Nanowires for Nanoelectronics Devices by Post-Annealing Carbon Reduction” at the TechConnect World Innovation Conference & Exposition.

Rajesh Chakraborty

- Graduate College Scholarship

Rigoberto Mayorga-Luna

- Presented poster titled, “Charge Transfer through Individual DNA Molecules, Measured by Mechanically Detected Electric Charge Sensing” at the Conference Across MRSEC and PREM Schools.

Rujan Kayastha

- Presented research titled, “Plantar pressure distribution on different postures by novice roofers: Effects of slope angles across foot zones and machine learning-based classification” at the 2025 Joint CSCE Construction Specialty & CRC Conference.
- Presented research titled, ““Biomechanical analysis of stability and fall risk in roofers working on sloped surfaces: Investigating the role of base of support, center of pressure, and center of gravity.” at the 2025 Joint CSCE Construction Specialty & CRC Conference.
- Presented research titled, “Muscle activation patterns in stooping posture on sloped roofing surfaces” at the 61st Annual ASC International Conference.
- Presented reserach titled, “Evaluating muscle activation and joint angle correlation during stooping tasks on sloped surfaces” at the 61st Annual ASC International Conference.
- Presented research titled, “Plantar pressure distribution and posture stability analysis in a construction roofing task” at the 61st Annual ASC International Conference.
- 2025 Graduate College Scholarship
- 2025 TXST Society of Plastics Engineers Chapter Awards
- STAR Grant Award
- Secretary for MSEC Student Club/ Co-president of International Students Organization
- Finalist for the three-minute thesis competition at Texas State University

Rahul Sheley

- 2025 Society of Plastics Engineers Chapter Award
- 2025 Society for the Advancement of Material and Process Engineering
- 1st place at the SAMPE Session for his poster titled, “Tension–Tension Fatigue of High-Temperature Thermoset Composites in Fire Drone Application”.
- Presented poster titled “Tension–Tension Fatigue of High-Temperature Thermoset Composites in Fire Drone Application” at TechConnect World Austin Conference.
- Session Chair at 2024 CAMX
- 2025 Society for the Advancement of Material and Process Engineering International University Student Leadership Award.

Saif Al Arafin Taqy

- Presented poster titled “Development of Novel Interfacial Layer for diamond/AlN Heterojunction” at the 2025 EMC conference.
- Presented research titled, “Laser annealing induced growth and characterization of carbon nanostructures” at the 2024 TSM Meeting.
- 2025-2026 Dorothy Coker Research Fellowship
- 2025 Graduate College Scholarship
- 3rd place for the 2025 Bobcat Innovation Challenge

Student Achievements

Sakib Bhuiyan

- Presented paper titled, “Thermally Reversible and NIR Light-Sensitive Agarose Hydrogels for Controlled Drug Release” at the PREM Poster Showcase, Southwest Regional Meeting, TXST PREM meeting, and MRS Fall Meeting.
- Presented poster titled, “Dynamic Hydrogel Crosslinked with Reversible Thiol-Michael and Non-Reversible Thiol-Maleimide Bonds for Controlled Drug Release” for PREM Day at The University of Texas at Austin.
- Presented his research poster titled, “Investigating ROS- and Photothermally Responsive Hydrogels for Drug Delivery Applications” at 2025 HEXT .
- Graduate College Scholarship
- 4th place in BOBCAT innovations challenge
- 3RD place in Bootcamp II

Samuel Cantrell

- Doctoral Retention Scholarship
- TSTG Grant

Scott Barrett

- Presented his research titled, “Aqueous Organic Batteries” at the Thrust 1 PREM Meeting .
- Presented his research titled, “Advancement of Renewable Energy Via Organic Chemistry” at the UT MRSEC/PREM Conference, SPE Conference, MRS Conference PREM, ECS Texas Section Symposium, ACS Conference, and CAMPS Conference.
- Department of Energy Scholarship.

Shriyank Somvanshi

- Presented poster titled, “Applying Tabular Deep Learning Models to Estimate Crash Injury Types of Young Motorcyclists” at the Spring 2025 TexITE District Meeting and the TXST STEM Conference.
- Presented poster titled, “Leveraging Explainable Machine Learning Techniques to Estimate Crash Severity for Different Pedestrian Actions” at the 2025 Transportation Research Board Annual Meeting.
- Presented poster titled, “Impact of Operating Speed, Roadway Curvature, and Precipitation on Crash Risks in Rural Two-Lane Roads” at the 2025 Transportation Research Board Annual Meeting.
- 2025 Graduate College Schoalrship
- 3rd place for the 2025 CASTITE Scholarship

Shuvo Brahma

- Presented his poster titled, “Electroactive Polymer Coatings on Polymer Nanofibers via Solution-Phase and Vapor-Phase Chemical Oxidative Polymerization” at the American Chemical Society National Meeting.
- Presented his poster titled, “Vapor Phase Deposition of Electroactive Polymers onto Electrospun Commodity Polymer Nanofibers” at the UT-MRSEC Annual Meeting, 2025 TXST STEM Conference, TXST Graduate Research Conference, 2025 Conference Across MRSEC and PREM Schools, SPE International Polyolefins Conference, and 2025 SWRM AC Southwest Regional Meeting.
- Society for Plastic Engineers Award

Saman Menbari

- Presented research titled, “Eco-Friendly Sandwich Panel Composites for Green Architecture” at the TXST Research Showcase.

Sushmit Sharma Bhattarai

- Presented poster titled, “Empowering Frontline Construction Crews with an AI-Driven Virtual Superintendent” at the 61st Annual ASC International Conference.
- 2024-2025 Graduate College Scholarship

Shyaamkrishnan Vigneswaran

- Presented poster titled “Evaluation of storage stability for CRM asphalt binder based on rheological properties and AFM images” at the 2024 Graduate Research Conference.

Student Achievements

Zachary Naymik

- 2024 NSF PREM Research Scholars Best Poster Award
- Presented his poster titled, “Factors Influencing Activity and Electrochemical Stability of Ru-Based Oxygen Evolution Electrocatalysts” at the PREM Meeting and the 2024 Southwest Regional American Chemical Society Meeting.
- Presented his research titled, “Managing Healthy Labs” at the Graduate College Shop talk
- Presented his poster titled, “Structure, Activity, and Stability of Ruthenium Pyrochlore Oxygen Evolution Catalysts for Electrochemical Water Splitting” at the 2024 Materials Research Society Meeting.
- Presented his poster titles “Structure, Activity, and Stability of Ruthenium Pyrochlore Electrocatalysts for Oxygen Evolution” at the 2025 MRSEC Annual.

MSEC Student Publications

Aduwenye, P., **Chong, B. W.**, Gujar, P., & Shi, X. (2024, November 2). Mechanical properties and durability of carbon fiber reinforced cementitious composites: A review. Construction and Building Materials, 452, 138822. https://doi.org/10.1016/j.conbuildmat.2024.138822

C. Belduquea, J. Tate, T. Ahmed, O. Arigbabowo, **R. Sheley**, W. Geerts, and D. Luna, "Development of strontium ferrite/polyamide 12 and neodymium iron boron/polyamide 12 composites using additive manufacturing," Journal of Nanoscience Nanoengineering and Applications, vol. 15, no. 02, pp. [pages], 2025, doi: 10.37591/JoNSNEA.v15i02.211398.

Cantrell, S. R., **Miracle, J. T.**, Cottier, R. J., Lindsey, S., & Theodoropoulou, N. (2025, April 29). Bandgap of epitaxial single-crystal BiFe1–xMnxO3 films grown directly on SrTiO3/Si(001). Materials, 18(9), 2022. https://doi.org/10.3390/ma18092022

Chong, B. W., Gujar, P., Shi, X., & others. (2024, November 6). Assessment of waste eggshell powder as a limestone alternative in Portland cement. Materials and Structures, 57, 219. https://doi.org/10.1617/s11527-024-02478-9

Cottier, R. J., **Koehne, B. D.**, **Miracle, J. T.**, Currie, D. A., Swartz, C. H., & Theodoropoulou, N. (2025, April 24). Phase coherence and electron-electron interactions in epitaxial strained $SrTiO_3$ films on Si(001). Physical Review B, 111(15), 155307. https://doi.org/10.1103/PhysRevB.111.155307

Das, M. K., **Das, K.**, Rana, A. A., & Ashaduzzaman, M. (2024, September). Complexation of Zn^{2+}, Mn^{2+}, Co^{2+}, Fe^{2+} cations with cefuroxime (cephalosporin) and amoxicillin antibiotics. KS Journal of Science, 12(5). https://doi.org/10.53555/ks.v12i5.3427

Das, M. K., Williams, E. P., Myhre, M. W., David, W. M., & Kerwin, S. M. (2024, September 20). Calcium-dependent chemiluminescence catalyzed by a truncated c-MYC promoter G-triplex DNA. Molecules, 29(18), 4457. https://doi.org/10.3390/molecules29184457

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MSEC Students Advancing to Candidacy

Beng Wei Chong
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Dr. Xijun Shi

Eunice Babatunde
Advised by
Dr. Sangchul Hwang and

Shyaamkrishnan Vigneswaran
Advised by
Dr. Soon-Jae Lee

Ganesh Aryal
Advised by
Dr. Edwin L. Piner

Ghazal Gholami Abadi
Advised by
Dr. Carlos Moro Martinez
Dr. Anthony Torres

John Travis Miracle
Advised by
Dr. Nikoleta Theodoropoulou

Junaid Ur Rehman
Advised by
Dr. Tania Betancourt and
Dr. Jennifer Irvin

Saif Al Arafin Taqy
Advised by
Dr. Ariful Haque

Saman Menbari
Advised by
Dr. Anthony Torres

Sushmit Sharma Bhattarai
Advised by
Dr. Hyunhwan Kim

MSEC Graduates
Congratulations!

Summer 24'

Brian Samuels
Advised by
Dr. Ravi Droopad

Kushal Thapa
Advised by
Dr. Tania Betancourt

Luis Albiter
Advised by
Dr. Christopher Rhodes

Nischal Khakurel
Advised by
Dr. Yoichi Miyahara and
Dr. Wilhelmus Geerts

Samuel Kimmel
Advised by
Dr. Christopher Rhodes

Fall 24'

Aamar Danish
Advised by
Dr. Anthony Torres

Binod D.C.
Advised by
Dr. Yoichi Miyahara

Muhammed Bayram
Advised by
Dr. Togay Ozbakkaloglu

Spring 25'

Asmita Mankar
Advised by
Dr. Anthony Torres

Jihyeon Yun
Advised by
Dr. Hyunhwan Kim

Samson Ghilu
Advised by
Dr. Liqin Du and
Dr. Peter Houghton

MSEC Alumni Spotlight

Md Abdul Halim

I graduated in December 2023 under the supervision of Dr. Gary W Beall. In my thesis I focused on studying structure and properties of two-dimensional nanomaterial systems such as metal-organic frameworks, graphene, and polymer-clay nanocomposites. It involves synthesis of nanomaterials and tuning their structures for a variety of applications such as gas barrier coating, natural gas refining, battery electrodes, and thin film fabrication for flexible electronics, energy storage and conversion. After completing my PhD in Materials Science, Engineering, and Commercialization Program from Texas State University, I joined Nabaco Inc. and currently, I am working there as a Senior Materials Research Scientist. As a materials scientist I lead projects on materials design and fabrication, performance test, and third-party validation to explore new application areas of the nanocomposite material systems such as in natural gas refining and food packaging industry.

As a part of my role I work on developing polymer-clay nanocomposite material systems and application techniques for gas (O_2, H_2O etc.) barrier coatings primarily applied in the fresh produce industry to improve the shelf-life of fruits and vegetables during storage and transportation. My job includes scaling up lab experiments, building process protocols and quality metrics to support field trials and technology transfer to the user facilities. About 25% of the packaged food is wasted globally along the supply chain and part of it is directly attributable to the poor oxygen barrier properties of the packaging material which contributes to spoilage by allowing oxygen ingress. The packaging projects I am working on promise enhanced oxygen barrier technology that will significantly reduce food damage and contribute to global sustainability efforts.

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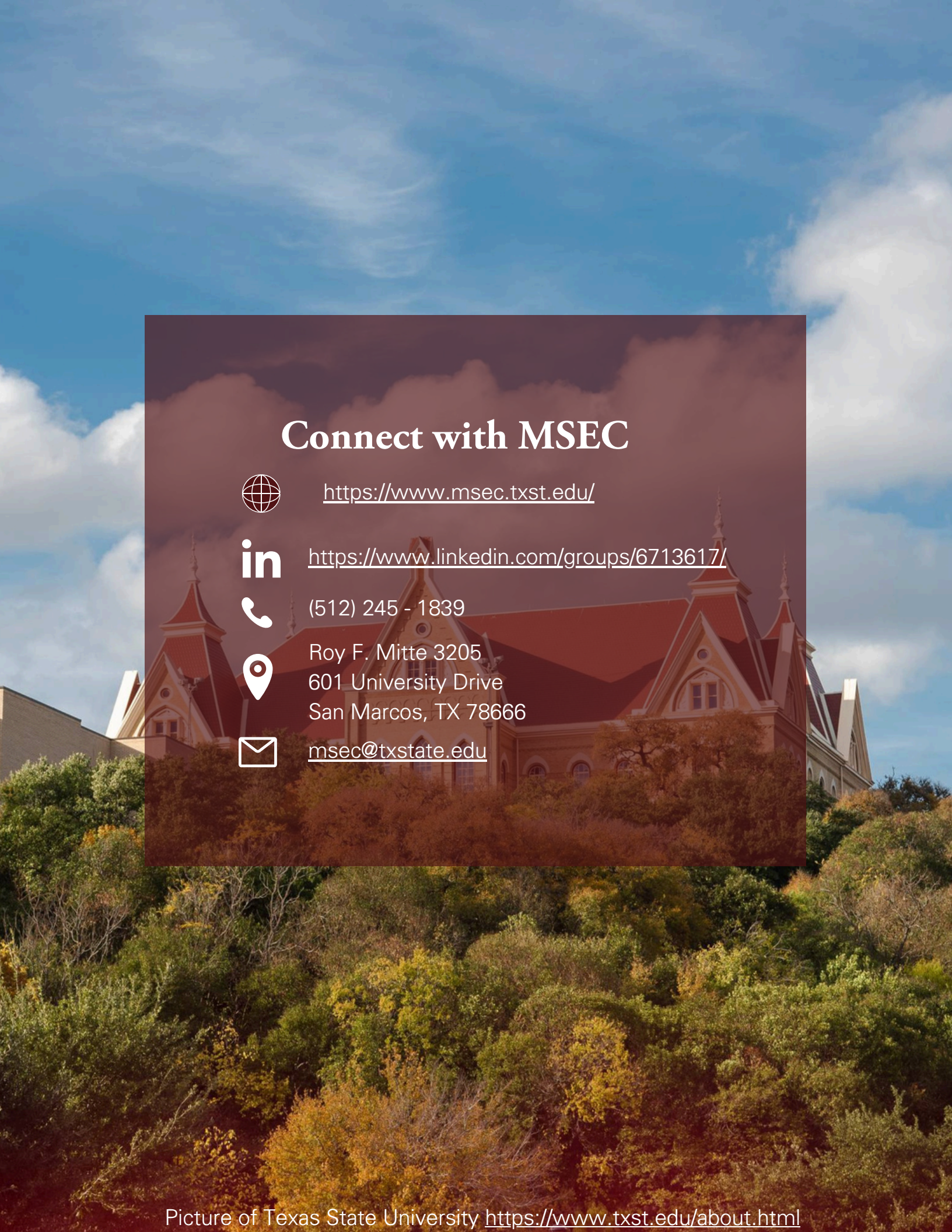

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