April 18-20, 2023

Welcome to the 2023 Celebration of Scholarship and the 20th Undergraduate Research and Creative Activity Forum. This event features research and creative activity presentations by MSU Texas faculty, graduate students (including the Graduate Three Minute Thesis TM Competition), undergraduate students, and Fain Elementary students. A special addition to the Celebration of Scholarship this year is the Earth Day Panel, including faculty from History, English, and Geosciences.

We also invite you to join the reception to celebrate the 10-year anniversary for the Office of Undergraduate Research and the UGRCAF.

The following abstracts represent hard work and dedication to research and creative work. Presentations are organized by Classification, Presentation Type, and have been sorted into like Disciplines.
Celebration of Scholarship 2023 & 20th Undergraduate Research & Creative Activities Forum  
APRIL 18th, 19th, and 20th

Table of Contents

Presentation Sessions run simultaneously in the Clark Student Center (CSC) Atrium, Comanche and Kiowa; Bridwell Activities Center (BAC) Lonestar and the Graduate Student Resource Center (GRC) Ferguson 202.

Tuesday, April 18: Earth Day Panel  

EARTH DAY 2023 PANEL  
4:00-5:30 CSC Kiowa .................................................................................................................. 4

Wednesday, April 19: Faculty and Graduate Student Presentations  

FACULTY & GRADUATE POSTERS  
1:00 CSC Atrium .................................................................................................................. 4

FACULTY & GRADUATE PODIUM PRESENTATIONS  
1:00 GRC-Ferguson 202 .......................................................................................................... 6  
2:00 CSC Comanche .............................................................................................................. 7  
2:00 GRC-Ferguson 202 .......................................................................................................... 8  
3:00 CSC Comanche .............................................................................................................. 9

Graduate Three-Minute Thesis™ Competition  
3:00 BAC-Lonestar ................................................................................................................ 10  
All 3MT presentations are pre-recorded and presented via Zoom.

Thursday, April 20: Undergraduate Presentations  

9:00-10:00 am CSC COMANCHE: UGRCAF 10TH ANNIVERSARY RECEPTION  

UNDERGRADUATE CREATIVE ACTIVITIES ........................................................................ 11  
10:00-11:00 CSC Atrium-Ceramics/Film Demo, MSU Texas Racing  
10:00-10:20 CSC Comanche- Political Science/Documentary  
10:30-11:15 CSC Comanche- Fain Elementary

UNDERGRADUATE PODIUM PRESENTATIONS  
10:30-1:20 Lonestar Session I- History ............................................................................. 13  
10:15-11:55 Kiowa Session I- Education, English, Political Science ...................................... 16
11:15-2:05 Comanche Session I-Computer Science, AI Tech, Automation & Robotics
1:00-1:20 Kiowa Session II-Health Care, Nursing
2:00-4:00 Kiowa Session III- History Papers
2:15-3:25 Comanche Session II Automotive Engineering
3:30-4:25 Comanche Session III Energy, Natural Resources Engineering

UNDERGRADUATE POSTER PRESENTATIONS
10:00-11:00 CSC Atrium Emerging Research Posters-Education
10:00-11:00 CSC Atrium Poster Session I-Study Abroad
11:00-12:00 CSC Atrium Poster Session II-Chemistry, Biology, Life Science
1:00-2:00 CSC Atrium Poster Session III-Health Care, Nursing, Respiratory
2:00-3:00 CSC Atrium Poster Session IV-Computer Science, Geoscience, Engineering

ACKNOWLEDGEMENTS
Earth Day 2023 Panel

4:00- 5:30 CSC Kiowa

After being canceled due to the COVID-19 Pandemic in 2020 for the 50th Anniversary of the creation of www.earthday.org, we are proud to add the Earth Day 2023 Panel to the Spring Celebration of Scholarship forum. There will be a question and answer discussion period after all three presenters.

“Gary Snyder, Earth Day & the Tao of Recycling” Todd Giles, English
“The History of Earth Day”, Whitney Snow, History
“The Science of Slowing a Human-Induced, Rapidly Warming Climate” Jonathan Price, Geoscience.

Faculty and Graduate Student Presentations

1:00 Posters CSC Atrium

Investigating the Effects of Trait-Mindfulness on Source-Monitoring Accuracy
Mikallah Alexander; Morgan Ballesteros; Shakira Hernandez; Graduate, Nicholas P. Maxwell, Faculty, Psychology
Source-monitoring, or the ability to accurately attend to an object’s location, is an important aspect of memory. To investigate source-monitoring accuracy, researchers can use the Judgment of Source task (JOS), in which participants study object-location pairs and estimate their likelihood of correctly remembering an object’s location on a later test. However, these ratings are sensitive to item expectancy: Participants overestimate their ability to recall expected item-location pairings (e.g., MICROWAVE-KITCHEN) but underestimate memory for unexpected pairings (e.g., MICROWAVE-BATHROOM). This expectancy illusion demonstrates a scenario where memory and metamemory are misaligned, resulting in potential memory errors. Because trait-mindfulness is linked to better memory for object locations (e.g., Konjedi & Maleeh, 2020), the present study tests whether trait-mindfulness moderates the expectancy illusion. Overall, we anticipated that high mindfulness individuals would provide more accurate JOSs, reducing or eliminating the expectancy illusion. Participants first studied a list of object-location pairs and made JOS ratings concurrent with study. Half of these pairs were schematically expected while the other half were unexpected pairs. Participants then completed a source-monitoring test where they reported the location of each previously studied item. Finally, participants completed two measures assessing trait mindfulness. Overall, our findings replicated the expectancy illusion: Participants’ JOSs overestimated later memory for expected pairs but underestimated it on unexpected pairs. However, comparison of high versus low mindfulness individuals yielded no differences in source-monitoring accuracy, suggesting that trait-mindfulness has little impact on source-monitoring accuracy. This study was approved by the MSU Texas IRB, Approval #22101701.
Empathy Training Through Role-Play Simulation
Melissa Witherspoon, Faculty, Nursing
Empathy is an essential component of patient-centered care and impacts patient safety and outcomes. Empathy is an essential skill for graduate nurses. However, many nursing students fail to provide empathetic care to suffering patients. Nurse educators are responsible for preparing nursing students to provide this essential care. Simulation has impacted student nurses' empathic concern for patients, especially when students role-play the patient conditions. The purpose of this study was to determine the impact of a role-play simulation on the change in nursing student empathy levels. This quantitative quasi-experimental pre-test post-test project used an experiential role-play simulation that placed the students in the shoes of an elderly patient experiencing common age-related deficits and completing tasks associated with home medication compliance and administration.

As part of my Doctor of Nursing Practice program through Post University this project was conducted at MSU Texas (IRB approval #21090801) in the fall of 2021. The Comprehensive State Empathy Scale (CSEC) (Levitt-Jones et al., 2017) was utilized to measure the change in empathic state. A paired samples t-test (t (84) = -5.64, p = .000 (two-tailed)) indicated that there was a statistically significant positive change in empathy levels for the students who completed the simulation. Therefore, the findings support using simulated role-play patient experiences to impact state empathy. IRB: 21090801

Bombing Laos
P. Mike Rattanasengchanh, Faculty, Political Science
Much of the research on the U.S. bombing of Laos focuses on statistics and building awareness of unexploded ordinances, but not so much on examining the history of relations between Lyndon B. Johnson’s administration and Souvanna Phouma's government and their decision-making process. Upon Laos gaining independence in 1954, the United States had a strong interest in stymieing communism in the country, especially as Prime Minister Souvanna sought for neutrality. Laos gained neutrality in 1962, forming a tri-partite government but peace was short-lived. The Lao coalition government was weak and relations between factions deteriorated quickly at about the same time U.S. intervention increased in the region, including Laos. By analyzing U.S. government documents from Johnson’s Presidential Library and various Lao and French language newspapers, we learn more about the evolution of Souvanna’s acceptance of U.S. demands for bombing the Ho Chi Minh Trail and essentially Laos. Souvanna was reluctant about increasing U.S. military intervention as he wanted to salvage neutrality and the coalition. I argue that with each skirmish between right and left-wing Lao groups in 1964-1965, Souvanna tried to balance U.S. demands for bombing the country and peace talks – fighting while negotiating, and would continue up until the 1970s. This paper will discuss the origins and decision-making process of one of the most devastating bombings in world history. Washington worked closely with Souvanna’s government to coordinate the timing and location of bombing missions and their rationale for doing so. Debates between both governments show the internal struggles Souvanna had with the decision to bomb Laos and the pressures Johnson put on the Lao leaders.
All Too Well: The Discourse of Wellness on College Campuses
Melissa Nivens, Faculty, English
If you search Amazon for books on wellness and college students, thousands of titles instantly appear. The College Wellness Guide offers advice for new college students. The Campus Cure aims its message at parents of college students, and Wellness Issues for Higher Education markets itself as a resource for university administration. With the discourse of health and wellness everywhere on college campuses today, seemingly all involved parties should be prioritizing the “wellness” of college students, so what does this turn in conversation mean for college faculty?
The implication that our students are sick and in need of some sort of physical, emotional, or social healing often leads faculty to focus away from disciplinary topics and more on lessons in basic coping skills intended to support student persistence. In the wake of COVID-19, isolation, emotional and physical trauma, and increased virtual learning, colleges recognize the need to build back student confidence and resilience. General education courses like first-year composition have become vital in acclimating students to college life. This presentation will explore the increasing presence of wellness rhetoric on college campuses and how writing courses can help address the wellness needs of students.

Movement in the College Classroom: The Impact on Engagement
Suzanne Lindt; Stacia Miller, Faculty, Undergraduate Education; Kinesiology & Physical Education
Research has persistently demonstrated that engaged students learn more than disengaged students. Physical activity strategies in the classroom enhance cognition, academic achievement, student engagement, and motivation, yet many college instructors may misunderstand engagement or may feel too many barriers exist in the college classroom to engage students in movement. In the current study, researchers sought to understand whether movement in the college classroom impacts students’ engagement. In this experimental research study, researchers measured students’ cognitive functioning at two time periods and across three groups to determine whether differences exist across treatments. Comparison analysis suggest that students engaged in both movement and seated-active conditions were more engaged than those in the seated lecture condition. Therefore, faculty and researchers may increase engagement at the college level by incorporating movement. IRB: 19022001

Mathematical Writing or Mathematical Typing: Which is Better for Student Problem-Solving Performance?
Heather Crowley, Graduate, Education
The differences in efficacy of writing modalities have been a topic of interest in educational research for many years with a particular focus on comparing handwriting to typing. Given the widespread adoption of digital devices in the classroom the last decade, the topic has only attracted more interest recently. Choice of writing modality affects cognition, memory retention, factual recall, and performance on assessments. In most cases, handwriting has been shown to
be slightly more effective for notetaking, but little research has been conducted on how reflective writing is affected by writing modality. Mathematical writing is a form of reflective writing and is considered effective in enhancing student understanding of mathematical concepts, prompting the use of metacognitive strategies, and improving problem-solving skills. The aim of this study is to compare the quality of mathematical writing responses when high school algebra students respond to mathematical writing prompts either by handwriting or typing to determine if a correlation in performance on mathematical assessments exists. Participants, students in a public high school Algebra I class, were given a math concepts pre-test and then weekly mathematical writing prompts in which they typed or hand wrote their responses. Participants were then given a post-test and a paired samples t-test was used to compare the scores. The goal is to improve educator decision making as it pertains to instructional design and contribute to general knowledge on how writing modalities may impact learning. Results are pending IRB: 23040407

2:00 CSC Comanche

The Scandalous Saga of Annie Skelton: A Nineteenth Century Sex Scandal
Whitney Snow, Faculty, History
On February 3, 1894, a murder launched Annie Skelton, a twenty-three-year-old Scottsboro socialite into national ignominy. Known for her good looks and lovely singing voice, she attracted myriad suitors. One was John Freeman, an aspiring lawyer who departed Scottsboro in order to attend the University of Alabama. The second was Bud Musgrove, a syphilitic journalist. The third was an unnamed Chattanooga man with whom she was kicked out of a hotel. The fourth was Bob Ross, a fortyish Scottsboro banker who had a wife and five children. After Ross took Annie to the 1893 World’s Columbian Exposition, he was tracked down and killed by three of her brothers and one of her first cousins. Her cousin broke out of jail, never to be seen again. All three brothers were acquitted. Many sympathized with the brothers and believed they had avenged their sister’s honor. Newspapers varied on their treatment of Annie. Headlines described her as fallen, ruined, even insane, but such descriptions deprived her of agency. Even today, most Scottsboro residents paint Annie as nothing more than a naïve girl who had been seduced by a much older man. This paper argues that based on letters presented during the trial and her movements before and after the murder, Annie was no victim. A willing participant in the affair with Ross, Annie was shrewd, deceitful, and very much an active orchestrator in her own downfall.

Dry Weather: Drought in the Eighteenth-Century Leeward Islands
Mary Draper, Faculty, History
In May 1726, Colonel John Hart, the Governor of the Leeward Islands, penned a letter to the Board of Trade. Antigua was “in a most deplorable condition from the Dry Weather.” To alleviate this catastrophe, Hart informed the Board of Trade that Antiguan colonists had begun acquiring water from nearby Guadeloupe and Montserrat, which they sold for 15 shillings a hogshead in local markets. This paper uses plantation records, letters from island officials such as Governor Hart, and minutes from local assemblies to reconstruct this interisland-trade in fresh water. In doing so, it examines how British colonists in the eighteenth-century Leeward Islands responded to their own climate crisis: “dry weather.” Despite sinking wells, building cisterns, and...
experimenting with desalination, British colonists in the Leeward Islands repeatedly experienced drought, especially in Antigua—an island that lacks fresh water.

**The Dispossession of Tejano Land in West Texas**
Joshua Ysasi, Faculty, History
Following the Mexican American War in 1848, Tejanos routinely lost their land, political influence, and social standing in an Anglo society. Economic institutions such as ranching, railroads, and oil needed land. Land provided opportunity and has traditionally been a commodity that provided a way for individuals to provide for their family. It also was used as a productive economic resource. Manifest Destiny ideology associated with Anglo expansion trumped the protections supposedly in place to protect Tejanos in the Treaty of Guadalupe Hidalgo. Such that actions resulted in the continued disenfranchisement of the Tejano population, particularly in West Texas. Anglos dehumanized and relegated Tejanos to second-class citizenship in order to control Tejano land and increase Anglo superiority. Tejanos experienced prejudice, racism, violence, and a legal system that failed them, one that perpetuated Anglos to enforce Tejano disenfranchisement. Exploring Tejano disenfranchisement through the dispossession of Tejanos’ land is important to the understanding of how Tejanos lost their land to Anglo institutions in West Texas.

2:00 GRC-Ferguson 202

**Experimental Core Flooding Test for Formation Damage during Gel Treatment**
Mahmoud Elsharafi; Jesse Green, Faculty, Petroleum Engineering
In mature oil fields, the success of gel treatment results depends on the ability of the gel to reduce the high permeable formation without damaging to low permeable formation. Formation damage refers to the extent of damage reservoir rocks face from various drilling techniques and/or chemical treatment during well completion. A dynamic filtration test was used to investigate this effect using distinct core samples, brine concentrations and preformed particle gels. The effect of high pressures applied on the particle gels on various core samples with various permeability ranges was determined. These gels were pushed into the core holder with samples and the core permeability change was calculated. Different constant pressures were used to push the piston behind the gel samples. Then, the gel was flown around the core sample and collected in the outlet container. Various hardware was used to tighten the apparatus and provide connection between brine source, syringe pump, piston accumulator, core holder, and flow outlet container. The damage on the core was evaluated by comparing the original core permeability and the core permeability after gel treatments. Pressure gauges were used to measure the pressure drop across the core samples. The penetration of the particle gels into the low permeable formations can be decreased by the best selection of gel types, particle sizes, and brine concentrations under the reservoir condition. This work results can be used to select the best gel types for the right reservoir condition such as reservoir permeability, and reservoir pressure.
A Many-Core Radix-2 Fast Fourier Transform (FFT), A Case Study
Dakota Wilson, Eduardo Colmenares, Computer Science
Graphic Processing Units (GPUs) have been dominating the floating-point race since 2003 and they have become the preferred architecture for computationally intensive task that exhibit high data parallelism. For the new generation of scientist, not only is imperative to adopt them, but also to properly learn how to harness the potential of these accelerators in order to reach better performance than the one achievable through sequential and parallel multi-core (CPU) approaches.
This research adopts, and expands the study of a multidisciplinary computationally intensive kernel, a Radix-2 Fast Fourier Transform (FFT). The proposed topic (FFT) is analyzed from different perspectives in order to highlight the fact that good programming practices can also offer an additional gain in performance.

Study and Control of Localized Vortices to Enhance Wind Turbine Power Generation
Pranaya Pokharel, Salim Azzouz, Faculty, Engineering
Commercial wind turbines which are primarily Horizontal Axis Wind Turbines (HAWT) are limited in their power production by the size of the blades and limitation on the size of the electricity generator. This research is focused on proposing a new type of Vertical Axis Wind Turbine (VAWT) designed to enhance and produce more electrical power that avoids the limitations described for HAWT. The proposed wind turbine design uses an obstacle structure that produces steady vortices to generate mechanical power. The obstacle generates two localized vortices by altering and deviating the incoming wind flow. The rotational motion of the vortices is used to produce the rotation of the turbine blades and consequently turn the electricity generator to produce electrical power. The obstacle and the turbine blades were designed using the SolidWorks Computer Aided Design software. Initial computer simulations were conducted using the ANSYS Fluent software. These simulations showed that the proposed design generated the sought localized vortices. Two stereolithography (STL) files of the proposed obstacle and blades were generated for 3D printing. The blades were 3D printed, while the obstacle 3D printing failed due to a malfunction of the 3D printer. A set of 3 accelerometers were purchased to monitor the vibration of the VAWT during tests. Two student helpers assisted with the design and 3D printing. Since the project could not be completed as desired, it is being continued and further investigated in the framework of the Mechanical Engineering Senior Design course.

3:00 CSC Comanche

Practical Application of Viewpoints for Collegiate Musical Theatre and Opera
Grace Edgar, Faculty, Theatre/Vocal Performance
Although singers spend hours a day working on their vocal production and musicianship, most tend to neglect their development as actors outside of the classroom and rehearsals. There is an added challenge to directing a musical or an opera in a university setting where the director is called upon to create a convincing piece of theatre before the singers have really "learned how to act" or have had the substantial life experiences required to provide emotional reference material. Directors want to give singers useful tools for their stagecraft without overwhelming them with terminology or bringing forward emotions that the students are unprepared to
process. Viewpoints is accessible because it is tangible, focusing on physicalizing, instead of emotion. Applying the principles of Viewpoints makes the theatrical presentation thoughtful, planned, and precise. This disciplined approach for performing a role leaves the singer free to dive into the emotion, or think about the trick of vocal technique that always secures the high note. My article of the same name was published in the "Journal of Singing," Volume 79, Number 1, September/October 2022.

A New Translation of Tolstoy's Hadji Murat
Kirsten Lodge, Faculty, World Literature
I am currently working on my fifth edition in the Russian classics’ series for Broadview Press, an independent academic publisher in Canada. I have just finished my new translation of Tolstoy's novella Hadji Murat, which is about the Russian conquest of the Caucasus in the mid-nineteenth century. It will be published with an introduction and scholarly apparatus within 1-2 years. I propose to briefly introduce the project (and its contemporary relevance), read a short excerpt from my translation, and take questions from the audience.

3:00 Bridwell Activities Center-Lonestar Rm

https://msutexas-edu.zoom.us/j/95966528924?pwd=a0N5cFljd1g1RFZ2VFVFZ2owZkZWdzO9
Meeting ID: 959 6652 8924 Passcode: 160183

Kathryn Brown, Geoscience
What can image of a cavern ceiling tell us about groundwater flow?
Anthony Castillo, Geoscience
What is happening beneath our feet?
Tayeisha Laville, Geoscience
Observation of the Mitchell Mesa Rhyolite in the Dalquest Desert Research Center, Presidio, Texas
Damilola Ola, Geoscience
Evidence of Temporal Strain in Evolution of Magma Poor Rifts; the Albertine Example
Bright Osuagwu, Geoscience
Global Energy Demand and Hydrocarbon Prospectivity
Rowann Remie, Geoscience
Where does the hot water go? An investigation of the periodic cycles of draining at the Boiling Lake in Dominica
Lauren Stancik, Geoscience
Can a 280-million-year old bone help us understand mammals today?
Krishna Winston, Geoscience
Carbon Estimates Using Satellite Lidar Data at Sam Houston National Forest at Huntsville, Texas
Undergraduate Student Presentations

10:00-11:00 - Creative Activities - CSC Atrium
Ceramics & Photography: Pottery Demonstration, and Poster

**CA1 Polaroids and Porcelain**
Colin Stevenson, Jaylei Lamb

*Mentor(s):* William McKinney, Fain College of Fine Arts, Fine Art & Mass Communication

What if a piece of art is its own autobiography? That question is what came to my mind when I found myself at a ceramics event this semester. The process is very storied; the layers of clay that cake onto the artist’s hands are like rings on a tree. As it kept piling on, the clay piece grows and takes its shape. As a photographer, I wanted to document these fleeting moments with arguably the most unique of photographic formats: the Polaroid. With every shot being difficult to reproduce, most Polaroids rarely go beyond being a 1 of 1 piece. Due to their unique and complex nature, Polaroids also have a unique way of being isolated and placed onto surfaces as the physical taken photo itself. I want to combine these complex art forms and create ceramic pieces that tell the story of their creation through multiple Polaroids photos placed onto the glazed ceramic surfaces through emulsion lifts.

**Automotive Engineering: Poster and Display of Formula SAE - MSU Texas Racing**

**CA2 Design and Manufacturing of Formula SAE Race Car Chassis**
Sharome Burton, Kory Prather, Jaden Corbin, Josiah Massey

*Mentor(s):* Pranaya Pokharel, McCoy College of Science, Mathematics & Engineering, Mechanical Engineering

Formula SAE is an engineering competition where university teams design, build and race small formula-style race cars. The chassis is a critical component, as it protects the driver and provides a rigid platform for the suspension and powertrain. The chassis for Mustangs Formula Racing team's MR-2 car was designed and manufactured with several key improvements over the previous year's design, which should result in improved performance on the track and increased competitiveness for the team. The chassis is a space frame design made from 4130 steel, which offers high strength and excellent weldability. The design was optimized using finite element analysis (FEA) to maximize stiffness and minimize weight, resulting in a chassis 10% lighter than the previous year's car, while also doubling the torsional rigidity. One major improvement in the chassis design was the addition of bolt holes to allow for bracketed suspension tabs. This allows for more precise suspension geometry, resulting in improved handling and cornering performance. Another improvement was the provision of space, allowing for the removal of the completely assembled engine from the chassis, which greatly simplifies engine maintenance and replacement. The manufacturing process for the MR-2 chassis began with cutting and bending of the 4130 steel tubing by our suppliers, VR3 Engineering. The tubes were then MIG welded together into the space frame, with particular attention paid to the critical joints where high stresses are encountered. The completed chassis was normalized to relieve welding stresses and ensure consistent material properties throughout the structure. No
CA3 Darkness On The Edge Of Town
Emily Beaman

Mentor(s): Jonathon Quam, Fain College of Fine Arts; Prothro-Yeager College of Humanities & Social Sciences, Mass Communication & Political Science

Darkness On The Edge Of Town is a short documentary about the lives of individuals who have worked or are working as informants for the Wichita Falls police and district attorney’s office. This documentary includes portraits of lives unfinished but marred by the choices of the past. Each story looks forward while reckoning with the difficulty path toward change. The connection between these individuals is the only man who knows the good they’ve done in the world: a local investigator and retired undercover detective who’s empathy built the foundation of trust needed to offer important, sometimes life-saving, information at the right time. These informants are often represented by their worst choices; but this documentary constructs a more nuanced understanding of survival on the fringe of society – where good and bad blur together.

This project was produced by political science senior Emily Beaman and associate professor of mass communication Jonathon Quam. Emily will lead a short introduction to the film and take questions after the film has been presented.

10:30- 11:00 Fain Elementary PBL-CSC Comanche

FE4 Shape Museum
Lillian Oechsner, Rashard Pringle, Brayson Russell, Jett Schmader, Kim Vu

Grade 4 PBL Instructors: Jennifer Anderson, Laura Wetzel

How can we as exhibit designers demonstrate the important role shapes have in our world? In this project, students learn about the different geometric shapes in the world around them (e.g., rectangles, squares, trapezoids, etc.). Through a combination of photographs and art, their exhibits will serve to educate others on the attributes of shapes and how one might encounter them in the world. As the 4th grade class at Fain Elementary, we will create an EDP project with the goal of promoting awareness and designing an exhibit on a particular shape using photographs and art to show the shape in our world. Students will also design an architectural house or building based on Frank Lloyd Wright’s vision. They will combine nature to a structure and convey the importance of shapes in written form. The results for this project is for students to understand, demonstrate, explain and record their evidence and provide the purpose of shapes as they introduce to an audience during the project. With this project students will achieve higher regard and respect toward shapes and the geometric forms of math. Fain’s 4th grade class will be responsible for their journal as they partake in discovering how shapes impact our world. The overall goal for this project is to learn how geometric shapes in two or three dimensions are used in design, architecture and construction of objects, buildings and art. Learning the distinctions in shapes expects for the students to concentrate on the particular attributes.
FE5 The Fain Zoo
Aniyah Jones, AJ Tembo, Brendan Hogan, Azriel Walters, Joy Denton, Tyree Taylor, Jesus Pando, Emery Oatman, and Nolan Pendley

Grade 5 PBL Instructor: Jennifer Gilbert

In this project students will learn about biomes and habitats as they design a habitat for an animal zoo exhibit. They will utilize cross-curricular academic skills, as well as 21st century skills to do research, defend their choices, collaborate with their team, and present their ideas. The students will use the engineering design process to design and build a scale model of a sustainable habitat for an animal zoo exhibit. Each team of students will be assigned an animal within one of three biomes - rainforest, savanna, or tundra. They will choose the elements in the habitat based on their research of the animal, its habitat, and the biome that it lives in. They will determine the necessary area for important elements such as ponds, tree coverage, caves, buildings or other large structures as well as determine the volume of one structure in the habitat. They will use academic language from math and science to write about their habitat and explain the reasoning behind their design. Finally, they will present their habitat to an audience of peers, teachers, and other adults in the community. The project provided students with an opportunity to creatively apply their learning in a real-world scenario. They demonstrated their understanding of their animal, habitats, biomes, area, volume, and coordinate planes. While the main purpose of this project was academic, the most challenging and valuable experience was learning to collaborate, cooperate, and compromise with their peers. The Fain Zoo project successfully aligned with science, math, and ELA standards. Students were engaged and excited to demonstrate their understanding of the content. The project allowed students to show creativity, draw upon each other’s strengths, and apply their learning in a unique and challenging way.

PODIUM PRESENTATIONS

10: 30 am- 12:55 pm BAC-Lonestar
History

10:30-10:50
OP18 "Ladies of the Sea"
Breana Phillips
Mentor(s): Whitney Snow, Prothro-Yeager College of Humanities & Social Sciences, History

Hollywood has introduced audiences to the idea of a pirate lifestyle through movies like Pirates of the Caribbean. This movie franchise portrays pirate life as one mainly for men with the exception of one woman who had disguised herself as the opposite sex. This was a common practice for women buccaneers as the ship could be a dangerous place for females. Many Pirate Queens of the Golden Age had to disguise themselves and hide their true identities. As a result of such masquerades, comparatively little is known about women pirates when compared to male counterparts. Pop culture, especially in the form of films, has played a prominent role in bringing attention to these overlooked or forgotten Pirate Queens in recent years. Anne Bonny and Mary Reade, two of the most popular Golden Age pirates, have received notice thanks to
shows like Starz’s Black Sails and Netflix’s The Lost Pirate Kingdom. What has made them so attractive to modern society, almost three centuries after their deaths. It might be their bold defiance or the fact that viewers appreciate female empowerment. The courage these women exhibited while breaking societal norms aids in the attraction of retelling their stories today.

10:55-11:15

**OP19 "The John F. Kennedy Assassination: The Conspiracies"**

Madison Cook

**Mentor(s):** Whitney Snow, Prothro-Yeager College of Humanities & Social Science, History

In the decades since JFK’s assassination, many conspiracy theories have been debated. Was Lee Harvey Oswald the patsy he claimed to be? Some say that Fidel Castro was behind the assassination and the CIA covered it up to avoid going to war with Cuba. Others believe he was killed on the orders of organized crime boss Sam Giancana. Still others blamed Teamsters Union leader Jimmy Hoffa. Perhaps strangest of all, one theory poses that Vice-President Lyndon B. Johnson orchestrated the hit. These conspiracy theories have attracted ridicule and yet, each has its believers. This paper attempts to uncover why so many refuse to believe Oswald acted alone.

11:20-11:40

**OP20 "The Fight for the West: What Did Anglo Americans and Native Americans Have to Gain or Lose"**

Jarrett Beach

**Mentor(s):** Whitney Snow, Prothro-Yeager College of Humanities & Social Sciences, History

Covering the 1860s-1890s, this research paper will explore the motivations Anglo Americans and Native Americans had for battling over the Great Plains. It will rely on a variety of primary and secondary sources. Two of the latter are Bury My Heart at Wounded Knee and Massacres of the Mountains.

11:45-12:05

**OP21 "Civilian Life in Post-World War II Germany"**

Emily Largent

**Mentor(s):** Whitney Snow, Prothro-Yeager College of Humanities & Social Sciences, History

After the end of WW2 Germany was divided into 2 “halves”, East and West. This divide was a big adjustment for the people of Germany. The peoples in the east were now under constant supervision from the Government and their peers. Food and supplies were scares, but was it all as bad as it seemed? Or, was it just as history has told us for many years? West Germany was seen and taught as being much more of a free country. They would send supplies over to the East to help with their lack of the bare necessities. Essentials in basic human living and novelties such as powdered sugar and baking supplies. People were able to be themselves and roam the streets without the fears and pressures that the East faced. What was it honestly like? What documentation is there to show that neither one of these places were as they seemed, or are they exactly what history has told us thus far? What more is there to learn after taking a deep dive into this specific area? This semester I will be looking at documents concerning the East and the West halves of Germany after WW2 to the fall of the Berlin wall in 1989. I will be taking a
look at how the people of each side lived after the war has concluded and how the economy has changed, and what changes have taken place. Whether those changes were beneficial or not.

12:10-12:30
**OP22 "The Demise of King John"
**
John Tunnell  
**Mentor(s):** Whitney Snow, Prothro-Yeager College of Humanities & Social Sciences, History
The crusades were a time period marked by the challenging of the power of both the Roman Catholic Church and monarchies like that of England. Hostility between England and the holy church started with quarreling over church offices, thus the church claimed that this offended in many ways God and the honored lord pope Innocent. Relations between Europe’s monarchies and the power of the holy church had been tense since the founding of the church and Christianity. A defining character caught within this generational power struggle is King John of England, also lord of Ireland, the duke of Normandy Aquitaine, and the count of Anjou, who began his rule in 1199. John would fuel the hostility with the church by quarreling with Pope Innocent, eventually leading to his ex-communication from the church. This damned the whole country of England, and Pope Innocent used this dread to make John do his bidding, signing the Magna Carta, and uniting the kingdoms of Ireland and England for the church’s benefit. King John was significant to the history of the crusades due to his manipulation and use by the church, for the ultimate effectiveness of the crusades. Pope Innocent took everything from John, his barons, his power, and his kingdom. John and England were made a tool for the church in terms of the crusades' hopeful success. With control of the monarchy’s military force, the crusades would have greater manpower, and with John defeated, the Pope would have even greater influence in Europe. John was made an example for those who would dare oppose the papal dynasty called the Holy Roman Empire.

12:35-12:55
**OP23 "A Deeper Look into the Assassination of President John F. Kennedy"
**
Kevin Neal  
**Mentor(s):** Whitney Snow, Prothro-Yeager College of Humanities & Social Sciences, History
This project will focus on the myriad conspiracy theories surrounding the assassination of President John F. Kennedy. Rather than dispute the accepted conclusion that Lee Harvey Oswald acted as a lone gunman, it simply attempts to analyze alternative claims and why they have drawn support. Subjects discussed will include the magic bullet, grassy knoll, organized crime, and government involvement. Using university press books and peer-reviewed articles, this paper will show that Hollywood, with films like JFK, has fueled the spread of such conspiracy theories.

1:00-1:20
**OP25 "The Effects of Women during the French Revolution"
**  
Alexis Washington  
**Mentor(s):** Whitney Snow, Prothro-Yeager College of Humanities & Social Sciences, History
Understanding the causes of the French Revolution are essential to comprehending the effects this era had on women and their families. With overpopulation, food shortages, and a failing
monarchy, the French Revolution began in 1789. Women during this time period participated in political groups that had significant roles in riots, assassinations, and even getting consumer goods at lower prices when they were at an all time high. After political involvement in the beginning of the French Revolution, women in these groups were called suspicious for their actions of feminism and were threatened into submission by the men around them. They faced a monetary fine, imprisonment, and even death if found guilty of political club involvement. Some stories deserve more attention and examination, and this paper will focus on lesser known works authored by women from that era. This paper will aim to contribute to the history written on the French Revolution by complementing the view of white men with that of overlooked feminist women. Research will be conducted at Moffett Library and through its online databases. The objective is to amplify the unheard or dismissed voices of women who exhibited immense strength during the French Revolution.

10:15-11:45  CSC Kiowa Session I
Education, English, Political Science

10:15-10:35
OP9  PSTs Using Culturally Relevant Math Tasks: A Framework to Critique Learning
Madeline Stanford

Mentor(s): Dittika Gupta, West College of Education, Undergraduate Education
Teaching with a commitment to culturally relevant pedagogy recognizes the need for preservice teachers (PSTs) to have structured learning opportunities to explore culture in the context of content pedagogy, especially mathematics. One way to recognize culture in mathematical studies is by integrating multicultural children’s literature to make connections between content and students’ cultural experiences (Mendoza & Reese, 2001). Research suggests that such texts can be essential resources to situate story problems and encourage reflection in terms of content identity, cultural competence, and critical consciousness (Chappell & Thompson, 2000; Harding et al., 2017; Iwai, 2013; Leonard et al., 2014; Moldavan, 2020). In this study, researchers propose a framework to analyze cultural relevance and mathematical content demand of PSTs’ created lessons as a way to evaluate and improve future students’ mathematical competency and cultural awareness. The purpose of this project is to evaluate the PSTs’ work on culturally relevant math tasks to make adjustments that encourage deeper connection and relevant learning. A qualitative research design with open coding and member checking is used to evaluate the PSTs sample and have shown that most lessons lean towards high cultural connection or high content demand; however, lessons with both high cultural connection and content demand are low. Preliminary results have significant implications for methods courses as higher level tasks and cultural connections must be made in the lesson to engage students in mathematics and reflect on their own culture as well as those around them. IRB#22020101

10:40-11:00
OP10  Queer Lit on Par: A Positive Assimilation Rubric for Queer YA Literature
Brandon Goins

Mentor(s): Peter Fields, Prothro-Yeager College of Humanities & Social Sciences; English
1969 saw the birth of LGBTQ literature for young adult audiences. Since then, it has grown, developed, and expanded from a niche subset, often depicting non-heteronormative sexualities as mere phases to be punished, into a thriving, representative genre. It supports queer young adults through difficult phases of their lives and provides a language for discussing and discovering their identities. Considering its importance, it is vital to ensure that the literature inspires hope in YA readers rather than simply aiming for literature that is not controversial. My creation, the Positive Assimilation Rubric (PAR), is a set of standards for judging the quality of queer representation in young adult literature (YAL), laying out a middle ground between the ideas of queer isolationism and total assimilation. It does this by placing works on a linear scale, where their position is determined based on the level of positive social integration queer characters experience. The project explains the classifications within PAR and applies them through close reading and analysis of fourteen modern examples of popular young adult literature with queer representation to illustrate and refine the application of the standards, which were found to need expansion.

11:05-11:25
**OP11 Resilience against Natural Disaster and Elections in US Counties**
Andres Revis, Zetta Cannedy, Caroline Gomez
**Mentor(s):** Juheon Lee, Prothro-Yeager College of Humanities & Social Sciences; Political Science
Disasters caused by natural hazards, such as floods, earthquakes, and storms, tend to occur at a scale that individuals and small communities cannot respond effectively and efficiently. Therefore, residents of disaster-stricken areas often rely on their governments during and after an event. In this study, we assume that aspects of societal resilience across the US is associated with people’s political behaviors. Specifically, it focuses on the relationship between community resilience against natural disasters, a crucial component of democratic governance, and electoral behaviors in US counties. The study first analyzed the Baseline Resilience Indicators for Communities (BRIC) database for resilience scores of all 3145 US counties in 2010, 2015, and 2020. The publicly available database is managed by Federal Emergency Management Agency (FEMA) and the University of South Carolina. Second, this study analyzes how the resilience scores of US counties are statistically associated with the residents’ voter turnouts and partisanship. Voter turnouts and partisanship data are published by the National Neighborhood Data Archive (NaNDA). The results of this study are demonstrated through geographic information systems (GIS) and time series regression analysis. Using GIS, we found that some counties in the west and south have become more resilient overtime. We also found through regression analysis that there is a significant relationship between resilience scores and presidential elections and partisanship. These results indicate that residents’ political behavior is closely associated with the resilience of their communities.

11:25-11:45
**OP12 Rural Law: Examining Legal Consciousness in Wichita County, Texas**
Zetta Cannedy, Cristin Martin
**Mentor(s):** Linda Veazey, Prothro-Yeager College of Humanities & Social Sciences, Political Science
Legal consciousness is the societal understanding or perception of law and the legal system. The perception of the legal system, and, as a corollary, the system’s legitimacy, can be studied on the community and individual level. Various studies have surveyed the national and certain state levels of legal consciousness and legal approval and trust. What influences legal consciousness in Wichita County, Texas? At the crossroads of the South, the West, and the Great Plains, Wichita County is a community known for its close-knit, small-town feel, but also the largest metropolitan area within a radius of over 100 miles. How does legal consciousness impact the approval of the legal system in Wichita County? Drawing on demographic and contextual characteristics, an in-depth survey will be used for data collection and analysis of legal consciousness and legal system approval by Wichita County residents. Demographic characteristics surveyed include age, race, gender, location within Wichita County (zip code), education, and income. Contextual characteristics will survey knowledge regarding legal system actors, legal resources, and legal procedure, while also surveying an individual’s approval and trust in the legal system. The project hypothesizes a connection between education level influences legal consciousness, with a high level of legal consciousness associated with a lower level of system approval and trust. IRB 22110804

11:15-2:05 CSC Comanche Session I
Computer Science, AI Technology, Automation & Robotics Engineering

11:15-11:35
OP2 Autonomous Collaborative Drones – Air and Ground-based Network
Sharome Burton
Mentor(s): Eduardo Colmenares-Diaz, Yu Guo, McCoy College of Science, Mathematics & Engineering, Computer Science & Mechanical Engineering
The aim of this project is to design a robust network of ground-based and air-based autonomous vehicles capable of efficiently accomplishing pseudo-intelligent tasks, including path-finding, obstacle avoidance, and collaborative problem-solving. The robots are two small four-wheeled robots and one quadcopter. Both ground and air vehicles are equipped with optical cameras in order to accept visual data from the environment and will be controlled using small, Raspberry Pi microcomputers. The network that this project designs is one where quadcopter will tracks the area of operation of the two robots, providing a top-down view of the field and revealing the locations of any possible obstacles, or other points of interest. A top-down view of the entire landscape provides significantly more information about the area than just the view from the perspective of the robots. The goal is to have the quadcopter to communicate the information from its point of view to the robots in order to facilitate the solving of a specific problem on the ground. This project will develop the proposed network by first creating a simple simulation environment for the two robots with a top-down view. The simulation environment not only would be used by the researchers to solve path-finding problems, but also would allow the use of a form of machine learning known as reinforcement learning, which is can be used to train artificial intelligence (A.I.) agents.
11:40-12:00
**OP 3** Mechanism-Control Design Integration for a Gravity Compensation System for Human Lower Limb Rehabilitation
Samuel Lee, Paul Nguyen, McClain White

*Mentor(s):* Zeki Ilhan, McCoy College of Science, Mathematics & Engineering, Mechanical Engineering

The aim of this work is to demonstrate the feasibility of a novel suspension system as a rehabilitation device for people with lower-limb injuries through mechanisms – nonlinear controls design integration. The proposed mechanism, which combines a basic four-bar parallelogram linkage with an additional link and two tension springs, is inspired from the gravity compensation approach for space research as it provides a reduced weight experience for the suspended person. Although a series of iterations have been made to fabricate a working prototype of the proposed system since Fall 2020 semester, the main focus of this presentation is on the most recent hybrid design which replaces the two wooden links with aluminum to allow for easier DC-motor integrations while reducing joint friction. Additionally, a stand-alone feedback control system has been proposed for torque control to achieve robustness against disturbances that could degrade the performance in a real implementation. The proposed control system includes two Nanotech Brushless DC-motors with built-in HALL sensors, which communicate with the SOLO motor controllers through the Motion Terminal user interface for calibration and real-time data visualization. ARDUINO microcontroller is also used at the heart of the system to implement the model-based, nonlinear, feedback control algorithm, based on which the motor torque requests are adjusted in real-time. Possible improvement areas toward the controlled closed-loop operation will be addressed based on the initial performance results.

12:05-12:25
**OP4** Smart Training Harness for Autonomous Humanoid Robot
Sharome Burton, Ryani Ferguson, Melina Riviere

*Mentor(s):* Yu Guo, McCoy College of Science, Mathematics & Engineering, Mechanical Engineering & Computer Science

This project aims to design, fabricate and test a mobile, holonomic-drive training gantry for a 3-foot-tall autonomous humanoid robot. Key device objectives include preventing damage to humanoid robot from falling while learning bipedal motion; carrying cameras for monitoring training and power supply; and minimizing optical occlusion and obstruction for robot-environment interaction. In a simple terms, robotics is the field of creating machines capable of performing tasks traditionally performed by human beings. In humanoid robotics, these machines take a human-like form. This humanoid form is typically geared towards allowing the robot to interact with and traverse its environment in a similar way to how humans do. However, humanoid robots have the significant added challenge of needing the capacity to maintain balance on two legs and while standing and while moving using a bipedal gait. Due to bipedal robots a much smaller base of support than robots with three or more legs or fixed to the ground, extra caution has to be taken in preventing damage to the robot from falls during training. Robots may be trained to walk or self-balance using special algorithms or deep learning, and are typically tethered to the ceiling or gantry from above to ‘catch’ them when they fall during
testing. In our project, the robot will be centered in our gantry by rotating and translating in phase with the movement of the robot, allowing the robot an unobstructed front field-of-view and preventing tangling of the tethering cable.

12:30-12:50

**OP5 A Fixed Wing UAV with Vertical Takeoff and Landing**

Nedabiah Warner, Miguel Bethel

**Mentor(s):** Yu Guo, McCoy College of Science, Mathematics & Engineering, McCoy School of Engineering

The overall purpose of this project is to build an unmanned aerial vehicle (UAV) with high power efficiency and long flight time. Presently battery technology cannot sustain fully powered electric flights, therefore we intend to produce an aerodynamic design that is capable of overcoming this constraint. Investigating this project requires us to use Computer Aided Design (CAD) software to create various designs of the UAV. These designs are then tested via Computational Fluid Dynamic (CFD) simulations under various conditions. The final design is then constructed, flown and tested via a radio controlled system. A different aircraft based on a traditional fixed wing design is also constructed and flown. The electrical data and flight times of the two aircrafts are then recorded and compared. Current analysis shows a high wing aircraft with a high aspect ratio to be very effective at producing lift for the UAV. The UAV is also equipped with a tri-motor set up that consists of two rotating motors that will lock in place horizontally or vertically and one stationary ducted fan motor for additional stability. In conclusion, we expect that the fixed wing VTOL UAV will outperform the regular fixed wing aircraft in both flight time and energy efficiency. The fixed wing VTOL design is expected to be useful to the UAV by reducing the amount of time the UAV needs to get in the air while also fully taking advantage of lift to reduce the energy expenditure of the motors.

12:55-1:15

**OP6 K9 A Multi-Planar Quadrupedal Robot**

Kuwin Wyke, Samuel Campbell, Zachary Scribner

**Mentor(s):** Yu Guo, McCoy College of Science, Mathematics & Engineering, Mechanical Engineering

The purpose of this project is to design and build an affordable small quadrupedal robot platform that is capable of traversing multiplanar terrain such as stairs. In the future this conceptual design may be used as a research platform for further research in robotics. Since robotics has been an object of intense academic interest in the past few centuries, we read many research papers that related to four legged robots. Based on what knowledge we gained from these papers we began our design process. To ensure that what we design will work as intended we modeled each part in SolidWorks and tested each assembly with the expected conditions applied in the simulation program Ansys. We also used MATLAB, an advanced mathematics program, for any calculations needed, including the maximum torque, rpm, and power consumption of each of the servos. After the digital design and testing was completed we ordered all of the components and began the manufacturing process of the robot. During this process of manufacturing we are also drafting the code that will be used to control the robot. Once construction is complete we will implement and improve the control logic and collect data on the robots’ performance.
OP7 Update and Expansion of Industrial Robotic Work Cell
Scott Harris, Deshaun Delgado, Cykelle Semper,
Mentor(s): Jan Brink, McCoy College of Science, Mathematics & Engineering, Engineering
With current industry efforts to increase productivity and efficiency in manufacturing large amounts of mechanical parts, the automation of robotic systems has been an integral focus of many manufacturing plants and engineering businesses. Robotic automation systems tend to be more efficient than human labor due to the accuracy, consistency, limited down time, and the potential for large scale production. Reuse and retrofitting of existing systems allows for these benefits with a lower cost. The main goal for the current project is to reduce the wear and tear of operation on an existing robotic work cell without sacrificing the desirable quality of the drilling and reaming operation. The robotic work cell is designed to perform drilling and reaming operations. A Cognex 7801 vision inspection system into the robotic work cell that will aid in ensuring that the drilling and reaming operations conducted produce an accurate product within desired tolerances. The movement of the workpieces is accomplished with a Kawasaki RS005L robotic device. The workpieces will be depalletized, machined, inspected and stamped by an autonomic process. The students have corrected errors found in the previous robotic code, the input and output diagrams of the work cell, the dimensioning of essential components found in the robotic work cell. Additionally, new functions have been added and damaged components redesigned and replaced. The students have used the AS programming language to facilitate safety guidelines, automation applications, and manual test routines.

OP8 Using Magnetism As A Stabilizer
Miguel Bethel,
Mentor(s): Yu Guo, Jeff Hood, McCoy College of Science, Mathematics & Engineering, Mechanical Engineering & Mathematics
Space exploration and travel is becoming more common as the world advances in technology. One of the problems that spacecrafts face is the eminent threat of collisions during docking with the Space stations. To solve this problem the spacecraft must be able to move into position with little to no impact. The Aim of this project is to create a two component simple machine that will prevent collision with each other while holding a position. There will be a fixed component (Base) and a free body component that will interact with each other. The free body component will be used as a representation for a spacecraft docking with the space station.

1:00-1:20 CSC Kiowa Session II
Healthcare, Nursing

OP1 Impact of Mindfulness Through Smartphone Application on Healthcare Students
Nicholas Hubbert
Mentor(s): Tracie Fulton, Catherine Pankonien, Phillis Bunch, Gunn College of Health Sciences & Human Services, Nursing, Radiology & Respiratory Care
This research project aims to observe and implement mindfulness strategies through a smartphone application for healthcare students enrolled in nursing, respiratory, or radiology classes focusing on test anxiety. During this study, we will monitor healthcare students' test anxiety levels to determine the overall benefit of using mindfulness through smartphone applications. This project will be conducted using the methodology known as quasi-experimental. The research will be achieved over four weeks. Healthcare students will participate in mindfulness activities via smartphone application once a week for the entirety of the four-week project. Each student that participates will complete a Westside Test Anxiety Scale during week one and again on week four. A unique ID and forms will be utilized to maintain the student's anonymity and the project's validity. Our research aims to observe and document the comparison between anxiety-reducing methods in a testing environment. In addition, this study will also educate students on the correlation between test anxiety and test performance. This research project will be focused on healthcare students enrolled in nursing, respiratory care, or radiology classes. The data collection period of this research project will begin on 3/30/23 and conclude on 4/26/23. After the research project, data will be collected from all disciplines, and a thorough analysis of demographics, healthcare major, and anxiety scale scores will be completed to establish and verify this research project's results. IRB 2208291

2:00-4:25- CSC Kiowa Session III History Paper Presentations

Group A-2:00-2:45
PAPER 1 "The Status of Jews in the Confederacy"
Ethan Allen
Mentor(s): Whitney Snow, Prothro-Yeager College of Humanities & Social Sciences, History
The status of the Jewish people in the Anglo world is difficult to pinpoint. While treated better than Jews in Central and Eastern Europe during the nineteenth century, avoiding pogroms and ghettos, Jewish people in the Anglo world still suffered discrimination. In the U.S. South, Jews were often discriminated against due to their religious independence and the reluctance to intermarriage between faiths. For the most part, southern Jews were tolerated but expected to mingle in the gentile society in which they lived. While southern Jews were often blamed for setbacks and defeats during the Civil War, many of them supported the Confederate cause. By examining the discrimination faced by several southern Jews, a small part of the Jewish story in the Confederacy can be pieced together and understood. In the face of mistreatment, many southern Jews put southern pride before their faith, often assimilating into the predominantly Protestant society. In most cases, these were of a higher socio-economic class than practicing Jews. Examples are Louis Leon, a North Carolina soldier; Clara Solomon, a wealthy devotee to the Confederate cause; and Judah P. Benjamin, Attorney General of the Confederacy.

PAPER 2 "The COVID-19 Lockdown Mandate"
Troy Porche
Mentor(s): Whitney Snow, Prothro-Yeager College of Humanities & Social Sciences, History
Due to the controversial nature of the issue, further studies will be conducted on COVID-19 vaccine mandate in the US. At present, it is widely known that employers are required to ensure that workers are vaccinated. The FDA has already approved three vaccines for adults, including
those made by Pfizer, Moderna, and Johnson and Johnson. However, there are still people who are not convinced that they should get the vaccine due to religious or personal reasons. Medical professionals have already explained that there is no need for people to get vaccinated against COVID-19. However, they believe that people should still be informed about the ethical issues surrounding the issue. My essay will contend to find a middle ground between created studies of the vaccine mandate and help people make an informed decision. In terms of employment, it is expected that people will start quitting their jobs due to the requirement for vaccinations. Also, it will be fascinating to see if there are companies that will go against the government’s mandate and allow employees to opt out of the program. When it comes to implementing vaccine mandates, various factors are considered. The effects of these mandates can have a significant impact on labor, employment, and public health in the US. One of the most feasible solutions is to allow employees to be exempted from the program.

Group B 2:50-3:35
PAPER 3 "North American Wildlife Conservation Model History and Success"
Garrison Smith

Mentor(s): Whitney Snow, Prothro-Yeager College of Humanities & Social Sciences, History
The North American Wildlife Conservation Model or NAWCM is a conservation strategy that was developed in the United States in the early 1900s. This model focuses on conservation of wildlife species, as well as their habitats and other resources necessary for their survival. The primary goal of this model is to ensure that all wildlife species have sufficient resources available to live in their natural environments, and to ensure their populations are not threatened by human activities or development. This model also works to promote sustainable use of wildlife resources, such as hunting and fishing. To do this, the model sets limits on what can be harvested in order to ensure that populations do not become overharvested or depleted. This strategy ensures that future generations will be able to continue enjoying these activities without worrying about depleting wildlife populations. This model has been paramount in conserving wildlife all across North America for decades. Model and all laws and regulations that uphold it, are based on seven principles: wildlife resources are a public trust, markets for games are eliminated, allocation of wildlife is by law, wildlife can be killed for only legitimate purposes, wildlife is considered an international resource, science is the proper tool for the discharge of wildlife, and democracy of hunting. The purpose of my paper is to provide the history of events that led to the formation of the North American Wildlife Conservation Model and to show how the model has done more for wildlife conservation than any other program, past or present

PAPER 4 "Mexico City: Lost in Corruption"
Lizbeth Jaimes

Mentor(s): Whitney Snow, Prothro-Yeager College of Humanities & Social Sciences, History
While many disapprove of the current president Andres Manuel Lopez Obrador, often referred to as AMLO per his initials, he inherits a legacy left by many that came before him. This paper will focus on establishing the connection between then and now. Then, when democracy was the blueprint for Mexico City, and now, when democracy only stands as a faint whisper of hope for the oppressed. In part, I hope to discuss what I refer to as Mexico’s “fallout” with democracy. Long before the North American Free Trade Agreement (NAFTA) was approved in 1994, the U.S.
and Mexico held a relationship of mutual benefit, or so they believed. After gaining its independence, Mexico became a target for western democracy. Once distracted by other affairs, a void was left to be filled by corruption with desperation. For the past three decades, neoliberalism has been growing in Mexico. The privatization of social benefits and services allows the privatization of profits and the socialization of losses. Poverty within the country has experienced a devastating increase while power groups with special interests gain control of the Mexican states. Several factors have influenced Mexico’s increase in crime; a relationship with the United States, neglect of human rights, and modern political ideas. The research will help to provide the details of the connection between actions of the past that have led the country to its current state.

Group C- 3:40-4:25

PAPER 6 "War Crimes of Asia: The Japanese Military, American Government, and the Implications of the Cover-up"
Michael Olds,

Mentor(s): Whitney Snow, Prothro-Yeager College of Humanities & Social Sciences, History

War crimes have existed in every major conflict in recent history, if not all of world history. This paper will highlight the war crimes that the Japanese military perpetrated prior to and during World War II, analyze the involvement of the U.S. government in preventing the prosecution of accused war criminals and explore the attempts to obfuscate the crimes and those responsible. The research will show that not only were a plethora of war crimes committed against the people of Asia before and during the war, but it will seek to interpret how and why the U.S. government made deals to protect those involved. This is meant to bring knowledge of the crimes back to the forefront of the general populace. Many outside the historical community lack understanding and knowledge of these crimes compared to the war crimes committed by the Nazis. This paper will discuss the implications of U.S. involvement in covering up Japanese war crimes, the protections afforded accused war criminals, and the results of those actions in post-war Japan. Those responsible, with the help of the American and Japanese governments, rose to places of significant power in post-war Japan. Additionally, this paper will seek to answer why known war criminals were allowed to so heavily influence political, economic, and social policy in post-war Japan.

2:15-3:25 CSC Comanche Session II
Automotive Engineering

2:15-2:35

OP13 Engine Dynamometer for FSAE Cars
Trevon Antoine, Nedabiah Warner, Garvin Joseph

Mentor(s): Pranaya Pokharel, McCoy College of Science, Mathematics & Engineering, McCoy School of Engineering

Engine dynamometers (dynos) are used to test and validate design concepts in cars. In our application, we will test engines 710cc and under, as per Formula Society of Automotive
Engineers (FSAE) guidelines. To do this we will be designing a cost effective, and efficient dyno. Our dyno will be modular which allows it to mount different size engines. To achieve this, we made the front and rear engine mounts moveable. The dyno will consist of components such as an engine, radiator, fuel tank, dynamometer control, laptop, and the Eddy Brake. The Eddy Current will provide resistance to the engine via a shaft to simulate the load that the engine will be under in the FSAE car. From this project, we will be able to tune the engine and collect information for various sub-teams before the designs are integrated into the car. The dyno will collect powertrain data such as the cylinder pressure, oil pressure, and power output. We can also test electrical sensors, plan electrical system design, and log data. The car’s drivetrain system can test final drive ratios and obtain power values being sent to the differential. The Eddy Brake will be calibrated to match values from the tire data for the tires we will be using on the car. The current output of the motor will equate to a certain slip angle which will tell us how the tires will behave under certain engine loading.

2:40-3:00
**OP 14 Rheological Study of a Non-Newtonian Polymer Fluid**  
Kalyb Beaver, Shanae Edwards, Alexandria Wester  
**Mentor(s):** Sheldon Wang, McCoy College of Science, Mathematics & Engineering, McCoy School of Engineering (Senior Design)  
Adhesives are extensively used in the automotive industry for bonding structures, although the dispensing system can exhibit uneven extrusion, or other difficulties in application, because of its unusual fluid properties. In this project, we are to determine the behavior of the non-Newtonian viscoelastic thixotropic adhesive by conducting a series of computational and experimental rheological studies. To evaluate a rheological system, through computational means, we employ multiple simulation softwares such as ADINA, ANSYS, and SOLIDWORKS. Based on early work, the softwares ADINA and ANSYS showed the most promising results, as the values tended to have the best of accuracy and precision based on a comparison made with analytical values. The experimental aspect of the project involves using a servo controlled circuit. This consists of a proportional–integral–derivative (PID) controller that will determine the pressure drop, flow rate, relaxation time and the fluid's viscosity. The electrohydraulic system consists of a feedback loop generated in SIMULINK paired with the hydraulic circuit with pressure gauges as well as a flow meter. The feedback system was set up with a feedback control loop implemented in SIMULINK where we are using velocity to find the volume flow rate of the hydraulic fluid for both inlet and outlet, using Mobil DTE 24 oil. The hydraulic system required an adapter to connect the flow meter to the circuit. For future work, instead of hydraulic oil and water for this rheological study, we recommend using the automotive adhesive. The results of both aspects will be compared to determine the accuracy of our study.

3:05-3:25
**OP15 Electric and Pneumatic Regulation of a Dual Planetary Gearing System Using a Programmable Logic Controller**  
Gillian Achord, Cahil Burlton, Kyle Hackett  
**Mentor(s):** Salim Azzouz, McCoy College of Science, Mathematics & Engineering, Engineering  
The purpose of this project is to create a new lab apparatus for the Machine Elements Design
course at the McCoy School of Engineering at Midwestern State University. The apparatus is designed so that future students can visualize and understand how a car transmission system works, specifically in regards to the concepts of determining the mechanical advantage and gear ratios. The transmission control system utilizes pneumatic-mechanical clutches and electromechanical brakes to realize one of the six possible gear ratios. The system is automated by a Programmable Logic Controller (PLC) that is able to shift the transmission into the different gear configurations for the students to determine the mechanical advantage and the efficiency of each configuration. To achieve the stated goals, necessary modifications have been made to a transmission built by a previous senior design group. The team used the SolidWorks CAD software to design a new clutching and braking system that works more effectively. The team also created a program for the PLC. The PLC performs several duties throughout the system. It controls the pneumatic cylinders for the clutch system, the linear actuators for the braking system, and it reads and displays the torque/speed readings from the transducers. The PLC is used in conjunction with a Human Machine Interface (HMI). The HMI has been programmed so that the user may select a gear configuration simply by tapping a digital button on the touch screen. The transmission apparatus is expected to be operational by the end of the spring 2023 semester.

3:30-4:25 CSC Comanche Session III
Energy, Natural Resources, Petroleum Engineering

3:30-3:55
**OP16 Heat Transfer Radiation Coefficient Measurements on Different Shaped Sections of A Piping System**
Abdullah Alkathiri, Ty Criss, Nevil Vora
**Mentor(s):** Mahmoud Elsharafi, McCoy College of Science, Mathematics & Engineering, Engineering
The understanding of heat transfer is very important to the success of any project or product dealing with thermal processes whether as a product or an unintended byproduct. There are three subcategories within heat transfer. These are convection, conduction, and radiation. Radiation, which is the purpose of our research, deals with electromagnetic waves being emitted as the charges within the particles themselves move. These waves radiate to other surfaces or the atmosphere which transfer thermal energy from which it was generated. Radiation is dependent on several factors, such as shape, and material properties. The goal of this project is to create a model of the temperature and heat losses associated with a typical piping system consisting of different shaped pipes. This would allow improvement in existing systems through the recommendations gathered from our research to increase efficiency and maximize or minimize thermal energy loss depending on the goal of the specific piping system. To do this, an apparatus consisting of three different shaped pipes will have a heated gaseous medium flowing through it, in which the temperature will be recorded, and analyzed. The focal point of the data would be the measured temperature from thermocouples on each shaped pipe. After completion of academic-based research, design, assembly, and testing, the results will yield useful information when dealing with the creation, and prolonged use of piping systems.
OP17 Construction and Wind Tunnel Testing of a Vortex Based Vertical Axis Wind Turbine
Roxanne Carlisle, Gabriel Ling,
Mentor(s): Salim Azzouz; Pranaya Pokharel, McCoy College of Science, Mathematics & Engineering, McCoy College of Engineering
The main purpose of this research project is to propose a new design of a Vertical Axis Wind Turbine (VAWT). VAWTs are mechanical devices where the rotor shaft is vertically positioned. The electricity generator and the gearbox systems are conveniently located at the base of the wind turbine. The new design is based on the idea of having an obstacle that generates two vortices to drive the rotor of the VAWT. Such a design, if successful, will solve the limited generator power that characterizes the horizontal axis wind turbine (HAWT).

The obstacle houses two wind turbines and is designed to create two internal vortices which will increase the energy output capabilities of the whole system. A Venturi system is implemented in the base to create a region of low pressure that sustains the two vortices. In an effort to achieve these objectives, the SolidWorks 3D CAD software was used to draw a final model of the new VAWT after many iterations. To adequately verify the performance of the new design, a model of the VAWT was 3D-printed for testing in the McCoy Hall wind tunnel.

It is expected that by the end of the Fall 2022 semester, the experimental tests for the new type of VAWT will start in the wind tunnel. The generation of the two vortices will be verified by using the Particle Image Velocimetry (PIV) and the performance of the whole wind turbine will be measured by the electricity produced by a connected electricity generator.

OP24 On the Design of a Feasible Fireproof Energy Storage System with Sustainable Energy Resources
Ernuel Tonge, Isaac Sekanyo, Elijah Portmann
Mentor(s): Sheldon Wang, McCoy College of Science, Mathematics & Engineering, Mechanical Engineering
After a thorough investigation into current and developing renewable energy technologies, issues associated with storage have been identified as one of the areas in need of the most development. To further that area, we have decided to focus on lithium-ion as one of the most widespread forms of energy storage. Despite the large-scale integration of Lithium Ion technology, many are still unaware of the potential dangers this technology can pose while left unattended or mishandled. As household Lithium Ion storage becomes more prevalent, an accessible monitoring system must be available to predict and help prevent potential fires. Our objective is to design such a system using a raspberry pi and other sensor components to monitor renewable energy storage systems for danger indicators. The developed companion app will receive system data in real-time sending alerts or taking preventative measures when necessary. It is our belief that this streamlined user-focused approach is the solution to many safety issues faced by this technology.

POSTER PRESENTATIONS
All poster presentations will be in the CSC Atrium. Presenters must remain at their posters for the duration of the assigned session.
10:00-11:00 - Emerging Research - Education

ER1: Impact on Student Learning Data Literacy
Reagan Worman
Mentor(s): Emily Reeves, Janice Wickard, Leann Curry, West College of Education, Undergraduate Education
The Impact on Student Learning project completed during Clinical Teaching supports data literacy for future teachers. Data collected includes environmental factors, instructional design, and student learning. The process involves first involved collecting and understanding environmental factors about the school and classroom. These include student demographics and needs. Understanding this data allows for accurate planning of instruction. Using the environmental factors as a building block for instruction, instructional design is the next step in the process. This not only involves lesson planning but also accommodations and appropriate assessments to use in part three, student learning. This final piece is where data analysis comes into play and engages the clinical teacher in data literacy. The Clinical Teacher must look at pre and post tests to determine the impact of student learning during the lessons taught. Working through parts 1, 2, and 3 or the Impact on Student Learning project during Clinical Teaching forces clinical teachers to think through data literacy and gears them to start using this process in the classroom as a action research cycle.

10:00-11:00 Poster Session I - Study Abroad

P1 The Statistics Behind the Educational and Diversification Benefits for Students whom Study Abroad
Ty Criss
Mentor(s): Mahmoud Elsharafi, McCoy College of Science, Mathematics & Engineering, Engineering
Studying abroad programs were created to allow students to immerse themselves in another part of the world for a semester while continuing their education. Most programs provide a brochure of promises; promising transformation, adventure, personal growth, and feature a photo of students smiling at a beautiful location. However, most of these promises have no data to back these statements. In our project we want to investigate how studying abroad affected students either adversely or beneficially. We wish to review the personal and academic effects on students after studying abroad. The research will consist of reviewing academic articles and journals, along with collecting data and personal reflections from our own Midwestern State University students. We wish to show students the true experience of studying abroad by presenting them with information from previous student travelers and researched statistics and data. IRB23031501
**P9 Using Membrane Protein Chaperone to Prevent and Disrupt Familial Mutant of Alpha-Synuclein Protein Aggregation in Parkinson Disease**

Abigail Matthew

**Mentor(s):** Fu-Cheng Liang, McCoy College of Science, Mathematics & Engineering, Chemistry and Biology

Protein homeostasis is essential for all cells and requires the proper control of the folding, localization and interactions of all proteins. However, protein aggregation and the associated neuronal death poses a special challenge to protein homeostasis and leads to several neurodegenerative diseases (e.g. Alzheimer’s and Parkinson’s disease). Intriguingly, these aggregation-prone proteins are always associated or encompassed with a hydrophobic membrane or vesicle. Inhibiting or reversing such insoluble/hydrophobic aggregates could shed new light on therapeutic strategy. However, a major knowledge gap involves how effective membrane protein chaperones can be used to prevent and/or disrupt protein aggregation. Membrane protein chaperone provides the first proof-of-principle model to prevent hydrophobic region of membrane proteins from aggregation. Most importantly, the membrane protein chaperone can actively disrupt protein aggregates without external energy, like ATP, emphasizing its unique function among protein chaperones. Here, we show that the novel protein targeting machinery from chloroplast, chloroplast signal recognition particle 43 (cpSRP43), is an effective ATP-independent membrane protein chaperone that can both prevent and reverse the aggregation of familial mutant of alpha synuclein (ASyn) A30P in Parkinson’s disease. Additionally, Scanning Transmission Electron Microscope (STEM) imaging identifies the aggregation morphology of ASyn A30P and shows the morphological contrast in the presence of the chaperone, suggesting ASyn A30P aggregation can be inhibited by cpSRP43. This research demonstrates that membrane protein chaperone can serve as a model system to utilize its unique anti-folding and disaggregation properties to strategically develop and characterize an effective therapeutics to prevent protein aggregation-prone disease.

**P10 Membrane Protein Chaperone Modulates the Kinetics and Morphology of Tau Aggregation: A Potential Treatment for Alzheimer’s disease**

Kara Rodgers,

**Mentor(s):** George Liang, McCoy College of Science, Mathematics & Engineering, Chemistry

The most common type of dementia, Alzheimer’s disease (AD), is a progressive neurodegenerative disease that initially consists of mild memory loss, but could eventually lead to loss of ability to communicate or react to their environment. A microtubule-associated protein, Tau, aggregates causing neurotoxicity and inevitably neuronal cell death. Abnormal hyper-phosphorylated Tau proteins clump together (aggregate) to form neurofibrillary tangles and are hypothesized as one of the leading causes to the pathogenesis of AD. The amyloid hypothesis suggests that protein aggregate accumulation in the brain is the primary culprit driving AD pathogenesis. Consequently, inhibiting or reversing this protein aggregation has potential for future therapeutic treatments. CpSRP43 is a membrane protein chaperone that has shown to efficiently reverse protein aggregation through chaperone and aggregation-prone substrate interactions. This process does not require the use of ATP because cpSRP43 selectively binds to...
hydrophobic amino acid residues, stabilizing these interactions and preventing the client proteins from ever aggregating. By using Thioflavin T fluorescence dye, we obtain the aggregation kinetics of Tau aggregation and determine that cpSRP43 prevents Tau aggregation in a concentration-dependent manner. In addition, the Scanning Transmission Electron Microscope (STEM) shows the morphological contrast of Tau aggregate in the presence of cpSRP43, indicating that cpSRP43 can inhibit Tau aggregation. Our results open the opportunity to prevent the Tau aggregation by utilizing unique anti-folding and disaggregation properties of cpSRP43 and emphasize the special role of the membrane protein chaperone in the treatment of protein aggregation-prone disease.

**P11 Synthesis of Aryl Substituted Methylene Malonates With Diethyl Malonate**
Glenna Linthicum, Sebastian Ibarra
**Mentor(s):** Chris Hansen, McCoy College of Science, Mathematics & Engineering, Chemistry
The purpose of this experiment was to confirm the synthesis of aryl substituted methylene malonates following procedures written up by previous research students. The reactions of benzaldehydes with diethyl ether, piperidine, and acetic acid were done over a period of 18-24 hours at 50°C. The identities of the compounds were confirmed with the use of Gas Chromatography-Mass Spectrometry, NMR, and IR Spectroscopy.

**P12 Genetic Typing of and Detection of Virulence Factors in Escherichia coli Strains From Local Waterfowl**
Zaniya Medlin
**Mentor(s):** James Masuoka, McCoy College of Science, Mathematics & Engineering, Biology
According to the World Health Organization, antimicrobial resistance is a major global public health threat. Antimicrobial resistance and other virulence factors can be spread by transfer of genes coding for these factors between cells. Over time, these transfers lead to highly virulent, multidrug-resistant strains that are extremely hard to treat. Migratory birds can act as bacteria carriers, introducing new strains into their various seasonal habitats. We hypothesized that migratory gulls arriving in Wichita Falls each winter play such a role and that the types of virulence factors present would change each time the gulls arrive. Fecal samples were collected from resident Canada geese (Branta canadensis) for a year, and bacterial isolates, presumptively identified as Escherichia coli, were selected. Multiplex PCR was used to test each isolate for twelve E. coli virulence factors. PCR-amplified sequences were visualized as bands separated by agarose gel electrophoresis. To date, of 53 presumptive E. coli isolates, we have confirmed the identity of 38. Of these, 16 have the Shiga toxin 1 gene. We also detected the genes for Shiga toxin 2 and Heat stable toxin at similar frequencies, and other virulence factors at lower frequencies. The pattern of gene sequences present will allow us to group the isolates by pathotype and to determine pattern changes over time. Understanding how genes associated with virulence are introduced to our local environment will help inform decisions related to public health and antibiotic stewardship.

**P13 Metabolic Plasticity Observed in Multi-Drug Resistant Enteric Bacteria Obtained as Part of a Year-Long Study of Canada Geese (Branta canadensis)**
Joshua de Waal, Austin Groth, Jacob Turnbow
**Mentor(s):** Elizabeth Machunis-Masuoka, McCoy College of Science, Mathematics &
Antimicrobial resistance, including multi-drug resistance (MDR), has been shown to exist in wild animal populations, especially birds. The extent to which this resistance is maintained is largely unknown. We are conducting a year-long survey of a non-migratory population of Canada Geese (Branta canadensis) residing at Sikes Lake, Midwestern State University, Wichita Falls, TX, looking for MDR. A total of 72 of 243 bacterial isolates obtained from 120 separate fecal samples have been screened. Of the 16 MDR isolates found, all are erythromycin-resistant (erythromycinR) and of these, 6 are also ampicillin-resistant (ampicillinR), 9 are ampicillin-resistant (ampicillinR), and 1 is tetracycline-resistant (tetracyclineR). MDR should be costly to maintain in organisms not exposed to antibiotic. We hypothesize that organisms will lose metabolic plasticity or change protein expression profiles to compensate for the MDR phenotype. Metabolic screening using a modified IMViC and sugar fermentation panel is being used to both aid identification of bacterial species as well as visualize phenotypic variability. Thus far, 25% of isolates show variable indole production and 23.6% show variable MRVP. Further testing is required to determine if variability represents species diversity or metabolic diversity. To examine protein profiles, soluble protein was obtained from lysed cell pellets and 20 μg by mass was run on 12% SDS-PAGE. Variability in whole-protein banding patterns (protein profiles) was observed across the MDR isolates, both in terms of the presence/absence of bands and band intensity. Overall, these initial findings appear to support the hypothesis that MDR organisms compensate metabolically to support the resistant phenotype.

**P14 Assessing the Correlation Between Underlying Genetic Diversity and Antimicrobial Resistance in Enteric Isolates Obtained from a Year-Long Sampling of Canada Geese (Branta canadensis)**

Elizabeth Bocanegra Nunez

**Mentor(s):** Elizabeth Machunis-Masuoka, McCoy College of Science, Mathematics & Engineering, Chemistry/Physics

Antimicrobial resistance (AMR) is a global problem potentially mediated by a wide range of genetic elements carried inside the gut bacteria of migratory and non-migratory animal populations. Migrant birds such as gulls (family Laridae) are known carriers of AMR bacteria. For gulls to move AMR genes along migration routes, those genes must persist in the environment to be available for horizontal gene transfer (HGT). The gut bacteria of non-migrant species may facilitate both persistence of AMR and HGT. Most studies of non-migrant populations involve single-day surveys of gut bacteria that fail to show how either AMR or HGT change in response to the presence of migrants. To address this knowledge gap, we are conducting a year long survey of a non-migrant population of Canada Geese (Branta canadensis) inhabiting Sikes Lake. We are looking specifically at the underlying genetic diversity in gut isolates as a proxy for HGT; higher levels of HGT are expected to correlate to increased chances for the exchange of AMR genes. We hypothesize an increase in overall genetic diversity in gut isolates when gulls are present with a concurrent increase in the levels of AMR. Currently, 72 of 243 bacterial isolates obtained from 120 separate goose feces have been fingerprinted using repetitive-element (REP) and enterobacterial repetitive intergenic consensus (ERIC) PCR. Fingerprints are visualized as bands in agarose gels. We have observed that fingerprints are noticeably variable, whether they are from intra-bird or inter-bird isolates, indicating observable background genetic diversity and potential HGT within the non-migratory goose population.
**P15 Effect of wall protein glycosylation on Candida albicans cell surface hydrophobicity**

Nasiha Khan  
**Mentor(s):** James Masuoka, McCoy College of Science, Mathematics & Engineering, Biology  
*Candida albicans*, a commensal fungal microorganism colonizing the gastrointestinal and vaginal tracts, is an opportunistic pathogen that can cause mild to severe disease. To colonize the host, *C. albicans* cells must adhere to host tissues. An important factor in the initial steps of adherence is cell surface hydrophobicity. Hydrophobic cells are more adherent than hydrophilic cells. Surface hydrophobicity correlates with conformation of surface-localized glycoproteins. Protein glycans comprise a primary branch, connected to the polypeptide backbone, with secondary and tertiary branches extending from the primary. Tertiary branches are composed of \( \text{b-1,2-oligomannosides} \) and linked to secondary branches through a phosphodiester bond. Previous work demonstrated that hydrophobic cells have longer tertiary branches than do hydrophilic cells. We hypothesized that this glycosylation change directly influences surface hydrophobicity due to longer \( \text{b-1,2-oligomannosides} \) interacting with like chains in the same or adjacent proteins. This interaction causes proteins to fold over or aggregate, leading to the observed surface hydrophobicity. To test this hypothesis, we assayed the hydrophobicity of wild-type *C. albicans* and mutant strains defective in various steps of tertiary branch glycosylation. Initial results suggest that limiting the length of the tertiary branches does not affect hydrophobicity. Thus, it appears that glycosylation changes correlate with, but do not directly influence, hydrophobicity levels. We are currently examining additional strains to ensure that our results are not strain-specific. The results of this work will help us understand how *C. albicans* interacts with host tissue and successfully colonizes the human host.

**P16 Effect of tryptophan and its derivatives indole and serotonin on Candida albicans germination**

Francine Pascal  
**Mentor(s):** James Masuoka, McCoy College of Science, Mathematics & Engineering, Biology  
*Department*  
*Candida albicans* is a species of yeast commonly found in the human gastrointestinal and reproductive tracts. Although usually commensal, *C. albicans* can, under certain conditions, become invasive and cause disease. *C. albicans* is dimorphic, having unicellular yeast and filamentous hyphal forms. Germination, the transition between the yeast and hyphae forms, is an important virulence trait and one influenced by quorum-sensing molecules such as farnesol. Another *C. albicans* quorum-sensing molecule, called MARS, was reported to have similar effects, but was structurally different from farnesol. However, MARS did have structural similarities to serotonin, also shown to inhibit germination. Since *C. albicans* does not secrete serotonin, it is unlikely to be MARS. Serotonin is derived from tryptophan, as is indole – proposed to be a signaling molecule even between kingdoms. We hypothesized that MARS is indole and that serotonin is acting as an analogue of indole. The present study investigates the effects of subinhibitory concentrations of indole, serotonin, and tryptophan on *C. albicans* germination. Preliminary results suggest that indole inhibits *C. albicans* germination and this effect occurs within the first 30 minutes of indole addition. Current efforts are extending these experiments to include testing several strains of *C. albicans* along with the serotonin and tryptophan trials. These results will help us understand how *C. albicans* interacts with the human host and the other
microbes making up the mucosal microbiome and may provide insights into ways by which we can maintain C. albicans in a commensal state.

**P17 Reversion of Antibiotic Resistance in E.coli**  
Ryan Azzouz  
Mentor(s): James Masuoka, McCoy College of Science, Mathematics & Engineering, Biology  
The development of antibiotics, along with the development of vaccines and sanitation systems, has been a major contributor to the improvement of human health, particularly over the last century. However, increasing resistance to these same antibiotics is threatening our ability to effectively treat infectious diseases. Alternatives to the drugs themselves or alternative strategies for using these drugs are needed to address this growing threat. One alternative-use strategy could be a rotating schedule of antibiotics. Bacteria resistant to one antibiotic can revert to being susceptible to it when grown in the presence of another. Previously, an erythromycin-resistant strain of *E. coli* showed increased susceptibility after growth in the presence of subinhibitory concentrations of tetracycline. For this project, we hypothesized that reversion was due to mutations in the erythromycin resistance genes and that these mutations will be different each time the experiment is performed. We repeated the tetracycline treatment experiment and generated a second isolate with increased susceptibility to erythromycin. Genomic DNA from the original strain and both revertant strains was extracted and submitted for whole genome sequencing. Comparison of these genomic sequences will determine where the genetic changes have occurred. Analysis of these changes will help us discern patterns of mutation and, we hope, provide insights into improved antibiotic stewardship.

**P18 Using Membrane Protein Chaperone to Prevent Familial Mutant of Alpha-Synuclein Protein Aggregation in Parkinson Disease**  
Abigail Guinan  
Mentor(s): Fu-cheng Liang, McCoy College of Science, Mathematics & Engineering, Chemistry.  
Protein homeostasis is essential for all cells and requires the proper control of the folding, localization, and interactions of all proteins. However, protein aggregation and the associated neuronal death pose a special challenge to protein homeostasis and lead to several neurodegenerative diseases. The pathological hallmark of Parkinson’s disease (PD) is characterized by cytoplasmic aggregates, the so-called Lewy bodies, containing the intraneuronal aggregates of protein, alpha-synuclein (ASyn). Several mutations in ASyn have been identified, including A53T, and have been proposed to disrupt the α-helical structure in this region and extend β-sheet, thereby rendering the protein more prone to self-aggregation. This A53T mutant has been associated with familial PD and produce aggregates more quickly than wild-type ASyn which can contribute to early onset of PD. Inhibiting or reversing such insoluble/hydrophobic aggregates could shed new light on therapeutic strategy. However, a major knowledge gap involves how effective membrane protein chaperones can be used to prevent and/or disrupt protein aggregation. Membrane protein chaperone provides the first proof-of-principle model to prevent the hydrophobic region of membrane proteins from aggregation. Most importantly, the membrane protein chaperone can actively disrupt protein aggregates without external energy, like ATP, emphasizing its unique function among protein chaperones. Here, we demonstrate that Thioflavin T fluorescence and scanning transmission electron microscope (STEM) can be used to
detect the aggregation of ASyn A53T. Surprisingly, membrane protein chaperone can modulate the ASyn A53T aggregation kinetics and disrupts the aggregation morphology within the protein aggregates.

1:00-2:00 Poster Session III - Healthcare, Nursing, Respiratory

P2 The Case to Prevent Medication Errors via Embedded EHR Alerts
Jack Murdock, Louis Adam (GS), Oloworibi Ekundayo (GS)
Mentor(s): Stephanie Baker, Gunn College of Health Sciences & Human Services, Wilson School of Nursing
Medication errors are a well-documented source of preventable injury, expense, and a significant burden on the healthcare system that affects overall patient outcomes. Within a hospital facility, errors can occur throughout the interdisciplinary medication-management process. Medication administration is an essential role of nurses in hospital facilities and a critical component of medication errors. The Food and Drug Administration (FDA) has identified injectable medications as a primary source of serious medication errors affecting patient safety. The rate of administration is an important consideration in administering injectable medications and has been identified as a source of medication errors involving significant patient harm. System factors, including the use of technology, have been identified as a practical intervention to promote patient safety in medication administration and can minimize human factors and communication deficits that contribute to medication errors. This qualitative, quasi-experimental multi-group pretest-posttest research project aims to measure the effect of embedded rate of admiration alerts and incidences of medication errors in a simulated inpatient healthcare facility. This study will present senior-level professional nursing students with two clinical scenarios. The first will be void of written prompts, and the second will contain prompts reiterating the intravenous medication instructions. Following the clinical scenarios, the students will be given a survey questioning the utility of readily available alerts. Our team expects the students will prefer the medication prompts. The Spring 2023 semester provided additional experiences to increase the volume of data collection. IRB23022003

P3 Exploring the language barrier in Healthcare for Individuals of Latino Heritage
Heriberto Torres
Mentor(s): Michael Olson, Gunn College of Health Sciences & Human Services, Exercise Physiology
Latinos are the largest minority group in the United States; despite this, they are the least likely ethnic and racial group to visit a healthcare provider. The purpose of this research/study is to explore the barriers of individuals of Latino descent seeking healthcare services. The motivation for this research/study is to bring awareness to the most prevalent barriers and identify possible solutions to the healthcare community to increase the presence of the Latino community in healthcare services. The experimental design is a survey comprising two major types of questions. The first type of questions are aimed towards geography; this portion of the question will allow for the exploration of barriers in different locations and how they vary among different communities. This aspect of the survey will also allow for future investigation and comparisons through the years, allowing for an examination of the implementation to help the barriers and
their effectiveness among the community over time. The second aspect of the survey are questions based on literature that allow for the exploration of the different types of barrier explored, such as (immigration status, lack of insurance, cultural beliefs, language barriers, and environmental factors). For the preliminary results, there is an expectation of about twenty-five volunteers through the Dallas district area, in which it is hypothesized that language is the primary barrier. Concluding the research/study accepting the hypothesis portraying language as the most substantial barrier for Latinos seeking healthcare services. IRB #23031502

**P4 Preceptor Perceptions of Students in the Clinical Environment**
Sheeba Kalvin, Angela Nguyen, TeeLee Cook,
**Mentor(s):** Randy Case, Tammy Kurszewski, Gunn College of Health Sciences & Human Services, Respiratory Care
As students making the transition from school to the professional world of clinical practice, we invest hours of our time in lecture halls as well as hospitals as part of clinical practicum. Health science students aspire to excel as future clinicians. The purpose of this study is to conduct a survey of preceptors’ perceptions of students to determine what qualities preceptors value in students who are entering their first clinical rotation. This study is beneficial to professors and students to better prepare for their learning experience in the clinical setting. Thirty preceptors (a combination of both respiratory therapists and nurses) were randomly selected from an area hospital to fill out the survey. Both female and male preceptors were surveyed. Informed consent was obtained through the preceptor’s participation. Participants were asked to fill out a fifty-three question survey asking what they perceived to be the best attributes that make a quality student. Thirty preceptors participated in the survey and gave various responses to the survey given. The outcomes of each survey differed. In each of the five categories, one to three character traits were identified as dominant. Overall, there were several top expectations for students entering on their first day from the perspective of clinical preceptors. This information will allow for more successful student and preceptor clinical experiences. IRB#23012606

**P5 Sleeping Patterns of College Students**
Travis Foster, Lizette Flores, Geordan Martinez,
**Mentor(s):** Randy Case Jennifer Anderson, Gunn College of Health Sciences & Human Services, Respiratory Care
The purpose of this project is to bring attention to the sleeping habits of college students attending MSU Texas. This survey can also help students recognize their own poor sleeping patterns and possibly encourage a positive change in the student’s overall sleep health and or habits. Methods: Thirty students were randomly selected from the Midwestern State University campus to participate in the research survey. The participants were asked to answer the questionnaire containing a series of questions related to their overall sleeping habits. Results: A majority of students (82.9%) went to bed on a school night between the hours of 11:00 PM – 2:00 AM, and 73.2% of students took anywhere from 10 minutes to over 20 minutes to fall asleep once in bed on a school night. One hundred percent of students surveyed felt unrested upon waking up. Stress associated with school work, watching TV, excessive use of electronic devices, and environmental temperature were discussed when asked about the issues that caused a loss of sleep. Conclusion: The findings demonstrate that a significant amount of college students go
to sleep late on school nights (82.9%), took greater than 20 minutes to fall asleep once in bed (36.6%), and all interviewees reported they regularly felt unrested upon waking up. These results indicate that most college students do not achieve the required amount of sleep necessary to function at optimal levels, and as a result, experience multiple side effects throughout the course of their day. IRB#23012604

**P6 Impact of COVID-19 on MSU College Students**

Nancy Rivera, Laisha Castro, Hailey Coyac, Lynda Gonzalez

**Mentor(s):** Randy Case, Mary Owen, Gunn College of Health Sciences & Human Services, Respiratory Care

The pandemic of COVID-19 made an impact worldwide in late 2019 and early 2020, affecting several different groups of people including college students. The COVID-19 epidemic has had significant effects on education and society, including the closing of college campuses, the development of online learning, and social isolation. Purpose: The purpose of this study was to determine what impact COVID-19 had on college students specifically. The data collected would benefit students and universities to help determine whether students were given adequate resources and assistance to help through a crisis, such as the pandemic. Methods: Literature was originally obtained from several scholarly articles that reported results on COVID-19, college students, and mental health or lifestyle impact. For this study, 40 college students were randomly selected from the Midwestern State University campus and were asked to complete a questionnaire. Results: Within the results, it was discovered that 35% of MSU Texas students who were enrolled in online classes during the COVID-19 pandemic felt that it was harder to complete the semester online versus face-to-face. In addition, 39% reported feeling a higher level of anxiety during the COVID-19 pandemic. Conclusion: As per the survey results, it was discovered that COVID-19 had impacts on college students mentally, educationally, and physically. IRB #23012605

**P7 College Vaping: Can It Be Prevented?**

Samantha Harris, Allyson Karr, Kristina Tran, Khanh Truong

**Mentor(s):** Randy Case, Jessica Fino, Gunn College of Health Sciences & Human Services, Respiratory Care

E-cigarette/Vape usage among college students has increased over the past decade. It was hypothesized that a majority of participants would confirm that they currently or have previously used e-cigarettes. The purpose of this study was to understand why there is an influx of e-cigarette usage among college students and what, if anything, could have prevented smokers from starting e-cigarettes. A survey was conducted at Midwestern State University that consisted of 35 participants and asked questions such as ‘How old were you when you first used an e-cigarette, even once or twice?’ and ‘Why did you first use an e-cigarette?’ Results: The results of the survey found that out of 35 participants, 10 (29%) confirmed that they have used or currently use an e-cigarette. The two most common ages the participants started using e-cigarettes were 16 or 17 years old, indicating that many college students started during high school. When the participants were asked why they first tried an e-cigarette, the top three reasons included that a friend used them, they were curious about them, or that they were available in multiple flavors. Conclusion: Based on the results of the survey, it was concluded that participants who currently
use or have used e-cigarettes started smoking prior to attending Midwestern State University. It was observed that young adults are heavily influenced by peer pressure, especially in their teenage years. It could be possible that providing informative education about nicotine could prevent others from using e-cigarettes. IRB#23012607

**P8 College Students Access to Healthy Food Options**  
Caroline Baxter, Megan Markwardt, Makayla Ross,  
*Mentor(s):* Randy Case, Erica Judie, Gunn College of Health Sciences & Human Services, Respiratory Care

College students are often faced with an environment that facilitates consistent access to a variety of foods. However, many of those options are often considered unhealthy and lacking nutritional value. Purpose: The purpose of this research was to determine if the students at Midwestern State University have access to healthy and nutritional food options and if the students were satisfied with the meal options on campus. Methods: Thirty-one students were randomly selected from the Midwestern State University campus. The participants included males and females ranging in age and degree majors. Informed consent was obtained, and the student participants were informed about the research study being conducted and asked to fill out a short questionnaire relating to their experience and perceptions of food options on the MSU campus. Result: After completing the research, it was discovered that twenty-eight of thirty-one students surveyed believe there is a need for a greater variety of healthy and nutritional food options on campus. The results of the survey also demonstrated that the majority of students on the MSU campus are dissatisfied with the food options present on campus. Conclusion: Findings within the study concluded that overall, students are dissatisfied with the variety of food options and prefer to have access to a variety of healthier food options within the campus. The ability to partake in a variety of healthy food options may directly affect the student’s overall experience on campus, provide the proper nutritional needs to maintain a sound academic presence, and prevent health-related illnesses. IRB# 23012603

**2:00-3:00 Poster Session IV - Computer Science, Engineering, Geoscience**

**P19 Membrane Distillation for Clean Water Production**  
Nevil Vora, McClain White  
*Mentor(s):* Mahmoud Elsharafi, McCoy College of Science, Mathematics & Engineering, Mechanical Engineering

Membrane distillation is a water purification process that utilizes a porous membrane to filter out particles such as salt and sand from water. This method uses a pressure difference across the membrane to push water across the membrane barrier and achieve filtration. As the dirty water pushed by pressure on one side of the membrane, the water was travel through the membrane and filtered for contaminants and turn into clean water on the other side. Water purification is a vital process for all mankind as we all need clean, freshwater to survive and water is necessary for many industries. For example, the oil and natural gas industry need to filter and recycle the dirty water they use in their extraction processes. As the membrane put through filtration cycles, it would naturally lose effectiveness as foreign particles from the dirty water enter it and the
porosity (volume of empty space) and permeability (flow output) of the membrane decreases. The longevity of the membrane is a major contributor to the overall cost of the water purification process. This work experiment aims to construct a membrane distillation filtering apparatus, measure the cleanliness of the water, measure the permeability of the membrane after filtration cycles and measure the longevity of the filtration membrane and attempt to increase it by finding optimal flowrate and pressure for the liquid which was filtering through various samples. No

**P20 On Analyzing the Accuracy of Financial Indicators in Predicting Stock Patterns Using Data Mining Tools**

Edgar Zapata

**Mentor(s):** Lopamudra Roychoudhuri, PhD, McCoy College of Science, Mathematics & Engineering, Computer Science

Investing in the stock market can be profitable, but it is also highly unpredictable. To maximize profits, traders must carefully time their stock purchases and sales. This research aims to assess the accuracy of data mining methods in predicting stock movement patterns.

Data Collection and Organization: We are using daily data of representative stocks across various sectors, such as tech, finance, and retail. We have researched and identified financial indicators necessary for applying data mining techniques on stock data, to analyze and predict trading signals, such as buy, hold and sell. We have used scripts to collect data since the beginning of the year, along with technical indicators, such as MACD and Vortex Indicators, from well-established financial websites, such as Yahoo Finance.

Analysis using Data Mining Tools: Currently, we are processing this data thru Weka, an industry-standard data mining tool. We are using four distinct mathematical algorithms, known as classifiers, and built in Weka, for our predictions. The classifiers we chose are rule-based OneR, decision tree-based J48, nearest neighbor IBK, and probabilistic Naïve Bayes. We are experimenting with our data using these classifiers, which are generating prediction results that are being analyzed, visualized, and compared for accuracy in predicting trading signals. Initial results are being validated, but they look promising.

**P21 Terrestrial remote sensing technology for improved forest biomass monitoring**

Elizabeth Elkins,

**Mentor(s):** Kashif Mahmud, Timothy Pegg, McCoy College of Science, Mathematics & Engineering, Geosciences

Tree above ground biomass (AGB) has been identified as an essential climate variable that quantifies the amount of carbon stored in terrestrial ecosystems. Recent advancements in terrestrial Light Detection And Ranging (LiDAR) remote sensing technology makes it possible to create detailed three-dimensional (3D) models of individual trees at the centimeter scale. Therefore, we can calculate AGB in a non-destructive and more accurate way compared to current forestry practices. Conventional practices use relationships between tree species and generic allometric equations to estimate AGB. AGB calculated with these methods may be susceptible to errors and uncertainties. This project assesses the accuracy and potential of LiDAR technology and tree segmentation algorithms that calculate above ground tree attributes and estimate AGB. We also aim to improve post-processing algorithms to streamline project workflow. Our methodology involves scanning several trees within the Midwestern State
University campus using LiDAR and analyzing the point clouds with tree segmentation / modeling algorithms. We then validate the estimated above ground attributes by comparing them to actual field measurements. By analyzing 3D reconstruction models utilizing the point cloud, we observe that the algorithm creates detailed and plausible models. This is crucial because of its implication in larger scales such as for local/regional forests by using satellite-derived data. Our non-destructive technique for estimating tree AGB has real-world impacts on local stakeholders by informing them of the potential of LiDAR technology to generating data-based, practical recommendations regarding terrestrial carbon sinks, and contribute towards sustainable forestry management strategies.
Acknowledgements

We would like to acknowledge the following for their continued support of faculty, graduate and undergraduate research at MSU Texas and WFISD:

Dr. Keith Lamb, Interim President
Dr. Margaret Brown-Marsden, Interim Provost, Melissa Boerma, Assistant to Provost
Dr. Kristen Garrison, Associate Vice President Academic Affairs
Mr. Matthew Park, Interim Vice President for Student Affairs
Dr. Billie Doris McAda Graduate School: Dr. Tiffany Ziegler, Interim Dean, Elizabeth Gibbs, Admin Assistant; Emma Brown, Graduate Academic Counselor & 3MT™ Organizer, Alonzo Burris
The Celebration of Scholarship Committee: Randy Case, Mahmoud Elsharafi, Pablo Garcia-Fuentes, Matt Luttrell (Committee Chair), Stacia Miller, Edward Schultz, John Schulze, Shanna Tole
Office of Sponsored Programs and Research Staff: Brittany Norman, Director, Courtney Hoover, Grant Specialist
Fain Elementary: Ms. Danielle McSweeney, Principal; Mr. Frank Tarver, Assistant Principal, and PBL mentors Ms. Laura Wetzel, Jennifer Anderson (G4), and Ms. Jennifer Gilbert (G5)
The Undergraduate Research Advisory Committee: Packairaj Arumugham, Tara Fox, Pablo Garcia-Fuentes, Ebany Hanna, Andrew Katumwehe, Eric Lynch, Morgan Mallory, Victor Marchesi, James Masuoka, Emily Smith, Whitney Snow, Jessyca Wagner, Lin Wang, Dirk Welch, Bradley Wilson
Facultly Mentors
The Evaluators and Moderators who volunteer their time and support to the undergraduate forum.
3MT Judges: Mary Draper, Pablo Garcia-Fuentes, Sally Henschel
Dr. Cammie Dean, Assistant Vice President Student Affairs
MSU Texas Student Ambassador volunteers
Redwine Honors Program: Dr. Steve Garrison and student volunteers

MSU Texas Marketing & Public Information Department
*The Wichitan*

UGR Office,
Dr. Stacia Miller, Director,
Ms. Julie Scales, Coordinator, Ms. Joy Ebri, SA
CSC Rm 161 940-397-6275/6274