Honors Research Symposium

Poster Presentation

November 17, 2023

University of Texas at Arlington

Mohamed S. Abdalati, Biology
Impact of the COVID-19 Pandemic on Microbiology Undergraduate Students' Academic Performance at the University of Texas at Arlington
Faculty Mentor: Dr. Whitney Tholen

The COVID-19 pandemic has brought unprecedented challenges to higher education, impacting students' academic performance. This study investigates the effects of the pandemic on microbiology undergraduate students at the University of Texas at Arlington (UTA).
A retrospective cohort study design was employed, analyzing academic records of 3,059 microbiology undergraduate students from 2020 to 2022. Results indicate a significant decline in academic performance for both cohorts of general and nursing microbiology students during spring 2020 and 2022. A literature review explored the relationship between socioeconomic status (SES) and academic performance during the pandemic. Literature shows students of lower economic status experienced more educational disparities. This may have impacted many students at UTA. This study reveals the COVID-19 pandemic significantly impacted students in higher education. Findings emphasize the need for tailored interventions and equitable education strategies to support students navigating unforeseen disruptions.

Nmesoma Anya, Nursing
"Check Yourself" - Increasing Access to Sexual Healthcare Services for Minority Young Adult College Students
Faculty Mentor: Dr. Jaquetta Reeves

The increasing HIV/STI rates among African American/Black and Hispanic/Latino college students raise concerns due to testing barriers. This study aims to gather insights and viewpoints on HIV/STI self-test kit utilization and identify barriers to testing within these communities. It uses a cross-sectional, quantitative online survey with eligible participants from the University of Texas at Arlington—African American/Black and Hispanic/Latinx/a students aged 18 or older who are sexually active. This research explores self-test kit attitudes, viability, and acceptability within these minority groups. The findings will guide public health initiatives to increase testing rates, reduce stigma, and promote early detection and treatment, ultimately curbing infection spread within college communities. This research fills a crucial gap in understanding the challenges faced by African American/Black and Hispanic/Latino college students, contributing to health equity and improved outcomes for these populations.

Abbey Beeck, Marketing
The Impact of COVID-19 on Consumer Tastes, Preferences, and Purchasing Behavior
Faculty Mentor: Dr. Lauren Brewer

The COVID-19 pandemic has brought about unprecedented changes in the global consumer landscape, particularly in the realm of apparel. This project delves into the crucial importance of understanding the multifaceted effects of COVID-19 on consumer behavior within the apparel industry. The research explores the dynamic shifts in consumer tastes, preferences, and purchasing habits in response to the pandemic, shedding light on their far-reaching consequences. In addition, the pandemic has disrupted traditional retail formats, leading to store closures and reduced foot traffic. This has pushed retailers to innovate by integrating technology and providing unique in-store experiences to attract customers back to physical locations. This research project analyzes and reports the results of a survey given to undergraduate students from UTA. The results of the survey can be used as a sample group for the population within similar demographics.

Ginevra Cerreto, Industrial Engineering
Modernizing and Automating the Manufacturing Process of Pole-Vaulting Poles
Faculty Mentor: Dr. Jamie Rogers

This Thesis Capstone Project endeavors to revolutionize the manufacturing process of pole-vaulting poles by replacing traditional paper-based methods with cutting-edge technology. The objective is to automate and modernize the process, eliminating the need for paper drawings and providing an electronic alternative. The Honors contribution focuses on creating a comprehensive database encompassing all previously crafted pole-vaulting poles, replacing the antiquated paper storage room. Scanning paper drawings and employing Python-based programming, including Optical Character Recognition (OCR) libraries, allows for efficient data extraction and storage in a structured database, simplifying the retrieval of old drawings.

Existing scholarship underscores the need for modernizing and automating pole vaulting pole manufacturing. Such a transformation promises increased efficiency, reduced manufacturing time, and consistent quality while meeting safety standards. The Honors contribution adds value by expediting the retrieval of historical pole designs and promoting the use of modern technology in manufacturing processes. The methodology involves a systematic approach to scanning paper drawings and employing OCR technology to extract and organize relevant data into a database. Preliminary references confirm the significance of the project, emphasizing the importance of modernizing manufacturing processes and using advanced technology to enhance quality and efficiency.

Jordyn Garca, Fine Arts
Why are we Creatives? Understanding the Psychology of Creativity Between Children and Adults
Faculty Mentor: Mr. Scott Hilton, MFA

As children, we are encouraged to explore our imagination and creativity. However, as adults, it is often not as accepted in society, both as a hobby and an occupation. Psychology can provide us with knowledge on the differences between a child's creativity compared to an adult's, and possible reasons for those differences. These may be explained by the child's upbringing, physiological changes in the brain, convergent or divergent thinking, or how age can affect an individual's thought process. This paper examines the differences between childhood and adulthood creativity, as well as different components that may play a role in the creative process, such as stress and anxiety.

Kacie Gray, Exercise Science
The Association Between Clinical and Research Measures for Motor Development in Preschool-Aged Children
Faculty Mentor: Dr. Priscila Tamplain

Early childhood is a time full of growth and development. There are various factors that can inhibit proper motor development. Motor development in children may be a predictor of later success. To explore the validity of common questionnaires currently used to assess motor development, clinical (ASQ-3) and research (MABC-2) measures of motor development were assessed. Research testing involved the motor assessment battery for children, 2nd edition; a 30-minute assessment that aids in detecting motor difficulties in kids. It involved eight simple "tests" which are geared for kids to enjoy! While the child completed the MABC-2 with research personnel, their guardian completed a variety of surveys to compare to the assessment. Data is still being collected; results are not yet obtained.

Ashley Haghighi, Mechanical Engineering
Thermal Response of Chiplets on Heterogeneous Substrates
Faculty Mentor: Dr. Dereje Agonafer

We need more from our computers; faster speeds, more power, artificial intelligence, 5G capability, but we want it cheaply. The use of chiplets allows for more customization based on needs, more efficient power consumption, and can be integrated into different Internet of Things (IoT) applications while simultaneously reducing electronic waste during the manufacturing process. The integration of chiplets into the chip manufacturing industry could meet the demand for high-performance computing while keeping the computer system's data safe with encryption and authentication capabilities. By running thermal response simulations of chiplets on heterogeneous substrates and in different integrated circuit formations, it can be determined which combination of variables would be best suited to meet the needs of the computer system and mitigate the risk of overheating.

Katherine M. Hamilton,
The Misrepresentation of American Sign Language and Deaf Culture in Mass Film Media
Faculty Mentor: Dr. Lisalee Egbert

Mass film media has the power to shape popular culture and influence public opinions and perceptions; thus, properly portraying Deaf characters, the correct linguistic model of American Sign Language (ASL), and Deaf Culture in this powerful medium is crucial. This research examines the misrepresentation of Deaf Culture and ASL in film and its impact on real-world interactions between Deaf and hearing communities. By analyzing historical film trends, bringing modern trends to light, and creating educational tools, this study aims to create measurable change in media practice. The study uses online questionnaires and interviews with ASL-fluent participants from the Deaf Community who have film media experience. Accurate Deaf life portrayal in storylines, abandoning archetypal Deaf characters, and intentional character composition emerge as key factors. The results of this study are intended to promote media literacy and educate film creators.

Maria Hernandez, Interdisciplinary Studies
Policy Entrepreneurship Examined Within Informal Communities
Faculty Mentors: Dr. Evan Mistur & Dr. Ericka Roland

A water scarcity dilemma is happening worldwide and is a dire issue in urban areas due to a lack of public provision. When such issues arise, community action becomes necessary with local policy entrepreneurs to lead to social change. In this study, I investigated how policy entrepreneurs and informal communities work on water scarcity through community-based leadership. Community-based leadership theory was used to analyze how the intersection of urban planning and communities provides collective approaches to addressing water scarcity. Interviews of agents involved in the community were conducted to get an understanding of what has been done to help the residents get access to water. The findings of this study will shed light on how communities can understand how entrepreneurship and leadership work together within informal communities and should inform how we understand and investigate water access in the future.

Imogen Hofer, History
An Office of Their Own: First Ladies and Their Changing Influence on American Society
Faculty Mentor: Dr. Stephanie Cole

Changing societal roles have dictated the lives of women throughout history. Although women choose whether to strictly adhere to these norms, these expectations continue to shape women. The wives of American presidents are no different. As women, they were impacted by these social ideals, but as First Ladies, they were placed in a unique position to effect change. In this paper, I discuss the effects of these shifting ideals on the power, influence, and control of a selection of these women. I compare women from three subsections of American history–the eighteenth, nineteenth, and twentieth centuries–to determine the impacts of the changing nature of women's perceived place in society on their ability to effect change. I posit that these women utilized the limitations and frameworks of their day to carve a role for themselves in the office, though the methods of doing so had to change with the times.

Le Huang, Architectural Engineering
Alternative Structural Analysis of Reinforced Concrete System in Building Design
Faculty Mentor: Dr. Shaher Rababeh

The structural system is the skeleton of a building, upon which all other systems are built and tied together, including architectural, mechanical, and electrical. The selection of the structural system requires a comprehensive understanding of the building's load-carrying capacity, constructability, cost, and time required. In the US, reinforced concrete system is one of the two most common structures, alongside steel. It is crucial to perform structural analysis on both systems in order to select the most appropriate one for the project at hand. Critical member load calculations and computer modeling of the structural frame are to be performed before the analysis, then systems will be compared, and the best fit will be selected to continue to the construction stage. The team or individual with the capability to analyze both steel and reinforced concrete systems will be better prepared for future projects and become more competent architectural and structural engineers.

Stefanie Huynh, Public Health
Wound Alkalinity as a Biomarker to Predict Healing of Chronic Wounds
Faculty Mentor: Dr. Zhaoli Liu

Recent studies have demonstrated how wound alkalinity can be utilized to assess wound healing activity, such as the effectiveness of acidity on wound healing processes. Despite this, there are no current commercial tools available to predict the healing outcomes of chronic wounds. Utilizing a specialized pH measurement device, several patients were evaluated and monitored over the course of 4 weeks (minimum) for changes in wound size, shape, and alkalinity. Wound dressings were collected from patients and assessed for pH levels upon application of the device. Indicators such as blue colorations determined areas of minimal healing progress and the presence of alkaline plasma components, whereas yellow-brown hues were indicative for healing and the presence of acidic plasma components.

Teresa Le, Biomedical Engineering
Modifying Metabolic Pathways to Produce Therapeutics in Gut Bacteria
Faculty Mentor: Dr. Justyn Jaworski

Equol is a natural isoflavone metabolite derived from daidzein, an isoflavone found in soybean and other soy products. Research investigating equol has linked it to a reduced risk of certain cancers, hormone-dependent illnesses, and more. While some can naturally convert dietary daidzein to equol utilizing their gut bacteria, a vast disparity exists between populations that can only do so due to the presence of that bacteria in their gut. In western countries, the number of people characterized as equol producers is significantly smaller than those of Asian countries. Allowing a non-equol-producer to produce equol from dietary soy products through a series of engineered enzymatic reactions is achievable and has recently been confirmed. This experiment will involve genetically engineering a biocompatible filamentous bacteriophage to carry these genes necessary for isoflavone metabolization, such that these may introduce genes to bacteria of the intestines to receive the health benefits of soy-product-derived equol.

Lakyah Morgan, Nursing
The Association Between Stress, Depression and Health Complications Among African American Childbearing Adolescents
Faculty Mentor: Dr. Cheryl Anderson

This study explored the association between stress, depression, and maternal and infant health complications between younger (13-17 years old) and older (18-19 years old) Black childbearing adolescents via secondary analysis. In the Institutional Review Board (IRB) approved primary study, the birth experience and mental health of adolescents up to nine months postpartum was analyzed. Significant associations were noted between postpartum depression (EPDS scores) and stress (IES scores), r=.503, p=.001. Maternal complications prenatally were reported by 17.6% (n=3) for the younger adolescent versus 37.9% (n=22) of the older adolescents. Postpartum complications for younger adolescents were similar at 17.6% (n=3) versus 29.3% (n=17) for the older adolescent. Infant complications were higher among the younger adolescents at 41.2% (n=7) versus 34.5% (n=20) for the older adolescents. Limited research yields an incomplete picture of health, particularly between Black adolescents and a potential pattern of "wear and tear" over time; thus, further research is suggested.

Juno C. Murray
Dead Money: Granbury, Texas and the Socioeconomics of Haunted History
Faculty Mentor: Dr. James Sandy

Granbury, Texas traces its origins as far back as 1866, beginning as a frontier town based around a central square. The American railroad industry expanded exponentially in the nineteenth century, transforming the landscape of the western frontier, and creating railroad towns like Granbury. As this prominence faded over time many railroad towns were faced with transforming their economies or risk shutting down entirely. Granbury had a cultural revolution in the 1970's in which the town capitalized upon its history and location for monetary gain, such as revamping the town square and creation of a human-made lake. Stories of ghosts and hauntings in and around the Granbury Square also began to take form. This project examines the history of railroads in the U.S., their transformation of the West and towns such as Granbury, how Granbury shifted after the railroad industry's fallout, and how ghost stories reflect the town's culture and economy.

Darashagam Nahal, Public Health
Investigation of the Impact of Neighborhood Environments on AD/ADRD
Faculty Mentor: Dr. Yeonwoo Kim

There has been increasing interest in understanding the impact of neighborhood environments on Alzheimer's disease and related dementias (AD/ADRD). Surprisingly, there has yet to be a comprehensive review that consolidates the findings from studies conducted in this specific neighborhood-AD/ADRD field. The purpose of this study is to comprehensively investigate the influence of seven neighborhood environments on AD/ADRD. The seven key neighborhood environments that are investigated in this study include: i) neighborhood socioeconomic status, ii) neighborhood food environments, iii) neighborhood physical activity resources, iv) neighborhood healthcare services, v) neighborhood crime, vi) neighborhood non-crime safety, vii) neighborhood social cohesion. This research conducts a review of studies exploring the impact of each of these neighborhood environments on AD/ADRD. A literature review was used as the form of research methodology. Extensive evidence was systematically searched for on electronic databases *PubMed* and *Google Scholar* to form the basis for our analysis.

Drew Shaw, Journalism
Christianity and COVID-19: Comparing Dallas-Fort Worth Churches Conflicting Pandemic Procedures
Faculty Mentor: Mr. Geoffrey Campbell

The months following the onset of the COVID-19 pandemic in 2020 saw global confusion from individuals, organizations, and governments alike. Religious institutions, able to influence the attitudes of mass congregations, were not excluded. This research studies how Christian churches in the Dallas-Fort Worth Metroplex navigated the pandemic quite differently, following widely different lockdown procedures and holding conflicting views on COVID-19 vaccines. After Texas' initial restrictions on in-person gatherings in March 2020, the 101 churches in this study relied on social media to communicate to their congregations about their responses to COVID-19. These social media pages now act as paper trails for each church's specific pandemic procedures. When quantified, these procedures show to have often followed trends based on a church's denomination and surrounding demographics. These results shed light on the differences within the Christian church, and they could be used to anticipate how diverse communities of faith respond to disasters.

Jacqueline Solis, Nursing
Does Length of Stay Affect Patient's Comfort in the Epilepsy Monitoring Unit?
Faculty Mentor: Dr. Maxine Adegbola

Epilepsy is a neurological disease that affects more than 50 million people throughout the world. Having unpredictable and spontaneous seizures can make patients feel overwhelmed because they believe they have no control over how or when their seizures occur. To help provide insight on the nature of patient's seizures, Epilepsy Monitoring Units (EMUs) were developed. This study aimed to evaluate the relationship between a patient's length of stay against the stress and comfort experienced by the patient. The survey used to evaluate stress and comfort levels was the Epilepsy Monitoring Unit Comfort Questionnaire (EMUCQ), which was given on the first and fourth day of the patient's stay in the EMU. Although a trend was noted in the data, this change in stress and comfort levels could not be attributed to the patient's length of stay.

Jacqueline Vidales, Interdisciplinary Studies
Breaking Barriers: Latinas and Business in the United States
Faculty Mentors: Dr. Kenyon W. Zimmer and Dr. Shim Hanbo

Latinas in the United States are a minority when it comes to gender or race, facing internal obstacles that have set them back. Having parents who were raised in countries that carried a strong machismo and marianismo beliefs, can be hard to separate from while also growing up in the United States. This study analyzes the barriers that first-generation Latinas in the United States face while becoming business leaders. Using historical research methods, the research conducted identifies these major barriers: cultural, educational, and financial. In order to overcome those barriers, Latinas in business now prioritize mental health and vocalize their needs in order to spread self-empowerment between Latinas, reaching their true potential. Studying the effects that gender, race, and ethnicity have on Latinas in the United States aids in bringing light to the unfair cultural and social structures Latinas face.

Hadeel Zourkout, Biology
Nuclear Argonaute HRDE-1 is required for proper development and maturation in C. elegans
Faculty Mentor: Dr. Alicia K. Rogers

Small interfering RNAs (siRNAs) maintain transgenerational gene silencing in *C. elegans*. siRNAs are loaded into Argonaute proteins to form an RNA-induced silencing complex (RISC), which functions in the nucleus or cytoplasm. In the nucleus, RISC directs the establishment of H3K9 trimethylation (H3K9me3) to silence loci. One nuclear Argonaute protein is HRDE-1. Here, we show that HRDE-1 is required for development and maturation in *C. elegans*. Brood size assays of *hrde-1* mutants and wild-type (N2) hermaphrodites grown at permissive temperature (20°C) and under heat stress conditions (25°C) were performed to examine the number of eggs laid, eggs hatched, and matured progeny. We found *hrde-1* mutants lay more eggs than wild-type animals but have a mild embryonic lethality phenotype. The effect is exacerbated at 25ºC, and after four generations, *hrde-1* mutants become sterile. Furthermore*, hrde-1* animals take longer than wild-type animals to start egg laying, suggesting HRDE-1 is critical for sexual maturation.