

**West Texas A&M University's
28th Annual Student Research Conference
April 7, 2022**



Contents

Index of Presenters
Schedule Overview
Posters/Visual Arts

Sponsored by
West Texas A&M University's
Department of Graduate School and Research

Index

Bonnet, Anna

The Civilian Conservation Corps: How Palo Duro Canyon Became a State Park

Session IV: 12:30 – 1:30 p.m.

Callaham, Ashley

Fiction of the American West: The Created Image of Charles Goodnight

Session IV: 12:30 – 1:30 p.m.

Cervantes, Daniela

The Effect of a Candidate's Social Media Presence on Election Outcomes

ZOOM Poster Session, Thursday, 12:15 – 1:15 p.m.

Cervantes, Keshon

Copper Clean Effectiveness Against Representative Organisms from the Human Microbiome

ZOOM Poster Session, Thursday, 12:15 – 1:15 p.m.

DeLeon, Lyanna

Microscopic examination on fibers, insect parts, plant exudates and burnt residues in the air causing allergic rhinitis

ZOOM Poster Session, Thursday, 12:15 – 1:15 p.m.

Denney, Katelyn

Texas Sundown Towns: A Panhandle Phenomenon?

Session IV: 12:30 – 1:30 p.m.

Fletcher, Lance

Predicting Anti-Foulant Material Performance Through Regression Models Based on Image Data

Session III: 11:20 a.m. - 12:20 p.m.

Heckman, Jessica

A Genetic Analysis of Sirens in Texas

Session IV: 12:30 – 1:30 p.m.

Heuss, Edith

Powering the Plains: How Cheap Dependable Electricity Fueled An Economic Boom

Session II: 10:10 – 11:10 a.m.

Hurst, Jacob

Determining Physiochemical Properties in Atmospheric Particle Samples from Atlantic and Arctic Islands

ZOOM Poster Session, Thursday, 12:15 – 1:15 p.m.

Husz, Taylor

The effect of days on feed for feedyard performance, health, carcass, and organ characteristics of Angus x Holstein heifers

ZOOM Poster Session, Thursday, 12:15 – 1:15 p.m.

Islam, Tania

Determinants of Labor Demand of Bangladesh: A Time Series Analysis

Session II: 10:10 – 11:10 a.m.

Kelley-Diaz, Kirbi

“Costly Articles of Adornment”: American Food, Economy, and Morality 1880-1920

Session II: 10:10 – 11:10 a.m.

Kleinschmidt, Madeline

Transitional Justice and Enforced Disappearances: An Analysis of the Mechanisms Used for Reconciliation and Recovery

Session II: 10:10 – 11:10 a.m.

Lee, Billy

Circadian Rhythms of Serotonin in the Stool of Mice

Session V: 1:40 – 2:40 p.m.

Lester, Ashlynn

Women and the Making of a Nation: An Analysis of the South Korean Family Planning Program Under President Park Chung Hee

Session I: 9:00 – 10:00 a.m.

Nguyen, Thinh

Fermi surface studies of type-II Dirac semimetal candidate NiTe₂ using de Haas-van Alphen oscillations

Session III: 11:20 a.m. - 12:20 p.m.

Ogle, Heather

Teaching Climate Science to 3rd to 6th Graders in Texas Panhandle

ZOOM Poster Session, Thursday, 12:15 – 1:15 p.m.

Phipps, Riley

Metabolic Differences of Cardiopulmonary Resuscitation during 2, 4, and 6-minute Compression Cycles

ZOOM Poster Session, Thursday, 12:15 – 1:15 p.m.

Richardson, Katylyn

Comparison of reproductive and early growth performance of an F1 USDA Prime yield grade one carcass clone sire and an industry-leading purebred sire i

ZOOM Poster Session, Thursday, 12:15 – 1:15 p.m.

Shaheen, Sania

Exploring the Wheat Demand Determinants and Food Security Challenges in Pakistan

Session II: 10:10 – 11:10 a.m.

Smith, Wyatt

Rumination and ruminal characteristics of beef steers receiving steam-flaked corn-based finishing diet with increasing concentrations of dried distill

ZOOM Poster Session, Thursday, 12:15 – 1:15 p.m.

Tsichlis, Aidan

Shuffling Along into the 21st Century: Analyzing the impact of the 1921 musical Shuffle Along

Session I: 9:00 – 10:00 a.m.

Voyles, Elizabeth

American Folklore and the Economy: How Mythos became Mascot

Session II: 10:10 – 11:10 a.m.

Zemanuel, Levi

Divisia Monetary Aggregates for Ethiopia: Design & Construction

Session V: 1:40 – 2:40 p.m.

Maroon Room #37

**Women and the Making of a Nation: An Analysis of the South Korean Family Planning Program
Under President Park Chung Hee**

Ashlynn Lester

The South Korean Family Planning Program of the 1960s and 1970s played a major role in President Park Chung Hee's modernization goals. Originally created by a voluntary organization, the Planned Parenthood Federation of Korea, Park delegated control of the program to the Ministry of Health and Social Affairs. The goal of the program revolved around curbing the high fertility rate and redirecting resources to the industrialization projects. The program distributed birth control to the population while it simultaneously modernized Korean attitudes and culture. In later years, rural women took over the distribution of contraceptives for the countryside through the Saemaul Mother's Clubs which helped to raise their status in society as they stepped into these leadership roles. The creation of the clubs came with the New Village Movement which helped to modernize the rural areas through the building of infrastructure and the restructuring of minds in the villages. Women played a central role in both programs through their biological, social, and economic reproduction they provided for the state. Therefore, this research argues that women and the Family Planning Program played a central role in not only curbing fertility but also evolving South Korean culture and life.

Shuffling Along into the 21st Century: Analyzing the impact of the 1921 musical Shuffle Along

Aidan Tsichlis

The modern musical is a relatively new art form, dating back just over one lifetime. However, musicals have adapted to build off of what came before it and fit the changing times, and my research intends to dive deeper into this transformation. How did we get to where we are today? What things would we not have today without the work of those that came before? This research intends to specifically focus on the 1921 musical "Shuffle Along." A lot of "firsts" are attributed to this piece of work. This musical was the first Broadway show to be written and composed by black writers, the first jazz score on Broadway, and the first all-female dance chorus. I want to look at Shuffle Along and its predecessors and how these shows challenged social norms and how they contributed to the fight for equality. How does "Shuffle Along" hold up today? What is the impact of Shuffle Along on Broadway today and how might it have inspired current shows?

White Room #38

Determinants of Labor Demand of Bangladesh: A Time Series Analysis

Tania Islam

This paper investigates the crucial antecedent of demand for labor in Bangladesh, and this examination contains a time-series structure and annual data from 1992 to 2017. Augmented Dickey-Fuller result shows that all the data are stationary at second-difference. Johansen cointegration analysis supports that at least one variable is cointegrated. This study finds that wage rate, gross domestic product, and foreign-direct-investment have an inverse long-run impact, and income per capita has a positive long-run effect on labor demand. Furthermore, error correction results exhibit that the equilibrium adjustment rate is about 2.16 percent per year. Granger-causality propose that foreign direct investment and wage rate both have Granger cause employment. But income per capita and gross domestic product do not have Granger cause employment. This research work suggests that the authority should introduce a wage subsidy to reform the labor market structure and should take steps to fix the wage rate of the labor, based on their experiences together with the labor union.

**Transitional Justice and Enforced Disappearances: An Analysis of the Mechanisms
Used for Reconciliation and Recovery**

Madeline Kleinschmidt

The transitional justice field continues to expand as its practical application increases. A mechanism for establishing accountability and reconciliation processes, transitional justice is most commonly used after large-scale human rights violations. As a clear human rights violation, enforced disappearances fall under this category. However, lack of ample evidence and first-hand encounters make it difficult to analyze the best way forward in deterring or recovering from these violations. Given these circumstances, the question arises: is transitional justice an effective mechanism for deterring enforced disappearances and aiding societies in the healing and reconciliation process?

Exploring the Wheat Demand Determinants and Food Security Challenges in Pakistan

Sania Shaheen

Wheat plays a vital role in overcoming food security challenges being one of the primary food source of Pakistan. In the beginning of time-period from 1975 to 2020, Pakistan had achieved near self-sufficiency in wheat production. It has been observed that Pakistan was somewhere a net importer and somewhere a net exporter. This trend shows an irregularity in the food policy of Pakistan. This study is conducted to explore the determinants of wheat demand in Pakistan as well as to analyze the own price, cross-price elasticity, and income elasticity of wheat demand. For estimation purpose, annual time series data was used from 1972-2020. The Autoregressive Distributed Lag approach (ARDL) econometric technique was applied to analyze the data. The estimated findings highlight that wheat is the basic necessity commodity in Pakistan. Further, the results of rice prices and corn consumption reveal that rice and corn commodities are substitutes to wheat with less elastic demand in Pakistan. Based on results, this study suggested that Pakistan government and all stakeholders should pay attention on increasing domestic wheat production in order to reduce the wheat imports, saving foreign exchange, and to resolve the food security issues in Pakistan.

Maroon Room #37

Powering the Plains: How Cheap Dependable Electricity Fueled An Economic Boom

Edith Heuss

Electricity was vital to the growth of defense-related industries, agriculture, and oil and gas exploration prior to, during, and after World War II. This research demonstrates how Southwestern Public Service (SPS) electric service facilitated the growth of World War II defense related industries and the subsequent post war economic boom in the Texas and Oklahoma panhandles and Pecos Valley Region of New Mexico. SPS electric service powered carbon black manufacture, potash mining, and natural gas production vital to the war effort. Electrified irrigation, farming, and grain elevators enabled the region's agriculture industry to keep the home front feed. Sources utilized for this research include issues of the SPS employee magazine The Southwesterner from the 1940s and 1950s located in the Panhandle-Plains Historical Museum archives. SPS advertisements from 1940s and 1950s editions of The Canyon News, Lubbock Avalanche-Journal, and Amarillo Daily News archives provide additional insight into the utility's boosterism efforts to attract new businesses and industries to the area. This research presents a unique perspective on the history of the Plains by discussing the relationship between electric service and area growth.

"Costly Articles of Adornment": American Food, Economy, and Morality 1880-1920

Kirbi Kelley-Diaz

The history of federal dietary advice is over a century-long, and many historians have evaluated its transformation as it relates to the economy, war, and agriculture in America. However, there is a dearth of analysis regarding these tracts before World War I. This paper intends to examine the foundations of modern dietary advice by analyzing the doctrine of Dr. Wilber Atwater, the author of the very first federal dietary advice published by the USDA in 1894 and 1906. By substituting cheaper foods of equal nutritive value, Atwater argued that Americans would be healthier, wealthier, and most importantly, capable of the rigorous labor demanded by the growing dominion of food corporations. His doctrine of "food economy" provided the foundation of all subsequent and modern dietary advice, which typically moralizes against working-class consumers and is influenced by contemporary ideas of class, gender, and race. Writing during the ensuing economic depression of the Panic of 1893, and spurred by rapid industrialization, urbanization, and advancements in nutritional science, this paper intends to demonstrate that Atwater and the USDA imposed a form of class discipline on the poor and working classes by using state apparatus to influence American diets.

American Folklore and the Economy: How Mythos became Mascot

Elizabeth Voyles

This research intends to specifically focus on the 1921 musical "Shuffle Along." A lot of "firsts" are attributed to this piece of work. This musical was the first Broadway show to be written and composed by black writers, the first jazz score on Broadway, and the first all-female dance chorus. I want to look at Shuffle Along and its predecessors and how these shows challenged social norms and how they contributed to the fight for equality. How does "Shuffle Along" hold up today? What is the impact of Shuffle Along on Broadway today and how might it have inspired current shows?

Thursday
Oral/Paper Presentations
Session III: 11:20 a.m. - 12:20 p.m.

Maroon Room #37

Predicting Anti-Foulant Material Performance Through Regression Models Based on Image Data
Lance Fletcher

Materials which have anti-fouling properties are useful for a variety of applications including when objects must be submerged in water for long periods of time. Leveraging machine learning, this research attempted to train regression models to predict anti-foulant material performance. The models were trained on data collected by submerging plates of varying material combinations and then recording the amount of foulant growth each month of submersion. The quantitative foulant growth data was determined by calculating the percentage of plate covered by fouling (PPCF) using images of the plates. Image analysis was performed by applying filters along with a white-black threshold on each pixel. The model input variables were the compound mixtures of the material, submersion time (weeks), and side of plate. The output variable was the PPCF. From the four different regression models trained, the k-NN model was the most effective with a mean absolute error of 4.34% and an R-squared value of 0.625. This research shows the models were able to predict anti-fouling material performance with accuracy. Future work using larger datasets along with better imaging techniques would lead to more robust prediction models which could be utilized to discover new anti-fouling materials.

**Fermi surface studies of type-II Dirac semimetal candidate NiTe₂
using de Haas-van Alphen oscillations**
Tinh Nguyen

We have investigated the Fermi surface of the type-II Dirac semimetal candidate NiTe₂ under a high magnetic field using a powerful technique which is torque magnetometry. The torque signal measured under an applied field of 35 T and at the temperature of 0.32 K has shown clear de Haas-van Alphen (dHvA) oscillations. The oscillations are well-defined and consist of one major frequency $F \sim 430$ T. To further study the properties of the Fermi surface, we have carried out measurements of angular and temperature dependence of the dHvA oscillations. The frequency varies as the angle between the sample surface and the magnetic field increases. Moreover, the amplitudes of the oscillations decrease as the temperature increases. Additional analyses showed that the Berry phase value is close to the theoretical value of 0.5, indicating a nontrivial band-structure topology. We have also analyzed the temperature-dependent dHvA data using the Lifshitz-Kosevich theory to determine the effective mass of NiTe₂ electrons. These analyses and results are essential in determining the properties of the Fermi surface of NiTe₂, which is useful for utilizing such material for real-life applications.

Thursday
Oral/Paper Presentations
Session IV: 12:30 – 1:30 p.m.

Maroon Room #37

The Civilian Conservation Corps: How Palo Duro Canyon Became a State Park

Anna Bonnet

The second largest canyon in the U.S. cuts through the Llano Estacado 10 miles east of Canyon, Texas, the place we know and love, Palo Duro Canyon State Park. This presentation will exam the efforts and labor taken to make Palo Duro Canyon a state park. The first proposal to make Palo Duro Canyon in to a National Park were made in 1931; however it was not until 1933, under President Roosevelt's New Deal, that the Civilian Conservation Corps were sent to start the manual labor of the long project. By looking at sources from Texas Parks and Wildlife, Texas State Parks and the CCC: The Legacy of the Civilian Conservation Corps, and Caprock Canyonlands this presentation will discuss the powerful efforts of civilians, government officials, and the CCC to preserve the beauty and history of Palo Duro Canyon. Millions of people each year flock to Palo Duro Canyon, to enjoy its natural adventures and landscape, but few understand all of the manpower and history that lies deep inside the canyon walls. By understanding the canyon's history, we will be able to add value to the already meaningful visits and appreciate the groundwork we stand on.

Fiction of the American West: The Created Image of Charles Goodnight

Ashley Callahan

Charles Goodnight is an important figure not only in the history of the Texas Panhandle, but in shaping literary works about the American West. While Goodnight's life has been picked apart and pieced together to form different stories of the Plains, much of what is true about Goodnight and his life has been muddled by these stories, leading to his name becoming surrounded by folklore. This presentation will focus on how Charles Goodnight is depicted in fiction and how that has shaped his image into what it is today. The purpose of this research is to show that the truth about Charles Goodnight has been overlooked in favor of a fictional image. The references that will be used are J Evetts Haley's Charles Goodnight, John Graves' "The Last Running", and novels by Aaron Lathan, Loula Grace Erdman, and Benjamin Capps. The comparison of the biography with the fictional works will help to show how Goodnight's experiences have shaped literature about the American West and how his name has become associated with that of fiction

Texas Sundown Towns: A Panhandle Phenomenon?

Katelyn Denney

Sundown towns were not an uncommon problem throughout the United States during the reign of Jim Crow segregation. However, not many people outside of these towns know about the history of sundown towns and what their purpose was. This paper will look at sundown towns in Texas that lie west of the 100th meridian. Texas identity is largely split in an east-west fashion, with citizens of the west feeling separated geographically, ideologically, and politically from eastern Texans. This

Thursday
Oral/Paper Presentations
Session IV: 12:30 – 1:30 p.m.

differentiation had led many individuals to conclude that the western part of Texas was not as problematic regarding race relations as in the east. This appears to be largely true—except for the panhandle region. By looking at secondary sources, maps, and primary sources such as newspapers and oral histories, this paper will reveal the complicated history of sundown towns. Furthermore, it will showcase that in West Texas, sundown towns were more of a panhandle area phenomenon. By understanding sundown towns, we can gain a deeper understanding of the complexities of race relations in West Texas while also realizing just how difficult sundown towns made movement and travel for African Americans.

Maroon Room #37

A Genetic Analysis of Sirens in Texas

Jessica Heckman

The identity of southern Texas Sirens has been debated, with various authorities assigning them to 1-3 species, because they have some morphological differences with other siren populations both within and outside of Texas. Since morphological identification is problematic, we approached this issue through genetics. We did this by sequencing four mitochondrial genes from both southern Texas and eastern Texas sirens, as well as sirens from out of state, and comparing those sequences amongst each other and with other sequences published online. We then created phylogenetic trees from these sequences to visualize and interpret the relationships between the different sirens. We found, that of the four genes we sequenced, there were conflicting results, emphasizing the mystery around the taxonomic relationships within sirens. Despite these conflicts, there was a consensus among our results that southern Texas sirens share affinity with the lesser siren more so than the greater or reticulated sirens. However, sirens in eastern and southern Texas do seem to have some level of genetic distinctiveness. Although these results do clarify some issues with the identity of sirens in Texas, they also suggest an increased need for sampling in eastern Texas before stronger conclusions can be made.

Circadian Rhythms of Serotonin in the Stool of Mice

Billy Lee

Through qualitative research, this study attempts to answer this timely question, as countries and communities everywhere continue to endure such crimes. Although transitional justice has the potential to aid in the transitional process of recovering from turmoil, this study finds it does not guarantee the prevention of enforced disappearances or other violations. Furthermore, it is evident that much more intricate planning, educational programming, and support from local governments and the international community are necessary for its mechanisms to reach maximum potential. This research study analyzes the discussions and factors associated with these topics in order to provide ample evidence from which these conclusions are drawn.

Divisia Monetary Aggregates for Ethiopia: Design & Construction

Levi Zemanuel

This paper constructs Divisia monetary aggregates at the M1, M2, and M3 levels using quarterly and annual data from the Bank of Ethiopia. Divisia monetary aggregates, as developed in Barnett (1980), provide an index number theory consistent approach to monetary measures, superior to the commonly used simple sum measures that do not consider the return on monetary assets. The data set spans quarterly observations from 2006 to 2020, which includes both the effects of the global recession in the late 2000s and the start of the Covid-19 pandemic in 2020. We examine the relationship of these superior index measures for monetary flow to output and inflation growth, detailing their performance

Thursday
Oral/Paper Presentations
Session V: 1:40 – 2:40 p.m.

in prediction and analysis. Furthermore, to ensure we stress test the aggregates under fluctuations to interest rates and money supply variations we perform a VAR model to create an impulsive shock to see the reactions of the Divisia Monetary aggregates against that of the simple summation methodology. This will not only strengthen the support of Divisia monetary aggregates usage within developing economies but have a statistical test to show its viability. To our knowledge, this is the first attempt in the literature to construct such measures for Ethiopia.

Thursday
Posters/Visual Arts
12:15 – 1:15 p.m.

ZOOM

The Effect of a Candidate's Social Media Presence on Election Outcomes

Daniela Cervantes

Political campaigning has long been using social media now as a way to advertise and market political candidates, but how exactly have candidates used social media to connect with their supporters and how much of these techniques actually influence voters and their support? In this conducted research, the 2018 Texas Senate Race between Ted Cruz and Beto O'Rourke is used to analyze how their social media use and presence on Twitter had any real effect on how they performed in the election outcome. Previous research has found that political candidates that won their election often used social media to create an online presence. Meaning, the candidate that tweeted and interacted with their supporters the most and received the most engagements was the candidate that was likely going to win. However, in this Texas senate election, Beto O'Rourke who was the more popular candidate online that fit into all the criteria mentioned, did not win. The findings for this research, which was conducted through manual count of tweets and content analysis, show that although O'Rourke had the most tweets and engagements, he was only able to garner national and viral support from everyone but from the ones that mattered, Texas voters.

Copper Clean Effectiveness Against Representative Organisms from the Human Microbiome

Keshon Cervantes

Microbial resistance to traditional antibiotics and cleaning chemicals is an increasing problem in today's climate. With the world in a global pandemic, alternative techniques and products that can kill/inhibit bacterial growth are in high demand. One new product is Copper Clean™, which is an antimicrobial surface patch intended for use on high-contact surfaces. Our objective was to test Copper Clean's ability to kill representative organisms from the human microbiome using a time-kill assay. The organisms used were *Escherichia coli* and *Staphylococcus epidermidis*. To perform the time-kill assay, we placed Copper Clean™ coupons in 50 ml sterile dH₂O with bacteria in a conical tube. The tubes were agitated at 150 RPM at 37°C in a shaker incubator. Samples (0.3 ml) were taken every 30 minutes and diluted in a 10-fold series up to 1000x. Dilutions were plated using an Eddy Jet spiral plater. Three replicates were plated for each dilution. Following incubation for 24 hours at 37°C, colonies were counted with a Sphere Flash colony counter. We observed the death of *E. coli* and *S. epidermidis* after 2-3 hours of contact with Copper Clean™. Our results demonstrate the effectiveness of Copper Clean™ against two, representative human microbiome organisms.

Thursday
Posters/Visual Arts
12:15 – 1:15 p.m.

ZOOM

Microscopic examination on fibers, insect parts, plant exudates and burnt residues in the air causing allergic rhinitis

Lyanna DeLeon

The recent increase in the incident of wildfire in the Texas Panhandle area and adjacent states caused an increase of airborne PM2.5, debris and fibers, dead insect parts, plant exudates, and burnt residues that got trapped in our Burkard Volumetric Spore Trap placed on the Natural Science building of the West Texas A&M University campus. We have collected the exposed tape from the spore trap regularly and mounted them on the glass slide after dividing them in seven equidistant strips using a standard scale and stained them with 2% Safranin-Gelvatol solution. The solution functions in a dual mode to stain the trapped materials and a mountant. We used a BX-40 Olympus Microscope attached to a computer with a CellSense software to capture images from the prepared slides that were also analyzed and assessed for the trapped samples collected from the air. As we analyzed and compared the data from the slides prepared in the last 20 years, it shows a significant increase in the number of dead insects and insect parts with the other forms of burnt debris in the year that may have traveled hundreds of miles from the source of wildfires.

Determining Physicochemical Properties in Atmospheric Particle Samples from Atlantic and Arctic Islands

Jacob Hurst

In this work, we analyzed aerosol particle samples obtained from Graciosa Island in the Eastern North Atlantic region (Lat 39.0916 N, Lon 28.0257 W) and Ny-Ålesund, Norway, which is an island in the European sector of the Arctic (Lat 78.9167 N, Lon 11.9333 E). We target understanding the impact of current global climate change from microphysical and chemical perspectives, especially by measuring the size and elemental composition of particles. We hypothesized that snow and ice coverage decreases due to global climate change, leading to greater dust emission; thereby, we would be able to identify different amounts of dust present in the aerosol particle samples depending on the region that samples are taken from. We also attempted to identify the age of aerosol particles using the sodium-to-chloride ratio, in which the depletion of chlorine indicates the aging of particles. To retrieve our results, we first assembled our aerosol capturing device (i.e., polycarbonate particle filters) and then captured aerosol samples from the two said locations. Subsequently, we analyzed the size and chemical composition of 300 hundred particles per location (preselected based on similar properties according to our complimentary analysis) in a scanning electron microscope with an energy dispersive X-ray analysis function to comprehensively assess the physicochemical properties of particles on our samples.

ZOOM

**The effect of days on feed for feedyard performance, health, carcass,
and organ characteristics of Angus x Holstein heifers**

Taylor Husz

The objective of this study was to evaluate the effect of days on feed (DOF) on performance, health, carcass, and organ characteristics of composite Angus by Holstein heifers (n = 3,676). At administration of final implant heifers, within lot, were randomly assigned to one of four smaller pens, creating a block (location A block n = 6, location B block n = 7). Pens within blocks were randomly assigned to treatment (323, 344, 365, or 386 DOF). Data were analyzed using DOF as the fixed effect; block was nested within location as a random effect. Linear and quadratic effects were also tested; pen was experimental unit (n = 52). Heifer hot carcass weight (HCW; 372, 387, 401, and 414 kg), longissimus dorsi muscle area (88.63, 89.55, 90.80, and 91.95 cm²), marbling score (535, 553, 563, and 594) and percentage of Prime QG (6.6, 11.2, 12.8, and 19.0%) linearly increased ($P \leq 0.01$) as DOF increased. Frequency of liver scores (edible, minor, or major abscess) did not change over DOF ($P \geq 0.82$). Data collected in this trial indicate that DOF increased HCW, LM area, marbling, and QG with minimal changes to DMI or liver scores for Angus x Holstein heifers.

Teaching Climate Science to 3rd to 6th Graders in Texas Panhandle

Heather Ogle

At West Texas A&M University, we developed three outreach modules and hands-on education activities. These modules have been used to teach chemistry and physics of Arctic warming and its impact on the ecosystem, which is important regarding the concurrent global climate change issues. Curriculum teaching materials were dispersed to students at local schools in the Texas Panhandle through afterschool programs and local non-profit organizations. We reached out to underrepresented students with hands-on activities that will stimulate their interest in climate sciences. We prioritized choosing the schools with the socioeconomically and ethnically diverse student body. From September 2020 to April 2022, we taught more than 500 students at ~20 schools. Furthermore, our lesson plans and materials as Kit were borrowed by a local non-profit educational organization (i.e., Don Harrington Discovery Center) to teach their visitors about the Arctic climate during the winter camp events. In the future, local school districts also plan to facilitate the development and loaning of our Kit, ensuring that learning objectives align with the state instructional materials allotment program. Loans of this type would have a direct impact on approximately 10,000 students in grades K-12 (1,600 in middle schools) and >70 K-12 and high school science teachers.

ZOOM

**Metabolic Differences of Cardiopulmonary Resuscitation
During 2, 4, and 6-minute Compression Cycles**
Riley Phipps

Patient transportation times average 8 and 27 minutes. During CPR, providers switch positions every two minutes. This results in multiple “hands-off” scenarios during CPR. A study of hands-off time and the effect on survival rates found that hands-off intervals can reduce a high probability (40% to 100%) of resuscitation to a low probability of 8% to 11% after 20 seconds (Eftestøl et al. 2002). If providers are able to maintain longer periods of quality CPR with fewer rotations, it could increase the rate of survival.

**Comparison of reproductive and early growth performance of an F1 USDA Prime yield grade one
carcass clone sire and an industry-leading purebred sire i**
Katylyn Richardson

The objectives of this research were to determine if a sire from the WTAMU PrimeOne Project (Sire A) was competitive for producing dairy composites when compared to a purebred Angus sire (Sire B), and to evaluate any subsequent reproductive impact on dam. Dairy cows were artificially inseminated resulting in 763 pregnancies with 564 births and 536 live calves ($n = 536$). Conception rates were 40% for Sire A and 31% for Sire B ($P \leq 0.01$). Average gestation length (GL) was 284-d and 280-d for Sire A and B, respectively ($P \leq 0.01$). Calves by Sire B reported lower average birth weight (BW) than those by Sire A ($P \leq 0.01$). Calves by Sire B also reported higher average daily gains at both 60- (0.61 and 0.58 kg; $P \leq 0.01$) and 120-d (0.70 and 0.67 kg; $P = 0.03$). Post-partum interval (PPI) and time from first estrus to conception were not different between sires ($P = 0.19$; $P = 0.14$), BW or calving ease score. Data from this trial indicates that Sire A increased conception rates, but Sire B was more favorable for GL, BW and progeny growth performance. Neither sire negatively impacted subsequent reproductive performance of the dam.

**Rumination and ruminal characteristics of beef steers receiving steam-flaked corn-based finishing diet
with increasing concentrations of dried distill**
Wyatt Smith

Research is limited on the evaluation of the physically effective fiber fraction of distillers' grains with solubles and their impact on rumination time of cattle. We hypothesized that dietary dried distillers' grains concentration would not impact total daily rumination of finishing steers. Ruminally cannulated steers ($n = 5$; average BW = 871 ± 37 lb.) were used in a 3×3 Latin square experimental design. Steers were fitted with sensory collars to record daily rumination. Proc Mixed was used for all analysis with steer as the experimental unit. For particle separation, rumination and digestibility variables fixed effects included diet and period and random effects included square and steer nested within square. For ruminal characteristics fixed effects included period, diet, time, and treatment \times time interactions. Pre-

Thursday
Posters/Visual Arts
12:15 – 1:15 p.m.

planned linear and quadratic orthogonal contrast were calculated when $P < 0.10$. Total ruminal VFA concentration (mM) tended to differ among diets ($P = 0.07$). Fecal NDF output tended to differ ($P = 0.07$) between diets. Apparent total tract organic matter digestibility tended to differ ($P < 0.07$) and decreased linearly ($P = 0.03$). This data suggests that DDGS may influence acidosis risk through means other than increasing peNDF, such as starch dilution.

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