THE OFFICE OF UNDERGRADUATE RESEARCH FALL 2024 CONFERENCE

A Showcase of Research and Creativity in the STEM and HASBSEB Areas at Undergraduate and Graduate Levels

November 15, 2024

Galloway and Archer Buildings

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O.U.R. FALL 2024 CONFERENCE

Event Summary

The O.U.R. 2024 Fall Conference continues a tradition that started more than a decade ago in showcasing research done over summer and fall at the undergraduate and graduate levels, from various STEM and HASBSEB academic areas. This year the format of offering two separate conferences on STEM and HASBSEB academic areas merged in one comprehensive conference for increasing the impact and participation of the whole campus to a major fall event. Indeed, the participation at this conference was larger than in the past when we had independent conferences. We also managed to have a more impressive participation from outside Lamar. This year we had the privilege to welcome four special guest speakers: Dr. David Jack, Professor of Mechanical Engineer and Program Director of Materials Science & Engineering at Baylor University, Mr. Alexander Schiller, a Project Engineer at BOEING Company, Mr. Levi Snowden – R & D Project Manager at Atmospheric Plasma Solutions, and Mr. Caleb Gordon, a Supply Chain Specialist at BOEING Company. We had eighteen guests from University of Houston—Downtown, Baylor University, UTMB—Galveston, and UT Dallas presenting their research. We warmly welcomed a fine group of student visitors from the Galveston Community College led by Dr. Barbara Dover. We thank heartly to all our sponsors, and to the Center for Resiliency for the great support and excellent research presented, and to all judges for talking with our students, for evaluating their presentations and for helping in offering awards and prizes to both undergraduate and graduate presenters for their most notable presentations!

We had a total of 36 talks and 24 poster presentations from various academic areas including engineering, medical research, artificial neural networking, material science, chemistry, communication and film, history, exercise science, political science, education, fundamental and applied science, and more. We enjoyed a delightful Short Films Showcase hosted by Professors. O'Brien Stanley and Andre Favors. Kudos to all presenters at the O.U.R. Fall conference!

Cristian Bahrim, Ph.D.
Director of O.U.R.

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MEMORIES FROM A GREAT EVENT

AGENDA - November 15, 2024

TIME	ACTIVITY
7:30 AM	Registration/Greetings
8:00 - 8:45 AM	Poster Session I - Galloway Bldg.
8:50 - 8:55 AM	Welcoming Remarks by Dr. Jaime Taylor, President of Lamar University
8:55 - 9:00 AM	Introduction of our guest speaker Dr. David Jack by Dr. Brian Craig, Professor of Industrial and System Engineering
9:00 - 10:00 AM	Plenary Speaker I - Landes 101 Dr. David A. Jack, Professor of Mechanical Engineering and Graduate Program Director of Materials Science and Engineering, Baylor University
10:00 - 12:00 PM	Summer Student Research - Landes 101
12:05 PM	Group Photo in the Quad
12:10 PM	Lunch
12:30 - 1:00 PM	Poster Sessions II - Galloway Bldg.
1:00 - 1:05 PM	Introduction of our guest speaker Mr. Alexander Schiller by Dr. Xuejun Fan, Professor of Mechanical Engineering
1:05 - 1:50 PM	Plenary Speaker II - Landes 101 Alexander Schiller, PMP, Project Engineer at Boeing

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AGENDA - November 15, 2024

2:00 - 3:15 PM	Breakout Sessions - Galloway Bldg.
3:15 - 3:45 PM	Poster Session III - Galloway Bldg.
3:15 - 3:50 PM	Short Film Showcase (Workshop - See Flyer - **Expo Film Flyer (Printable)**)
4:00 - 4:05 PM	Introduction of our guest speaker Mr. Levi Snowden by Dr. Tracy Benson, Professor of Chemical Engineering & Dean of COE
4:00 - 4:40 PM	**Plenary Speaker III** - Archer 108 Levi Snowden, PMP, R&D Project Manager, Atmospheric Plasma Solutions
4:45 - 5:15 PM	**Plenary Speaker IV** - Archer 108 Caleb Gordon, Supply Chain Specialist, The Boeing Company
5:15 - 5:30 PM	Conference Awards Recognition
5:30 PM	Closing remarks by Dr. Gene Theodori, Associate Provost
5:30 - 6:00 PM	U.R.G. Awards Ceremony (satellite event, outside the conference) Hosts: Dr. Samuel Jator, Sr. Associate Provost for Academic Affairs, and Dr. Cristian Bahrim, Director of O.U.R.

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The O.U.R 2024 Fall Conference

GUEST SPEAKER

David A. Jack, Ph.D

Professor of Mechanical Engineering; Program Director of Materials Science and Engineering, Baylor University

9:00 to 9:50 am – November 15, 2024

Galloway – Business bldg. – Landes 101

SHORT BIOGRAPHY:

Dr. David Jack, professor of Mechanical Engineering at Baylor University, founded Baylor's ISO 17025 test lab. He helped to establish Baylor's PhD program in Mechanical Engineering and established the PhD program in Materials Science and Engineering. He has authored more than 150 journal and conference publications, holds twenty patents, and produced twelve FAA 8100-9 certifications. His team specializes in next-generation material systems from the sub-micron to full-scale aircraft to oil and gas well mitigation. His expertise crosses physics-based constitutive modeling, composites characterization, and non-destructive testing and inspection. His group is known for their expertise in numerical modeling and characterization of polymer systems and are pioneers in high-resolution non-destructive testing methods. He has been awarded over $19.2M in externally sponsored research, $12.4M as the lead investigator.

LECTURE: Establishing the Digital Twin from Nondestructive Inspection Data for Composite Analysis

The use of carbon fiber reinforced materials has become mainstream in the aerospace, automotive, and sporting industries due to their versatility, performance, and high strength to weight ratio. Parts are often designed under a defect-free assumption, and then a factor of safety approach is imposed to allow for unknown manufacturing variabilities. The present work presents a new approach where internal features, often termed defects, are captured using non-destructive techniques and then incorporated into a finite element simulation allowing for inspection informed digital twin modeling. The talk highlights some of the current work by the research team at Baylor University to quantify using non-destructive testing of a variety of common manufacturing induced and service induced defects. This work presents a novel method to nondestructively characterize the internal features within a laminated composite, and then feed the features into a finite element model domain to estimate the true, not necessarily the as designed, part performance. Inspections are performed using high-frequency ultrasound to create a three-dimensional image of internal features, and results are compared to those from micro-X-ray computed tomography and are in excellent agreement. The characterized three-dimensional features are then incorporated into a finite element model domain, and the finite element results for the strain field are then compared to results of the strain field during loading from digital image correlation (DIC). The novelty of the presented method is the combination of physical testing, non-destructive testing for the geometric extraction, to structural predictions using the inspection data directly thus closing the loop of the true digital twin.

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The O.U.R 2024 Fall Conference

GUEST SPEAKER

Alexander Schiller, PMP

F-15 – Project Engineer at BOEING

1:00 to 1:50 pm – November 15, 2024
Galloway – Business bldg. – Landes 101

SHORT BIOGRAPHY:

Alexander Schiller, a military brat with a passion for aviation, aspired to be a fighter pilot from a young age, but his eyesight prevented him from pursuing that dream. He spent most of his life in Arizona. After earning his Bachelor's degree in Architecture from Arizona State, he worked in the field from 2006 to 2008 before transitioning into banking from 2009 to 2010. Seeking a new challenge, Mr. Schiller decided to pursue his Master's in Civil/Structural Engineering at Lamar University, completing it in 2012. After graduating, he joined Boeing in St. Louis, where he has lived and worked ever since. Throughout his career, Mr. Schiller has contributed to various military aircraft projects, including the F-15, F/A-18, AV-8B, T-45, and MQ-25, as well as the commercial 777-X. He currently resides in St. Louis with his wife and two amazing children, actively promoting STEM education to inspire the next generation of problem solvers.

EDUCATION:

Master's in Civil Engineering and Structural Engineering - Lamar University
Master's in Engineering Management and Master Certificate Engineering Mechanics at the Missouri University Science & Technology (Rolla, MO)
Master Certificate Supply Chain Management - Michigan State University (East Lansing, MI)
Bachelor's in Science Design Architecture - Arizona State University (Tempe, AZ)
Project Management Professional (PMP) - Project Management Institute (Philadelphia, PA)

LECTURE: Soaring: A Cardinal's Evolution to the Innovative 777-X Folding Wingtip

Mr. Alexander Schiller, a Distinguished Lamar Alumnus (Master in Civil/Structural Engineering, 2012), currently works for Boeing in St. Louis as a Senior Project Engineer, will share with us how his graduate engineering education at Lamar has served him at Boeing, and how his experience from working on the commercial aviation and the innovative folding wingtip (FWT) of the 777-X changed the very fabric of how he looks at the aviation industry and engineering personally and professionally.

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GUEST SPEAKER

Levi Snowden, PMP

R&D Project Manager -
Atmospheric Plasma Solutions

4:00 to 4:40 pm – November 15, 2024
Archer – Physics bldg. – Archer 108

SHORT BIOGRAPHY:

Levi Snowden is the Research and Development Laboratory Manager at Atmospheric Plasma Solutions, where he manages plasma research, business development, and sustainability projects. A proud alumnus of Lamar University, Mr. Snowden earned a B.S. in both Chemical Engineering and Physics and has since earned a Project Management Professional (PMP) certification from the Project Management Institute. During his time at Lamar University, Mr. Snowden participated in tribology research with Dr. de la Madrid, served as a teaching assistant for the physics department, was a Smith-Hutson scholar, and played in the marching band, jazz band, and pep band. Since graduating in 2019, he has helped develop Atmospheric Plasma Coating Removal (APCR) technology, acquiring and managing Small Business Innovation Research (SBIR) and Strategic Environmental Research and Development Program (SERDP) grants with the team at Atmospheric Plasma Solutions. Outside of work, Mr. Snowden enjoys spending time with his wife and three cats at their home in Apex, North Carolina.

LECTURE: Plasma Innovations & Thriving Through Small Business Research

Plasma, the fourth state of matter, is revolutionizing various industries with its unique applications and properties. Plasma's special properties make it an effective tool for cleaning surfaces and enhancing their surface energy, crucial for improving adhesion and performance in applications like coatings and electronics. We'll discuss how this high-energy state can remove contaminants at the molecular level, modify surface characteristics, and the story behind how plasma is breaking into coating and paint removal industries as a sustainable alternative to grit blasting and laser cleaning.
We will also cover my journey from studying at Lamar to working in a small business and the rewarding and challenging aspects of starting your career at a company with fewer than 20 employees. We'll discuss some of the basics of securing funding through government grants, which has been essential for our growth and stability. Additionally, I'll share insights on successfully managing projects with the Department of Defense and other government stakeholders, highlighting the importance of communication and adaptability in collaborative efforts.

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The O.U.R 2024 Fall Conference

GUEST SPEAKER

Caleb Gordon

Supply Chain Specialist – The Boeing Company

Archer – Physics bldg. – Auditorium 108, from **4:45 to 5:15pm**

SHORT BIOGRAPHY:

Caleb Gordon, a Dallas native, discovered his passion for aviation at an early age, choosing to forge a unique path distinct from his family's educational legacy. His academic journey began at Grand Prairie Collegiate Institute, where he laid a strong foundation through rigorous engineering and college preparatory courses. Caleb went on to pursue Aviation Science Management at Texas Southern University. During his university years, Gordon demonstrated exceptional leadership as President of the TSU chapter of the Organization of Black Aerospace Professionals (OBAP). His commitment to aviation organizations led him to be an active membership in Women in Aviation, the American Association of Airport Executives (AAAE), and Alpha Eta Rho, building a comprehensive understanding of the aviation sector.

Caleb's academic excellence and leadership experience culminated in a valuable internship during his senior year, which paved the way for his current role as a Supply Chain Specialist at The Boeing Company. Looking ahead, he aspires to establish his own Part 135 Charter operation, with a vision to revolutionize the airport industry by enhancing travel efficiency.

This combination of educational background, leadership experience, and industry knowledge positions Gordon as an emerging professional in aviation, dedicated to advancing the field through innovation and service.

LECTURE: Boeing "First Responder": How Preparation & Readiness Shape Your Future Career

This speech outlines my journey in the aviation industry, highlighting my current role as a Supply Chain Specialist at Boeing and my path from early inspiration to industry engagement. I discuss my responsibilities as a "First Responder" handling customer inquiries and technical issues, while emphasizing how this experience aligns with my future goal of owning a Part 135 charter company. The presentation covers my early passion for aviation, sparked during childhood, and emphasizes the importance of organizational involvement, particularly my leadership role in the Organization of Black Aerospace Professionals (OBAP) and participation in other aviation groups like Women in Aviation (WIA) and the American Association of Airport Executives (AAAE). I stress the critical role of internships in professional development and encourage students to explore diverse positions within the aviation industry, even outside their comfort zones. The speech concludes by emphasizing the importance of continuous learning, peer networking, and passionate engagement in the aviation field.

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Book of Abstracts

Part I

Oral Presentations

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Oral Sessions Abstracts

Summer Research Session – Landes 101

Chair: Dr. Robert Kelley Bradley

10:15 AM

Harvest Prater - Major in Speech and Hearing Science
Mentors: **Mrs. Elizabeth Sanders [#] and Mr. Andre Favors [%]**
[#] Mary and John Gray Library
[%] Department of Communication and Media, Lamar University

Asexuals of Color: Experiences of an Invisible Identity.

Asexuality, or the lack of sexual attraction or low sexual interest, is a relatively new and growing orientation within the LGBTQIA+ community. Anthropologists, scientists, and activists study the identity's meaning and related history as the community continues to find acceptance and understanding. As 17 asexuality became more mainstream in Queer and youth culture, the orientation has continued to expand its representation. However, due to the lack of perception, the orientation has become white centric and overlooked in minority groups. This study delved into the shared experiences and stories of ten participants who identified as an asexual of color. This project utilized interpretative phenomenological analysis- a qualitative methodology that identifies trends in data to create assumptions about population or demographic. The study conducted private-personal interviews consisting of eight open-ended questions and found five central trends across the participants' testimonies: (1) Identifying as Asexual, (2) Disclosure of Identity, (3) Sexualization and Fetishization of BIPOC Asexuals, (4) BIPOC Asexuals within Queer and Asexual Communities, (5) Self-Acceptance. This research aims to bring attention to asexuality and the lived experiences and journeys of Asexuals of color. Keywords: asexuality, racial minorities, aromanticism, Queer community, BIPOC.

10:30 AM

Natalia Pulido González - Major in Psychology
Mentor: **Dr. Edythe Kirk**, Department of Psychology, Lamar University

Exploring Ethnicity and Intimate Partner Violence.

Traditional gender roles often reinforce power dynamics in heterosexual relationships, leading to the normalization of men's abuse of power (McCarry, 2009). This issue is exacerbated in patriarchal cultures, particularly for Latina women (Mookerjee et al., 2015). However, the connection between patriarchal Latin cultures and Latina women's acceptance of male perpetrated abuse remains under-explored. In this study I investigate differences in perceptions of intimate partner violence (IPV) between White women and Latinas, with three hypotheses: White women would identify IPV more frequently than Latinas; participants in an experimental group would recognize IPV more than those in a control group; and ethnicity and group condition would significantly affect IPV perception, hypothesizing that White participants in the experimental group would identify IPV more frequently than Latinas in. The first and third hypotheses were not supported, the second was confirmed. Data from 32 participants, who completed demographic questionnaires, read IPV or non-IPV vignettes, and completed perception questionnaires, were analyzed using a two-way factorial ANOVA. Both groups reported greater discomfort after reading IPV vignettes compared to non-IPV scenarios, which supported the second hypothesis. Participants in the IPV group perceived the male partner's response and scenario as abusive. However, despite recognizing IPV, there was a tendency to assign partial blame to female victims, echoing previous findings that women can identify abuse yet hesitate to fully reprimand male perpetrators and victim-blame. These results highlight the need for further research on how ethnicity influences IPV perception to protect vulnerable populations.

10:45 AM

Kayla McKinley - Major in Exercise Science
Mentor: **Dr. Shannon Jordan**, Department of Health and Kinesiology, Lamar University

Does Vaping Nicotine and/or THC Produce Different Levels of Oxidative Stress for Men and Women: An Examination of Markers of Oxidative Stress (8-Isoprostanes) in Expired Respiratory Condensate.

E-cigarettes or vaping cause thermal degradation of liquid bases, producing vapor that is inhaled. There is evidence that diluents, compounds produced because of vaping, and the vaporized substance itself, cause lung damage and oxidative stress. Assaying 8-isoprostanes, which are biomarkers of oxidative stress, is a way to measure the level of oxidative stress and injury in the respiratory system. The current study is comparing the respiratory oxidative stress of individuals aged 18-30. Both nicotine and THC vapers and the results of men and women are compared to determine if sex is a factor in respiratory oxidative stress and/or reduced spirometry results. Participants who vape are asked to identify if they vape only nicotine, only THC, or both as well as how long they have been vaping the substance(s). All participants perform the same non-invasive tests. Participants are asked to breathe normally into a respiratory condensate collection tube (Respiratory Research, Inc) that is covered with a cold sleeve for 10 minutes. The expired respiratory condensate (ERC) from the tube is stored in a –80C freezer until all samples are collected. ERC samples are analyzed using an ELISA assay kit from Oxford Biomedical. Lung function testing is performed by each participant through spirometry. The purpose of this study is to test the 8-isoprostane levels and lung function in men and women (nicotine and/or THC vapers and nonsmokers) to determine if men and women exhibit differing levels of oxidative stress or demonstrate reduced lung function due to vaping nicotine and/or THC.

11:00 AM
Mahima Verma - Major in Computer Science
Mentor: **Dr. Jane Liu,** Department of Computer Science**,** Lamar University

Advancing Protein Downstream Tasks through Pre-trained Large Language Model Representations.

Large language models (LLMs) have demonstrated remarkable success in addressing various natural language processing (NLP) challenges. Recently, LLMs pretrained on protein sequences have led to the development of Protein Language Models (pLMs), which show promise in protein-specific tasks such as structure and function prediction. In this study, we investigate the efficacy of pLMs in tackling two significant bioinformatics problems. The first problem is the prediction of crotonylation sites, a crucial post-translational modification in proteins. We utilize embeddings extracted from the pLM ProtT5- UniRef50-XL, using full protein sequences as input. These embeddings are then input into a Multi-layer Perceptron (MLP) classifier to predict crotonylation sites, resulting in a model we designate as CrotT5- MLP. The second problem involves predicting DNA/RNA binding proteins, approached as a multi-label classification task to simultaneously predict DNA and RNA binding proteins. We generate protein-level representations by applying average pooling to the ProtT5 embeddings and employ an MLP as the classification head to assign DNA/RNA binding labels. We refer to this model as DNA-RNA-T5-MLP. By leveraging pLMs, we obtain high-quality and robust representations directly from protein sequences, thereby automating prediction tasks through machine learning. This approach eliminates the need for handcrafted features, reducing manual effort, and replaces lab-intensive methods that are time consuming and costly.

11:15 AM
Ashlin Stinson - Major in Interdisciplinary Studies EC 6
Mentor: **Dr. Yan Yan,** Department of Curriculum & Instruction**,** Lamar University

Elementary School Classroom Physical and Social Environment Effect on Students' Affective Performance.

This study examines the impact of the classroom environment on students' affective performance in elementary schools, focusing specifically on second, fourth, and fifth-grade classrooms. Guided by a faculty mentor, the undergraduate researcher investigates four key indicators of a successful classroom environment: physical environment, social climate, accommodations and advocacy for diversity, and classroom expectations and routines. Through a combination of classroom observations and one-on-one teacher interviews, this research aims to explore the nuances of how these environmental factors influence students' emotional and academic engagement. Observational data provided insights into the real-time dynamics of classroom interactions, while interviews offered depth, revealing teachers' perspectives and strategies in shaping these environments. The findings from this study are expected to highlight significant correlations between the classroom environment and student affective performance, offering actionable insights into optimizing educational settings to enhance student outcomes. This comprehensive analysis contributes to the broader discourse on educational best practices, with the potential to inform future policy and classroom management strategies aimed at fostering more effective and supportive learning atmospheres.

11:30 AM
Brandon Stumpf - Major in History
Mentor: **Dr. Jeff Forret,** Department of History**,** Lamar University

Slavery, Freedom, and the Law in Antebellum Georgia.

This project examines "Registers of Free Persons of Color" from several counties in antebellum Georgia. In addition to the registries, I also analyze the evolution of Georgia laws surrounding the freeing of slaves and control of Georgia's free Black population. My research shows that, despite laws designed to assert the inferiority of Black Georgians and to differentiate between Georgia's enslaved and free Black populations, some Black Georgians were able to play Georgia's law to their advantage, frustrating the institution of slavery and undercutting the real intent of the law. Acknowledgement: This study was partially supported by a travel grant offered by The Hawthorn Family. "I want to express my gratitude and appreciation for this donation. I was able to complete exemplary history research in the undergraduate research fellowship program." (Brandon Stumpf)

11:45 AM
Kirtunia Rahul - Major in Mechanical Engineering
Co-authors: Arief Yudhanto and Pruthul Kokkada Ravindranath
Mentor: **Dr. David Jack,** Department of Mechanical Engineering**,** Baylor University - Waco

Cohesive Zone Modeling Strategy to Simulate Progressive Delamination Failure in L-shaped CFRP Laminates with Varying Inter-ply Angle Difference.

Enhancing the damage resistance of curved laminated carbon fiber reinforced polymer (CFRP) composites, e.g., L-shaped components that are widely used in geometrically complex aerospace and automotive structures, can be attained by optimizing the inter-ply relative angle. However, the modeling strategies to estimate the delamination resistance of L-shaped laminates by considering the effect of inter-ply angle differences are not yet established. This work utilizes a modified cohesive element property where the nominal traction in the traction-separation law is replaced with the experimentally obtained interlaminar tensile strength (ILTS) of L-curved laminates with various inter-ply angle differences of 0°,15°,45°, and 90° (unidirectional, helicoidal, quasi-isotropic and cross-ply laminates, respectively). Quasi-static four-point bending tests were conducted to evaluate the ILTS of respective laminates and their associated progressive delamination failure using optical microscopy and X-ray computed tomography. Three-dimensional finite element models incorporating the modified cohesive element properties were built to simulate the delamination progression. Our modeling strategy can accurately predict the onset and progression of delamination in four laminates, validating the use of ILTS instead of nominal traction value in characterizing the failure of L-shaped laminates.

1:00 PM
Introduction of our guest speaker Dr. Alexander Schiller by Dr. Xuejun Fan, Professor of Mechanical Engineering at Lamar University.

1:05-1:50 PM
Mr. Alexander Schiller – Project Engineering at Boeing
Soaring: A Cardinal's Evolution to the Innovative 777-X Folding Wingtip.

Breakout Session 1 – Galloway 124
Communication Session

Chair: Professor O'Brien Stanley

2:00 PM
Luis Lemmen - Major in Sociology, Politics & Economics
Mentor: **Dr. Nicki Michalski,** Department of Communication and Media**,** Lamar University

Ethical Evaluation of Nuclear Deterrence on the Example of the Russo-Ukrainian War.

This paper examines the ethical implications of nuclear deterrence, particularly in the context of the Russo-Ukrainian war. It explores two major ethical frameworks: consequentialist (utilitarian) and deontological ethics. The utilitarian perspective supports nuclear deterrence by highlighting its effectiveness in maintaining peace during the Cold War through the principle of Mutually Assured Destruction (MAD). In contrast, the deontological approach, as argued by Noam Chomsky, criticizes nuclear deterrence, pointing to its potential for catastrophic consequences and moral issues, emphasizing disarmament and international cooperation. The paper further discusses the shift in German geopolitics caused by the outbreak of the Russo-Ukrainian war, including increased military spending and debates on nuclear armament, reflecting a broader dilemma between national security and global peace.

2:15 PM
Alexa Heng - Major in Communication
Mentors: **Dr. Sheila Springer and Dr. Nicki Michalski,** Department of Communication and Media**,** Lamar University

Navigating Sexual and Emotional Communication in Generation Z University Situationships.

The phenomenon of situationships, a concept evolved from friends with benefits, casual hookups, and flings, reflects Generation Z's (Gen Z) agency and independence as t he vocal advocates of the emerging generation (Antopolskaya et al., 2022; Langlais et al., 2024). The conceptual definition of situationships is non-exclusive, undefined romantic relationships that resist clear labels or commitment but often exhibit many features of a traditional relationship, such as physical intimacy, emotional vulnerability, and the appearance

of exclusivity (Langlais et al., 2024). Utilizing qualitative interviews with 10-12 anonymous participants, we will investigate how students at Lamar University navigate these dynamics, particularly in a sexually charged environment with a lack of sex education (Stinson, 2010; Tanne, 2005). Key areas of focus will include factors such as boundaries, exclusivity, gender, dating apps, and attachment styles. By examining how partners navigate sexual and emotional communication, we aim to explore how these types of relationships impact communication patterns, boundaries, and expectations among Generation Z university students.

2:30 PM

Marie Panchot - Major in Sociology

Mentor: **Professor O'Brien Stanley,** Department of Communication and Media, Lamar University

Examining Pop Culture Theories in the Movie Some Like It Hot.

The paper "Examining Pop Culture Theories in the Movie "Some Like It Hot" delves into the 1959 film's exploration of gender norms, the male gaze, and queerness. The story follows two male musicians, Joe and Jerry, who cross-dress as women to escape gangsters. This disguise allows them to experience life from a woman's perspective, challenging traditional masculinity and expectations around gender. The paper applies Laura Mulvey's psychoanalytic theory, particularly her concepts of the male gaze and scopophilia, to examine how gender and visual pleasure are presented in the film. As Joe and Jerry navigate life in disguise, they not only view women differently but are themselves viewed through a feminizing lens. Additionally, the text discusses how cross-dressing in the film subverts masculine norms, using Antony Easthope's theories on masculinity as a social construct. Queer theory is also explored, particularly in Jerry's character; his fluidity shifts between masculine and feminine identities. The paper underscores the film's progressive handling of queer relationships, as seen in the closing scene where Osgood remains undeterred after learning Jerry is a man. "Some Like It Hot" successfully combines humor with a critical exploration of gender, identity, and queerness, making it a pop culture classic that continues to influence film and television.

2:45 PM

Helen (Rory) J West-Harp - Major in Communication – Film Studies

Mentors: **Mr. Andre Favors,** Department of Communication and Media**,** Lamar University

A Metis approach to the discourse in Crip Camp.

This essay analyzes the discourse shown in the documentary "Crip Camp", which chronicles the experiences of disabled teenagers at Camp Jened in the 1970s, emphasizing its role as a foundational space for disability activism. By using Métis methodology, the analysis highlights the importance of embodiment in disability rhetoric, challenging traditional narratives that often exclude disability from rhetorical discussions. Drawing from scholars like Dolmage, the essay argues that Métis, rooted in a rich history of disability representation, reframes disability not as a loss but as a valid and desired human variation. The discussion extends to how disability rhetoric encompasses various identities and experiences, illustrated through the stories of Camp Jened attendees and prominent activists like the late Judy Heumann. Key themes include the role of touch in communication and solidarity, the ongoing struggles for inclusion in education, and the necessity of reframing

societal perceptions of disability. Ultimately, the essay proposes that embracing a Métis perspective enriches our understanding of disability discourse, advocating for a more inclusive narrative that acknowledges the diverse realities of disabled individuals.

3:00 PM
Karen Figueroa - Major in Communication – Film Studies
Mentor: **Mr. Andre Favors,** Department of Communication and Media**,** Lamar University

Letter to Myself.

College is a time of uncertainty, a time to figure out what path in life to take and what kind of person you want to be. Through this photoshoot documentary, we will explore how people developed their gender identity and self-confidence throughout their college experience in Southeast Texas. Participants will work with me to create their dream photo shoot that showcases their identity and expression of themselves, as well as participate in interviews explaining their decisions for the concept and how the college experience affected their journey in becoming the person they are now. Along with exploring that relationship, the goal of this project is to capture people's most confident selves in a creative way, hence the reason for the title of this project. The title "letter to myself." refers to the idea that whenever the participants look back to this moment/project it will serve as a reminder to their future selves to embrace their true identity and serve as a confidence boost. Likewise, it could also be interpreted as a letter to their past self, kind of like a letter of what you would tell kid-you.

Breakout Session 2 – Galloway 128
HASBSEB Session

Chair: Dr. Sara Hillin

2:00 PM
Robyn Gerry - Major in History
Mentor: **Dr. Mark Mengerink,** Department of History, Lamar University

Music as Oppression or Hope: Alma Rosé and the Women's Orchestra of Auschwitz.

My research focuses on Alma Rose, the Women's Orchestra of Auschwitz, and how music affected not only their lives but the other prisoners. Alma Rose was the conductor of the orchestra from 1943-1944 and helped save more than twelve girls and women from annihilation in the Holocaust. The orchestra was forced to play "German music" as prisoners entered the camp, when work started, and for the SS guards. Alma was well loved not only by the musicians, but also by prisoners who saw the orchestra as an emblem of hope. Historians have disagreed on the function the orchestra's music served in the Holocaust, some saying that it accentuated the macabre of the Holocaust. I used recorded audio interviews from the survivors of the orchestra to

reconstruct its plight inside the Holocaust. With the use of primary sources such as the interviews, personal memoirs, and some secondary sources, this research illustrates how music both consoled and oppressed the musicians and prisoners in Auschwitz-Birkenau. My research proves that music was a dual-edged blade for the musicians that played it and the prisoners that listened. It either supplied them with a sense of security and hope or further immersed them in the atrocities they witnessed and endured in the camp.

2:15 PM

Avinash Sah - Major in Mechanical Engineering
Co-author: **Mariah Javed,** Department of Nutrition with Pre-med concentration, Lamar University
Mentor: **Dr. Mamta Singh,** Department of Curriculum and Instruction, Lamar University

Empowering Future Teachers with Port Education & Activities.

This study explored the knowledge and awareness of port-related activities and vocabulary among preservice elementary teachers. Using pre-mid-post assessments and exploratory learning activities, the study evaluated their understanding and confidence in these areas. The results indicated that the preservice teachers improved their port related content knowledge and vocabulary. The study also equipped future teachers with the skills to comprehend complex port education parameters and effectively convey this knowledge to their students. Additionally, it enhanced student engagement by incorporating problem-solving skills and real-world applications of port-related activities into lesson plans. Future study will assess if these preservice teachers were successfully integrating these concepts into their classroom activities, such as science experiments.

2:30 PM

Ramona Young - Major in University Studies
Mentor: **Mr. Andre Favors,** Department of Communication and Media, Lamar University

The Journey from Black to White in Southwest Louisiana: A Study of Redbones.

Method: This research explores the complex identity trajectory of mixed-race individuals in Southwest Louisiana, tracing their evolution from being recognized as Free People of Color with African ancestry in the early 19th century to increasingly identifying as white in contemporary society. Beginning in the early 1800s after the Louisiana Purchase, the legal and social frameworks established during this period for the people known as Redbones created distinct racial classifications that impacted the lives of these mixed-race people. Historical records indicate that these individuals often navigated a fluid social landscape, utilizing various strategies to assert their identities in response to systemic racism and shifting societal norms. Data Collection: The study analyzes key historical events, legislation, and cultural shifts that contributed to the transformation of racial identity. By employing a mixed-methods approach, combining interviews, legal records and newspaper accounts with historical analysis, this research highlights narratives that illustrate the challenges and successes faced by mixed-race individuals. Results: The findings reveal a significant pattern of assimilation over generations, shaped by sociopolitical factors and a desire for social mobility. Conclusions/Implications: Ultimately, this research underscores the importance of understanding racial identity as a dynamic and evolving construct, influenced by historical context and personal agency. The

journey of mixed-race people in Southwest Louisiana serves as a case study for broader discussions on race, identity, and belonging in America.

2:45 PM
Chloe Lopez - Major in English
Mentor: **Dr. Sara Hillin,** Department of English and Modern Languages, Lamar University

How Southern Gothic Authors Use Genre Tropes to Convey Their Opinions of Racism, Segregation, and Jim Crow Laws.

The Southern Gothic genre discusses the more macabre side of Southern literature, which often depicts the South as idyllic, cozy, and fertile for drama and romance to unfold. It, instead, uses the Southern United States often rural landscape and isolated communities to create a more sinister picture of the South, especially considering the legacy of slavery and segregation in the South. Race and the Southern Gothic are both intertwined in many works and, prior to now, there is and was little scholarship discussing their relationship and just how authors use the genre to speak on racism, segregation, and race in general. This paper aims to discuss how authors of the traditional Southern Gothic (1930-1994) use tropes and their subsequent imagery and evocation of fear to discuss the landscape of Civil Rights in the South, whether it be Jim Crow, segregation, the legacy of slavery, or even the aftermath of segregation in a fully integrated society. Authors often use the grotesque or a similar "freak trope" to either promote integration, display the brutality of racism, or create satire and parodies of bigoted figures. This research provides a fill-in to the gap previously discussed between the genre and racial discussions. Therefore, it allows scholars to further touch on the subject more in depth as a whole and in specific works.

Breakout Session 3 – Galloway 116
Medical Research Session

Chair: Dr. Jill Killough

2:00 PM
Vicky Longoria - Major in Biochemistry
Mentor: **Dr. T. Thuy Minh Nguyen,** Department of Chemistry and Biochemistry, Lamar University

Effect of Zinc Oxide Nanoparticles on the Biosynthesis of Ergosterol in *Candida tropicalis*.

This study aimed to investigate how lipid manipulation impact cancer cells, which depend on excessive lipids for their metabolism and rapid proliferation. Candida tropicalis was used as a model organism due to its rich sterol content, particularly ergosterol, which resembles the chemical structure of human cholesterol. This

similarity allows findings to be transferable to eukaryotic cells with further investigation. To manipulate sterol content, C. tropicalis were exposed to seven concentrations of zinc oxide nanoparticles (ZnO NPs) for 24 hours at 30°C. Optical density (OD) at 600 nm was measured to assess cell count, and 40x light-microscopic images were taken of the cells before and after ZnO exposure to visualize morphological changes. Membrane sterols were extracted using hexane, 10% KOH, methanol, and DMSO solvents. Infrared (IR) spectroscopy was performed before and after lipid extraction, and gas 14 chromatography (GC) was used for the separation and analysis of lipids after extraction. OD showed that as ZnO concertation increased, cell count decreased, despite similar absorptions across samples. Microscopically, cells retained their blastoconidia bud morphology but lost their hyphae form with higher nanoparticle levels. IR before extraction revealed a decrease in ether link intensity (at 1700-1000 cm-1 wavelength) as ZnO concentration increased, while post-lipid extraction IR indicated a reduction in carbonyl intensity (at 1700-1660 cm-1). GC supported ZnO altered ergosterol, though higher ZnO did not reduce ergosterol levels. These findings suggest zinc oxide can be used as a treatment against cells with abnormal lipid biosynthesis and can be further explored as a potential oncology treatment.

2:15 PM

Kaitlin Ricks - Major in Chemistry and Biochemistry
Co-authors: **Sergio Mendez [$], Muneeb Akhtar [$], and Ian Lian [#]**
Mentor: **Dr. Zhifo Guo,** Department of Chemistry and Biochemistry, Lamar University
[$] Department of Chemistry and Biochemistry
[#] Department of Biology

N-Amidothiourea Fluorescence Sensor for Sensitive Detection of Zn^{2+} Ions and Cell Imaging: A Tool for Plasma Membrane Analysis.

We present the development of an innovative "turn-on" fluorescent chemosensor, L1, specifically designed for the selective detection of Zn^{2+} ions in biological sengis. L1 exhibited enhanced fluorescence upon the addition of both Zn^{2+} and Cd^{2+} ions, with compositional analysis revealing a 2:1 ligand-to-Zn^{2+} stoichiometry. The chemosensor demonstrated significant selectivity for Zn^{2+}, effectively minimizing interference from other metal ions, particularly heavy metals. Comprehensive characterization techniques, including FT-IR, ^{1}H NMR, mass spectrometry, and Density Functional Theory 19 (DFT) calculations, confirmed the formation and binding mechanisms of the complex. Notably, fluorescence intensity was optimized at a pH range of 7.0 to 7.5, aligning with physiological conditions. Imaging studies using HEK293 cells validated the chemosensor's capability to visualize Zn^{2+} interactions, primarily at the plasma membrane, highlighting its potential as a valuable tool in cellular signaling research. This study emphasizes the potential of N-amidothiourea-based fluorescent sensors in the exploration of Zn^{2+} dynamics in biological systems.

2:30 PM
Richa Hoy † - Major in Medical degree
Co-authors: **Batul Shakir†, Sierra Wood, Celeste Traub, Lauren Richardson, and Ramkumar Menon (†Equal contribution of authors)#**
Mentor: **Dr. Anath Kumar Kammala,** Division of Basic Science and Translational Research, Department of Obstetrics & Gynecology, The University of Texas Medical Branch at Galveston

N Repurposing FDA-Approved Drugs to Prevent Preterm Birth: A Computational and Experimental Approach.

Background: Preterm birth (PTB), affecting about 11% of pregnancies, carries significant health risks linked to inflammation-driven fetal injury. However, no drugs have yet been approved to prevent PTB or reduce fetal inflammation, due to safety concerns associated with conducting drug trials during pregnancy. Drug repurposing and repositioning offer a promising approach to identifying existing drugs that could mitigate inflammation and help prevent PTB. Objective: This study aims to repurpose and reposition FDA-approved drugs to reduce fetal inflammation and prevent PTB, utilizing a computational approach to accelerate drug identification and validation. Methods: An initial evaluation of 10 FDA-approved drugs was conducted using ADMET-LAB, Protox-II, and AutoDock-Vina to profile absorption, distribution, metabolism, and excretion (ADME), as well as toxicity. Validation used a novel 3D-printed feto-maternal interface model. This approach was then extended to the National Center for Advancing Translational Sciences (NCATS) library of 913 compounds. Drugs were screened based on gastrointestinal absorption, toxicity profiles (neurotoxicity, cardiotoxicity, mutagenicity), and binding affinity to inflammation-related targets such as NF-kB, COX-2, JAK-STAT, and MAP/AKT. Results: Initial computational screening identified celecoxib as a promising candidate. Screening the NCATS library further highlighted 25 repurposed and 25 repositioned drugs with favorable ADME properties and low toxicity profiles. The top 10 drugs showing strong affinity to inflammatory targets were selected for further testing in micro physiological systems. Conclusion: This study supports drug repurposing as a viable path for identifying treatments to prevent PTB. The next phase will use Organ-On-Chip technology to evaluate top candidates, ultimately aiming to develop a clinician-friendly app for high-risk pregnancy management.

2:45 PM
Harvest Prater - Major in Speech and Hearing Science
Mentor: **Dr. Elizabeth Long, DNP, APRN, GNP-BC, CNS,** JoAnne Gay Dishman School of Nursing, Lamar University

Care Intervention in Aphasia Among Nursing & Speech and Hearing Undergraduates.

This study examined interdisciplinary roles between speech and hearing- and nursing students toward care interventions for aphasia. Previous researchers discovered a significant contrast in competence between nursing and speech-language pathologists when working with patients with aphasia. The objective is to assess a potential need for workplace or educational training for aphasia. Participants were interviewed about their knowledge and experiences with aphasia using a qualitative, structured interpretative phenomenological approach that identified and evaluated shared trends and perspectives on interdisciplinary pre-professional

roles among the interviewees. Interviews suggested speech and hearing students (n = 3) possessed limited knowledge of aphasia. Despite the lack of knowledge, the students recognized a nurse's capabilities when aiding aphasia patients. Similarly, nursing students (n = 3) understood speech pathologists' role in care intervention but were more aware of aphasia. When asked about nursing intervention tactics for aphasia, nursing students understood the responsibilities within their field. Their knowledge came from exposure to aphasia in classroom and practicum settings. Overall, participants from both disciplines had various levels of expertise about aphasia, and only nursing students could define care interventions and relate the concept to aphasia. However, both groups recognized the other occupations' role in aphasia. Future directions for this research will be expanding the sample size and academic level of participants and working with those interested in aphasia focusing on care interventions rather than general knowledge of aphasia. Keywords: aphasia, care intervention, nursing intervention, nursing undergraduates, speech and hearing science undergraduates.

3:00 PM

Jill Stokes - Major in Communication emphasis PR
Mentor: **Dr. Nicki Michalski,** Department of Communication and Media, Lamar University

Ethical Implications of Non- Life Saving Hysterectomies in Young Women.

This paper explores the ethical considerations surrounding non-life-saving hysterectomies in young women, specifically focusing on the permanent alteration of fertility in patients of childbearing age. Using the ethical frameworks of utilitarianism and deontology, the analysis assesses whether such procedures can be justified. A case study of a 15-year-old patient, suffering from urogynecological anomalies and considering a hysterectomy, is examined. The paper considers the potential for long-term regret, the impact on gender identity, and the psychological consequences of infertility. Through utilitarianism, the decision's ethical soundness depends on whether it maximizes overall well-being, including that of family members and the patient. In contrast, deontology emphasizes the autonomy of the patient and the moral obligation to reduce suffering, supporting the right to choose the procedure. Research findings reveal that while some women experience grief or regret post-hysterectomy, the majority report improved quality of life and satisfaction with their decision. This study concludes that the ethical implications of such surgeries are highly contextual, with utilitarianism and deontology offering divergent but insightful perspectives. Keywords: hysterectomy, ethics, utilitarianism, deontology, fertility, gender identity, patient autonomy.

Breakout Session 4 – Landes 101
Medical Research Session

Chair: Dr. Cengiz Sen

2:00 PM

Aaron Tabor - Major in Criminal Justice
Mentors: **Dr. Millicent Musyoka [#] and Dr. Vidisha Worley [$]**
[$] Department of Criminal Justice
[#] Department of Deaf Studies and Deaf Education, Lamar University

Deaf Interactions within the First Responder World: The Communication Issue.

The knowledge of American Sign Language and various communication technologies used by Deaf and Hard-of-hearing (DHH) rarely exists or does not exist in the first responders' world, particularly among law enforcement officers. Since communication is vital for DHH individuals and law enforcement officers in every incident, challenges in communication can create a barrier. The communication barrier can make it more challenging for the DHH individuals to express themselves, resulting in misunderstandings and delays in dispatching and receiving first responder services from the law enforcement officers who arrive on the scene. The current research has two primary purposes. First, to examine the nature of communication and interaction between law enforcement officers and DHH individuals. Secondly, to know the perceptions of DHH individuals when interacting with a police officer. The current study will adopt a narrative inquiry to address these two goals. The data will involve individual interviews of both police officers and DHH individuals. Content analysis was completed, and emerging themes provided guidelines to better the interactions between the Deaf and Hard-of-Hearing, and law enforcement officers.

2:15 PM

Caleb Gregory - Major in Physics
Mentor: **Dr. Rafael de la Madrid,** Department of Physics, Lamar University

The Numerical Calculation of the Energies and the Decay Energy Spectra of Quantum Mechanical Resonance.

In quantum mechanics, unstable states (called resonances) decay spontaneously. Such decays are characterized by their energies and spectra. These decay energies were calculated via the Schrödinger's equation, using square well potentials and Gram Schmidt potentials. Using Fortran and Mathematica, we were able to develop a numerical procedure to calculate the energies and the decay spectra of quantum mechanical resonances.

2:30 PM
Matthew Flores - Major in Mechanical Engineering
Mentor: **Dr. Xianchang Li,** Department of Mechanical Engineering, Lamar University

An analysis of the lift coefficient of 2D Airfoils at Hypersonic Speed.

This research was done to analyze and compare the lift coefficients of 2D airfoils when subjected to hypersonic conditions. The airfoils used were chosen due to their varying geometry and current use at subsonic and supersonic speeds. They are then simulated at hypersonic speeds using the ANSYS-Fluent Workbench 24.0 program. Once simulated with various angle of attack values, the generated data was analyzed to observe which had a higher aerodynamic lift. The focus on lift is due to much of the drag being generated by the body of an aircraft and thus a practical non-factor when just analyzing an airfoil. Given a high enough lift coefficient, the use of a proper airfoil could decrease in the power required to fly, resulting in a higher efficiency. ANSYS-Fluent Workbench 24.0 was used for its ability to perform Computational Fluid Dynamics (CFD) analysis, which gave us the values of the lift coefficients. The parameters for Hypersonic flight are defined as flight that has a Mach Number greater then 5, or a minimum velocity of 1,715 meters per second. The Mach Number (M) denotes how many times faster than the speed of sound an object is traveling. The data from the simulations thus far show that the shape of the airfoil and the angle of attack play major roles in the values of the lift coefficients. The 8 airfoils with consistently high lift coefficients will be analyzed further to design future airfoils and to make hypersonic flight more efficient and viable.

2:45 PM
Audrey Vincent-Eze - Major in Political Science
Mentor: **Dr. Christina Gregory,** Department of Political Science, Lamar University

Gender Equality Blueprint: Analyzing the Relationship of FML Policies and Cultural Attitudes in OECD Countries.

Despite advancements in gender equality, the gender wage gap remains stagnant in many developed countries. This paradox highlights the relationship progressive family leave policies have with deeply ingrained cultural attitudes that continue to shape career outcomes for women. In this research i investigate the intricate relationship between Family Medical Leave (FML) policies, cultural attitudes, and the gender wage gap in OECD countries. While FML policies are designed to support work-life balance and increase female labor force participation, preliminary findings suggest these policies may inadvertently reinforce traditional gender roles, contributing to the persistence or widening of the gender wage gap. Using a mixed-methods approach, this study analyzes quantitative data from a subset of OECD countries and explores the influence of cultural norms on policy effectiveness. The results highlight the need for a holistic policy framework that balances legislative measures with initiatives aimed at cultural change. This research provides insights for policymakers seeking to close the gender wage gap and promote true gender equality in the workforce.

Breakout Session 5 – Galloway 114
STEM 1 Session

Chair: Dr. Venkatesh Uddameri

2:00 PM
Arjun Shrestha - Major in Computer Science
Mentor: **Dr. Sujing Wang,** Department of Computer Science, Lamar University

Sentiment Analysis of Weather Disasters: A comprehensive Evaluation from Reddit Data.

LLms models are widely Implemented to gain perspective into the data and comprehend the foundations and emotions of what is going on, as well as what the data can give to the community or any organization in order to assist get things done. Detecting human emotions using simple text and machine learning models is a novel technique to assess and interpret emotional context, improve humancomputer interaction, and create individualized user experiences. As of now Two models have been used Transformer Model(Roberta) and Deep Learning Neural Network(LSTM) These two models with different 20 techniques have been combined to achieve higher and improved the efficient accuracy . The Weather disasters play a vital role in human's life. The model utilizing the LSTM stack achieved 82% accuracy, while the model without the LSTM stack reached 91% accuracy. The people have found a platform to express their experiences through a social media platform. The challenges people go through, the disasters are crucial and effects different household's activities. In this wake of storm events understanding the public sentiments and the collective response of the affected communities has become Important. Social media platform, especially Reddit, have become a vital source of real-time information, people sharing personal experiences, and community support during such natural disasters. Reddit, with its vast and active user base, provides a rich repository of public opinions and that can be analyzed to scale the public sentiment. There has been a lot of Sentiment analysis but in this work, We Compare and contrast various hybrid and individual models to analyze the sentiments of the people using different large language models and different techniques to provide more efficient result. This will help to understand the comprehensive impact.

2:15 PM
Sambeg Dhakal - Major in Computer Science
Mentor: **Dr. Sujing Wang,** Department of Computer Science, Lamar University

Social Media Data Analysis for Community Disaster Resilience: Emotion Detection and Prediction Using Neural Network Models.

Community disaster resilience refers to the ability of the community to withstand, adapt, and recover from the adverse impacts of disasters. COVID-19 is a recent pandemic that caused a lot of issues around the world. This paper indulges in determining how people reacted during this pandemic. It involves the analysis of public Tweets from the United States to assess their emotions during that period. Social media platforms have emerged as a powerful tool that facilitates real-time information sharing, so social media has been a popular medium for expressing emotions. Hence, analyzing emotions from these rich sources of data helps us understand the profound impacts that disasters have on community resilience. This paper utilizes advanced machine learning and data science techniques like neural networks to develop an effective and efficient framework/model from scratch to analyze social media data which is further tested against human labeling for better accuracy. The goal of the paper is to leverage the framework in future cases where similar kinds of disasters might occur.

2:30 PM

Arip Syaripudin Nur - Major in Civil and Environmental Engineering
Mentor: **Dr. Yong Je Kim,** Department of Civil and Environmental Engineering, Lamar University

Comprehensive Assessment of Ground Subsidence using InSAR, GIS, and Deep Learning in the Southeast Texas Coastal Region.

The rising global sea level, a consequence of climate change, poses a significant threat to coastal areas. Southeast Texas (SETX) is particularly vulnerable to submersion by seawater, primarily due to heightened flooding compounded by subsidence. Monitoring subsidence in the coastal zone contributes to elevated sea levels, amplifying the frequency and intensity of flooding. Consequently, assessing ground subsidence and its associated geohazards along the SETX coast is crucial for effective engineering risk management and monitoring-use planning. This study aims to identify subsidence-prone areas in SETX and quantify the rate of subsidence in recent years through time series analysis, specifically focusing on its impact on flooding. The study employs the Persistence Scatterer Interferometric Synthetic Aperture Radar (PS-InSAR) method, utilizing Sentinel-1 SAR satellite data collected during ascending observations from 2020 to 2024. Notably suited for urban environments, the PS-InSAR method captures stable signal scattering detected by SAR satellites. The findings will illustrate the spatial and temporal distribution of monitoring subsidence, providing insights into its evolution and its implications for flood risk in coastal regions. Validation of results will be carried out using GPS station data dispersed across the study area. Further analysis of ground subsidence in SETX will involve susceptibility mapping employing Geographic Information System (GIS) and deep learning models. InSAR measurements will be utilized as an inventory map to generate ground subsidence susceptibility maps. Potential factors contributing to ground subsidence will be collected and subjected to analysis, assessing their relationship with subsidence occurrences using frequency ratio method and multicollinearity tests. Deep learning algorithms, 16 including convolutional neural networks (CNN), will be employed to generate ground subsidence susceptibility results, and comparisons will be made with conventional machine learning algorithms such as logistic regression and random forest. Accuracy assessments will be based on metrics like root mean square error (RMSE) and area under the curve (AUC). This comprehensive study aims to significantly contribute to ground subsidence mitigation, flood warning, and prevention in the SETX area.

2:45 PM
Md Saffiquzzaman Chowdhury - Major in Civil Engineering
Mentor: **Dr. Yong Je Kim,** Department of Civil and Environmental Engineering, Lamar University

Comprehensive Analysis of Ground Deformation in Beaumont, Texas: Integrating PS-InSAR, and GeoDetector Techniques to Evaluate Impact Factors and Their Interactions.

This research focuses on Beaumont, Texas, situated in Jefferson County along the vulnerable Gulf Coast, an area notably susceptible to subsidence due to its complex geological characteristics. The choice of this locale is driven by its exposure to fluctuating subsidence rates, influenced by a combination of natural and anthropogenic factors such as soil composition, water extraction, and land use changes. Utilizing Interferometric Synthetic Aperture Radar (InSAR) techniques, specifically Persistent Scatterer Interferometric Synthetic Aperture Radar (PS-InSAR), this study capitalizes on the high precision of these methods in monitoring minute ground movements over time. PS-InSAR is particularly effective in urban areas and regions with stable, reflective surfaces, making it ideal for studying subsidence, infrastructure stability, and geological hazards. This methodology's suitability is demonstrated through the analysis of 28 Sentinel-1 SAR satellite images collected in an ascending orbit configuration from January 2023 to December 2023. By applying the PS-InSAR technique, the study captures line-of-sight (LOS) deformation ranging from +20.4 mm to -21.9 mm throughout the year, highlighting significant ground movement. Further investigation reveals that road density (19.9%) and built-up area (16.8%) have a more pronounced impact on ground deformation compared to precipitation (11.73%) and temperature (10.31%). Using the geographical detector (geodetector) tool, this research quantifies the influence of each factor on spatial ground deformation patterns throughout Beaumont and its surrounding areas. Additionally, it explores how weather patterns specifically impact the most subsidence-prone areas, providing insights into the dynamic interplay between urban development and natural environmental changes in shaping the region's ground stability.

3:00 PM
Rishi Bharadwaj - Major in Electrical Engineering
Mentor: **Dr. Cristian Bahrim,** Department of Physics, Lamar University

Changing the Reflectivity of Silica Surfaces Using the Coherent Coupling Between Two cw-Laser Beams.

We report experimental results of coherent interference between two linearly polarized 532 nm laser beams of different brightnesses superimposed on a silica glass surface and assisted by an energy background from a voltage set across the surface. The parallel reflectance of the weak probe for incidence angles near Brewster angle is measured and next, is calibrated and normalized to the total reflectance. Plotting this reflectance versus the angular position of the probe laser beam incident on the silica surface reveals a sinusoidal pattern observed over an angular range of 5° near the Brewster angle. The reason for this finding is because the laser beams create an array of aligned dipoles on the surface that act as a diffraction grating. The experimental

angular separation, $\Delta\theta = \lambda/d$, between the first three adjacent maxima is $\Delta\theta = 1.571°$, and the geometric characteristic, d, of the polarized array of silica dipoles is calculated as being 0.0194 μm. The interference structure shows a change in the optical reflectivity of the silica surface with a reduction in the reflectivity at minima and an enhancement of reflectivity at maxima. We find that the index of refraction (and the Brewster angle) shifts from 1.5211 (and 56.678°) at no voltage, to 1.6053 (and 58.079°) at 3.3V. This reduces the angular separation between adjacent maxima of interference from $\Delta\theta = 1.571°$ at no voltage, to 0.649° at 3.3V. We find that higher voltages shrink the interference pattern. Our results show an excellent agreement between the theoretical and experimental results at low voltages.

Breakout Session 6 – Galloway 122
Mechanical Engineering

Chair: Dr. Sushil Doranga

2:00 PM

Md Admay Amif - Major in Mechanical Engineering
Mentor: **Dr. Jack David,** Department of Mechanical Engineering, Baylor University

Quantification of Sub-Surface Wrinkles in Woven Carbon Fiber Reinforced Polymer Laminate Using High-Resolution Ultrasound.

Carbon fiber reinforced polymer (CFRP) composites are highly favored in the aerospace and automotive sectors due to their lightweight, excellent strength, and corrosion resistance. Nevertheless, imperfections like wrinkles or distortions in the composite layers significantly diminish their mechanical properties and structural soundness. This study introduces a manufacturing process to consistently produce out-of-plane wrinkled panels using woven carbon fiber reinforced polymer (CFRP), replicating the wrinkles observed in real-world applications involving thick composite structures. The individual geometries of each lamina were extracted from fabricated samples containing embedded wrinkles, which are captured through ultrasonic waveforms generated by single-element conventional ultrasonic (UT) scans. A methodology is presented for characterizing the wrinkle attributes of each lamina, including the spatial variation in wrinkle height and intensity. Through visual inspection, parts are produced with visually imperceptible wrinkles using a wet layup process and a hot press for curing. Scanning was carried out in a conventional immersion tank scanning system, and the scan data was analyzed to detect and characterize the subsurface wrinkles. Layer extraction was performed by tracking voltage peaks from A-scans in the time domain, followed by spatial Gaussian averaging to smoothen the A-scans, enabling the extraction of surface profiles for each lamina. Wrinkles with wrinkle heights and intensity were presented as a function of layer numbers in a 27 laminae part. The extracted wrinkle surfaces align closely with the anticipated wrinkle geometry.

2:15 PM
Mahsa Khademi - Major in Mechanical Engineering
Mentor: **Dr. David Jack,** Department of Mechanical Engineering, Baylor University

Automated Defect Detection and Quantification in Honeycomb Sandwich Panels Using High-Frequency Ultrasound Testing.

Honeycomb sandwich panels are widely used in industrial applications due to their high bending resistance relative to their weight. Defects between the core and facesheet, however, compromise their integrity by hindering load transfer. While current nondestructive testing methods focus primarily on defect detection, this study introduces a high-frequency ultrasound testing (UT) approach that not only detects but also quantifies defect geometry and type, automating the entire process. Two automated methods were compared: one using signal energy and the other utilizing thickness data. Testing was conducted using two setups: a laboratory-scale immersion tank and a novel portable UT system, both 13 enabling single-side access. The study included coupons with defects ranging from 5 to 40 mm in diameter, such as missing adhesive, foreign objects, and removed core sections. An algorithm was developed to quantify defect perimeters, achieving successful detection for all coupons, with an average error of 0.6 mm in defect diameter—significantly lower than the typical detectability limits of 15-25 mm. Results highlight the potential of this automated UT approach for effective defect detection and quantification in honeycomb sandwich panels.

2:30 PM
Nafiz Ahmed Badhan - Major in Mechanical Engineering
Co-authors**: S M Yeasin Habib[$], Zhe Fan[$,*], Xinchang Zhang [#], and Cheng Sun[%]**
Mentor: **Dr. Xuejun Fan,** Department of Mechanical Engineering, Lamar University
[$] Department of Mechanical Engineering, Lamar University
[#] Idaho National Laboratory, Idaho Falls
[%] Clemson University, Clemson, SC

Effects of Cr Addition on the Corrosion and Mechanical Properties of the AlMoNbTi High Entropy Alloy.

This work evaluates the effects of equimolar Cr addition on the corrosion and mechanical properties of the AlMoNbTi high entropy alloy (HEA) by comparing it with the CrAlMoNbTi HEA. Microstructures of the alloys were characterized using optical microscopy and scanning electron microscopy (SEM). The microstructural analysis revealed elemental segregation of both alloys. Electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization tests were performed in a 3.5 wt.% of NaCl solution at room temperature for the evaluation of corrosion properties of the alloys. The EIS test revealed that by the inclusion of Cr the charge transfer resistance doubled, while the potentiodynamic polarization test indicated the corrosion current decreased by 50%. Because of the heterogeneous microstructures of the alloys, nanoindentation tests were performed to find the localized mechanical properties of different regions. However, there were no significant difference in the hardness and reduced modulus of the alloys. The hardness mapping, microstructures, and X-ray diffraction data indicate that all three specimens have at least two phases

in their microstructures. Both specimens' experimental results are compared with conventional carbon steel alloy C1060 for better understanding the performance of these two alloys. Acknowledgement: Corrosion, HEAs, electrochemical impedance spectroscopy, two phase microstructures. *Corresponding authors: zfan.phd@gmail.com, xfan@lamar.edu.

2:45 PM

S M Yeasin Habib - Major in Mechanical Engineering
Co-authors**: Nafiz Ahmed Badhan and Zhe Fan**
Mentor: **Dr. Xuejun Fan,** Department of Mechanical Engineering, Baylor University

Effects of Al Addition on the Corrosion and Mechanical Properties of NbTaTiV High Entropy Alloy.

High-entropy alloys (HEAs) are known for their excellent microstructural stability, mechanical properties, and corrosion resistance owing to the high configurational entropy by multiple principal elements. NbTaTiV, a refractory HEA, is particularly interesting because of its high melting point (2275°C), good ductility with high compressive fracture strain (>40%), high yield strength and wear resistance. Alloying with other elements, such as Al, Cr, and Zr, has the potential to further improve these properties. In this study, we investigated the impact of Al addition at an equimolar ratio on the NbTaTiV HEA system, as it not only has the potential to improve the corrosion resistance and mechanical properties but also reduces the alloy's density and production cost. The alloys were prepared by casting and homogenization. X-ray diffraction (XRD), backscattered electron scanning electron microscopy (BSE-SEM) and energy dispersive X-ray spectroscopy (EDS) techniques were used for the characterization of the alloys. To evaluate the corrosion resistance, electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization experiments were performed in a 3.5wt% NaCl solution at room temperature. Optical microscopic photographs of the surface were taken before and after the corrosion experiments to detect the presence of pitting or crevice corrosion. The localized mechanical properties of the alloys, such as hardness and modulus, were measured using nanoindentation. The XRD results revealed that both alloys are BCC solid solutions. The BSE-SEM and EDS images revealed a lower level of elemental segregation in the AlNbTaTiV HEA in contrast to the NbTaTiV HEA. The EIS results indicated that the addition of Al leads to an increase in the charge transfer resistance (~40%), which means higher corrosion resistance. However, the potentiodynamic test revealed that above 1.5V, the AlNbTaTiV HEA's passive film dissolves leading to pitting corrosion, whereas the NbTaTiV HEA formed a second metastable passive film that protected it from pitting. Nanoindentation tests showed that adding Al increases the hardness (~10%) and modulus (~10%) of the matrix. Al addition also increased 11 the density of titanium precipitation, especially along grain boundaries, which may enhance the alloy's strength, hardness, creep resistance, and wear resistance. In summary, adding Al to the NbTaTiV HEA can improve both the mechanical properties and corrosion resistance of the alloy, except in scenarios where pitting corrosion might occur. These findings contribute to the ongoing development of HEAs for better performance in various industrial applications. Acknowledgements: This research was funded by the U.S. National Science Foundation (NSF), Award Number: 2138674

3:00 PM

Nafiz Ahmed Badhan - Major in Mechanical Engineering
Co-authors**: S M Yeasin Habib[$], Zhe Fan[$,*], Saifur Rahman[#] and Ahmad Amiri[%]**
Mentor: **Dr. Xuejun Fan,** Department of Mechanical Engineering, Lamar University
[$] Department of Mechanical Engineering, Lamar University
[#] ATSP Innovations Inc., Houston
[%] Russell School of Chemical Engineering, The University of Tulsa

Corrosion Protection Performance of Aromatic Thermosetting Copolyester Coatings on Steel in 3.5 wt.% NaCl Solution.

This study investigates the corrosion protection performance of two advanced polymer coatings sample of Aromatic Thermosetting Copolyester (ATSP), using electrochemical impedance spectroscopy (EIS). Two ATSP samples were labeled as ATSP-Powder (ATSP-P) and ATSP-Solution (ATSP-S) based on the coating application procedure. The results were compared with a commercially available polymer, IMP 444 (IMPREGLON). Carbon steel plates were coated with each of the three polymers in different methods and immersed in a 3.5 wt.% NaCl solution at room temperature. After six months of immersion, the ATSP-P and IMP 444 coatings exhibited no significant signs of corrosion, as evidenced by the high 5 impedance measured in the EIS tests. Both coatings also demonstrated excellent corrosion resistance during accelerated AC-DC-AC tests from -2V to -9V, with no noticeable drop in impedance. Conversely, while ATSP-S initially showed high impedance, its performance declined significantly after one week of immersion due to polymer breakdown. Substantial corrosion was observed on the ATSP-S-coated steel after 108 days of immersion. The findings indicate that ATSP-P outperforms IMP 444 as a polymer coating, while ATSP-S requires further modification to enhance its corrosion protection capabilities.

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Book of Abstracts

Part II

Poster Presentations

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SEE FOR YOURSELF

Poster 1

Presenter: **Kayode Adeoye** [$] / GR-S / In progress / Welch project
Major: Chemistry and Biochemistry
Email: kadeoye@lamar.edu
Mentor: Dr. Paul Bernazzani [$]
[$] Department of Chemistry and Biochemistry, Lamar University

Investigating the Potential of an Amylose/Pectin Composite for Organic Contaminants Remediation.

The environmental impact of pollutants such as heavy metals, organic dyes, and industrial waste has prompted the development of advanced materials capable of detecting and removing contaminants efficiently. Biopolymer-based composites of polysaccharides have been shown to bind to heavy metals and could offer a sustainable method for the remediation of organic contaminants. In this study we explore the potential of a composite material composed of amylose, a linear polysaccharide derived from starch, and pectin, a Herero polysaccharide found in plant cell walls, for the adsorption of environmental organic contaminants. This study investigated the thermal stability of amylose and pectin polymers, crucial components in plant-based materials, using (DSC).

Poster 2

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Investigating the Addition of Nanoparticles to the Melting Temperature of PEEK.

Next generation semi-conductors will require novel packaging materials with high temperature resistance. Polyether ether ketone (PEEK) is a high-performance thermoplastic known for its excellent thermal stability, making it a good starting material, however, enhancing its thermal resistivity is essential for expanding its application in high-temperature environments. This study investigates the effect of incorporating titanium dioxide (TiO2) nanoparticles on the thermal behavior of PEEK. A series of PEEK/TiO_2 composite films were prepared by dissolving PEEK in concentrated sulfuric acid and mixing with TiO2 dispersed in methanol. The thermal properties of the composites were evaluated using differential scanning calorimetry (DSC). Results indicate that the addition of TiO2 nanoparticles significantly increases the melting temperature and thermal stability of PEEK, making the composite material more suitable for high-temperature applications

Poster 3

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Perfluorooctanoic Acid Monohydrate (PFOA-H_2O) Studied by Molecular Rotational Resonance (MRR) Spectroscopy.

As a part of efforts to determine the utility of MRR spectroscopy as a novel tool for fast detection of PFOA in environmental samples, a Bright Spec broadband MRR spectrometer, which operates in 2-8GHz, has been employed to record the rotational spectrum of perfluorooctanoic acid monohydrate (PFOA-H2O). The observed spectrum shows well-resolved rotational patterns due to MRR's sensitivity to conformational changes. With the aid of quantum chemistry calculation, one conformer has been assigned by adding each measured rotational to the fit one by one until all three rotational constants (A, B, C) are well determined. The final fits have been performed using Pickett's SPFIT Suite. Additionally, the validity of PFOA-H2O as a prolate symmetric molecule has been evaluated. The work to assign other conformers is underway and will be reported in the future.

Poster 4

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CFD Modeling of Methane Gas Release from an underground pipeline.

Subterranean pipelines are crucial for transporting natural gas and light hydrocarbons globally, but these pipelines carry the risk of ruptures that can release hazardous materials, leading to severe financial and human consequences. Effective consequence modeling necessitates a deep understanding of gas flow dynamics and its atmospheric escape to develop robust preventive and mitigation strategies. This research focuses on developing a computational fluid dynamics model in ANSYS Fluent to simulate the flow of gas from ruptured subterranean pipelines, addressing the critical need for better safety measures. By integrating advanced modeling techniques in ANSYS Workbench, the study aims to predict gas flow regimes such as diffusion, fluidization, and crater formation under various conditions. The model will be validated with experimental work conducted by Yan et al. and assessed for its ability to predict methane concentrations and flow behaviors. This work provides a valuable tool for understanding and mitigating the risks of underground pipeline breaches.

Acknowledgement: This study was supported by the Welch Foundation grant AT-2111-20220331 and the US Department of Defense CDMRP grants W81XWH-19-1-0741, W81XWH-21-1-0176, W81XWH-22-1-0105, W81XWH-22-1-0003, HT9425-23-1-0062, and HT9425-24-1-0287.

Poster 5

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A Numerical Analysis of Engine Characteristics with Biodiesel.

Transportation sector is developing day by day, with the increasing number of populations. Still now it is much more dependent on petroleum-based fuels which are derived from non-renewable crude oil reserves. The extraction of this fuel is troublesome and costly, which makes if more demanding and the price is increasing as well. Besides this, this source of energy is also depleting on an alarming rate that it has become a concern for the world. Moreover, excessive consumption of petroleum-based fuel has serious consequences on climate change as it is one of the contributors to GHG (Green House Gas) emissions. By keeping in mind these issues, it is now claimed that biodiesel can be a powerful source of energy which can replace the conventional fuels in the transportation sector which has also the potential in mitigating carbon emissions. The aim of this study is to focus on performance and emission characteristics of diesel engine with biofuel blended with diesel. This numerical study will add a new dimension of research for the potential candidate of conventional diesel fuel.

Poster 6

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Preliminary Study of Temperature Variations within Pervious Concrete-Aggregate Systems.

The urban heat island effect (UHI) is a phenomenon in which cities or other highly urbanized areas experience higher overall ambient temperatures as compared to rural areas. This is primarily due to the large number of structural materials present in urban areas which have a greater capacity to store thermal energy as compared to vegetation. Pervious concrete (PC)-aggregate systems are well known for their stormwater management properties, but further research into their impact on UHI is needed to see what positive or negative

environmental impacts it may have in urban centers. For this study, temperature data from two PC-aggregate systems (with different site characteristics) on or near the Lamar University campus in Beaumont, Texas, are being analyzed to better understand what drives the temperature variations in these systems. Analyzing this temperature data is an important first step in determining what impact these systems may have on UHI**.**

Poster 7

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Modeling Climate Change Impacts on Southeast Texas Coast waterbodies.

With the increasing frequency of disasters, Southeast Texas coastal regions are prone to higher risk of heat, freeze, flooding, and storm surges than before. Intensified land erosion by waves currents during events of flooding and storm surges and water temperature change under extreme hot and freeze conditions due to climate changes had emerged. To understand the impacts of climate change, a 3D hydrodynamic model using Environmental Fluid Dynamics Code Plus (EFDC+) was developed including the Sabine Lake and its two major inflows – Neches River and Sabine River using the updated 1-meter resolution Lidar data with bathymetric sonar data developed by United States Interagency Elevation Inventory. The boundary and initial condition data were collected from USGS, NOAA, TCEQ, and NWS. The model calculated the time series of flow vectors and temperatures to demonstrate the hydrodynamics and a warming process due to dry and extra heat conditions. The flow vector responded to the wind speed and direction and strong wind action pushed the water to cause erosion along the shoreline of the Sabine River. The results showed that the hydrodynamics and water temperature are impacted by the meteorological data, wind and tide conditions, flows from the interconnect waterbodies. In summary, this study provides useful outputs may be used for understanding the flow characters and temperature profile of the Sabine Lake, gives a possibility of a fundamental knowledge for more complex hydrodynamic and water quality modeling to unveil the impact of hydrology and meteorology variability in the future climate conditions.

Poster 8

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Preliminary Study of Vibrations in Rainfall Distribution in Southeast Texas.

Variation in rainfall data over a small-gaged area is a subject of interest to hydrology works and spatial analysis. Variations could be a result of various factors such as topography, vegetation, proximity to water bodies, wind direction, seasonal changes or urbanization. Sometimes, it could be as a result of a gage calibration. In this research, daily rainfall accumulation data between January and September 2024 were obtained and compared from two Low-Cost Flood Sensors (LU01 & LU02) within Lamar University which are less than a mile apart. To confirm the accuracy of the rain data obtained from each rain gage, the data will be compared with data from a weather station nearby (less than a mile) and other rain gage stations belonging to Lamar University. Variations during individual daily events and over the 9 months periods were observed. It was observed that LU03 experienced more rainfall than LU02. Further research will include possible causes of the variations and likely effects of such variations. The variations will be useful in understanding the advantages, limitations and usability of the Low-Cost Flood Sensors and the accuracy of the rain data in modeling watersheds.

Poster 9

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Study of Ships' Travel Delay in Staying Turning Basins in Deep-draft Inland Waterways: Application to Sabine-Neches Waterway.

The turning basin in a deep-draft inland waterway provides the space for big ships to stay and wait (e.g., for taking bunker) when heading in a narrow channel if its actual destination docks are not available. Such stay and wait causes some serious delay. In this study, we aim to investigate the travel patterns of such stay and wait in these turning basins, and investigate the delay associated with such travel patterns with the AIS data. In this study, we employed the AIS data collected from May 1st to July 15th of 2022 in the Sabine-Neches Waterway (SNWW), a vital maritime route serving Southeast Texas with several turning basins. To maintain safe and efficient water transportation, it becomes imperative to deepen the waterways, especially considering the growing demands of local energy industries and ports. The study develops a comprehensive methodological framework to identify ships' travel patterns if they have to stay and wait in these turning basins, and then to estimate the travel delay associated with such stays and waits. All AIS data were analyzed based on a PostgreSQL database with a GIS package. The implementation shows the effectiveness of the proposed methods, and the revealed travel patterns and the delay helps the waterway management authority better understand the effectiveness of the channel, and it can also help them better arrange the traffic of ships

in the channel to reduce the travel delay. The proposed methods can be also applied to other inland waterways with turning basins.

Keywords: waterway transportation, delay, turning basin, AIS data.

Poster 10

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Stress Analysis of Piping with Expansion Loops by Using Finite Element Method.

The primary means of transporting fluids across an industrial facility is through piping systems. The stresses caused by the operating fluid's heat effects have a significant impact on the design and routing of pipes. Long pipes that are subjected to large temperature variations frequently experience substantial thermal stress and thus displacement. To allow for thermal expansion and contraction and avoid undue strain and possible failure, an expansion loop is an essential part of piping systems. The negative impact is that expansion loops require extra supports, elbows, bends, and associated structures, and thus more room. To ensure the system's integrity and safety, it is critical to assess the stresses and deformation of the piping system under thermal loads.

By using the ANSYS workbench, a finite element analysis is conducted in this study to examine the displacement and stress distribution along a pipe with different types of expansion loops. By varying the loop length, width, bend radius, and number of loops, the maximum stress as well as its location can be identified and formulated. For example, for a specific length and width of an expansion loop, the maximum stress becomes lower when multiple loops are adopted. The maximum stress can also be reduced when the loop length increases while the other parameters remain the same. This study can help acquire the optimal design within a certain safety factor.

Poster 11

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Mixed Reality Flood Simulation and Analysis at Lamar University.

Flooding is a critical issue affecting the Southeast Texas area. Mixed Reality (MR), an emerging technology that integrates computer-generated sensory inputs into real-world surroundings to create immersive and interactive environments, can serve as a powerful tool for predicting and simulating potential floods in support of flood management and resiliency analysis. This project utilizes Microsoft HoloLens 2 to create an MR experience that simulates flooding scenarios on the Lamar University campus. Through a 3D map from Google Earth, users can interact with flood conditions ranging from light rain to heavy downpours. The MR platform provides real-time flood simulations, featuring red markers to identify flood-prone areas and wave animations to depict rising water levels as rain intensity increases. It also includes a simulation of Hurricane Harvey (which occurred on August 29, 2017, and lasted approximately five days), using datasets from the Civil & Environmental Engineering department at Lamar University.

This research demonstrates the potential of MR technology to enhance flood risk visualization, making it an invaluable tool for flood management and resiliency-focused research, teaching, and outreach. The MR platform allows researchers to gain deeper insights into flood scenarios, offers students an interactive and immersive learning experience, and raises awareness about flood resiliency through various Lamar University events, such as Cardinal View for prospective students, new student orientation, and summer camps for local K-12 students.

Poster 12

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Dissolved Oxygen Prediction Using Long Short-Term Memory-Based Deep Learning Models with Recurrent Transfer Learning.

Simultaneous extreme climatic events, e.g., flooding/heat, droughts/heat, are potentially capable of destabilizing hydro-meteorological conditions to deteriorate river water quality. Machine learning (ML) models utilizing wireless sensor measurements have been applied to predict dissolved oxygen (DO) in various water management systems. This study aims to develop DO models based on Long Short-Term Memory (LSTM) to facilitate decision-making in water supply management. Hourly measurements of DO, water temperature, sample depth, conductivity, pH, turbidity, and discharge, are adopted for model development at the Pine Island Bayou C749 station and Neches River Saltwater Barrier. LSTM and Bi- direction LSTM (BiLSTM) with and without Attention mechanism (AT) are selected to develop DO models. Recurrent transfer learning (RTL) is utilized to overcome the insufficient data at the Saltwater Barrier. Moreover, Integrated Gradients (IG) algorithm is applied to analyze feature importance. The AT-BiLSTM and RTL-LSTM models achieved the best performance at the station C749 (RMSE=0.054) and Saltwater Barrier (RMSE=0.028),

respectively. Meanwhile, DO, temperature, and pH were identified as the important features, consistent with the physical model. Furthermore, the best model was employed to conduct 14- day DO estimations at the station C749 through the rolling forecast procedure under drought and flooding events for practical applications. The forecasts revealed the obvious decline in DO levels under high temperatures during drought events, and the possible hypoxia after the flood peak due to increasing temperatures and nonpoint sources carried by the floodwater. In conclusion, LSTM-based models are recommended as an alternative tool to monitor water quality to provide information for water management.

Keywords: Dissolved Oxygen (DO), Wireless Sensor, Deep Learning, Long Short-Term Memory (LSTM), Attention Mechanism (AT), Recurrent Transfer Learning (RTL), Flood/Drought Events.

Poster 13

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Using Artificial Neural Network Models to Understand and Predict Baseball.

Major League Baseball (MLB) is one of America's largest sports and is uniquely suited for data-driven analysis and prediction due to the volume of games and data collected (around 7 TB per team per game). This vast dataset provides ample independent variables for research and is accessible to the public, enabling a range of applications from gambling and fantasy leagues to team scouting.

Given baseball's discrete, quantifiable nature, it is ideal for statistical analysis and serves as an effective training ground for machine learning models, including Artificial Neural Networks (ANNs). In this study, we use variables such as release position, spin axis, release velocity, and acceleration to predict pitch location as our dependent variable. This initial model lays the groundwork for a more complex ANN, wherein the predicted pitch location will serve as an independent variable in a larger network. The ultimate goal is to predict whether a batter will reach base by building a multi-node neural network model with hidden layers, leveraging pitch location as an influential factor.

This research highlights the potential of artificial intelligence in sports analytics, with applications that may enhance team strategies and player performance evaluations.

Keywords: Logistic Regression, Predictive Modeling, Classification, Sports Analytics.

Poster 14

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Exosomal Interleukin-10 (eIL-10), a Novel Anti-Inflammatory Therapeutic for Preterm Birth: Evaluation of Cell-Secreted Metabolites at the Placenta and Fetal Membrane Fetal-Maternal Interfaces.

Background/Introduction: Inflammatory pathways are implicated in parturition signals at the fetal- maternal interface (FMi) preceding preterm labor. Exosomal IL-10 (eIL-10), a novel therapeutic designed to target these pathways and delay preterm parturition, has shown success in reducing preterm delivery in mice models. Little is known, however, about its effects on human FMi local metabolism. In this project, an organ-on-chip (OOC) biomimicking both FMis (placenta/fetal membranes) was utilized to assess eIL-10-induced secreted metabolic changes.

Methods: OOCs were loaded with maternal (decidua), placental (trophoblasts-endothelial), and membrane (chorioamnion) cell and collagen layers. PKH26-eIL-10 treatment was added to the decidua, and live cell imaging documented maternal-to-fetal exosome propagation. After 3 days, media was collected from each layer and processed for untargeted mass spectrometry. Devices without eIL-10 were used as a control. Top abundant compounds, along with differently produced compounds between control vs. eIL-10 devices, were evaluated and assigned to their most implicated metabolic pathways and cellular localizations.

Results: Cell layer-specific metabolites were identified; however, most abundant compounds were similar across treatment groups. Across maternal and fetal layers, eIL-10 treatment upregulated compounds were classified in glutathione, fatty and salicylic acid, and various subtypes of amino acid metabolism and found to exhibit anti-inflammatory functions (traumatic acid, 9-oxononanoic acid, and tyrosol) compared to controls. Treatment also downregulated inflammatory pathway-associated compounds, e.g.arachidonic acid and inflammatory neuroactive peptide metabolism.

Conclusion: eIL-10 has been shown to reduce maternal inflammation and delay preterm birth in mice. Here, we augment these pre-clinical studies by documenting eIL-10s' ability to cross both FMis and induce cellular level anti-inflammatory metabolic changes.

Poster 15

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Novel Organ-On-Chip Devices for Modeling Reproduction and Pregnancy-Related Organ.

Introduction: Drug testing in obstetrics is challenging as two patients, mother and fetus, must be evaluated. Animal models structurally nor functionally mimic human tissue contributing to these discrepancies. To overcome these limitations, we have developed six organ-on-chips (OOC) that represent the structure, functions, and responses of various human intrauterine organs.

Methods: OOCs were fabricated in poly(dimethylsiloxane) (PDMS) with two-step photolithography and soft lithography. PDMS chambers were plasma bonded to glass to make them hydrophilic. Devices contained an on-chip reservoir generated by acrylic milling for long-term media storage. Reservoirs were aligned on top of inlets/outlets of chambers and bonded. Human-derived primary cells were isolated, immortalized, and utilized within each respective OOC system.

Results: The Fetal membrane-OOC contains four cell chambers filled with decidua, chorion trophoblasts, and amnion cells connected by arrays of microchannels. The placenta-OOC is comprised of three rectangular chambers containing syncytiotrophoblasts, cytotrophoblasts, and umbilical cord endothelial cells connected by horizontal microchannels. Fetal membrane-placenta-feto-maternal interface-OOC combines both chips into one device biomimicing all cellular and collagen layers. The second-trimester placenta villous-OOC contains six representatives maternal (vessel/decidua) and fetal (trophoblasts/stroma/vessel) cell chambers. The vaginal-cervix-decidua-OOC is composed of six cell chambers (vaginal epithelium, cervix epithelium/stroma, decidua) to mimic the lower female uterine tract. Additionally, a two-chamber-OOC can be used to study segments of these interfaces.

Conclusion: These OOC platforms can be used as novel tools to study physiological and pathological pregnancy conditions, conduct preclinical trials, and conduct toxicology screening. These advances also minimize the need for animal model testing in obstetrics research.

Poster 16

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In-Silico Evaluation of FDA-Approved Compounds for Safe Use in Pregnancy: Targeting Preterm Birth Prevention.

Background/Introduction: Pregnant women are often excluded from clinical trials, leaving a significant gap in safety data for many FDA-approved drugs. This knowledge gap poses risks due to unclear drug effects on both mother and fetus. This study aims to evaluate the safety and pharmacokinetics of FDA- approved drugs, focusing on those that may reduce inflammation and prevent preterm birth (PTB)..

Objectives: To apply a computational approach to assess the safety of various classes of FDA-approved drugs for use during pregnancy by evaluating their absorption, distribution, metabolism, excretion (ADME), and toxicity profiles, identifying compounds with favorable maternal-fetal interactions.

Methods: A screening of 3,113 compounds from the FDA-approved drug library (Selleckchem.com) was conducted using ADMET LAB 2.0 for pharmacokinetics and ProTox 3.0 for toxicity. Drugs were grouped by mechanism of action, including anti-infectives, H1-antagonists, 5-HT receptor agonists, adrenergic receptor agonists, COX inhibitors, and anti-epileptic agents. Compounds were assessed based on gastrointestinal absorption, organ toxicity, neurotoxicity, respiratory toxicity, cardiotoxicity, and mutagenicity, filtering those with anti-inflammatory potential and low toxicity.

Results: Of the 3,113 compounds, 1,320 had high absorption. Following toxicity screening, 50 compounds with favorable ADME and toxicity profiles remained. The top drug classes included 5-HT receptor agonists, adrenergic receptor agonists, anti-infectives, and COX inhibitors, showing minimal toxicity and potential anti-inflammatory effects.

Conclusion: This study demonstrates the utility of computational methods in assessing FDA-approved drug safety during pregnancy. By identifying compounds with minimal toxicity and beneficial anti-inflammatory effects, this research lays the foundation for future in-silico studies to refine drug selection for managing preterm birth and its associated complications.

Poster 17

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Study of the Effects of Zinc Oxide Nanoparticles on *Candida parapsilosis* Cellular Growth.

The pathogenic yeast *Candida parapsilosis* is well known to cause infections in hospital settings. A key issue of this fungi is a growing ability to develop resistance to antifungal agents. This resistance may be associated with the fast exportation of drugs through the efficient activity of eflux pumps. ZnO nanoparticles have shown promise to affect this pump. The goal of this project is to demonstrate that ZnO can affect the cell growth of *Candida p.* by causing permanent DNA damage. Cells were grown in the presence of different amounts of ZnO nanoparticles, and studied using optical density, FTIR spectroscopy, and agarose gel electrophoresis. Results demonstrate changes in cells as the quantity of nanoparticles is increased.

Poster 18

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Zinc Oxide Nanoparticles Impede Reduce the Biosynthetic Production of Ergosterol in *Candida albicans*.

Candida albicans is a pathogenic organism that is found in the gastrointestinal tract and mouth of about half of the healthy adult population. Under certain circumstances, it can become pathogenic leasing to the development of antifungal drugs. These drugs target the ergosterol biosynthetic pathway, but drug resistance is becoming a problem. Our goal is to seek to understand this pathway better to establish different drug target. Candida a. cells were grown in the presence of ZnO nanoparticles, a known sterol pathway inhibitor, and the lipid composition of the cells was evaluated using gas chromatography. Results show at a minimum concentration of ZnO, a significant change in the sterol composition occurs.

Poster 19

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Blending Biocompatible Polymers for Potential Biomedical Applications.

Polylactic acid (PLA) and its copolymers have been safely used in an extensive range of applications including packaging, textiles, and biomedical devices. PLA is biocompatible, biodegradable by hydrolysis and enzymatic activity, and has a large range of mechanical and physical properties that can be engineered appropriately to suit multiple applications. On the other hand, Polyethylene glycol (PEG) is a versatile, hydrophilic polymer widely used in pharmaceuticals, cosmetics, and industrial applications. A combination of PLA and PEG could have significant advantages. Films of PLA, PEG, and their mixtures were prepared from solutions in chloroform. Blends were evaluated using FTIR spectroscopy and changes in thermodynamic properties were followed using differential scanning calorimetry. Results show that stable blends were produced.

Poster 20

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13C NMR Spectroscopic Analysis of Glycolytic and TCA Cycle Dysregulation in Cancer Cells.

Glycolysis and the tricarboxylic acid (TCA) cycle are crucial metabolic pathways responsible for energy production, biosynthesis, and maintaining cellular redox balance. Glycolysis occurs in the cytoplasm and is vital for generating energy and metabolic intermediates. The TCA cycle, localized in the mitochondria of eukaryotic cells, facilitates nutrient-derived energy extraction and provides intermediates for biosynthesis. In cancer, these metabolic pathways are often disrupted, with glycolysis becoming dysregulated and TCA cycle function impaired. In this study, nuclear magnetic resonance (NMR) spectroscopy was employed to investigate lactate production from glycolysis in Caki-1 and 786-O renal cancer cell lines, and SK-N-SH neuroblastoma cell line, using [1,2-13C] glucose, as well as TCA cycle dynamics using [1,4-13C] aspartic acid. Lactate production was found in both Caki-1 and 786-O cell lines with [1,2-13C] glucose, but none in either cell line with [1,4-13C] aspartic acid. Preliminary results for SK-N-SH cell line will be presented here.

Poster 21

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Utilizing 13C NMR Spectroscopy to Investigate Krebs Cycle Dynamics with [2-13C] D-Glucose in Glioblastoma Cell Lines U87 and LN18.

The Krebs cycle, a central metabolic pathway in mitochondria, oxidizes acetyl-CoA derived from carbohydrates, fats, and proteins to produce NADH and FADH2. These molecules carry high-energy electrons to the electron transport chain, where they drive the synthesis of ATP through oxidative phosphorylation. This study explores the dynamics of the Krebs cycle in glioblastoma cells by using [2-13C] D-Glucose as a metabolic tracer in two glioblastoma cell lines, U87 and LN18. The cells were cultured in glucose-enriched media until reaching sufficient density and then seeded in regular media for 24 hours. Subsequently, one set of flasks was incubated for 48 hours in media containing [2-13C] D-Glucose, this was the experimental condition. While the other set was maintained in regular media for 47 hours and exposed to [2-13C] D-Glucose for the final hour as the control condition. Both cells and media were collected and analyzed using 13C NMR spectroscopy to probe the metabolic fluxes of the Krebs cycle, providing detailed information into altered metabolic pathways in glioblastoma. The results of the experimental condition show expected lactate production; however, the control condition showed an increased presence of downstream Krebs cycle metabolites. This could indicate glioblastoma's preference to utilize glucose for metabolites produced by the Krebs Cycle, even with available glutamine for reductive carboxylation.

Acknowledgement: This study was supported by the Welch Foundation grant AT-2111-20220331 and the US Department of Defense CDMRP grants W81XWH-19-1-0741, W81XWH-21-1-0176, W81XWH-22-1-0105, W81XWH-22-1-0003, HT9425-23-1-0062, and HT9425-24-1-0287.

Poster 22

Presenter: **Jiya Khatri** [$] / UG-S / In progress / Independent project
Major: Cognitive Science
Email: jiyakhatri10@gmail.com
Mentor: Dr. Llyod Lumata [$,#,%]
[$] Department of Physics, University of Texas at Dallas, Richardson
[#] Department of Bioengineering, University of Texas at Dallas, Richardson
[%]Department of Neuroscience, University of Texas at Dallas, Richardson

NMR Analysis of Lactate Production via Alanine Metabolism in Pancreatic Ductal Adenocarcinoma Cells.

Pancreatic ductal adenocarcinoma (PDAC) is a type of pancreatic cancer with a high recurrence rate due to its aggressive nature and resistance to treatments. MIA-paCa-2 cells, derived from human PDAC, are used to investigate metabolic changes in pancreatic cancer cells. Glucose is the primary substrate driving cancer cell proliferation. Specifically, glucose rapidly produces pyruvate through glycolysis, which is then converted to lactate through Lactate Dehydrogenase. However, studies suggest that in the absence of glucose, alanine may contribute to the pyruvate pools and lactate production. The mechanism uses Alanine Transaminase and transfers an amino group from alanine to α-ketoglutarate, resulting in pyruvate and glutamate. Although MIA PaCa-2 cells are in a glycolytic environment, alanine can contribute to the acidic tumor microenvironment. This study utilized [1-13C] Alanine and Nuclear Magnetic Resonance Spectroscopy to investigate and track alanine metabolism in MIA-paCa-2 cells for 48 hrs in the absence of glucose. We hypothesized that alanine will serve as an auxiliary energy source to the production of lactate in certain conditions, although it is significantly less compared to the use of glucose. Understanding the altered metabolic states of cancer cells, which could inform future therapeutic strategies by targeting cancer-specific metabolic pathways. The results of this study will be presented and discussed.

Acknowledgement: This study was supported by the Welch Foundation grant AT-2111-20220331 and the US Department of Defense CDMRP grants W81XWH-19-1-0741, W81XWH-21-1-0176, W81XWH-22-1-0105, W81XWH-22-1-0003, HT9425-23-1-0062, and HT9425-24-1-0287.

Poster 23

Presenter: **Christopher St. Julian** [$] / UG-S / In progress / TEAM-UP project
Major: Physics
Email: cstjulian@lamar.edu
Mentor: **Dr. Bogdana Bahrim**
[$] Department of Physics, Lamar University

Charge Transfer During H^- Collisions with Au (111) Surfaces

The H- ion survival probability after scattering from Au (111) surfaces, is investigated for various incident projectile energies and exit angles, by using a Wave Packet Propagation approach. The ion survival probability exhibits a peak at low exit angles, followed by a broader structure at high exit angles. The peak is attributed to the H- projectile experiencing the Au (111) band gap effect, while the broad structure at higher angles is attributed to electron recapture processes that may occur during the outgoing projectile trajectory. The band gap effect needs time to become fully operational, as it can be seen from the behavior of the ion survival probability versus time, for several incoming energies. Therefore, it significantly affects the ion-surface charge transfer at lower collision velocities, and eventually lower exit angles, when the projectile spends more time in the vicinity of the surface. This research has a broad range of applications in various applied fields such as: Space Science, Aeronautics and Engineering, Plasma-Wall Interactions, and Ion Collisions.

Acknowledgements: We acknowledge AIP TEAM-UP TOGETHER, Award TUTEXCEL-0001 for financial support of this project, and the Office of Undergraduate Research.

Poster 24

Presenter: **Rishi Bharadwaj** [$] / GR-S / Advanced / Doctoral project
Major: Electrical and Computer Engineering
Email: rbharadwaj@lamar.edu
Mentor: Dr. Cristian Bahrim [#, $]
[$] Department of Phillip Drayer Department of Electrical and Computer Engineering, Lamar University
[#] Department of Physics, Lamar University

Retention of Radiation on a Reflective Glass Surface.

The interaction between two cw-TEM00 laser beams assisted by a capacitor voltage which is set across a silica-glass surface allows us to finely adjust the vibrational frequencies of the surface dipoles. We use low voltages (< 5.3V) for having a linear optical response from the silica glass irradiated with a weak 532 nm probe laser in its transparency window. This background of isotropic energy shifts the frequency of the surface dipoles by a few eV/h. To further modify the interaction of the probe alone with the surface dipoles, a much brighter coupler is oriented at normal incidence on the glass. We use a polarization configuration of the two lasers that favors the coupling between the two lasers. The surface dipoles align along the resultant electric field of the two laser beams and act as a diffraction grating for the reflected light. For data processing, in the first step we calibrate and normalize the parallel reflectance to the plane of incidence using a numerical code in MATLAB and next, we reduce the reflectance's error bar using a graphical method based on the removing of outliers created by random experimental causes. Thus, we manage to reduce the error bar to less than 0.5% without altering the reflectance's value and reach a precision for our experimental signal that allows an accurate interpretation of the interference pattern between the two laser beams observed in the parallel component of the reflectance by using our modified diffraction grating theory.

UNDERGRADUATE RESEARCH AWARDS CEREMONY

The 2024-25 undergraduate research grant (URG) program recognizes twelve grant winners for eleven research projects in each of the five academic colleges. Three grant winners are from the Reaud Honors College and three are from the Texas Academy. The grant proposals have been reviewed and scored by 35 faculty with expertise in closely related research areas.

The winning research projects received scores between 75% and 94%. This year we selected 5 STEM and 6 HASBSEB projects. Each U.R.G. winner receives a $700 stipend, up to $1,000 in research support, and $300 in travel support from university funds.

The 2025 U.R.G. projects were presented at the EXPO 2025, on April 23- 24, as a talk or poster.

President Taylor, the Office of the Provost, Dr. Samuel Jator, the Senior Associate Provost for Academic Affairs and Dean of Undergraduate Studies, the Advisory Board members of the O.U.R., and all faculty reviewers, heartly congratulate the twelve U.R.G. winners and their mentors for this nice achievement.

Dr. Cristian Bahrim, Director of the Office of Undergraduate Research

OFFICE OF UNDERGRADUATE RESEARCH
LAMAR UNIVERSITY

2024-25 UR GRANT WINNERS

College of Arts and Sciences

Interim Dean Rebecca Ard Boone, Ph.D.

1

Natalie Bean [$] | Nursing |
Mentor: **Dr. Gina Hale**
JoAnne Gay Dishman School of Nursing
HASBSEB Project: "Generating Educational Materials on Firearm Safety: Action to Promote Public Safety ."

2

Brianna Magdaleno | Biology |
Mentor: **Dr. Kole Kubicek**
Department of Biology
STEM Project: "Optimizing Acid-Free Clearing and Double Staining for Small Vertebrate Skeletons ."

3

Austin Robertson | Computer Science |
Mentor: **Dr. Jane Liu**
Department of Computer Science
STEM Project: "Predicting Future Deforestation Hotspots Using Deep Learning and Satellite Images ."

4

Jason Withers | Physics |
Mentor: **Dr. Cristian Bahrim**
Department of Physics
STEM Project: "Fundamentals of Light-Matter Interaction for Explaining Optical Phenomena ."

College of Engineering

Interim Dean Tracy Benson, Ph.D.

5

Mololuwa Oloyede [%] | Electrical Engineering |
Mentor: **Dr. Cagatay Tokgoz**
Phillip M. Drayer Department of Electrical and Computer Engineering
STEM Project: "A Comparative Study of Monopole Antennas Using Various Simulation Methods ."

[$] Reaud Honors College Student [%] Texas Academy Student

College of Fine Arts and Communication

Dean Golden Wright, Ph.D.

6

Allison Deras | Speech and Hearing Sciences |
Mentors: **Dr. Priyanka Jaisinghani**
Department of Speech and Hearing Sciences
HASBSEB Project: "Classroom Seating and Auditory Capabilities in Students with Hearing Loss ."

7

Alexa Heng [$] | Sociology |
Mentors: **Dr. Sheila Springer** and **Dr. Nicki Michalski**
Department of Communication and Media
HASBSEB Project: "Navigating Sexual and Emotional Communication in Generation Z University Situationships."

8

Harvest Prater | Speech and Hearing Sciences |
Mentor: **Dr. Paul Prezas**
Department of Speech and Hearing Sciences
HASBSEB Project: "Simulative Role: Disclosing Broca's Area Aphasia Post-Ischemic Stroke to Health Advocates ."

College of Education and Human Development

Dean Alberto Ruiz, Ph.D.

9

Ashlin Stinson | Interdisciplinary Studies EC-6 |
Mentor: **Dr. Yan Yan**
Department of Curriculum and Instruction
HASBSEB Project: "Enhancing Student Behavior and Engagement through Whole Brain Teaching in an Elementary English Language Arts Classroom ."

10

Jenny Xiaoxuan Tu [$] | Exercise Science |
Mentor: **Dr. Shannon Jordan**
Department of Health and Kinesiology
STEM Project: "Landing Mechanics and Muscle Activation in Modern Dancers ."

College of Business

Dean Joby John, Ph.D.

11

Nikbin Ali % | Accounting and Finance |

Rahman Abrar % | Electrical Engineering |

% Texas Academy Student

Mentors: **Dr. Gevorg Sargsyan and Dr. Don Warren**

Department of Accounting and Finances

HASBSEB Project: "Improving the Construction Permitting Process in SETX through Technological Integration."

O.U.R. 2024 FALL AWARDS

Outstanding POSTER Presentation
Undergraduate Level

Winner: Jiya Khatri [$]

NMR Analysis of Lactate Production via Alanine Metabolism in Pancreatic Ductal Adenocarcinoma Cells.

Mentor: **Dr. Llyod Lumata** [$,#,%]

[$] Department of Physics, University of Texas at Dallas, Richardson
[#] Department of Bioengineering, University of Texas at Dallas, Richardson
[%]Department of Neuroscience, University of Texas at Dallas, Richardson

Winners: Robert Reinartz, Christina Hamilton, Justin Cline, Jabari Fowler

Using Artificial Neural Network Models to Understand and Predict Baseball.

Mentor: **Dr. Katarina Jegdic**

Scholar's Academy, University of Houston – Downtown

Winner: Victoria Taylor [$]

Novel Organ-On-Chip Devices for Modeling Reproduction and Pregnancy-Related Organ.

Co-authors: Briana Ortiz [#], Ashley Driscoll [#], Sungjin Kim [%], Po Yi Pam [%], Arum Han [%] , Ramkumar Menon [#]

Mentor: **Dr. Lauren Richardson** [$]

[$] Wellborn Middle School, College Station
[#] Department of Obstetrics & Gynecology, Division of Basic Science and Translational Research, The University of Texas Medical Branch at Galveston
[%] Department of Electrical and Computer Engineering, Department of Biomedical Engineering, Texas A&M University, College Station

Graduate Level

Winner: Kaitlyn Timmons [$]

Exosomal Interleukin-10 (eIL-10), a Novel Anti-Inflammatory Therapeutic for Preterm Birth: Evaluation of Cell-Secreted Metabolites at the Placenta and Fetal Membrane Fetal-Maternal Interfaces. Related Organ.

Co-authors: Souvik Paul [#] , Rheanna Urrabaz-Garza [#] , Jeena Jacob [#] , Pilar Flores [#] Ananth Kammala [#] and Ramkumar Menon [#]

Mentor: **Dr. Lauren Richardson** [#]

[$]John Sealy School of Medicine, The University of Texas Medical Branch at Galveston
[#]Division of Basic Science and Translational Research, Department of Obstetrics and Gynecology, The University of Texas Medical Branch at Galveston

O.U.R. 2024 FALL AWARDS

Outstanding POSTER Presentation
Graduate Level

Winner: Anusha Shahzeb Meghani

Zinc Oxide Nanoparticles Impede Reduce the Biosynthetic Production of Ergosterol in *Candida albicans*.

Mentor: **Dr. Thuy Minh Nguyen**

Department of Chemistry and Biochemistry, Lamar University

Winner: Ramya Gollamudi

Perfluorooctanoic Acid Monohydrate (PFOA-H_2O) Studied by Molecular Rotational Resonance (MRR) Spectroscopy .

Mentor: **Dr. Sylvestre Twagirayezu**

Department of Chemistry and Biochemistry, Lamar University

Outstanding ORAL Presentation
Undergraduate Level

Winner: Luis Lemmen

Ethical Evaluation of Nuclear Deterrence on the Example of the Russo-Ukrainian War.

Mentor: **Dr. Nicki Michalski**

Department of Communication and Media, Lamar University

Winner: Kayla McKinley

Does Vaping Nicotine and/or THC Produce Different Levels of Oxidative Stress for Men and Women: An Examination of Markers of Oxidative Stress (8-Isoprostanes) in Expired Respiratory Condensate.

Mentor: **Dr. Shannon Jordan**

Department of Health and Kinesiology, Lamar University

Winner: Harvest Prater

Asexuals of Color: Experiences of an Invisible Identity.

Mentors: **Mrs. Elizabeth Sanders [#] and Mr. Andre Favors [%]**

[#] Mary and John Gray Library, Lamar University

[%] Department of Communication and Media, Lamar University

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O.U.R. 2024 FALL AWARDS

Outstanding ORAL Presentation
Graduate Level

Winner: Md Admay Amif

Quantification of Sub-Surface Wrinkles in Woven Carbon Fiber Reinforced Polymer Laminate Using High-Resolution Ultrasound.

Mentor: **Dr. David Jack**

Department of Mechanical Engineering, Baylor University - Waco

Winner: Kirtunia Rahul

Cohesive Zone Modeling Strategy to Simulate Progressive Delamination Failure in L-shaped CFRP Laminates with Varying Inter-ply Angle Difference.

Co-authors: Arief Yudhanto and Pruthul Kokkada Ravindranath

Mentor: **Dr. David Jack**

Department of Mechanical Engineering, Baylor University - Waco

Winner: S M Yeasin Habib

Effects of Al Addition on the Corrosion and Mechanical Properties of NbTaTiV High Entropy Alloy.

Co-authors: Nafiz Ahmed Badhan and Zhe Fan

Mentor: **Dr. Xuejun Fan**

Department of Mechanical Engineering, Lamar University

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SINCERE THANKS TO LAMAR HIGHER ADMINISTRATION FOR CONTINUED SUPPORT TO O.U.R. CONFERENCES AND EVENTS




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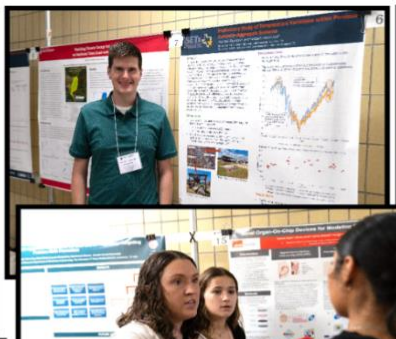
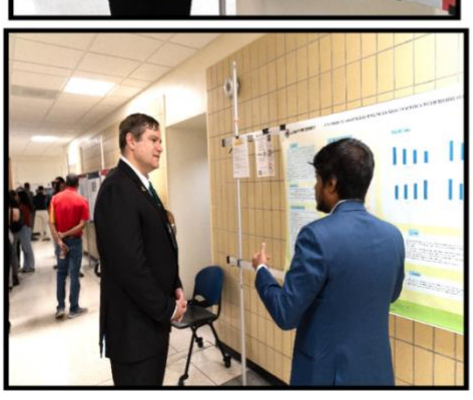
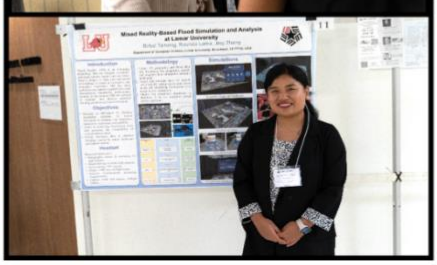
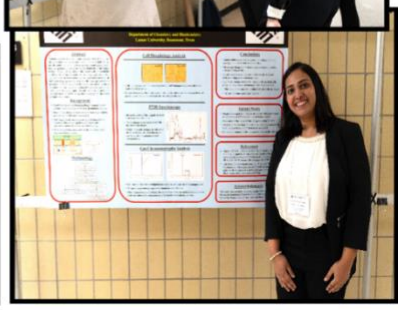
ORAL PRESENTATIONS

POSTER PRESENTATIONS









KEYNOTE SPEAKERS

UNDERGRADUATE RESEARCH AWARDEES

LAMAR UNDERGRADUATE RESEARCH ASSOCIATION

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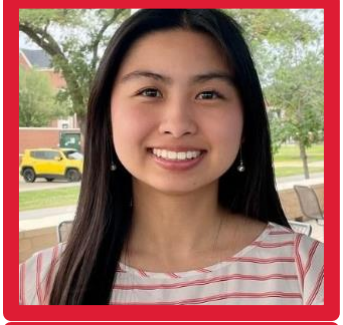
Biology Major



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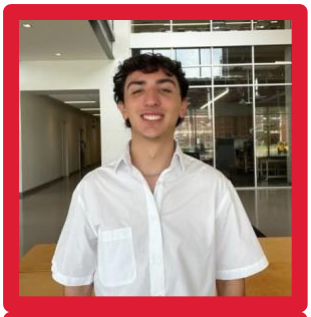

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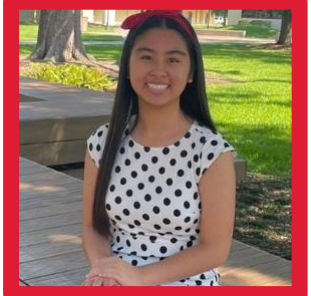

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Kayla McKinley
Exercise Science Major

OFFICE OF UNDERGRADUATE RESEARCH
LAMAR UNIVERSITY

LAMAR UNDERGRADUATE RESEARCH ASSOCIATION – L.U.R.A.

Join our Student Organization!

LURA was founded in Fall 2019 to fulfill the need for a community *by* and *for* undergraduate students to discuss, collaborate, and learn how effectively one can conduct research. The consistent quality and volume of research conducted by undergraduate students at Lamar University has made it clear that there is a need for an organization to act as a vital resource for building young researchers. Thus, LURA provides an academic forum that connects all level students from freshmen to seniors with their professors and mentors and facilitates communication between LU undergraduates and their peers around the nation.

LURA is a platform for offering panel discussions about:

- Research opportunities inside and outside of Lamar.
- Better ways to deliver undergraduate research results in poster and oral presentations.
- Ways to perform peer-mentoring.
- Organizing workshops and panel discussions on various topics, including how to successfully apply to graduate schools.

The Office of Undergraduate Research provides strong support and offers logistics for this student organization. For more information, contact URALamar@gmail.com or visit the Office of Undergraduate Research – Archer Physics 100-D.

THANK YOU, L.U.R.A.,
FOR MANNING THE REGISTRATION DESK!