

HONORS RESEARCH SYMPOSIUM

POSTER PRESENTATION

ABSTRACTS



COLLEGE HALL

Honors College
Office of the Dean
Honors Advising
Carolyn A. Barros Reading Room
Honors Academy

Department of Military Science

Recruiting
Administration
Hall of Honor - Sponsored by the Corps of Cadets Alumni Chapter

APRIL 19, 2024

UNIVERSITY OF TEXAS AT ARLINGTON

Salwa Abdelmalak, Biology

Title: *Influences of No-Till Practices as a Climate-Smart Approach on the Soybean-Rhizobium Symbiosis*

Faculty Mentor: Dr. Woo-Suk Chang

Climate change poses significant challenges to crop production, emphasizing the need for adopting climate-smart sustainable agricultural practices. This study examines the impact of no-till or reduced/minimal tillage as climate-smart practice on the N-fixing symbiosis between soybean and its symbiotic partner Rhizobium, as well as soybean production, with conventional tillage included for comparison. Through a comprehensive methodology, including nodulation assays, plant biomass analysis, and soil physiochemical assessments, we aim to elucidate the intricate relationship between tillage practices and symbiotic nitrogen fixation. Our findings suggest that no-till or reduced/minimal tillage practices may contribute to improving soil health and enhancing crop productivity. This provides a scientific assessment of the importance of no-till practices as a climate-smart approach to agriculture.

Elizabeth Adeola Adebayo, Architecture

Title: *An Architecture of The Diaspora: A Digital Gallery of Diasporic Artifacts*

Faculty Mentor: Mr. Dennis Chiessa

Fragments of pre-colonial history endured through the Yoruba language, along with subverted interpretations of European methods of architectural representation, function as generative concepts for digital architecture. The Yoruba language existed only in oral tradition before the seventeenth century. Consequently, contemporary spoken language is an anthropogenic tool for understanding Yoruba architecture. Specifically, the project focuses on the concept of domestic spaces called ile meaning 'the house' and the forms it describes. The house acts as a prefix for organizing the use of space. For example, ile-aye means 'house of the living,' and ile-okun means 'house of the dead.' The analysis draws parallels between language and form through a study of spoken language's meanings. The result proposes a digital architecture, one that exists within an abstracted map and uses interpretations of the Yoruba concept of 'the house' to create form.

Sami Ali, Information Systems

Title: *Balancing Perspectives: Assessing the Integration of AI in Academic Support within Higher Education*

Faculty Mentor: Dr. Anil Singh

The rapid proliferation of Artificial Intelligence (AI) across diverse sectors has underscored its potential transformative impact, yet its integration into academic settings raises significant concerns. Faculty and professors worry about the potential for misuse by students, such as relying on AI for completing assignments unethically. This study embarks on a comprehensive analysis of the sentiment towards AI in education, scrutinizing the apprehensions and expectations of its role. Through a robust methodology combining literature review and sentiment analysis, our research aims to uncover the overarching perceptions of AI within the educational sector from a broad spectrum of viewpoints, both academic and non-academic. This investigation seeks to enlighten the academic community about AI's potential benefits and pitfalls, fostering a balanced understanding that could guide its responsible implementation in educational frameworks. Our findings aim to contribute to the ongoing dialogue on leveraging AI to enhance, rather than undermine, educational integrity and effectiveness.

Zachary Armstrong, Biomedical Engineering

Title: *Stem Cell Potency: Automated vs. Manual Segmentation in Adipogenic Differentiation*

Faculty Mentor: Dr. Michael Cho

Important cell processes can be captured and analyzed with live-cell imaging followed by computational analysis. Current methods of microscopy image analysis involve manually segmenting cells, often done by multiple researchers, which is time-consuming and can limit the accuracy and throughput of the desired data. By implementing deep learning algorithms, captured images can be automatically segmented which greatly reduces the time required to do so and can possibly improve the accuracy of desired data. A newly developed deep learning algorithm pipeline, Lipid Locator, will be utilized to automatically segment acquired images of adipose-derived stem cells (ADSC). More specifically, ADSC with fluorescently labeled nuclei and lipid droplets during adipogenic differentiation (AD). Benchmark data testing will be done to compare the pretrained models of Lipid Locator's automated cell segmentation data to manually segmented cells of the same images. When comparing automated cell segmentation to manual segmentation, the morphological characteristics of ADSC will also be analyzed such as cell count, nuclear area, and lipid accumulation area during AD. This provides an opportunity to quantify automated and manual cell segmentation benchmark data.

Aastha Arora, Psychology

Title: *Exploring Mindfulness Engagement and its Relationship with Mental Health in College Students: Implications for Campus Wellness Programs*

Faculty Mentor: Dr. Tracy Greer

Mindfulness practice has strong potential for improving mental health outcomes and well-being among college students. However, mental health challenges may impact adoption of mindfulness practices. This research examines the relationship between mental health challenges – specifically, depression, anxiety, and rumination – and the propensity towards engaging in mindfulness activities. A cross-sectional correlational design was employed to analyze data in a sample of 431 students at UTA, who completed an online survey comprised of validated psychological scales to measure mental health states, as well as characteristics and frequency of mindfulness practice. The findings aim to identify mental health factors that significantly predict mindfulness engagement, providing evidence-based insights for developing targeted, effective interventions on college campuses. Understanding these relationships enables the creation of tailored strategies to enhance mental wellness initiatives, making mindfulness practices and other related tools more accessible and beneficial for university students.

Sybil Asher, Biology

Title: *Synthesis of Diallylsilane for Biomedical Applications*

Faculty Mentor: Dr. Junha Jeon

Several drugs have a limited ability to dissolve in water, making it challenging for them to be absorbed by the body and reach their intended tissues. Although silicon can increase hydrophobicity it is not well known. By incorporating silicon into the drug's composition, its solubility and permeability will increase, enabling effective absorption and widespread distribution throughout the body. The goal of this research is the development of 4-silicon 1,7 heptene (diallylsilane) which incorporates silicon into its structure. The approach to achieve this goal will be to use dichlorosilane as an electrophile and react it with allyl magnesium bromide ($\text{CH}_2\text{CHCH}_2\text{MgBr}$), a nucleophile, to produce the target molecule. The results will be obtained through proton nuclear magnetic resonance spectroscopy (^1H NMR) and Gas Chromatography-Mass Spectrometry (GC MS). The compound will then be isolated by vacuum distillation. The compound will be useful in synthesis of bioactive chemicals, medicinally important compounds, and functional materials.

Ifeoluwa Ayandiji, Criminology and Criminal Justice

Title: *Global Perspective on Child Abuse: Socioeconomic Influence and the Reporting System*

Faculty Mentor: Dr. Jaya Davis

Child abuse is a widespread global issue affecting millions of children, regardless of their socioeconomic backgrounds. This research examines the complex connection between child abuse and socioeconomic factors, exploring how employment opportunities, educational levels, access to social services, income disparity, cultural norms, and legal systems contribute to its occurrence. Contemporary literature, particularly from Kobulsky et al. (2022), reveals the significance of education in diminishing abuse rates and highlights the pivotal role of stable employment and accessible social services. The research utilizes a systematic review approach, analyzing peer-reviewed literature from the past ten years to thoroughly understand the global landscape. The study's outcome aims to not only clarify the intricacies surrounding child abuse but also offer insightful information for tailored intervention and enhanced reporting systems on a global scale, which will ultimately promote collaborative efforts to end child abuse.

Jordan Booth, English

Title: *Employers' Perceptions of Microcredentials on Entry-Level Résumés in Technical and Professional Communication*

Faculty Mentors: Dr. Timothy Ponce and Dr. Amy Hodges

Increasingly, higher education institutions are investing in a booming microcredentialing industry. These courses often promise to improve learners' "hireability", however, previous studies show uncertainty about the level of education these microcredential programs provide. Within the field of technical and professional communication (TPC), hiring managers face similar uncertainty as the value of microcredentials is not always apparent to employers. Moreover, few studies have examined what impact microcredentials might have on TPC graduate job placement rates. This study investigates these perceptions within the context of hiring entry-level TPC graduates. This study reports findings from 5 guided interviews with hiring managers and recruiters in a U.S. metropolitan area reacting to sample résumés with varying credentials. Participants expressed concern over a lack of transparency regarding the level of rigor, competency, and consistency in TPC microcredential programs. Findings suggest that institutions should advise learners to integrate TPC microcredentials with traditional degree certifications or work-related experiences.

Crew Borgeson, Interdisciplinary Studies (Economics and Psychology)

Title: *Urban Harmony: Exploring the Interplay of New Urbanism Qualities on Economic Prosperity and Psychological Wellbeing in Contemporary Cities*

Faculty Mentor: Dr. C.Y. Choi and Dr. John Adams

Urban form significantly impacts a city's vitality, and the sprawl indicative of most of the cities in the south is known to have numerous detriments. New Urbanism, as a movement, seeks to identify and adapt elements contributing to beloved historic cities worldwide to contemporary urban contexts, particularly in the US. From reforms in areas such as walkability, form-based codes, and architecture, cities are enhancing residents' lives. This research investigated the positive impact of New Urbanism qualities on the economy and psychological wellbeing through comparing Arlington, Texas and Minneapolis, Minnesota. Employing literature review and a comparative case study, the study aimed to provide nuanced insights into the effects of these urbanism factors, offering guidance for urban development.

Lydia Burge, Communication Technology

Title: *The Impact of Website Interface Micro Animations on User Perceptions of Trust, Credibility, and Design Quality*

Faculty Mentor: Dr. Chyng-Yang Jang

Animation is increasingly considered an important aspect of quality website design. Although research indicates the positive effects well-crafted visual design can have on user perceptions of a website, there is little research investigating animation's effects on user perceptions. This study examines whether interface micro animation can have a positive impact on users' perceptions of design quality, credibility, and trust in a website. After viewing a series of identical hypothetical nonprofit organization websites, participants were divided into two groups for the last website. One group was presented with a website incorporating interface micro animations and the other with the same website but without animations. An online questionnaire was used to assess participants' perceptions of the last website. Welch's *t*-tests were conducted to examine the effects of website interface micro animation. This study helps inform future use of animation in website interfaces as a way to communicate more effectively with users.

Thomas Caballero, Interdisciplinary Studies (Business and Law & Legal Studies)

Title: *Promoting Due Diligence: The Role of the Gramm-Leach-Bliley Act, and Information Security Standards on Financial Institutions Protecting Consumers' Non-Public Personal Information (NPI)*

Faculty Mentors: Dr. Andrew Clark and Mr. Scott Johnson

The FTC safeguard rule included in the GLBA pertains to industry standards associated with cyber security risks associated with financial institutions in their duty to protect consumer non-public data. By using quantitative data gathered and reviewed from resources that the FTC provides and scholarly peer review articles, statistics on compliance standards in storing consumer non-public data and data breaches will assist in depicting the current impact of information security compliance in the financial sector, as well as exploring future proposals. Supported by statistics and a quantitative analysis in the areas of cybersecurity laws and industry standards that promote the due diligence of compliance efforts in protecting the NPI privacy rights of consumers, I plan to use python to create my own charts to represent the amount in damages individual companies have faced from lack of compliance with the GLBA. A specific discussion based on the data and analysis will assess how technology and consumer financial data is stored and whether compliance standards and laws are keeping pace with the requirements for consumer data protection systems, as well as the need for future due diligence compliance laws and industry standards.

Emmanuel Chinwuba, Computer Engineering

Title: *Design and Assembly of an Intelligent Ground Vehicle for the 31st Annual Intelligent Ground Vehicle Competition*

Faculty Mentor: Dr. Christopher McMurrough

Intelligent Ground Vehicles are terrestrial vehicles that use sensors to operate or navigate from one point to another with little or no human involvement. They have been around for many years and have seen many uses in various fields, such as in research for collecting data in unsafe and unreachable areas, in the army for detecting and clearing areas of mines, and lately they have seen use in self-driving vehicles in the transportation and logistics industry. The IGVC is an annual international and multidisciplinary competition that aims to promote and improve upon already existing knowledge of intelligent ground vehicles by challenging teams to design and implement autonomous vehicles that participate in an Auto-Nav, Design, and Self-Drive Challenge. This paper will discuss how the physical and electronical components were assembled for an intelligent ground vehicle that was designed to participate in the Auto-Nav challenge of the 31st annual IGVC.

Van Bawi Chum, Architecture

Title: *Dallas Fort-Worth: Investigation of Unit Typologies*

Faculty Mentor: Mr. Bijan Youssefzadeh

In the past few years, the housing unit typologies in the Dallas Fort Worth (DFW) area have showcased a diverse range of architectural styles to meet the evolving needs of its growing population. From traditional detached single-family homes to contemporary high-rise apartments, the landscape of housing typologies shows how the area is changing. Mixed-use developments have become popular, where you can live and work in the same place, and there are also townhouses and urban villas, all aiming to create lively, walkable neighborhoods. People are also focusing more on eco-friendly building designs to protect the environment. However, one big problem is that housing costs are increasing, making it hard for people with different incomes to afford homes. As the DFW area keeps growing, it's important to understand these different types of homes to ensure everyone can find a place to live and build eco-friendly communities.

Leah Angelica De Leon, Nursing

Title: *The Effect of Field-Related Hyperbaric Oxygen Therapy on Skeletal Muscle Regeneration*

Faculty Mentor: Dr. Barbara St. Pierre Schneider

Muscle trauma requires prompt recovery mechanisms, particularly in locations lacking specialized medical facilities. Hyperbaric oxygen (HBO₂) therapy at 2.5 atmospheres absolute (ATA) positively impacts muscle recovery but necessitates specialized facilities. This study assessed the effectiveness of HBO₂ therapy at a more accessible pressure level, 1.5 ATA, on muscle regeneration. Crush-injured muscle in male and female C57BL/6 mice were treated with mild HBO₂ (100% oxygen at 1.5 ATA) or hyperoxia (100% oxygen at room atmospheric pressure). Regenerating fiber properties were examined at 4- and 8-days post-injury. Quantification included fiber cross-sectional area and overall regenerating myofiber count. Outcomes included a higher proportion of smaller regenerating myofibers in mice treated with HBO₂ compared to 100% O₂, a gender difference in protein expression in regenerating myofibers, and a potential increase in regenerating myofibers with mild HBO₂ treatment. These findings highlight the potential of HBO₂ therapy at 1.5 ATA in accelerating muscle regeneration, offering a practical solution for non-specialized settings.

Jose Diosdado, Civil Engineering

Title: *Optimizing Construction Costs for FM 4 Roadway Reconstruction in Cleburne, Texas: A Comprehensive Bill of Qualities Analysis*

Faculty Mentor: Dr. Tamer Eljufout

This project is centered on the optimization of construction costs pertaining to the FM 4 roadway reconstruction in Cleburne, Texas, with a focus on a detailed Bill of Quantities (BOQ) analysis. FM 4 is a vital artery to the community requiring an extensive reconstruction to meet modern safety standards and accommodate increasing traffic demands. The analysis encompasses a variety of components, such as pavement, earthwork, drainage systems, bridge redesign, railroad crossing, and culvert crossings. The study aims to enhance cost-efficiency and accuracy in project budgeting by utilizing a comprehensive methodology for quantifying equipment, material, and labor costs. Leveraging modern cost estimation techniques and standards, this study integrates historical cost data, regional market rates, and meticulous quantity take-offs designed to provide insights into resources allocations. The findings are expected to inform the readers and reviewers at Texas Department of Transportation (TXDOT) on promoting cost-effective approaches in roadway reconstruction projects.

Savannah Fennell, Critical Languages & International Studies

Title: *Methodology Matters: How Translation Theories and Technology Have Shaped Journey to the West*

Faculty Mentor: Mr. Blake Carpenter

Translation between Chinese and English demonstrates that different language pairs are more difficult for humans and machines to translate. Additionally, difficulties in the translation world center around literary translation, the topic of the Workshop on Machine Translation's (WMT) shared discourse taskforce. The main conference on Machine Translation and MT research, WMT 2023 focused on literary translation, specifically the challenges posed by Chinese literature. The use of entirely vernacular language combined with other literary, cultural, and historical traditions in *Xiyou Ji* (西游记), poses a unique translation dilemma. Translation is best described as a spectrum of theories that influence a translator's approach to their work ranging from dynamic to literal. Machine Translation (MT), however, is governed by different approaches based on engineering programs that mimic natural language production. Comparing human and machine translation approaches to Chinese literature can improve classical Chinese-to-English translations through a comparison of translation techniques. This research will focus on the most influential translators of Classical Chinese, Arthur Waley, Anthony C. Yu and William J. F. Jenner. Particularly the influences of a translator's approach to their work through the lens of Liraz Postan's categories and the methodologies of various machine translation engine types.

Alfredo Gil, Exercise Science – Clinical and Applied Physiology

Title: *The Effects of HIIT and Alcohol Abstinence on Blood Pressure and Arterial Stiffness in Mid-life Adults*

Faculty Mentor: Dr. Chueh-Lung Hwang

Binge drinking contributes to the development of cardiovascular disease, including hypertension. One of the underlying mechanisms of binge drinking-induced hypertension is thought to be the changes in blood vascular function, including stiffening of the arteries. Therefore, theoretically long-term alcohol abstinence would reverse these changes, reduce arterial stiffness, and thus improve blood pressure. On the other hand, high intensity interval training (HIIT) is recommended to reduce blood pressure and arterial stiffness. However, it is unknown whether the combination of alcohol abstinence and HIIT will lead to greater improvements in blood pressure and arterial stiffness. To this end, we propose a randomized clinical study to investigate the effects of 8-weeks of HIIT combined with alcohol abstinence versus alcohol abstinence only on blood pressure and arterial stiffness in mid-life adult binge drinkers.

Graciela Hargrave, Interdisciplinary Studies (Psychology and History)

Title: *Historical Analysis of Research Surrounding Child Language Brokers*

Faculty Mentors: Dr. Bonnie Laster and Dr. Kenyon Zimmer

Child language brokers (CLBs) provide translating services for their parents in their everyday lives, from navigating the grocery store to interpreting legal documents. Psychological research shows that CLBing can alter a child's socialization, language development, and relationship with their parents. Research surrounding this topic began in the 1970s and has focused on modern examples while providing conflicting conclusions about whether this phenomenon has a more positive or negative impact on a child. Because this research is new, it is important to provide historical context to understand how this phenomenon has changed and impacted children in earlier generations. To provide this context, studies from the early 20th century will be analyzed to understand how societal values and pressures placed on immigrants brought about the utilization of CLBing. Studying the necessary phenomenon of CLBing creates a better understanding of its effects on family dynamics and individual development while commenting on Americans' perceptions of immigrants.

Chris Huddleston, English

Title: *Queering the Beginning: A Poetic Exploration of Genesis and Creation*

Faculty Mentor: Dr. Nathanael O'Reilly

The Bible is one of the most influential texts in Western literature, shaping literature, politics, and culture since its introduction. The book of *Genesis* contains some of the most iconic stories from the Bible, such as the Garden of Eden, Noah's Flood, and the Tower of Babel. This project will break down the text through literary analysis and the creation of poetry to reveal how the text explores identity, community, and nature. All these stories are cyclical, examining the creation of something, its destruction, and its final recreation. The cyclical nature of the text implies creation as a process rather than an individual event. The text implies that the creation of humanity and identity is ongoing and shaped by both the environment and ourselves.

Jasdeep Kaur, Biology

Title: *Phenotypic Plasticity in Pigmentation: Investigating Coloration Patterns in *Anablepoides hartii* Population Responses to Environmental Variation*.

Faculty Mentors: Dr. Matthew Walsh and Mr. Marcus Lee

Phenotypic plasticity is an organism's ability to exhibit different physical traits in response to its environment. This phenomenon may partake in major roles with adaptive evolution which are important to environmental unpredictability by which organisms evolve traits to increase their fitness. This study aims to understand adaptive resonances when killifish only populations of *A. hartii* are subjected to different backgrounds, exploring their mechanisms to color change. Data was analyzed using principal component analysis and a linear model to assess the significance of PC1 by background color, sex and family relations. Results showed that there is a distinct variation between the light and dark background color in the killifish populations with no overlap, this supporting that they are undergoing plasticity to match background color.

Elyas Kham, Architecture

Title: *The Legacy of Modern Architecture Impacting Contemporary Housing Crisis*

Faculty Mentor: Mr. Don Gatzke

Housing for urban populations has always been a precarious challenge for architectural designers. This issue has been widespread among different communities across the globe as they deal with various social, economic, and ecological issues. For instance, Millennials and Generation Z struggle to buy and own their first homes in today's era due to a plethora of obstacles related to housing market and architecture. While influential historical figures like Frank Lloyd Wright, Le Corbusier, and other individuals made attempts to solve their country's housing problems through many distinct modernist projects, those past designs are not as effective and prominent in the present day for equitable and inclusive housing conditions.

Overall, the influence of modernism affecting many international countries is significant. A few research questions must be addressed in this research: Why does the 20th century modern architectural style not appear or exist clearly in the present? Why has that influence been limited? And how can future housing crisis be changed through these principles? It will be crucial to examine architectural history that includes demand for housing, social movements for more equitable living, and how modernism has shaped the architecture and accessibility to specific single-family homes in several unique parts of the world.

Md Mohotasim Rahman Khan, Economics & Accounting

Title: *Evaluating the Applicability of Hernando de Soto's Theories in the Context of Bangladesh's Informal Housing Sector*

Faculty Mentor: Dr. Ashish K. Sedai

This research project examines Bangladesh's urban informal housing sector, aiming to understand the dynamics in light of Hernando de Soto's theories, as articulated in "The Other Path." With 52% of urban residents living in slums (World Bank Data, 2020), the study adopts a mixed-method approach, analyzing De Soto's framework, conducting literature reviews, case studies, and utilizing secondary data on urban informal housing. The objective is to identify structural and operational aspects of informal housing in Bangladesh and compare these with De Soto's observations in Peru. The significance is underscored by its focus on socio-economic perspectives, offering insights into the informal housing sector's impact on development indicators. By providing a comparative analysis that places Bangladesh's informal housing sector in a global context, the study aims to contribute to a deeper understanding of informal economies and inform policy implications for more effective integration and regulation of informal housing in Bangladesh.

Madeline Kline, Exercise Science

Title: *Evaluating the Effects of Nitric Oxide Supplementation on Oxygen Consumption and Fat Metabolism During Submaximal Exercise*

Faculty Mentor: Dr. Judy Wilson

Nitric oxide is known to increase blood flow and therefore increases the rate oxygen is delivered to active muscles. With this increase, it would be expected for oxygen cost to decrease and for fat metabolism to increase during exercise. However, the effect of nitric oxide supplementation on oxygen consumption (VO_2) and fat metabolism has not been formally studied. To investigate this, 10 recreationally active UTA students participated in this single-blind placebo, randomized crossover study. Each subject consumed the supplement or the placebo two hours before completing a 30-minute submaximal exercise test on a cycle ergometer. During the test, VO_2 and the respiratory exchange ratio (RER) were recorded. The subjects returned a week later to complete a second trial with the drink that was not consumed for the first trial. There were no significant differences found between VO_2 and RER with or without nitric oxide supplementation during submaximal exercise.

Suyeon Kwon, Advertising

Title: *The Importance of Branding Elements: How UTA Communicates with Students and Employees as a Brand*

Faculty Mentor: Dr. Roger Gans

Branding is the process that a company identifies itself to target audience by differentiating its features from competitors. In university context, how an institution identifies itself to consumers, who are students, faculties, and staff, is called university branding. Universities deliver persuasive and consistent messages, reflecting their missions, visions, and values. Symbolic representations, such as a logo, advertisement designs, and visuals, work as brand elements in university branding. The ultimate goal of university branding is to form a solid relationship between the institution and its consumers. To study about current brand strategies of the University of Texas at Arlington, a content analysis and an online survey were conducted. The conduct analysis was utilized to gather data how UTA is currently branding itself through various brand elements. The perceptions of the target audiences were researched with the online survey, which had answerers from 73 respondents.

Nhien Nguyen An La, Psychology

Title: *The Effect of Academic Self-Efficacy on Sleep and Academic Performance: A Moderation Analysis*

Faculty Mentor: Dr. Angela Liegey-Dougall

While research acknowledges the independent effects of sleep and self-efficacy on academic outcomes, the potential moderating role of academic self-efficacy (ASE) on the relationship between sleep and academic success remained unexplored. Academic self-efficacy has been consistently associated with students' motivation, goal setting, and resilience, while sleep quality predicts cognitive functioning and memory consolidation. Thus, this project addressed the gaps in the literature by examining these three variables collectively among 371 UTA college students using a cross-sectional survey design. Results suggested that among the subscales of ASE, only ASE academic performance in class significantly predicted academic performance ($p < .001$), while sleep quality and the remaining three subscales did not. Additionally, ASE interaction at school was found to be a significant moderator in the relationship between sleep and academic performance ($p < .001$). The findings of this study could have implications for educational interventions aimed at enhancing student achievement and promoting self-efficacy in academic settings.

Cyntia Lopez Lara, Interdisciplinary Studies (Spanish and Sociology)

Title: *Latinas in a Hispanic Serving Institution: A Social, Political, and Economic Landscape*

Faculty Mentors: Ms. Rosa M. Téllez and Dr. Alma Nidia Garza

The purpose of this study is to explore the progress of Latinas in the United States by focusing on first generation female students in a Hispanic Serving Institution (HSI), who self-identify as Hispanic and/or Latin American. This study aims to explore their experiences. The research questions are: (1) What career fields do Latin American and Hispanic women pursue? (2) What impact does culture have on their career choices and overall experiences in higher education? It is a qualitative study exploring scholarly literature to create a social, political, and economic landscape and six in-person targeted interviews to UTA students and staff. The general evaluation of the gathered information for this study has three recurring themes: education, individual determination, and interpersonal relationships. The results are consistent; however, this study is limited by a small sample size and time. This study contributes to the significant lack of research on this topic.

Daniela Loya-Rivera, Exercise Science

Title: *Improving Breast Cancer Patients' Disclosure Practices in the Workplace through an eLearning Intervention- An Analysis on Interview Data from an Existing Intervention*

Faculty Mentors: Dr. Grace Brannon and Dr. Yue Liao

Breast cancer diagnoses are rising yearly in the United States, with the 18-45 year old age group affecting many employed women. Previous breast cancer disclosure interventions identify challenges faced following the diagnosis, as well as common themes and aspects in the breast cancer disclosure process in the workplace, however few have approached the process holistically. A pre-existing study conducted by faculty researchers at the University of Texas at Arlington originally planned to examine how individuals with breast cancer perceived the feasibility and acceptability of a theory-driven eLearning intervention on disclosure at work. The focus of this study was to form qualitative data analyses through a phronetic iterative approach, first level coding, and interpretation on the interviews conducted in the pre-existing intervention. The results showed participants finding relevant information in the pre-existing intervention to be helpful in applying it to their current situation, regardless of whether or not they ultimately chose to disclose their diagnosis.

Ameen Mahouch, Software Engineering

Title: *Navigating Industrial Safety Regulations: Integrating Compliance in the Mitsubishi RV-8CRL Robotic Workcell*

Faculty Mentor: Dr. Chris McMurrough

The Mitsubishi RV-8CRL vertical robot arm plays a crucial role in automating industrial warehouses. However, safety compliance with regulations set by governing agencies is of utmost importance to ensure a safe working environment and reduce workplace injuries. This study presents an agile methodology for continuously integrating safety features into the RV-8CRL work cell to adapt to evolving requirements and operational needs. The study documents the research into safety standards and the implementation of notable safety measures, including an industrial signal output tower, rail boundary detection sensors, and proper lockout/tagout procedures. The results demonstrate enhanced workplace safety and compliance, leading to reduced risks of accidents and increased operational efficiency.

Preston McKee, Kinesiology

Title: *A Comparison between Clinical and Research Measures of Motor Development and Development Delays in Children Ages 36 months to 48 months*

Faculty mentor: Dr. Priscila Tamplain

Developmental delays (DD) and Autism Spectrum Disorder (ASD) affect roughly 1-3% of all children worldwide with the majority of cases present in low to middle income countries. Current methods of diagnosing developmental delays rely largely on parental questionnaires and the primary care physician's observations. However, these parental questionnaires have been demonstrated to be inadequate in catching all cases of DD. Motor assessments such as the Motor Assessment Battery for Children are much more thorough and are geared specifically towards the child's abilities rather than the parents' perception of them. To further study this gap, children ages 3-4 were assessed both with the MABC and the parental questionnaires such as the Ages and Stages Questionnaire (ASQ), the Little Developmental Coordination Disorders Questionnaire (DCDQ), and the Environmental Screening Questionnaire (ESQ). The results found that questionnaires gave false negatives when compared to the more rigorous MABC.

Sergio Melendez, Social Work

Title: *The Effects of Pollution in the Hispanic Population of North Texas: A Study on Cultural Practices/Habits and Potential Solutions*

Faculty Mentor: Mrs. LaShaunn Bold, LCSW-S Associate Professor in Practice

Air pollution poses a devastating health threat to everyone's lives involved in the burning, consumption, and emitting of greenhouse gases and nonrenewable energy. From air pollution, you can contract a variety of respiratory diseases and illnesses including asthma, lung cancer, stroke, pneumonia, heart disease, etc. These toxic pollutants mix with other substances (dust, dirt, soot, smoke in the air) to create Particulate Matter (PM). PM of 10 (microns in diameter) can become inhaled and absorbed in the bloodstream bypassing our body's defense system (immune system) penetrating deep into our respiratory and circulatory system, and damaging our lungs, heart, and brain. This is just some of the information that we need to know as perpetrators and victims of the actions we take. Having awareness of this issue is especially important within the Hispanic population of North Texas. The goal of this experience is to highlight the vulnerabilities that the Hispanic population (locally) will sustain through the cultural practices that accelerate and worsen the effects of air pollution. From the discovery of these practices also finding healthier habits/practices and meta analyzing them for their effectiveness on this population.

Noman Ali Molwani, Biology

Title: *Enhanced Magnetic Hyperthermia in Iron Carbide Nanorods*

Faculty Mentors: Mr. Xavier Aranda and Dr. Ping Liu

This research investigated the potential of Fe₅C₂ nanorods, particularly focusing on elongated shapes, for enhanced magnetic hyperthermia. Fe₅C₂ nanorods possess several advantages over other nanoparticles commonly used in magnetic hyperthermia because of high saturation magnetization, moderate coercivity, exceptional chemical inertness, and low toxicity. The solvothermal method was used to synthesize Fe₅C₂ nanorods with high anisotropy, elongated shapes, monodispersity, and biocompatibility. Tailoring the magnetic properties of these particles was achieved through meticulous control over the synthesis process. Characterizations using X-ray diffraction and transmission electron microscopy were used to confirm the structure and phase of the synthesized nanorods. Physical property measurement systems and alternating gradient magnetometers were employed to evaluate their magnetic properties comprehensively. The heating performance of the nanorods under an AMF was measured to assess their suitability for magnetic hyperthermia applications. By refining the synthesis of Fe₅C₂ nanorods, emphasizing elongated shapes, and exploring functionalization strategies for tumor-specific targeting, this project aimed to pave the way for their translation into clinical applications.

Mia Moreno, Nursing

Title: *Exploring the Nexus: The Influence of Acculturation and Stress on Infant Outcomes among Adolescent Hispanic and Black/African American Women*

Faculty Mentor: Dr. Cheryl Anderson

Research often is inconsistent and overlooks disparities in acculturation, stress, and birth outcomes between Hispanic and Black/African American (B/AA) adolescents. Despite societal challenges, Hispanic women generally experience positive birth outcomes, unlike B/AA childbearing women who face increased risks. Minority and childbearing adolescent women also often receive inadequate prenatal care (PNC), impacting their birth outcomes. This study compared birth outcomes among Hispanic and B/AA adolescents, assessing their acculturation, stress, and prenatal care regularity. Using a secondary analysis from a dataset of adolescents, there were 65 Hispanic adolescents and 75 B/AA adolescents for a total sample size of 140. Acculturation and stress were measured via the Acculturation Rating Scale for Mexican Americans-II and the Impact Event Scale respectively. Infant outcomes were measured via gestational age (GA), birth weight (BW), and reported infant complications. Results revealed no significant association between acculturation category with infant outcomes. Higher GA was, however, found to be positively associated with PNC. Race-ethnic differences were significant only for infant BW and stress level. Stress levels were found to be significantly higher for the B/AA adolescents, and higher stress levels were associated with a lower GA. While PNC visits were not significantly different between groups, only 50% of traditional Hispanic teens and 63% of B/AA adolescents received the recommended number of visits. PNC positively influences GA and enables stress management, which can be especially crucial for Black/African American adolescents. Therefore, healthcare providers must stress regular PNC to offer support, assess risks, and alleviate stress during pregnancy.

Olivia Mullen, Communication Studies

Title: *Germany's Journey from a Common Enemy to a Loved Ally*

Faculty Mentors: Dr. Molly Cummins and Dr. Lonny Harrison

World War Two is considered one of the most impactful wars to date. Something it is notorious for is the war crimes committed by the countries involved. Specifically, the genocide committed by the German government, known as the Holocaust. This study focuses on the events, messaging, and other factors that changed the world's opinion of Germany from a common enemy to a "must-visit" world superpower. The study focused on three factors: finances, citizens' attitudes, and government policy. By tracking the tourism levels in and out of Germany and the international trade rates, significant events of each of the three factors are monitored to see their impact on Germany's global acceptance.

Hofran Ngoma, Marketing

Title: *From Instagram to Top Ranks: Unveiling the Influence of Social Media Engagement on Business School Prestige*

Faculty Mentor: Dr. Yiyi Li

Social media usage by universities has become widespread, serving as a dynamic platform for engaging with a diverse audience that includes prospective students, alumni, and the broader community. This research paper delves into the multifaceted role of social media in universities, serving as a tool for communication, audience engagement, brand promotion, and academic support. The study aims to explore the correlation between universities' social media usage and their ranking performances. Utilizing Instagram as a data collection platform, the investigation gathers insights into social media usage and engagement among various universities. By examining this relationship, this study's findings can enhance a school's performance on the annual best business school list.

Christina Nguyen, Biology

Title: *Transcriptional Regulation of Lipoproteins Lpp1 and Lpp2 in the Nosocomial Pathogen, Acinetobacter baumannii*

Faculty Mentors: Dr. Nicholas Pollock and Dr. Joseph Boll

The lipid A precursor of LPS/LOS was canonically thought to be essential for Gram-negative survival. However, *Acinetobacter baumannii* (Ab) inactivates lipid A biosynthesis to gain resistance to the last line antimicrobial, colistin. There is not an understanding of how Ab survives without LOS (LOS-) to develop colistin resistance but it was found that lipoproteins are enriched in the LOS- outer membrane (OM). In *Escherichia coli*, physical tethering of the OM to peptidoglycan via lipoproteins, Lpp, likely stabilizes the cell envelope when LOS is not produced. It was found that two putative Lpp proteins are present in *A.baumannii*. Lpp1 is expressed in both the growth and stationary phase, while Lpp2 is only expressed in the stationary phase, suggesting separate roles in OM assembly. Furthermore, Lpp2 appears to be expressed in stress. This study investigated the regulatory mechanisms that control Lpp1 and Lpp2 ions during growth. In response to OM defects, Ab lipoproteins increase cell envelope stability.

Ikechukwu Ofili, Computer Engineering

Title: *Raspberry Pi Digital Dashboard using OBD-II interface.*

Faculty Mentor: Dr. Chris Conly

The Raspberry Pi is a powerful computer. Running a 1.5GHz core, this powerhouse is powerful enough to be the main driver of a digital dashboard. Powering not only the graphics, but the data collection also. This is what this project explores: extending a fully functional digital dashboard which currently reads data via raw CAN lines to use the OBD-II interface present in most automotive vehicles today. The technical challenges involved in interfacing the Raspberry Pi with the OBD-II port are discussed, including communication protocols, data interpretation, and security considerations. Through a combination of hardware modifications and software development, a robust connection between the Raspberry Pi and the OBD-II port was established, enabling real-time data retrieval and analysis. Additionally, a user-friendly interface on the Raspberry Pi was implemented, allowing for intuitive visualization of vehicle metrics such as speed, fuel consumption, engine diagnostics, and more.

Martin Luther Ogbuigwe, Economics and Information Systems

Title: *How does Internet Access Impact Employment Opportunities for the Black Community in Texas?*

Faculty Mentor: Mr. Roger Wehr

In today's era, having access to the internet is seen as a factor in determining job opportunities significantly impacting the economy in different areas. This study specifically looks at how internet access affects employment chances for individuals in Texas. Despite efforts to promote equality in access disparities still exist, which could worsen inequalities. The main goal of this study is to measure how internet availability relates to employment rates among residents of Texas focusing on an aspect of the digital gap. By using methods and analyzing data from sources like the American Community Survey and Bureau of Labor Statistics this research aims to offer a detailed insight into how having or lacking digital connection influences job prospects for one of the most underserved groups in Texas. The results are intended to help policymakers and stakeholders make decisions on addressing the divide and improving economic opportunities, for Black Texans.

Rachana Pandey, Computer Science

Title: *Navigating the World of RFID: Diversity, Capabilities, and Constraints of Readers and Tags*

Faculty Mentor: Dr. Chris Conly

Radio-Frequency Identification (RFID) technology, a method for storing and retrieving data through electromagnetic transmission to an RFID tag, is revolutionizing inventory and asset management in various sectors, including healthcare. This research explores the applications of RFID in a medical setting. It assesses various RFID readers and tags, focusing on their functional capabilities, ranges, and limitations within a medical environment. Employing a comprehensive approach, the study integrates an extensive literature review, comparative analysis, and empirical data from both experimental simulations and real-world healthcare scenarios. The aim is to identify RFID solutions that optimize surgical equipment management, thereby enhancing both operational efficiency and patient safety. This research is crucial for understanding how RFID technology can meet the unique challenges of healthcare settings, offering vital insights into its effective use in critical areas like surgical departments. The outcomes are expected to significantly contribute to the advancement of RFID applications in medical environments, prioritizing accuracy, inventory management, sterility and patient care.

Jainil Patel, Construction Management

Title: *Review: Implementation of Video Documentation in Lessons Learned System in Construction*

Faculty Mentor: Dr. Kyeong Rok Ryu

Organizations employ Lessons Learned Systems (LLS) to manage knowledge and capture valuable project experiences to improve future performance. However, the construction industry has yet to widely adopt such systems, presumably due to its sluggish tech integration and risk-prone characteristics. Of the numerous fragmented obstacles that impede LLS adoption, one noteworthy obstacle would be the challenge faced during the text documentation of experiences. Traditional text inputs are labor-intensive and time-consuming. Hence, video documentation can be a more efficient replacement with its quick and modern recording features. The technological advancement and the preference shift of younger generations from text to video highlight the potential of video documentation. This paper focuses on identifying the status quo of LLS and conducting a multidisciplinary study on video documentation to validate it as a preferable alternative. The results of this study will contribute to advancements in knowledge capture in LLS using videos.

Ma Anjelika Pineda, Civil Engineering

Title: *Investigating Rural Traffic Dynamics: A Traffic Study on E 2nd Street Intersection's Behavior and Safety*

Faculty Mentor: Dr. Tamer Eljufout

Traffic studies guide engineers in designing road networks to ensure smooth traffic flow and public safety. Such studies assess the need for traffic control devices to manage vehicle flow safely and efficiently. This is crucial at intersections which pose high risks of collision and congestion. A traffic analysis at the intersection of Island Grove and E 2nd Street on the FM-4 roadway in Cleburne, TX was conducted to evaluate the sufficiency of the current traffic control device. TxDOT warrants and standards and a field study were utilized and performed to justify the substitution for a traffic signal at the intersection. Based on the data and criteria warrants, the intersection's current traffic control device is sufficient to manage the volume of traffic. Although no changes are to be made for the intersection, the study emphasizes the properly planned design and safety of the intersection.

Alisa Pjetrovic, Civil Engineering

Title: *An Assessment of Methane Cracking Technologies for Hydrogen Production and Greenhouse Gas Reduction*

Faculty Mentors: Dr. Frank Lu and Dr. Arpita Bhatt

Methane reformation and methane pyrolysis involves cracking the components of methane, leading to the production of hydrogen gas and in the case of pyrolysis, solid carbon. These technologies are gaining attention as the global community moves to address methane as a greenhouse gas. This study aims to assess, through a systematic literature review, the current state-of-the-art methane reformation and methane pyrolysis technologies based on seven technology criteria: hydrogen production capability, greenhouse gas reduction, decarbonization capability, reaction stability, operating temperature requirements, energy requirements, and Technology Readiness Level (TRL). This study relies on a thorough literature search that determines the state-of-the-art technologies, a comparison of their advantages and disadvantages, and a proposed quantitative analysis using a decision-making matrix. Global progress and challenges of biogas and biomethane utilization are also discussed, and recommendations are made on how the TRL of the technologies can be improved to make a lasting impact on global efforts relating to hydrogen production, greenhouse gas reduction, and decarbonization.

Andres Plascencia, Architecture

Title: *Fthneed: An Inquiry into the Intersections Between Sustainable Methods of Fabrication and Furniture Design*

Faculty Mentor: Mr. Dennis Chiessa

In the greater continuity and canon of architectural pedagogy and practice, there exists a very rich history of furniture design that still exists today. The project investigates the importance of furniture design as an integral part of design pedagogy and expression. Not only that, but the project also considers relevant issues such as fabrication, sustainability, and adaptability. This culminated of interests and considerations resulted in both the production of an item of furniture and a body of work investigating and displaying the produced item. The resultant furniture piece is the “Fthneed”. The Fthneed is an object of play. Lacking any definite form or configuration, the kinetic object can fold and stack into any piece of sculpture or furniture your heart desires.

Md Safkat Rahman, Electrical Engineering

Title: *High Voltage Solid-State Relay*

Faculty Mentors: Dr. David Wetz and Dr. Alexander Nathaniel Johnston

This project is an additional Honors component for an electrical engineering senior design class project designing a compact high-voltage testing resource that can supply up to 4kV. This extra project involves designing a high-voltage solid-state relay that can support up to 4kV, 10mA, and low voltage drop, using discrete parts only. The relay is essential to isolate the high-voltage power for safety. The relay of my design utilizes two silicon carbide MOSFETs, each supporting 3.3kV, thus supporting a total of 6.6kV. All other components surrounding the MOSFETs, which constitute the control circuit of the relay, are simple components such as resistors, capacitors, diodes, etc. After designing the circuit, the relay must be tested with the rest of the components of the testing resource to ensure functionality, and the test results will determine the need for further improvements.

Angel Ray, Interdisciplinary Studies (Korean and Linguistics)

Title: *L2 Acquisition of Korean: Phonology & Prosody*

Faculty Mentors: Dr. Daniel Scarpace and Ms. Hyuna Choi

Learning Korean as a second language (L2) has many challenges for a native (L1) non-native speaker. There is a new alphabet, word order, and new sounds that English does not have. Additionally, pronunciation and prosody are among the hardest aspects of the language to learn and master. Especially if one's native language is not tonal or does not have similar sounds in their inventory. The new sounds that a new language introduces can be too subtle to pick up when listening, making it difficult for non-native speakers to replicate in their speech. The language's flow of speech and rising and falling intonations only add to the struggle of L2 learners of Korean.

Brianda Paulina Rocha Hernandez, Psychology

Title: *Anxious Scrolling: Prosocial Social Media Content Implications*

Faculty Mentor: Dr. Jared Kenworthy

This study explores the effects of prosocial social media videos on anxiety. In this modern age of social media, many people have reported that social media poorly influences their mental health. Many social media videos that thousands or even millions of people are exposed to could contain hateful or dangerous content that can negatively impact a person's mental state. Past research has not mentioned the effects of prosocial social media videos on anxiety, but similar papers have been published. Prosocial behavior is described as helpful, positive, and promotes a more welcoming social community. Prosocial behavior in video games has shown an increase in prosocial behavior among the people consuming the content. Still, these research papers fail to mention the effect prosocial content can have on anxiety. In this study, an STAI anxiety scale has been used to measure anxiety pre- and post-social media consumption. There will be three conditions to measure. The prosocial condition, the positive condition, and the neutral condition. Each condition describes the type of videos being consumed. The results will be acquired through QuestionPro and analyzed through SPSS.

Zoe Rodriguez, Industrial Engineering

Title: *Establishing Employee Sense of Belonging in a Busy Work Environment*

Faculty Mentors: Dr. Jamie Rogers & Dr. Shernette Kydd

This honors thesis capstone project explores the concept of an employee's sense of belonging within a busy work environment. A department within ABC Company faces operational challenges regarding their daily tasks. The Honors contribution addresses the comparison between the busy work environment at ABC Company and existing literature to provide scholarly-supported recommendations and mitigation strategies for ABC Company.

Existing literature underscores the importance of understanding contributing influences on an employee's sense of belonging within the workplace. The honors contribution adds value by closing the information gap within companies that operate under a busy work environment and strategies of how to establish an employee sense of belonging within the busy environment. The methodology involves using a survey to capture employee feedback regarding their work environments with an emphasis on influences that contribute to employee sense of belonging as supported by existing literature.

Saniah Safat, Computer Science and Engineering

Title: *Recommendation System Algorithm E-commerce Web Application*

Faculty Mentor: Dr. Chris Conly

This study explores the effectiveness of a hybrid recommendation system for e-commerce by integrating content-based, collaborative, and popularity-based models. Traditional individual algorithms each have inherent limitations such as handling new users or items data sparsity and ensuring relevance and diversity in suggestions. The hybrid model seeks to overcome these challenges by leveraging the strengths of all three methods, thus potentially offering more precise, personalized product suggestions. Through logistic regression analysis, the performance of each model and their integration into a hybrid system are evaluated. Initial results indicate that the hybrid system significantly outperforms the individual models in terms of accuracy and user satisfaction. This research underscores the potential of hybrid recommendation systems to enhance user experience and support businesses in optimizing their online platforms. The study is pivotal for advancing the field of recommendation systems and offers practical insights for e-commerce enterprises aiming to refine their customer interaction strategies.

Abigail Serna, Finance

Title: *Exploring the Relationship between Female Executives, Environmental Risk Ratings, and Market Capitalization: An Analysis of Fortune 100 Companies*

Faculty Mentor: Dr. Trang Thai

This research addresses the connection between gender diversity, environmental risk ratings, and financial performance using market capitalizations within Fortune 100 companies. The primary problem to be investigated is if and how the presence of a female executive influences environmental risk ratings in these leading corporations. It seeks to determine whether the higher environmental risk ratings directly correlates with a measurable impact on the financial performance of top-performing companies. It is relevant given the recent surge in sustainability reporting among U.S. publicly traded companies. This is significant because understanding and bringing attention to the relationship between gender diversity and sustainability practices and therefore, financial performance, can help corporations reshape their organizational strategies.

Hector Sosa, Computer Engineering

Title: *Design of a Security ECU with Wireless Connectivity*

Faculty Mentor: Dr. Chris Conly

As automobiles are becoming more connected to the cloud and are becoming more autonomous, the need for secure data transfer between user and network of Electronic Control Units (ECU) must be addressed. Therefore, there needs to be a thoughtful design of the wireless communication between the user and the network of the car. One of the many methods car manufacturers use to secure wireless communications is the use of rolling codes. In this study, an ECU will be designed for a mock electric vehicle which contains an already established network of ECU's. The ECU will have a Controller Area Network (CAN) module to communicate with the network, a wireless transceiver for data transfer, and a Real Time Operating System (RTOS) to handle scheduling of the various tasks. The effectiveness of secure wireless communication will be determined by having another user attempt to send information wirelessly.

Vykhari Sreekumar, Biomedical Engineering

Title: *Light-Responsive Nanoparticles for Knee Osteoarthritis Pain Relief*

Faculty Mentor: Dr. Kytai Nguyen

Knee osteoarthritis (OA) is a disease that results from loss of cartilage at the knee, leading to severe pain. Current treatments to alleviate pain include the use of non-steroidal anti-inflammatory drugs and opioids. The latter presents an elevated risk of addiction development and overdose. To prevent these issues, an on-demand light responsive drug delivery system was fabricated and tested. Nanoparticles loaded with a model hydrophobic drug were synthesized and characterized by size, zeta potential, photoresponsive coating, and loading efficiency. Moreover, their light-triggered drug release profile was also evaluated. The nanoparticles were found to be of an appropriate size and demonstrated a higher drug release under light exposure than that of uncoated nanoparticles. Therefore, this drug delivery system presents an elevated potential to benefit patients of knee osteoarthritis by treating pain on-demand, preventing the need for direct drug intake, and potentially reducing drug abuse and overdosing.

Nina Tarpley, CLIS Russian and Interdisciplinary Studies (History, English, and Classics)

Title: *The Mercy of Saint Seraphim by Ivan Shmelyov: An Original English Translation*

Faculty Mentors: Dr. Iya Price and Dr. Scott Palmer

The Russian writer Ivan Shmelyov (1872-1950) is acclaimed not only in Russia but also widely throughout Europe for his novels, short stories, and fairytales written with a marked depth of meaning, beauty, and expression. He wrote and published throughout his entire life ~ from the pre-revolutionary years in Russia into the years of the Revolution, and eventually as an émigré in Europe. Although Shmelyov is celebrated throughout Russia and Europe both in academic and public circles, he is little known to the American people and English-speaking people as a whole. In academic circles, scholarship on Shmelyov in the English language is extremely limited. Many of his works remain inaccessible to English speakers. *The Mercy of Saint Seraphim*, an autobiographical sketch illustrating a miracle in the life of the writer, is numbered among these and, in this work, made available for the first time in English.

Alexandria Tatum, Psychology

Title: *Ratings Creep: The Increase of Violence in Movies Through Time*

Faculty Mentor: Mr. Derek Mangino Sirvent

Aggression and violence are interwoven, and both are prevalent issues in society. Even at the neurological level, viewing violent media activates the prefrontal cortex, amygdala, and the anterior cingulate cortex, all areas that influence aggression. To regulate exposure to violent and aggressive content, movies are usually ranked using the MPAA. Yet, there has been an observed ratings creep in this system (i.e., the progressive escalation of violent content in films). The current study hypothesizes that since the standard of the current rating system, PG-13 and R-rated movies have become more violent through time. The study compares 165 randomly selected movie trailers from 1985 to 2023 on six criteria: sexual content, substance abuse, physical violence, verbal profanity, presence of weapons and disturbing imagery and gore. The criteria will be rated on a scale of one to five. The results show that there was an increase in offensive content across the span of 39 years. There was also a marked difference in the ratings creep observed between R and Pg-13 movies, with R-rated movies being much higher in offensive content.

Makayla Thompson, Interdisciplinary Studies (Environmental & Sustainability Studies and Geography)

Title: *Biophilic Design on the University of Texas at Arlington Campus: Comparison of 1999-2024*

Faculty Mentors: Dr. Andrew Milson and Ms. Meghna Tare

The University of Texas at Arlington (UTA) is home for many students and the care of this college campus environment is essential. Over the years many improvements have been made to help students have a higher quality experience at UTA. This study addresses a historical pursuit of the development of UTA's campus environmental features, also known as biophilia, between the years of 1999-2024. Biophilia is the environmental features containing natural elements within an architecturally designed space. Biophilic environmental features on UTA's campus and the resulting student experience enhancement are the purpose behind the research. This research examines the historical establishment of the UTA campus biophilia and the transformation of biophilic design to make space for students to have a better quality of life at UTA. The paper encompasses a case study of the UTA Master Plans ranging from 1999-2024 including local news reports, and an analysis of peer reviewed research about biophilic properties on college campuses. The purpose of the study is to improve the biophilic environment at UTA, and the findings can be applied to create a more inviting space for students to be a part of a beloved community on campus. By analyzing these documents this capstone will tell the story of how past and present biophilic design affect the students and UTA community.

Gwendelyn Tran, Biology

Title: *The Implementation and Effect of a Guided Inquiry Lab within an Introductory Microbiology Lab*

Faculty Mentor: Dr. Whitney Tholen

Microbiology lab is a foundational course in microbiology, biology, and nursing students' education at many colleges. While microbiology lab pedagogy within upper-level courses has shifted from a cookbook-style lab to favor more inquiry-based labs, there is a lack of introductory-level microbiology inquiry-based labs. This study aims to introduce an easily adaptable one-week guided inquiry-based lab to an introductory microbiology lab curriculum and assess the effects of this pedagogy change on the students. To analyze the impact of this shift, student attitude and success within UT Arlington's undergraduate microbiology labs were assessed via student perception surveys and concept inventory surveys, respectively, before and after the lab. Results from this study serve as an example of how professors can introduce guided inquiry to their classroom and explain what additional learning targets students can gain from the course.

Preston Truong, Biology

Title: *Analyzing The Effects of Sex-Biased Gene Expression on Dosage Compensation: An Exploratory Investigation of Gene Expression Differences in Tribolium Leg Tissue*

Faculty Mentor: Dr. Jeffery Demuth

The XX/XY sex chromosome system governs the sex determination of many organisms, where female individuals typically possess the XX sex chromosome pair and male individuals possess the XY pair. However, in some species, the Y chromosome is degraded due to reduced recombination and genetic processes that result in the loss of gene content. Dosage compensation (DC) mechanisms evolve to counteract the significant loss of one copy of genes and serve to maintain the level of gene expression before the loss of one copy of genes. This study will explore how sex-biased gene expression may affect DC evolution by observing the difference between expression levels of sex-linked genes (sex-biased expression) on the neoX sex chromosome in male and female *Tribolium confusum* and then comparing the difference in expression levels of the same genes found on autosomal chromosome #2 (Chr2) in the closely related species *Tribolium castaneum*. This research hopes to determine if dosage compensation or sex-bias had driven the translocation of Chr2 to neoX from autosome to sex-linked chromosome. Male and female T. confusum were raised for multiple generations and their front legs were dissected. Gene expression from male and female legs was obtained by RNA-sequencing (RNA-seq) analysis. Although the results cannot be considered statistically significant due to the lack of replicates in the project, further research may provide more insight on the relationship between sex-biased gene expression and dosage compensation.

Miranda Williams, Physics & Chemistry

Title: *The Search for Photonuclear Interactions of Muons Utilizing Test Beam Data at the Large Hadron Collider*

Faculty Advisor: Dr. Haleh Hadavand

The ATLAS Detector is one of four different types of detectors within the Large Hadron Collider and is used to study the fundamental theories of the universe. Within the ATLAS experiment, beams of known composition and energies – otherwise known as “test beams” – are one of the many methods used to study specific physical phenomena. In this study, a test beam of muons with an energy of 160 GeV was analyzed to search for evidence of photonuclear interactions. This involved analyzing and filtering over 50,000 total events using specific parameters that would indicate such an event had occurred. The first step of this process involves mapping the energy distribution between cells within the Tile Calorimeter, which is in progress and is estimated to be completed within the next two weeks. Still, more work needs to be done to begin the search for photonuclear interaction events within this run of data.

Ahmad Hamzah Yousaf, Mechanical Engineering

Title: *Construction of Benchmark Standards to Evaluate 3D Printing Techniques*

Faculty Mentor: Dr. Robert Taylor

3D printing manufacturing is one of the most innovative and growing methods to manufacture parts that can be used across various industries. However, cost and efficiency of manufacturing is one of the biggest concerns amongst manufacturers and customers and by utilizing the development of benchmark tests for evaluating the performance of 3D printing technologies such as Multi Jet Fusion, Selective Laser Sintering and Extrusion printing the efficiencies of these 3D printing technologies along with their cost will be compared to determine which is the most ideal printer to manufacture parts. The key elements will be to establish standardized procedures for assessing key parameters such as dimensional accuracy, surface finish, material integrity and mechanical properties across these different 3D printing technologies. By comparing the manufactured product of each 3D printer under controlled conditions, this will provide valuable insights into the strengths, limitations, and optimal applications.