Celebration of Scholarship

Wednesday, Thursday,
April 25 & 26
Clark Student Center
2018 Spring Undergraduate Research and Creative Activity Forum  
Thursday, April 26, 2018  
Clark Student Center

Oral Presentations

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<td>Wichita I &amp; II</td>
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Poster Presentations  
Clark Student Center Atrium

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*Students will be at the posters at indicated times for evaluation.  
Outside those times, students may stay at their poster during the day for dissemination purposes.
Oral Presentations
Comanche Suites
Session 1A
9:00 – 10:40 am

MODERATOR: MATT PARK

9:05-9:25 (O1) Africa and Her Contributions to Civilization
Kerdell Cuffy, Dillard College of Business Administration, Finance
Mentor: Dr. Whitney Snow
As time progresses, civilizations are losing more and more interest in history. Often, the youth of today complain that history is always so redundant, boring, and contains too much reading. Thus, with the motivation of allowing people to see the beauty that history is, this project embarks on a journey to the past. This journey focuses on the beautiful history of the African civilization. This journey into history is important because many times in U.S. history classes students hear of the Transatlantic Slave Trade whenever a professor refers to Africa. The main goal of this project is to shift the lens and to discuss the timeline of some of Africa's contributions to the history of mankind. This presentation is part of a larger project that is divided into three phases. Due to time constraints, this presentation will focus on the first phase, which deals briefly with the origination of life on Earth and goes into greater depth in describing the evolution of Homo sapiens, whose oldest fossils can be traced to Africa. The researcher uses mainly desk research to conduct her research. The information is compiled from numerous journal articles, books, and certified websites.

9:30: 9:50 (O2) A Mixed Method Study of Factors Influencing Student Enrollment at MSU Texas
Kiley Beaver, Ghislaine Bigot, Anni Scholl, Sarah Moore, Dillard College of Business Administration, Marketing
Mentor: Dr. Thuy Nguyen
The study attempts to answer the following questions: 1. What are MSU students' perceptions about the university's traditions? 2. To what extent MSU students’ college experiences influence their identification with the university? 3. To what extent MSU students’ identification with the university influence their involvement and satisfaction with MSU? 4. To what extent MSU students' college experiences influence their involvement and satisfaction with MSU before and after graduation? 5. How can MSU increase its student enrollment? Method: Rank order association, MANOVA, Multiple regression Results: Rank order association analyses revealed that students ranked MSU college town experience and community as the most important traditions for them. ANOVA analyses showed that First time students are more likely to identify, committed, donate, have positive WOM, and differentiate MSU than transferred students. Regressions test showed that students are not satisfied with MSU as a college town, and the number of events students attend at MSU and their satisfaction with MSU as a college town positively influence their identification with the university, their intention to donate to the university after graduation, commitment to the university, and their intention to provide positive WOM. Conclusions: Position MSU as a college town and increase the numbers of traditions involving the whole MSU community are the key strategies for MSU to increase enrollment.

9:55 – 10:15 (O3) Bettering the MSU Texas Experience
Tana Riley Ashely Baird, Austin Snyder, Dillard College of Business Administration, Marketing
Mentor: Dr. Thuy D. Nguyen
The study attempts to answer the following questions: 1. What do MSU Texas students expect of faculty in regards to education and campus traditions? 2. What suggestions do MSU Texas faculty and staff have for events that involve both faculty and staff? 3. How do MSU Texas students currently perceive branding of the University? 4. To what extent do students feel that their identity is connected to MSU Texas? We used Qualitative Research and in person interviews. Overall, survey results showed that there are specific and significant areas of improvement for campus traditions, as well as for MSU Texas as a brand. This study found that there are 8 different categories of traditions perceived as necessary by MSU Texas students, faculty, and staff. These categories range from campus activities to alumni involvement. Faculty and student suggestions were similar in content. In regards to branding, students expressed a need for clear, continuous, and clean branding of our University name, logos, and promotions on social media. Lastly, this study found varying degrees of identity connection with students of MSU Texas. Various reasons were sighted for this, with lack of lasting traditions being the largest. This study expresses the need for improvements in various areas of MSU Texas campus culture to increase loyalty and retention of students throughout their life. The findings shed light on how to promote MSU Texas as a brand and lifestyle to current students and faculty, as well as alumni to increase involvement and promote growth.
Brand Attraction and Brand Attachment: What's the Difference?
Madison Salvatore, Dillard College of Business Administration, Marketing
Mentor: Dr. Thuy Nguyen
The study attempts to answer the following questions: What influences brand attraction? How does that differ from brand attachment? Which consumer group displays the highest level of brand attachment? Do they have more or less spending control than the other groups? Are their purchase decisions influenced by society's opinions? Method: ANOVA and regression
Results: Of the five demographics surveyed (gender, age, ethnicity, level of education, and income); age and level of education significantly influence both brand attraction and brand attachment. The differing influential factor for brand attachment is gender; Males are more attached to brands than females. Status consumers displayed the highest level of brand attachment, but ended up in the middle of the line for level of spending control compared to the other consumer groups. It was also discovered that purchase decisions made by status consumers are very much influenced by society's opinions. This study delves into the differences between brand attraction and brand attachment with regard to demographics and consumer type, which is a lacking topic in the current marketing literature.

Oral Presentations
Kiowa
Session 1B
9:00 – 10:40 am
Moderator: Stuart McClintock

Running and Braking of Hydraulic Motors with Varying Loads
Calvert Aaron, Denzel Martin Kinyua, College of Science and Mathematics, McCoy School of Engineering
Mentors: Drs. Jan Brink & Yu Guo
The purpose of this project is to study the phenomena of hydraulic shock when suddenly braking different inertia loads. An additional objective is to measure breakaway torque, which is required to get a stationary load turning vs. running torque, which is required to maintain a load turning. Hydraulic motors are used to turn heavy loads in many types of industries such as steel mills, mobile hydraulic machinery, fair grounds, theatre stages as used for the fine arts, etc. Hydraulic shock (water hammer) occurs due to deceleration or stoppage of the hydraulic fluid flowing at a high velocity in hydraulic systems. The method in this project incorporates a hydraulic pump unit connected to various hydraulic equipment components. The circuit will be run without or with the cross over relief valves with a variable setting across the cross over relief valves. This process will be repeated for five different sized loads (no load, light, medium, medium-heavy and heavy), with and without the use of the cross over relief valves. The expected results include; the amount of hydraulic pressure shock in a bi-directional motor circuit with varying loads will be significantly higher for circuits without cross over relief valves than those that do have them installed. The amount of shock will be higher for applications with larger inertia loads. Lastly, the breakaway torque will be higher than running torque and these values will be higher for increasing loads.

The Year 2030: Do Humans Still Interact?
Johann Redhead, College of Science and Mathematics, Computer Science
Mentor: Dr. Tina Johnson
Modern Technology is making communication and business so convenient that it is slowly replacing the need for human interaction. This convenience has ruled modern society to the point where most do not realize the substitution taking place. This substitution left unchecked can produce numerous negative effects on humans and society. This study examines the different areas such as Web Commerce, Social Media and Social Interaction itself, in which modern technology has replaced human beings as the entity we interact with. This study was carried out using a correlational analysis in which a correlation between modern technology and decreased social functioning and development is to be determined. Findings suggest that constant interaction between humans and technology does indeed lead to lesser social functioning and development.
9:55-10:15  (O7)  The Hound Drone

Sean K. Egloff, Hunter May, Latham Moody, Tyler Parnell, Zeltzin Reyes, College of Science and Mathematics, McCoy School of Engineering

Mentor: Dr. Yu Guo

The purpose of the Hound Drone Group is to research and develop a fixed-wing drone system. The drone should meet the following essential requirements: long duration of flight, low detectability, low cost, no pilot required, live video feed, simple launch/recovery, rugged design, and computer controlled. Approach method is intended to keep the development simple and low cost. Primarily integrating existing technology into a new system to meet requirements. Accomplished by using available hobby drone components, existing autopilot hardware, and modifying open-source autopilot code. Fabrication technique will be simple and low-cost. Results are promising thus far. Building on available research a delta wing type drone cut from high-durability, EPP foam has been assembled and test flown. Standard grade, low-cost electronic components have been installed to establish basic functionality. A launch rail system is currently being constructed. With excellent progress being made, the final results are expected to meet or exceed our expectations. This will enable the team to present a drone that fills a new category and capability in the growing world of drone systems. A drone with these specifications at such a low cost will enable municipalities and agencies to increase their capabilities.

10:20-10:40  (O8)  The Potential & Inherent Risks of The Internet of Things

Tellon Smith, College of Science and Mathematics, Computer Science

Mentor: Dr. Tina Johnson

The Internet of Things, more commonly known as IoT, promises to be the catalyst that catapults us to a technologically advanced future and lifestyle as seen in science fiction. From healthcare to manufacturing, and even agriculture, IoT is set to have a major economic impact of up to six trillion dollars by 2025; outpacing cloud technology, advanced robotics, and 3D printing. However, the great potential of IoT opens the door for even greater risks such as data breaches, spying, and ransomware. This study examines and evaluates the current and future potential of IoT along with its inherent risks. This study was conducted via a systematic review. Findings suggest that IoT can indeed live up to its promise as advertised. However, we must proceed cautiously in order to minimize the impact of its inherent risks, as IoT is the future and it is here to stay.

Oral Presentations
Wichita I & II
Session 1C
9:00 – 10:40 am

Mentor: Niyati Kataria

9:05-9:25  (O9)  From Margin to Center: Multicultural Picture books in Math, Science and Social Studies

Frida Arredondo, Montserrat Garay, West College of Education, Curriculum & Learning

Mentor: Dr. Dittika Gupta and Ms. Kelly Medellin

Due to changes in public school demographics, there is a need to examine the current representations of diversity in children's picture books to provide culturally responsive teaching in content areas. Subsequently, this project had two purposes. One, to review and analyze the cultural authenticity of current picture books in elementary school curriculum. Second, to enhance educational experiences for marginalized students by foregrounding counter-narratives in multicultural picture books that give voice and agency to characters of color, giving children from diverse backgrounds messages of resiliency, creativity and strength. This study was conducted in two stages. First, critical content analysis was conducted to explore the representations of culturally and linguistically diverse characters in picture books included in Texas elementary school curriculums. The second stage consisted of collecting culturally authentic picture books related to science, math, and social studies content areas through the literature review, Pura Belpre and Coretta Scott King award winners, and multicultural book websites. These books were used to create activities and lessons that were presented to preservice teachers. Surveys were used to collect data on the experiences and views of the preservice teachers. The first stage of data analysis shows the lack of cultural diversity in currently adopted Texas elementary school curriculums, which exemplified the need for the second stage of the research. This is significant because preservice teachers will serve increasingly diverse populations in their future classrooms and will need to be aware of culturally relevant and authentic literature to supplement the existing curriculum.
Female Voices of the Third Reich
Margaret Greenhalgh, Prothro-Yeager College of Humanities & Social Sciences, English
Mentor: Dr. Yvonne Franke
The women of the Third Reich shaped the way world burned in that era; they built the stage on which WWII was acted out. This project explores stories of women during the Third Reich, studying their personal accounts as female participants in the Nazi regime, bystanders, or resistance movements. A factor in the ways women acted was the aftermath of WWI: Germany was an economic wreck, relying on women in the industrial workforce, which took women's attention away from marriage and family. The Third Reich's promise of Kinder, Kirche, Küche, or Children, Church, Cooking, an acronym for metaphorical security, sounded heavenly to many women, a chance to escape low wages and long work hours. The project will be analyzing these accounts and comparing them. Because Hollywood has cemented the stereotypes of the evil Nazi, the macho American, and the sexy femme fatale, many have forgotten the humanity of the participants. Not enough attention has been paid to the stories of those who were forced into action simply because they were born who, when, and where they were. This ongoing project takes a closer look at the effects of WWI which affected the way the women of that generation reacted to the NSADP's politics, which in turn affected the back drop for the men in power. The motivations, and consequences, of actions taken by women during the war have largely been ignored by research. Inspecting the stories of these women should reveal striking revelations regarding the events of World War II.

Reviewing Parent-Child Interaction Therapy as a Treatment for Autism Spectrum Disorder
Jennifer Holt, Prothro-Yeager College of Humanities and Social Sciences, Psychology
Mentor: Dr. David Carlston
Parent-Child Interaction Therapy (PCIT) is an empirically supported, parent-based treatment used to treat childhood behavior disorders. PCIT utilizes live coaching by a therapist via a bug-in-the-ear-device to facilitate changes in child behavior. Autism Spectrum Disorder is characterized by the DSM-V as lacking in social reciprocity, nonverbal communicative behaviors, and developing relationships, as well as exhibiting repetitive movements, inflexibility to change, and a fixation on an interest/interests. My purpose is to evaluate the appropriateness of PCIT in the treatment of behavioral symptoms associated with Autism Spectrum Disorder (ASD). A literature review was conducted using PsychInfo to identify existing empirical support for PCIT use in the treatment of ASD. Fifteen articles were identified that met inclusion criteria. Current research into PCIT as a treatment for ASD is limited to a few case studies and fewer empirical studies either done with a small group of families or in conjunction with other behavior disorders. Six case studies, five trials, and an interview, along with several other literature reviews were used. So far, results have been promising. Researchers have demonstrated PCIT is effective in increasing prosocial behaviors among children, reducing problematic behaviors, and improving the overall parent-child relationship. Conceptually, PCIT intervention is congruent with ASD intervention needs. Although the existing research demonstrates promise, future research must include larger samples, must utilize random assignment, and must employ methodologies of greater complexity in order to establish empirical justification for the use of PCIT in the treatment of ASD.

The Importance of Understanding Religious Symptom Patterns for Psychological Therapy
Brooke Benson, Prothro-Yeager College of Humanities & Social Sciences, Psychology
Mentor: Dr. Michael Vandehey
The purpose of my research is to recognize the relationship between religion and psychology and to analyze religion symptom patterns that might be present during clinical treatment. I have completed exhaustive literature research of peer-reviewed articles. Religious symptom patterns that present from the client to the clinical psychologist were identified and explained. The client’s symptom patterns include the belief that having a mental disorder reflects their level of faith, demanding that they want a therapist who shares the same faith, relating to or identifying as a religious figure, claiming to experience a form of demonic possession, and not feeling forgiven or feelings of abandonment by their God. It is critical for the therapist to identify religious symptom patterns to aid in the further understanding of the client. There are different approaches a therapist may take upon a religious pattern being identified that could change the course of client treatment. The client’s care is the top priority and it is the responsibility of the therapist to understand if the client exhibits any of these religious patterns to reach maximal treatment potential.
Oral Presentations
Comanche Suites
Session 2A
11:00 am – 12:40 pm

MODERATOR: CRYSTAL BOYLE

11:05-11:25 (O13) Going Behind the Scenes
Courtney Wood, Brendan Wynne, Fain College of Fine Arts, Mass Communication
Mentor: Dr. Bradley Wilson
Learning takes many forms. For the 100 or so students involved in the production of 'Urinetown: The Musical' students had to learn how to sing and dance, often at the same time. They had to learn how to build sets as well as how to light them. They had to learn how to fit actors and create costumes, even using cheese graters and yellow die to make them appear more authentic. What the hundreds of people who came to see the show did not see was all the work that went into the production behind the scenes for more than two months. In a series of online stories, social media posts, videos and photo galleries, however, mass communication faculty and students researched and documented the process of putting on the musical to provide insight into exactly what it did take from start to finish, from broken ankles to curtain calls. Along the way, as part of this creative project, mass communication students also learned more about telling stories using a variety of media, including producing a hardcover book.

11:30-11:50 (O14) Whatever May Come
Jenna Horn, Sam Sutton, Taylor Warren, Fain College of Fine Arts, Mass Communication
Mentors: Drs. Jonathon Quam & James Sernoe
This poetic documentary examines the development of individual belief in the afterlife. Through discussions with a cross-section of religious and philosophy experts as well as individuals who have experienced death and were revived, the film's narrative weaves through complex belief systems or an adamant lack of them. Visually striking and poetic images guide the audience through these deeply personal stories while pushing the audience to question their own values and beliefs.

11:55-12:15 (O15) Mr. Midwestern
Dayton Chambers, Fain College of Fine Arts, Mass Communication
Mentors: Drs. Jonathon Quam & James Sernoe
This is a documentary spotlighting Midwestern State University super fan Leroy McIlhaney. An athletics department volunteer who dedicates himself to being a positive force for students and staff. The narrative takes an expository approach to storytelling that allows Leroy's closest friends and family unpack the challenges and successes in his life. As a document of a man who is limited in his opportunities, it is both unflinching and uplifting.

12:20-12:40 (O16) Visual Rhythm
Jenna Horn, Taylor Morrison, Fain College of Fine Arts, Mass Communication
Mentor: Dr. Jonathon Quam
Through the combined efforts of the Midwestern State University Department of Mass Communication and Department of Music, Prof. Jonathon Quam, Jenna Horn and Taylor Morrison have created a unique live media and performance experience for the Spring 2018 MSU Percussion Ensemble Concert. Utilizing Max-7 media software and drum triggers, we have created an ever changing and thematically connected visual out of triggered percussion sounds. The triggers on the drums create and send readable electronic signals to the media software when certain instruments are struck. The numeric values (pitch, velocity) are the building blocks of the visual design inside Max. The visuals are unique to the music of the ensemble and no version will ever look exactly the same, creating a unique experience for every audience. The objective of the project is to show the immutable connection between music and visuals. Although humans perceive music/sound mostly through aural and textural processes, it is also inherently visual. It makes people remember or relive moments of their life. It inspires people to create; but the connected qualities of a sound itself can be used to develop its own visual patterns. The combined qualities of our different sounds and algorithms are being used to craft a visual narrative that will enhance the innate narrative of a composition.
ORAL PRESENTATIONS

KIOWA

SESSION 2B

11:00 AM – 1:05 PM

MODERATOR: LYNETTE WATTS

11:05-11:25 (O17) Growth of Minorities in the Accounting Profession: The Importance of Accounting Classes in Secondary Education

Veronica Balderas, Dillard College of Business Administration, Accounting

Mentor: Dr. Robert Forrester

Accounting is a growing business profession within the U.S. Historically, accountants have been white males. With the minority population in the U.S. growing, the accounting field needs to diversify itself to reflect these changes. CPA Frank Ross, along with colleagues, state that because this field cannot enjoy sustainable growth without a strategy to increase its attractiveness to larger talent pools then a profession wide strategy must be developed to enhance accounting education and convince top, underrepresented minority students to choose a career in accounting. In order to address this problem, diversity incentive programs are being used by the AICPA to target and encourage young minority students to take an interest in accounting. These programs are being initiated at the high school level to influence young and promising students to pursue a major in accounting during college, so they can graduate with a degree and enter into the profession. The incentive programs are showing promising results as the percentage of minority students enrolling in accounting degrees programs have increased from 38 to 41 percent in the past ten years. With the continuing innovation of these programs, the diversity of the field is on the right path to continue growing. This paper examines those secondary education programs, their contribution to minority growth in the accounting profession, and offers recommendations to policymakers for continued and enhanced future growth.

11:30-11:50 (O18) Innovative Ways to Encourage Saving Amongst College Students

Shayne Matambanadzo, Dillard College of Business Administration, Accounting and Finance

Mentor: Dr. Quan Li

Most college students barely make enough money to meet all their needs, and so there is a need to be frugal with the little that they earn. Difficult as it may be, there are still ways in which college students can save some money even whilst being in the lowest tax bracket. College is the perfect time to instill strong and healthy financial habits that can ultimately lead to a successful financial future. Surveys will be used to seek out information regarding students' general attitude towards savings; the average credit card debt college students carry; as well as the expenditures students make with their earned income. After getting a rough idea of where college students are utilizing their financial resources, the data will then be analyzed (using statistical summary via excel) and used to come up with innovative ways for students to increase their savings and develop strong financial habits.

11:55-12:15 (O19) Leading without Harassing

Morgan Barnes, Dillard College of Business Administration Management

Mentor: Dr. Charles Bultena

The purpose of this study is to explore the epidemic of harassment specifically in the workplace. Through this research I plan to focus on current events. With everything that is going on in society, focusing on leading without harassing is important. Harassment allegations are on the rise and through research a better understanding will be made along with ways to prevent harassment. Preliminary research shows that sexual harassment is a foremost issue that needs greater awareness and prevention responsiveness. Through this research, I will find a better understanding of why there is a rise in harassment allegations and I will establish solutions to the issue. Through focusing on the solution, especially how leaders can relate to women appropriately, I will explain which leadership styles are most appropriate in work situations between men and women and what we can do to alter the pattern that is emerging now. Preliminary research relates the rise of sexual harassment allegations to social media and how easy it is for women to use it to speak out. Along with this, improvement with anti-harassment policies is necessary and a safe environment which discourages retaliation against harassment claims. In order to successfully accomplish this leaders need to first and foremost lead by example. Workplaces also must have a clear no sexual harassment policy in place along with steps to follow in the case of a sexual harassment incident.
This research uses survey data to assess the effect of oxen as draft animals on agricultural productivity and farm agricultural income in Nicaragua. A follow-up survey was administered in November-December 2017 to 103 farmers from 51 of the 56 villages of the municipality of La Trinidad, Esteli, Nicaragua. The effect of oxen on farm productivity of beans is given by $Y = (A_fL,Fs,Ox)$, where $Y$ is beans output, $A_f$ is beans planted area, $L$ is labor, $F$s is farm size, and $Ox$ is a dummy variable equal 1 if the farmer uses oxen to plow the land and zero if the farmer uses a stick to plant the crops. The effect of oxen on planted area is given by $Af = f(Fs,Ox)$, where $Af$ farm’s planted area. And, the effect of planted area on agricultural gross income is given by $If = (Af,LnPb,LnPc,LnP_s)$, where $If$ is farm’s gross agricultural income, $Af$ is farm’s planted area, and $LnPb$, $LnPc$ and $LnP_s$ are farm’s sale prices of beans, corn and sorghum respectively. The results show that using oxen increases farm’s beans output by 7.75 100-pound bags, and hiring oxen increases farm’s beans output by 8.5 100-pound bags. Farms that use oxen or hire oxen to plow the land have more planted area. The impact of using oxen to plow the land through farm planted area on farm agricultural gross income is 18.13 percent, and the impact of hiring oxen to plow the land through farm planted area on farm agricultural gross income is 25.55 percent.

This research assesses the effect of remittances on income inequality, education and health in developing countries. It uses an unbalanced panel data set for the period 1990-2014 and a sample of 85 developing countries in Latin America and the Caribbean, Middle East and North Africa, Europe and Central Asia, East Asia, South Asia, and Sub-Saharan Africa. The following model estimates the effect of remittances on education: $Edu_{it} = \delta_0 + \delta_1 Gin_{it} + \delta_2 LnR_{it} + \delta_3 Pgap_{it} + \delta_4 Health_{it} + \delta_5 LnGDPc_{it} + \delta_6 SSA + \delta_7 LAC + \delta_8 MENA + \theta_1t$. $Edu_{it}$ is secondary school enrollment, $Gin_{it}$ is income inequality, $Rem_{it}$ is personal remittances/GDP, $Pgap_{it}$ is poverty gap at $1.90 a day, $Health_{it}$ is the under-five mortality rate per 1,000 live births, $LnGDPc_{it}$ is per capita GDP, $SSA$, $LAC$ and $MENA$ are regional dummies, and $\theta_1t$ is the i.i.d error term. The next model assesses the effect of remittances on health: $Health_{it} = \beta_0 + \beta_1 Edu_{it} + \beta_2 LnRem_{it} + \beta_3 Pgap_{it} + \beta_4 Gin_{it} + \beta_5 LnGDPc_{it} + \beta_6 SSA + \beta_7 LAC + \beta_8 MENA + \mu_{it}$. $Health_{it}$ is the under-five mortality rate per 1,000 live births, and $\mu_{it}$ is the i.i.d error term. The last model assesses the effect of remittances on income inequality: $Gin_{it} = \alpha_0 + \alpha_1 Edu_{it} + \alpha_2 LnRem_{it} + \alpha_3 Pgap_{it} + \alpha_4 Health_{it} + \alpha_5 LnGDPc_{it} + \alpha_6 SSA + \alpha_7 LAC + \alpha_8 MENA + \epsilon_{it}$. $Gin_{it}$ represents income inequality and $\epsilon_{it}$ is the i.i.d error term. The results of robust ordinary least squares (OLS) and two stage least squares suggest that remittances contribute to increasing education and health levels in developing countries. However, remittances do not reduce inequality.

**Oral Presentations**

**Wichita I & II**

**Session 2C**

11:00 am – 12:40 pm

**MODERATOR: Leslie Berryhill**

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11:05-11:25 (O22) Cultural Influences on Risk Factors for Familial Diseases

**Aroob Bhatti**, Gunn College of Health Sciences & Human Services, Wilson School of Nursing

Mentor: Dr. Betty Bowles

The purpose of this literature review is to explore cultural influences on risk factors for diseases that tend to exhibit a familial predisposition. Type II diabetes mellitus is an example of a disease that through lifestyle modifications and behavior changes can prevent the manifestation, or at least delay the early onset, of the disease that tends to run in families. An individual's culture is a social determinant of health. Cultural practices such as high fat diets and sedentary lifestyle can contribute to obesity that is a risk factor for diabetes. Two specific cultures that were explored were Pakistani-American and Mexican-American. Culturally based expectations and family pressures can be hindrances to motivation for...
behavior change to achieve healthier diets and increased physical activity levels. Forming new habits in place of older more comfortable activities or preferences is a change that requires much commitment and dedication. Health educators can assist clients to formulate culturally appropriate short-term achievable goals and support them through their behavior change efforts.

11:30-11:50 (O23) Forecasting Regional Output Level: Case of Wichita Falls

Kaushik S. Shah, Dillard College of Business Administration, Economics
Mentor: Dr. Agim Kukeli
The purpose of this research is to forecast the real GDP of Wichita Falls. The Bureau of Economic Analysis releases the real GDP of Wichita county of a given year in the following year and not in the same year. Therefore, forecasting the real GDP of Wichita Falls would help investors and business people. The method we used to forecast the real GDP is by regressing the GDP against variables that drive GDP. And we used this regression to make an estimated model from the postulated model and used it to calculate GDP. The variables we used for regression include unemployment rates of Wichita Falls (WF), employment rates of WF, housing price indexes of WF, crude oil prices of Texas, economic growth rate of the United States, sales taxes of Wichita Falls, interest rate, inflation rate, and coincidence index of Texas. But first we had to convert all the data into one form, that is, into quarterly form. But some of the data was in monthly format. We converted this data into quarterly format by taking simple three-month average. Plus, some of the data is in yearly format. To convert yearly data into quarterly data, we created a seasonal index using employment and unemployment rates. To sum up, we have forecasted the real GDP of Wichita Falls by regressing GDP against the variables mentioned above.

11:55-12:15 (O24) Detection of Child Abuse in Medical Imaging

Camille Khan, Gunn College of Health Sciences & Human Services, Radiologic Sciences
Mentor: Dr. Robert Comello
The X-ray technologist is usually one of the first medical professionals to interact with a suspected abuse victim. There are many legal ramifications and ethical concerns surrounding the topic of abuse. The goal of this project is to establish what the role of the X-ray technologist is when faced with a suspected child abuse issue and what legal obstacles one could face when dealing with a suspect child abuse victim. A literature review will be conducted to gather the appropriate information. Medical images of child abuse from medical databases and journals will be selected to be shown during the presentation. All images will be HIPAA compliant. The X-ray technologist usually has more patient interaction than the Radiologist, so they must have a better understanding of the warning signs associated with possible child abuse. It is important for the technologist to be aware of the possible legal ramifications associated with false accusations of child abuse. Information from this project will show the role of the various aspects of medical imaging and medical personnel in determining child abuse.


Dareem Antoine, Dillard College of Business Administration/College of Science and Mathematics, Economics/Mathematics
Mentors: Drs. Agim Kukeli & Marcos Lopez
The Black Scholes Options Pricing Model (1973) is the premier model used when determining the price of real options, where the value is derived from decisions (primarily entry and exit decisions). The model has since been adopted by many in areas including management science and game theory, where it has been used to consider investment decisions in competitive markets. In this study we utilize the game theory adaptation of a version of the Black Scholes Options Pricing Model, to analyze the interaction between two players - a college senior and the job market. The game can be classified as dynamic game in which the senior has incomplete information. It centers around the valuation of decisions to begin graduate studies or not, in a given year after graduating from college, which also creates an option to delay inadvertently. We have examined the theoretical basis on which our approach and claim rests and found a body of literature that supports the direction of our paper in both aspects. We have created the different data scenarios which will form the basis for testing the adaptation of the model through Microsoft Excel and other statistical software. We have not yet tested the data using the model but hope to do so soon. After this analysis is completed, we hope to find the following; 1) the most lucrative delay period for the graduate study decision, 2) the variable with the greatest effect, 3) possible adaptations further use by graduate school administrators.
Reducing Chromosomal Antibiotic Resistance in *Escherichia coli*

**Bethany Russell**, College of Science and Mathematics, Biology

**Mentors:** Drs. James Masuoka & Jon Scales

Antibiotic resistance is a clinical catastrophe. Bacteria often gain resistance via horizontal transfer of plasmids (extrachromosomal DNA) with resistance genes. Plasmid-located resistance is lost when bacteria are cured of plasmids. However, in vivo clinical studies show that chromosomal-located resistance factors can also be lost. Lacev et al. concluded that a strain of *Staphylococcus aureus* lost chromosomal resistance genes after treating patients with claxacinil, an antibiotic to which the strain was susceptible. We hypothesized a similar loss of resistance could occur in other bacteria such as *Escherichia coli*. We further hypothesized that the targeting mechanism of the drug would influence this loss of resistance. An *E. coli* strain isolated from seagulls by previous students in the lab was erythromycin resistant and tetracycline susceptible when cured of its plasmids. This plasmid-cured strain was pressured with a sub-inhibitory level of tetracycline and subcultured every 24 hours for 10 days. Erythromycin resistance in these samples decreased over days 1-5, then plateaued over days 6-10. This demonstrated an increase in the susceptibility of the strain to this drug. Polymerase chain reaction (PCR) and gel electrophoresis analysis of the erythromycin resistance gene before and after tetracycline treatment revealed an insertion mutation in the gene that we are currently working to analyze. To test our hypothesis regarding targeting mechanisms, we are extending our experiment by using imipenem instead of tetracycline to pressure the *E. coli*. We hope to identify mechanism(s) of reversion that could reveal strategies of antibiotic use that will increase the lifespan of these drugs.

Effect of Growth Medium pH on Cell Surface Hydrophobicity of *Candida albicans*

**Melissa Rose**, College of Science and Mathematics, Biology

**Mentor:** Dr. James Masuoka

*Candida albicans* is part of the natural microbiome in humans inhabiting the gastrointestinal and genitourinary tracts of healthy humans. In immunocompromised individuals, this dimorphic fungus can opportunistically cause diseases such as vaginal and oral candidiasis ('yeast infections' and thrush, respectively) and other chronic conditions. Adherence is the first step in colonizing the host, and cell surface hydrophobicity (CSH) is an important component of adhesion. Hydrophobic cells have been shown to adhere better to mouse tissues than hydrophilic cells, and hydrophobic cells are more resistant to phagocytic killing. Both characteristics greatly contribute to the ability of *C. albicans* to cause disease. Environmental conditions such as growth temperature were previously shown to affect cell surface hydrophobicity. Cells grown to stationary phase at 23 °C are hydrophobic, and those grown at 37 °C are hydrophilic. We hypothesized that other growth conditions, such as the pH and nutrient composition of the growth medium, would also influence hydrophobicity since these affect other cellular processes. Our results indicate that the growth medium composition influenced CSH, but this effect was strain-dependent. They also showed that pH did not affect CSH when grown at 37 °C. However, when grown at 23 °C, CSH was significantly lower at pH 4.5, that of the vaginal mucosa, than at pH 7.2, the pH of the blood. By understanding how cell surface hydrophobicity changes with these parameters, we will gain a better understanding of how *C. albicans* successfully colonizes multiple niches within the human host.

Identification and Antibacterial Activity of Cellulose-Degrading Symbiotic Bacteria from Grass-feeding Termites

**Paytan Stubbs**, College of Science and Mathematics, Biology

**Mentor:** Dr. James Masuoka

Most organisms are thought to contain microbial symbions that assist in everyday life functions such as providing additional and essential nutrients, and assistance in digestion. In return, the host provides a constant environment and stable food supply. This mutualistic relationship can be observed in a termite, where the host insect provides stable living conditions and the microbes provide the ability to digest cellulose; a metabolic activity a termite and many other organisms cannot accomplish themselves. In the familiar wood-eating termites, cellulose digestion is performed by protozoa. However, in grass-feeding termites such as *Gnathamitermes perplexus*, bacteria appear to perform this function. A graduate student in the lab, isolated cellulose-degrading bacteria from the termite gut. Many of these isolates show
morphological similarity to Streptomyces species, some of which are known to produce antimicrobial agents. We hypothesized that these bacterial symbionts produce antimicrobial compounds to protect the host in addition to degrading cellulose. The isolates were identified using traditional biochemical and morphological techniques, and by sequence analysis of the 16S ribosomal DNA. Antimicrobial activity of the termite isolates is tested using two bioassay methods, with *Streptomyces kanamyceticus*, a known antibiotic producer, as a control. The results of this study will help us better understand the symbiotic relationship between these bacteria and the termite host. In addition, it may lead to the discovery of new antimicrobial compounds.

2:45-3:05 (029) Rapid Evolution of Mediterranean House Gecko Morphology and Performance Based upon the Building Materials They Live upon

**Jessica Duffy**, College of Science and Mathematics, Biology
Mentor: Dr. Charles M. Watson

Morphological changes can occur rapidly in populations when exposed to new or more intense selective pressures. One instance of acute exposure is the introduction of non-native species into new habitats. While the addition of a non-native species can have profound effects on natives, there can also be large impacts on the invader itself. The Mediterranean House Gecko, *Hemidactylus turcicus*, is native to Southern Europe and Northern Africa and has spread throughout the world as a resilient invader. This species evolved to naturally inhabit rock faces and cracks but now also thrives on human-made walls and other structures. Since these structures are often constructed using materials of varying smoothness and the gecko relies on lamellar toepad and claws to adhere to vertical structures, we compared toepad area and body size between two isolated populations with different substrate properties. We also measure the speed of each population on both vertical brick and metal substrates. Lizards that primarily inhabit brick structures were larger than those collected on metal buildings. Their abilities to adhere and climb were maximized on the surfaces that matched the substrate from which they were collected. This study provides evidence for rapid evolution based upon strong selection in a widespread invasive species. Moving forward, we will broaden this research to validate these findings across the North American invasive range of this species.

3:10-3:30 (030) Salt Ions Separation Study When Exposed to an Electric Field

**Vongai Nyikayaramba, Kristen Moss**, College of Science and Mathematics, Mechanical Engineering
Mentor: Dr. Salim Azzouz

A third of the world's population does not have access to clean water. The UNICEF reports that 289,000 children under age of 5 die each year due to diseases caused by poor water sanitation. Drought conditions due to a lack of rain in areas like the African Sahara, Texas, and California have also created an urgent need for additional water resources. Considering that oceans hold about 96.5 percent of all Earth's water, desalination is an answer to the endemic water shortages. The purpose of this study is to find a new way to desalinate water by studying the behavior of sodium and chloride ions in saltwater when subjected to an electric field. The saltwater solution passes through a multitude of electrified grids and two isolated external electrodes. The ions are then subjected an intense electric field. It causes the sodium ions to migrate towards the negative electrode whereas the chloride ions are attracted towards the positive electrode. A system of wall separators divides the main flow into three sub-flows. Two of them are highly concentrated with sodium or chloride ions, and the other one has a lower concentration of them. The three flows are collected in three different tanks. The sodium and chloride ion concentrations are measured using specific ion selective electrodes. The conductivity of the solution is measured as well. The changes in the concentration and conductivity are then graphed for trends study. An experiment set-up is being built to study the efficiency of such system in desalinating water.
1:05 – 1:25 (031)  
**Displacement and Gender-Based Violence: Assessing Transit State Security Gaps for Women and Girls in the Northern Triangle and Syrian Refugee Crises**  
*Herbert McCullough, Natalia Zamora Garcia,*  
Prothro-Yeager College of Humanities and Social Sciences, Political Science  
Mentor: Dr. Linda Veazey  
As the International community continues to focus on refugee flows from the Global South an increasing area of concern are gender-based challenges that arise in transit countries. Using comparative case studies and development indicators, this paper seeks to identify the gaps in protection from gender-based violence in transit states in both resource poor and state policy driven displacement contexts. In the Syrian crisis, the large influx of refugees exceeds transit states’ capacities to protect displaced women and girls from gender-based violence. In the case of the Northern Triangle, the cause of displacement is rooted in gender-based violence and transit state policies that attempt to return women and girls to countries of origin can further exacerbate gender-based violence concerns. In the Syrian crisis context, this research focuses on the transit states of Turkey and Lebanon. In the Northern Triangle of Central America, Mexico and Costa Rica will be the primary transit states examined in order to find linkages between gender-based violence, legal regimes, development, and displacement. These case studies demonstrate that currently an important area overlooked in refugee and displacement studies is gender protections within transit countries.

1:30 – 1:50 (032)  
**Ecotourism and the Icelandic Economy: A Case Study**  
*Kyle Walsh,* Prothro-Yeager College of Humanities and Social Sciences, Political Science  
Mentor: Dr. Steve Garrison  
Ecotourism is estimated to be an $8 billion-dollar industry worldwide. By using the natural beauty of a country or community, one can attract tourists from around the world adding money to their economies with little to no upfront costs. This case study is meant to evaluate exactly how ecotourism can benefit economies around the world by focusing on what Iceland has done with ecotourism to boost their economy. The study will analyze what Iceland has done that has worked as well as what it has done that has not worked to offer solutions which could work inclusively around the world. Ecotourism is the largest sector of Iceland’s economy and has helped their economy grow 11.3% last year compared to the year before. Iceland is one of the most sustainable countries on earth and continues to grow their economy by revolutionizing the ecotourism sector. They leave a blueprint for all others who may follow in their path.

1:55-2:30  
Invited Presentation  
**TBH, I’m Just Here for the Extra Credit…” Why is Undergraduate Research Important? My experience with EURECA**  
*William Ash,* Accounting, Finance, Dillard College of Business Administration  
Mentor: Dr. Pablo A. Garcia-Fuentes  
It’s nearly the end of the semester. Finals are just a few weeks away and Summer is on the horizon. As stress from another long semester builds to a peak, you scramble for extra credit to make up for lost time. The only thing keeping you from kicking back and relaxing are those last few points you need to bump up your grade. So, come join me for a discussion about my journey through undergraduate research, what EURECA is, and why it’s the most underrated organization at MSU. In an era where ideas are shared globally, access to information happens in real time, and technological innovation is reshaping society, undergraduate research can help inspire young scholars to make more informed decisions about their futures.
Pneumatic Robot
Kentzie Rhodes, Denzel Martin Kinyua, Alan Peregrino, Michael Reynolds, Brady Burross, The College of Science and Mathematics, Mechanical Engineering
Mentor: Dr. Jan Brink
The purpose of this project is to design and build a non-servo pick and place pneumatic robot. The robot will be controlled by using a programmable logic controller (PLC). The robot will be able to perform simple pick and place operations that would be applicable in the manufacturing industry. The authors developed a Solidworks drawing and model for the robot and then had the required parts machined in the McCoy School of Engineering machine shop. The group purchased the needed items such as wood, pneumatic components, and electrical components. The group then began to assemble the robot and program the robot to perform certain functions. The result of this project will be a pick and place robot that can perform variable sequences. The robot will increase the productivity of a hypothetical assembly line in a manufacturing setting. The robot will interface with other manufacturing equipment. In conclusion, robots can improve productivity and ultimately lower production costs when implemented into manufacturing settings. Robots can interface with different types of manufacturing equipment essentially allowing a robot to increase productivity and efficiency.

Robotic Soccer using Artificial Intelligence
Mpathi Nzima, Joshua Washington, The College of Science and Mathematics, Mechanical Engineering
Mentors: Drs. Yu Guo, Bingyang Wei, Jeong Ok
This project is aimed to enable autonomous recognition of objects through vision feedback on a team of humanoid robots. The Robots will use an Artificial Neural Network to recognize objects in a constantly changing environment. By training the vision recognition of the robots, a robot will become better at recognizing specific objects. The control of vision processing takes place directly on a Raspberry Pi microcomputer board. The Raspberry Pi undergoes detection, image processing, and recognition tasks. A decision algorithm will be made to determine when specific actions should be taken for the robot. As a specific set of conditions are met, the decision algorithm allows for a motion to be executed accordingly. Multiple robots will be running individual vision feedback systems, to react together in a team setting. By tying a vision feedback system with a distance sensor, the robots will be able to identify its relative location within its environment and determine its location from other objects. Communication between all inputs is capable through the virtual serial ports we have created on the Raspberry Pi's combined with the on board bluetooth of the robots. The goal for each robot is to use its vision to determine when and how to properly react with other robots to play a highly strategic game of soccer.
Deep Sea Exploration using an Intelligent Unmanned Drone Fleet, Rojitha Goonesekere, Ryan Fidlar, Chiezda Tokonyai, Nicholas Jaramillo, College of Science and Mathematics, Mechanical Engineering

Mentor: Dr. Yu Guo

According to the National Oceanic and Atmospheric Administration to date we have explored less than five percent of the ocean. It is the lifeblood of the earth and covers over 70 percent of the planet's surface. We spend a significant amount of time and money taking our expeditions out of earth to planets like Mars, yet our own planet is still left unexplored. Our goal as humanity should not be to focus all our efforts on exploring another planet but explore our own to understand ocean dynamics, develop new technologies using this knowledge and unlocking secrets that have baffled the scientific community. This underlying thirst for exploration is how our project came into fruition. To address this need we will design and develop an intelligent unmanned underwater vehicle that could survive in the ocean for months collecting data and working together with a group of similar vehicles organically. Traditionally, UUV's have been used for missions such as detecting and mapping submerged wrecks, rocks, and obstructions that pose a hazard to navigation for commercial and recreational vessels, but our applications have a more biological tone. We will collect data such as salinity, temperature, PH, mineral composition and map these areas of interest for further exploration. We have completed a prototype for Senior Design I and are in the process of developing a production quality drone. The goal is to move on to expanding this model into a fleet of drones working together using neural networking methods to collect mass data in the future.

On Slippage of a Sucker Rod Pump System

Eric Savage, Brandon Allen, Danielle Arrington, Daryn Sims, College of Science and Mathematics, Mechanical Engineering

Mentor: Dr. Sheldon Wang

We will need a table for display purposes. The purpose of our research is to develop an analytical solution that represents slippage in a sucker rod pumping system. Slippage is a term used in the oil and gas industry that defines a column of oil and gas that passes between the clearances of a sucker rod pump assembly. Slippage occurring in the pump assembly can be attributed to both the pressure difference and the plunger motion. The method of this research is twofold, with one part being a mathematical model, and the other a real world pump jack model apparatus. Mathematical solutions will be compared with the actual measurements of our newly designed and constructed apparatus. At the moment, mathematical results have been derived and a corresponding apparatus has also been assembled. In addition, an educational acrylic demonstration model has also been created to illustrate working mechanisms of a sucker rod pumping system. Through this project, better understanding of physical and mathematical models has been achieved and a critical mass of students and faculty members have been trained in artificial lift areas.

Flow Loop System with Heat Transfer

Corbin Matamoros, Mitchell Henton, College of Science and Mathematics, Mechanical Engineering

Mentor: Dr. Sheldon Wang

The fluid flow system within McCoy School of Engineering Thermo-Fluids Lab was designed to test and analyze basic fluid flow and heat & mass transfer properties. Built in three separate sections, the flow system was designed by a number of senior design groups over the past six years, culminating in Spring 2018 with the addition of a concentric heat exchanger with counter-current and parallel flow capabilities. Upon its completion, we are now capable of testing and fine-tuning all three sections of the system and start to design fluid mechanics and heat transfer laboratory experiments to be performed by MSU engineering students in Fluid Mechanics and Heat Transfer classes. The first and second set of experiments will study characteristics of and design considerations for pipe flow systems such as major and minor pressure loss due to friction and flow complication in straight pipes, elbows, tees, and other pipe fittings as well as the pump sizing, in addition to addressing questions about laminar, turbulent, and transition flows. The last set of experiments are implemented to study heat and mass transfer, cavitation, concentric mixing, and multi-jet injection techniques as well as counter-current and parallel flow heat exchangers. Ultimately, these labs will help engineering students to acquire applied experience and improved practicality in the design of thermal fluid systems with fluid flow and heat & mass transfer for their respective work places.
3:35-3:55 (O38)  
**Automated Indexing**  
**Aaron Stewart, Jason Hill, Victor Juarez, Colton Kowalick**, College of Science and Mathematics, McCoy School of Engineering  
Mentor: Dr. Jan Brink  
Automation with pneumatics and programmable logic controllers is widely used in the manufacturing industry. The group designed and built a machine that feeds blocks through a series of positions where various functions are performed, in an certain order to improve efficiency. Before building a physical assembly of our unit, the group took steps to design it first. First, a general layout was drawn. Then the group put together a systematic process. The next step in the process is the automated programming of the machine. The whole process required designing computer-aided drawings (CAD) of parts needed in the design with accurate dimensions and creating a Bill of Materials (BOM). Our primary goal in this project is to understand the basics of automated pneumatics through a unique design collaborated by the group. This engineering design project that entails a wide variety of technology and components that will be encountered in an industrial setting. Our next major goal is to implement creative and helpful designs. We will create a system of pneumatics and Programmable Logic Controller (PLC) logic that works together so that we can demonstrate a process that is found in many factories worldwide. The pneumatic/PLC logic will also have safety and other considerations in its design such as an On/Off Switch, a guard door, safety lights, and an emergency button to shut off the cycle in case of an emergency. The Human Machine Interface (HMI) will display production data.

4:00-4:20 (O39)  
**Design and Implementation of a Heat Transfer System for the Pyrolysis of Synthetic Polymers**  
**Brandy Fields, Caleb Acuna, Okan Lafleur, Will Stratham, Sheldon Walsh**, College of Science and Mathematics, McCoy School of Engineering  
Mentor: Dr. Mahmoud Elsharafi  
Plastic trash has been building up for over a century in our landfills and our oceans. We produce 300 million tons of trash a year. To alleviate this burden pyrolysis of plastics is producing the petroleum oil from plastics by heating plastics to the boiling point. Our goal for this semester is to create a design for a reactor system that will optimize our oil yielding results. We have redesigned the furnace used in research previously to get a higher, more stable heat that will reach the boiling point of the plastic to create the vapor. The system will require thermocouples to measure the temperature and provide feedback through a closed loop to maintain proper temperatures within the furnace. In our design of experiment the gases released from boiling will travel through a pipe to a water bath condenser. There the gases will cool and condense to petroleum oil which will settle on top of the water in the cooling bath. There it will be condensed back into a liquid form to create petroleum oil, a solid wax, and gaseous byproducts. Variables for this research includes types of plastics, temperature magnitudes, and temperature stabilities. Optimally 1 kg of plastics will yield close to 1 liter of oil. If we estimate $58 a barrel for oil, we could make $99.5 billion a year from plastic trash. With this research we will aid in the creation of commercial/industrial sized pyrolysis systems that will make eco friendliness economical.

4:25-4:45 (O40)  
**Compressible Flow Through a Converging-Diverging Nozzle**  
**Christian Gregory, Bailey Kaufman**, College of Science and Mathematics, McCoy School of Engineering  
Mentor: Dr. Sheldon Wang  
The purpose of our project is to design and construct a duct system with air flow speed approaching Mach 1.0 (approximately 768 mph). This high-speed air duct system is being designed and implemented for education and research purposes in the McCoy School of Engineering. The functionality of this system will be focused on the simulation of the air flow through a converging-diverging nozzle. At the nozzle, the air flow can act differently depending on the flow speed. Current design consists of a powerful fan that will pull the air through the intake, compress the air through the converging-diverging nozzle, push the air through the diffuser, and then send it through the exhaust. By injecting smoke into the duct system there will be a visual streamline demonstration of the air flow characteristics at different
speeds. By adding thermocouples, pressure gauges, microphones, and velocity sensors in three different locations in the duct system, we should be able to compare theoretical values with experimental measurements and utilize this duct system as one or two Fluid Mechanics Lab experiments.

4:50-5:10  (O41)  Increasing the Pressure Tolerance Limit of a Plate Heat Exchanger

Jocelyn Brown, Brett Scheffe, Duli de Alwis, College of Science and Mathematics, McCoy School of Engineering

Mentor: Dr. Salim Azzouz

The purpose of this project is to redesign a plate-type heat exchanger gasket support features to withstand higher liquid pressure. This project is conducted in collaboration with a local heat exchanger manufacturer, Tranter. A rubber gasket that is held between two machined plates ensures sealing of the fluid inside the apparatus. However, pressure generated by the inside fluid can make the gasket deform and displace, causing unwanted leaks. A three-dimensional model of the plate and gasket assembly has been created, upon which a Finite Element Analysis (FEA) simulations can identify the weak points most likely responsible for gasket failure. Based upon these results, the pitch, or distance between center points of adjacent nubs on the plate, and the width, or area of the top of the nubs, will be adjusted to improve the liquid pressure the gasket can withstand. A coupled Plexiglas-Aluminum prototype of the final plate redesign will be manufactured and tested so that any further deformation or displacement and any leaks of the liquid would be visible on a high-speed camera. We expect that adjusting the pitch, width, or a combination of both will increase the amount of pressure the gasket can withstand before it deforms or displaces. The group has already run computer simulations for stress and displacement on the completed three-dimensional model of the original design. A physical prototype of the redesigned plate is currently being built for use in a practical experiment set-up.
P1  *TSA Implementation of Computed Tomography*

**Patrick Rowland, Sabrina Barnes, Kyle Walsh, Iris Zhang, Jake West**  
Gunn Health Sciences & Human Services, Radiologic Sciences  
Mentor: Dr. Jessyca Wagner  

Due to governmental influence, the Transportation Security Administration (TSA) has begun to replace x-ray scanners with computed tomography baggage scanners in an attempt to increase security. This poster investigates the potential dangers that are presented to employees and passengers in-light of this advancement. Multiple articles involving the implementation of CT scanners have been compared. Computed tomography baggage screening has shown an increased ability to differentiate between organic materials and liquids, while x-ray has been insufficient in this field. However, due to lack of TSA training in safety, harmful practices have been observed that potentially endanger employees and passengers to unfiltered radiation.

P2  *3D Comparison: CT & MR (Stroke)*

**Haley Brock, Haley Hansen, Marisa Gomez, Ashlin Koleth,**  
Gunn Health Sciences & Human Services, Radiologic Sciences  
Mentor: Dr. Jessyca Wagner  

Technology advancements rapidly change the way technologists view the body. Taking a machine and turning it three-dimensional, allows the human eye to see greater detail and present possible future health risks such as stroke. Two modalities are used for this type of imaging, CT and MRI. A review of the literature was conducted, and this poster provides a comparison of the two modalities to determine if one is superior to the other for evaluating stroke. Advantage and disadvantages of both 3D CT and 3D MRI are discussed. 3D CT is more beneficial for evaluating the Circle of Willis but has some safety considerations and disadvantages. MRI has fewer disadvantages; however, both modalities are continuing to improve and show great promise in the future of 3D imaging for stroke.

P3  *3-D Printing and Computer Aided Design*

**Victoria Fatheree, Abby Watts, Dalena Pham, Kristen McCanlies**  
Gunn Health Sciences & Human Services, Radiologic Sciences  
Mentor: Dr. Jessyca Wagner  

The purpose of this study is to bring knowledge and awareness of 3-D printing and computer-aided design to the general public and the healthcare industry. It also serves a purpose to find growing developments within the field of radiology and the medical field as a whole. The method or approach of the study came from researching peer reviewed articles, radiologic magazines, and healthcare websites. The final results collected from the studies show how efficient and effective 3-D printing and computer-aided design can provide a major improvement in knowledge and surgical procedures. Surgical planning, prosthetics and implants, and modeling of organ systems are just a few topics that are discussed within the study that provide a basis to show just how important this technology is to improving the medical field. In conclusion, 3-D printing and computer-aided design is helpful in planning surgical procedures for patients, assessing the patients’ conditions, and improves the knowledge of healthcare workers by creating a hands-on model of the anatomy.

P4  *Next Generation MRI Scanning*

**Meagan Sissom, Cassandra Gomez, Katelyn McQuerry,**  
Gunn Health Sciences & Human Services, Radiologic Sciences  
Mentor: Dr. Jessyca Wagner  

Research is currently being conducted to attempt to make MRI machines less expensive, which will allow countries around the world to have access to this technology. An injection of parahydrogen could be used to hyperpolarize molecules, which makes the molecules, glucose, urea, and pyruvate, more magnetic making them more visible during the imaging process. Using the injection allows for the use of weaker magnets to transform into stronger magnets without changing form and causing toxicity to the body. Using this cost-efficient technique allows for the detection of cancerous tissues to be more accurate and detailed. It would increase the strength of the magnetic field in MRI. Therefore, any magnet could be used, which means it would be more cost efficient to the medical field. This could improve treatment time for cancer patients and allow the radiologists to see more molecules that normally would not be seen on an MRI. With these new advances, scientists are implying that MRI could be brought to communities around the world that lack power supply or the supplies to manage scanners that have superconducting magnets, making them extremely costly. Since 1987, parahydrogen has been known to make magnets stronger, but was never clinically tested in MRI. The topic of using parahydrogen has recently been brought up in the medical field with hopes that it can improve the illuminance of the molecules. Using the parahydrogen would efficiently lower the cost of MRI machines,
improve the treatment process, and allow for more communities to use MRI.

P5  
**CT Perfusion Imaging for Stroke Patients**  
**Gwynaldyn Gonzalez, Alyssa Stone, Madison Terry**  
Gunn Health Sciences & Human Services, Radiologic Sciences  
Mentor: Dr. Jessyca Wagner  
A stroke is a blood clot of the brain capable of producing temporary paralysis of either the left or right side of the body, along with permanent brain damage if not treated promptly. Computed tomography (CT) perfusion imaging is a newer advance on CT imaging capable of determining if stroke-like conditions are in fact strokes or not. CT perfusion can display which tissues of the brain were affected, how much was affected, and even which tissues have permanent brain damage. CT perfusion imaging is used to help in early detection of strokes as an effort to keep any possible brain damage to a minimum. This poster will display how helpful CT perfusion imaging is for stroke treatment.

P6  
**Using AI and MRI to Evaluate Children with Hearing Loss**  
**Elam Lazo, Kenia Rodriguez, Emily Stewart, Mireya Victoria**  
Gunn Health Sciences & Human Services, Radiologic Sciences  
Mentor: Dr. Jessyca Wagner  
The purpose of this poster is to examine the effects of using artificial intelligence algorithms in conjunction with MRI to determine how a cochlear implant would affect a child suffering from hearing loss. By providing images of the cochlear nerve and cranial structures, physicians are better able to determine to what extent an implant would benefit the child and diagnose other possible abnormalities. Data was collected using peer reviewed articles from case studies. MRIs of children presenting with unilateral and bilateral sensorineural hearing (SNHL) were viewed to evaluate the intracranial structures and cochlear nerves for anomalies and/or other ailments. Findings concluded that although MRI scans can prove to be beneficial in assessing cochlear implant effects in pre- and post-operative children, there are risks to be considered including implant displacement and possible pain and discomfort to the child. Further research and methodology with artificial intelligence algorithms and MRI is needed to provide conclusive data.

P7  
**Thermal Physiology of the Giant Hispaniolan galliwasp.**  
**Ciera Wolinski, College of Science and Mathematics, Biology**  
Mentor: Dr. Charles M. Watson  
The direct and indirect effects of deforestation, coupled with general anthropogenic climate change, are increasing global temperatures at an alarming rate. It is important; therefore, to understand the physiological response of organisms to different temperatures in order to predict future effects of an elevated thermal environment on their populations. Among the organisms experiencing the acute effects of deforestation is the giant *Hispaniolan galliwasp*, especially among populations in Haiti. This lizard is classified as vulnerable by the IUCN because of habitat destruction and urbanization. Here we quantify metabolic rate and Q10 at four ecologically relevant temperatures and establish optimal temperatures using maximum locomotor performance. Our research shows that this species may be especially vulnerable to extinction due to their relatively low thermal optima and metabolic response to higher temperatures.

P8  
**Childhood Vaccination: Definitely Worth a Shot**  
**Macy Marshall, Jasmine Moore, Lindsey Morris, Beatriz Gonzalez**  
Gunn College of Health Sciences & Human Services, Respiratory Care  
Mentor: Dr. Randy Case  
Diseases and infections are still prevalent, in the US, accounting for many deaths today. Vaccinations are considered the biggest advancement of modern time. Childhood vaccinations are used to prevent diseases such as hepatitis b, diphtheria, pertussis, tetanus, HIV, polio, pneumococcal conjugate, and rotavirus. Additionally, research has proven that the utilization and implementation of vaccinations can reduce overall hospital costs associated with certain disease processes. Although annual vaccinations are recommended for all children from birth up to early teenage years, some individuals are hesitant to use vaccinations due to their potential side effects and consequences. Furthermore, it is suggested that vaccinations are associated with autism, breast feeding infections, and paralysis. Others suggest that children should be naturally exposed to catching a disease, some claim that these diseases aren't serious enough, and some even go on to suggest that these diseases are not relevant in today's day and age. This study will review current literature obtained from various peer-reviewed articles such as; Google Scholar, EBSCOHo, and CDC.gov to determine what recent research has concluded regarding the risks and benefits associated with childhood vaccination. As a result of these fears, vaccines are becoming a taboo subject. Some individuals have doubts about the benefits of vaccines. In addition, many question if the risks associated with vaccinations outweigh the benefits? In conclusion, negating myths associated with vaccinations can help these previously dormant diseases from reemerging. In an effort to reduce the redevelopment of these diseases, it is imperative to provide proper education concerning childhood vaccinations.
Primary Causes of Stress in Undergraduate Students Pursuing Health Care Professions
Jacob Loeffler, Reavan Thomas, Lindsey Stone
Gunn College of Health Sciences & Human Services, Respiratory Care
Mentor: Dr. Randy Case
With the ever increasing demand of highly skilled and educated healthcare professionals, many students are flocking to pursue undergraduate degrees in order to become vital healthcare providers. This pursuit does not come without burden or stress. Students pursuing a higher education in numerous healthcare fields including respiratory, nursing, radiology, dental hygiene, and medicine often succumb to the pressures of their course work and the clinical portion of their degree. The chronic stress often associated with said pursuits can be taxing. In this study the question posed is: what are the primary causes of stress in undergraduate students pursuing healthcare professions? The literature was obtained from various peer reviewed journals and databases including, Journal Association of American Medical Colleges, Journal of Physiotherapy, Journal of Biomedical Education, NCBI, East Tennessee University Digital Commons, PubMed, and Ebsco Host. Data analysis of the diverse methods and designs utilized within the research was conducted in order to categorize the common patterns and sources of stress. As a result, the themes identified specific sources of stress that students face throughout their education. Principal topics encompassed test anxiety, challenging curriculum, course load, clinical practicum anxiety, and effects on student's overall mental health. A direct correlation between the causes and negative effects can be seen within this study. In conclusion, identifying the sources of stress and promoting awareness among current and prospective students is vital for the betterment of the healthcare industry.

Sleepless in Wichita
Bailey Schnirring, Carlos Tara, Melanie Walker, Jacob Sherrill
Gunn College of Health Sciences & Human Services, Respiratory Care
Mentor: Dr. Randy Case
Sleep reduction has become a common behavior in modern society. Sleep is often classified as one of the most important activities needed to function properly. In addition, sleep and consistency within one's circadian rhythm often helps individuals stay healthy, have optimal performance, and improves one's overall well-being. Circadian misalignment describes inappropriately timed sleep and awake. Individuals are potentially putting themselves at a disadvantage if their body does not get a chance to properly recharge through REM and NREM sleep on a regular schedule. On average people between the ages of 18-60 should receive at least 7 hours of sleep a night (Liu, 2016). Without sleep the body isn't working properly and can cause many different mental and physical health problems. Chronic lack of sleep can increase an individual's risk of obesity, cardiovascular disease, depression, diabetes, infection and mood disorders. Other changes to the body can include memory loss, decline in academic performance, physical dysfunction and immunity. Not only does sleep deprivation effect students, it also effects healthcare workers, family and friends. Researchers have determined how sleep negatively affects the body. Additionally, research has discovered ways to improve sleep deprivation through meditation, aromatherapy and medications. Literature was obtained from a series of peer-reviewed journals obtained from Google Scholar and Ebsco Host discussing the importance of sleep and how damaging lack of sleep and circadian misalignment can be to the body's mental and physical health. This study also aims to provide the readers with tips and techniques to improve the quality of sleep. As a result, the research based on peer reviewed articles has proven that that sleep disorders can have a negative effect on the body, as well as one's overall health and well being. In conclusion, the disruption of one's circadian rhythms is proven to have numerous negative effects on one's health and well-being. This study discusses various peer-reviewed journals and identifies that regulating sleep cycles is a primary theme in the improvement of overall health.

Battle against Sudden Infant Death Syndrome (SIDS)
Ashley Lomeli, Denisha Hill, Shaini Parikh, Daniel Le.
Gunn College of Health Sciences & Human Services, Respiratory Care
Mentor: Dr. Randy Case
In the United States, Sudden Infant Death Syndrome (SIDS) is the leading cause of death among infants. SIDS is common among infants less than 1 year old, but premature infants are at an even greater risk of mortality. According to the CDC, in 2015 about 3,500 infants in the United States suffered from SIDS. The best form of prevention is continually being discovered within the medical and scientific community. PURPOSE: This study seeks to identify the optimal method of preventing SIDS; based on various peer reviewed literature, the primary modes include quality education and technology. METHODS: The findings in this study were collected from the CINAHL database and consists of articles from various journals such as: BBC News, The Business Medical Journal, American Journal of Public Health, University of Tennessee College of Medicine, and the Journal of Perinatology. RESULTS: A large percentage of the findings from the assorted case studies and clinical trials presented within peer reviewed articles favor quality education over advanced technological devices in effort to prevent SIDS. CONCLUSION: In conclusion, educating parents and caregivers has proven to be the most effective method and strategy in the prevention of SIDS.
Increase Exposure of Sickness and Illness among Healthcare Workers
Halil Hicks, Darline Nyabicha, Trisha Taylor, Suzanne Triana, Gunn College of Health Sciences & Human Services, Respiratory Care
Mentor: Dr. Randy Case

In the healthcare setting, healthcare professionals are often exposed to many different pathogens due to the micro-organisms ability to germinate easily and quickly. These illnesses can be transmitted via contact, airborne and bodily fluids. Through these types of transmissions, healthcare workers are at risk of being exposed to different types of diseases and viruses that can cause severe illnesses. A simple cough, inadequate handwashing, improper sterilization techniques, in addition to not wearing the proper personal protection equipment (PPE) can increase the exposure of infectious disease and viruses throughout the hospital. Some of the acquired illnesses include flu (influenza, airborne), human immunodeficiency virus (HIV, blood-borne pathogen), and clostridium difficile level of transmission. Utilizing several databases including Ebsco Host and Google Scholar, a review of literature was conducted from numerous peer reviewed journals. The results determined that the proper use of personal protection equipment (PPE) and handwashing are effective against the transmission of diseases and infections including contact, droplet, and airborne transmission. This research study will provide readers with methods and strategies utilized within the healthcare setting to reduce the exposure and transmission of healthcare-associated pathogens. It is recommended that healthcare workers take advantage of the available PPE provided by the hospital. This is for the protection of the healthcare workers themselves as well as the patients.

Poster Presentations
Atrium
Poster Session II
10:00 am - 12:00 pm

Using the Fourth-Order Runge-Kutta Method to Determine the Dynamic Response of a Free Vibrating Laminated Composite Shallow Shell Panel
Vongai Nyikayaramba, Gayal Hewakuruppu, College of Science and Mathematics, Mechanical Engineering
Mentor: Dr. Salim Azzouz

The pressing need for faster aircrafts is becoming a crucial issue for military and business operators. This quest is faced with many technical difficulties and complications. Such complications may appear in the form of a harmful skin panel vibration (flutter) that damage the aircraft’s skin panel during supersonic or hypersonic flights. This EURECA project is a continuation of the EURECA Fall 2017 project which task is to determine the free vibration dynamic behavior of shallow shell panels. The nonlinear Finite Elements Method uses the First-Order Plate theory, the von Karman nonlinear strain theory, and the Marguerre shallow shell theory. In the previous EURECA projects, the nonlinear modal first-order and second-order coefficients were determined for a free vibrating isotropic and composite laminate shallow shell panels at various panel height-rises. A numerical technique was used to solve the nonlinear free vibration modal equation of motion. This technique is based on the use of the 4th order Runge-Kutta numerical integration method. The method was developed to solve simultaneously the three nonlinear equations of motion of the free vibrating shallow shell panel. The concentration in this spring 2018 semester is to use the Galerkin Method to validate our numerical method for flat plates. Once the proof is done, the concentration will be to arrange the results and to write a technical paper.

A Distributed Cache Reduction Approach to DNA Sequencing using the Greedy Shortest Common Superstring
Ali Khalid, Anthony Enem, College of Science and Mathematics, Computer Science
Mentor: Dr. Eduardo Colmenares

The shortest common superstring (SCS) problem is known to be difficult in computer science. It has wide applications ranging from matrix compression to DNA Sequencing. In sequence assembly, the SCS can determine the precise order of DNA fragments. Previous implementations have adopted a standard and sequential approach to the SCS problem. These approaches do not take advantage of massively parallel architectures and fail to reuse computed overlap values between DNA fragments making them very inefficient for large sizes of DNA fragments. In this research, we present a parallel approach to the SCS problem in DNA sequencing. The proposed method utilizes the concept of a distributed cache to compute and store overlap values of DNA fragments, and a reduction procedure to extract and merge DNA fragments with high overlapping values recursively until a shortest common superstring is obtained. In addition to greatly reducing memory requirements, the proposed method scales very well across multi core architectures. Although the result of the SCS does not always provide the original
intended DNA sequence, this solution works reasonably well in practice.

**P15  UAV-based Remote Terrain Search & Rescue missions with Payload delivery using object-based image analysis**

**Rojitha Goonesekere, Don Wijesinghe**, College of Science and Mathematics, McCoy School of Engineering

Mentor: Dr. Yu Guo

Aerial drones have traditionally been used to push forward military objectives. In recent years though these machines of surveillance and destruction have transformed to be more versatile than ever. Beautiful aerial video and timely delivery of products are just the beginning for a whole list of applications that they could be used for. Our research on drones have more humanitarian application. The objective of our project is to program a fleet of drones that will work as a single unit to perform various tasks. We have had a very successful research history spanning 3 semesters in which we have programed multiple drones to receive instructions through a small microcomputer such as a Raspberry Pi 3, perform facial recognition in flight, follow an individual that was recognized and programed a thermal array to get the heat signature of an individual and set a target to observe and follow when instructed. We have even gone as far as being able to program our drone to find an individual in a crowded group differentiating between their facial features. All this combined gives us a powerful set of tools to do some incredible things like finding and rescuing missing people and delivering food and medical aid to people in need. This semester we will be focusing on improving our software to lock onto an individual regardless of the visibility of their face and exploring ways in which we can enhance the design of our drones to facilitate payload delivery in a rough terrain.

**P16  Puerto Rico Power Restoration using Renewable Energy**

**Rojitha Goonesekere, Don Wijesinghe**, College of Science and Mathematics, McCoy School of Engineering

Mentor: Dr. Yu Guo

One million people without power for 4 months. That's one million people with no lights, no source of food preservation and digital communication for over 120 days. Disaster zones cut off from the power grid have been a common occurrence in the recent past. Our project aims to design and develop an emergency power source for regions in distress such as Puerto Rico in the form of a low cost solar generator. We had two objectives in mind for the prototype, first was to use renewable energy and second was to design a generator that was more economical than current products in the market. We chose solar power as our primary energy source due to its abundance in nature and chose a Lithium Ion battery chemistry to store the energy harvested. The use of Li-Ion batteries addressed our objective of a low production cost in comparison to current generators in the market that use high cost, low efficiency Nickel metal hydride batteries. We were not only able to significantly reduce the weight of our generator in comparison but also develop a solution that has a smaller overall footprint and higher efficiency. A secondary objective of the project was to ensure that the unit will follow all air transport guidelines which include special discharge and storage of batteries and static shock prevention. We strongly believe that our prototype has the potential to be a renowned solution to emergency power in the future.

**P17  Development of a Lizard PBT Data Collection Apparatus**

**Colton Dorion, William Hendrickson, Kennan Marino, Kevin Tracy**, College of Science and Mathematics, McCoy School of Engineering, Biology

Mentors: Drs. Jeong Tae Ok, Salim Azzouz, Yu Guo, Charles Watson

Biologists endeavor to collect data on the Preferred Body Temperature (PBT) of lizard species in laboratory settings and are still searching for an effective apparatus. The objective of this research is to provide biology researchers with an accurate, efficient, compact, and repeatable apparatus for future PBT data collection. The solution for the compact apparatus is a serpentine layout, making it less cumbersome than other layouts. Individual temperature zones requiring cooling are brought down to temperature utilizing a thermoelectric cooler by means of convection. Zones needing an increase in temperature are heated by thermal heat tape under copper panels. All of this is monitored and controlled with thermocouples and a proportional-integral-derivative (PID) controller. Through preliminary experimentation, temperature distribution on the copper panels has been determined to have a deviation of 0.5 °C or less of the desired 1 °C difference between temperature zones. Use of a Peltier thermoelectric convection cooler has proven to be effective for the lower temperature zones. This solution will allow biologists to gather PBT data with ease, noting the temperature of the surface in the zone where the lizard decides to come to a rest. By simply noting the zone in which the lizard is located, the biologist will acquire the desired temperature data without disturbing the lizard or using external temperature measurement devices. Future analyses planned include submitting the device to the biology department for them to commence experimentation. With the results from the biology department, final confirmation of this solution can be reached.
The microbiome comprises microorganisms, such as bacteria and fungi, which reside within multicellular hosts or other habitats. The multicellular host provides protection and a favorable environment for growth while the microbiome often provides useful nutrients or performs other helpful functions. For example, the breast cancer drug taxol, is produced by fungal symbionts within the Pacific Yew tree (*Taxus brevifolia*). Other native plants, such as Smooth Sumac (*Rhus glabra*), were used by several Native American tribes in the United States to treat diarrhea, dysentery, and mouth ulcers. We hypothesized that endophytic symbionts within the plant *Rhus glabra* are responsible for the observed medicinal effects. After finding evidence that several fungal isolates were residing within *Rhus glabra*, PCR techniques were used to isolate DNA fragments that could be useful in identifying each isolate. After obtaining and running the sequences of the PCR products through GenBank, we have tentatively identified seven of the eight isolates up to the genus level. Current work involves further identification of the symbionts through biochemical assays to narrow down the identity of each isolate to a single species. In addition, we will test the fungal isolates to determine if the reported medicinal effects of *Rhus glabra* can be attributed to the fungal endophytes.

The chemical-physical analysis of the DNA have pointed out connections between forces, thermodynamics and kinetics. The entropy generation approach has been suggested as a thermodynamic approach to evaluate the accessible states for cell systems in relation to their thermodynamic characteristic quantities. Cell can be described as an open and dynamic and self-organizing system. The stationary states of tumor systems are analyzed by a thermodynamic approach by using the entropy generation. The aim of the research is to improve the thermodynamic approach to cell systems based on entropy generation.

Identifying *Hymenobacter ginsengsoli*: An Ongoing Process

Identifying a bacterium is a multifaceted process that requires methodical observation and testing of several differentiating factors. In search of plant endophytic bacteria, a red colony was isolated from the topsoil near a yucca plant. The bacteria were grown on both differential and selective media, as well as being subjected to various stains, like Gram staining, and various metabolic reaction tests. These tests were supported by sequencing of the 16S ribosomal RNA gene. Based on sequence comparisons using BLAST and a majority of the biochemical tests performed, the bacterium has been tentatively identified as *Hymenobacter ginsengsoli*. However, upon reviewing the relevant literature from the International Journal of Systematic and Evolutionary Microbiology and several other sources, further testing is required to confirm the identity of the bacteria. Aside from some conflicting results in the differential tests, which should be repeated, there is no mention in the literature of *H. ginsengsoli* being photosynthetic when it was observed to be so during the experiment. There are also further tests that would need to be conducted for more accurate identification like an assay of the fatty acid composition of the cell membrane, since many bacteria of the *Hymenobacter* genus have slightly differing compositions. The goal of further research would be to confirm the identity of this bacterium and to characterize its role in the soil environment.
Dynamic Filtration Test to Investigate the Effects of Performed Gels on Unswept/Low Permeable Zones
Crege E La Ronde, Shanley Paul, College of Science and Mathematics, Mechanical Engineering
Mentor: Dr. Mahmoud Elsharafi
The production of excess water has become a major problem for oil field operations in reservoirs. To correct this, water treatment methods are used to help reduce the high permeability streak fractures and hence decrease excess water production. Determining the best methods highly depends on whether or not chemical or mechanical treatments are able to effectively correct the reservoir heterogeneity, without damaging the formation zones. In this research, we use a dynamic filtration test to determine whether swollen performed particle gels used in the oil industry affects up-swept low permeable zones, and which gels cause the most damage. Our main goal is to use our results from this experiment to further find methods to minimize the damage caused by those gels on the rock formation. The dynamic filtration test involves the use of equipment including a syringe pump necessary for controlling the water pressure through the system, piston accumulator which holds the gels to be pressured through the dynamic damage core holder, which contains the Boise, Bentheimer and Castlegate sandstone core samples. Our preliminary results are expected to show that the smaller particle sizes, weaker gels and lower brine concentrations could damage the core further than large particle sizes, stronger gels and higher brine concentrations. We further expect to conclude that the higher permeable sandstone cores (Boise and Bentheimer) will experience more damage than the lower permeable core. The results from this project can help in selecting the best gel types for the right reservoir conditions.

Poster Presentations
Atrium
Poster Session 3
1:00 - 3:00 pm

Single Parent Struggles
Rachel Wilson, Fuin College of Fine Arts, Harvey School of Visual Arts
Mentor: Morgan Page
With this project I want to construct a visual PSA exposing the struggles of single parenthood to help create more understanding and support from those who do not face them. The way I researched these stresses was by interviewing single parents in the area. After reviewing the transcripts, I chose the most pressing and biggest stresses and chose to focus on them for each individual. Because I am an artist, the most effective way for me to communicate these to others is through art. I have chosen to make a series of posters, each highlighting a single parent by drawing their portrait and including quotes from their interviews by using expressive typography. Through overlapping lines of text and manipulating scale, I have achieved a sort of visual dissonance that triggers a small feeling of stress for most people. By providing a visual representation of the stresses of single parents I have been able to make more people understand and feel the stress of single parents. Talking with these parents in person and drawing their portraits opened up a reception of emotion that text on a page would not accomplish. The project has resulted in 6, 28x18 posters. These posters have already started a conversation among my friends, and professors who have seen the work. More questions have been asked and I have felt much more support and understanding from those who have viewed them. I hope these posters can provide that same reaction for the other parents I have represented.

The Tragic End of Your Internet Freedom: Net Neutrality
Taylor McCreary, Graciela Ruiz, Rolando Diaz, Natally Chavarria, Joe Hankins, Dillard College of Business Administration, Management
Mentor: Dr. Niyati Kataria
As part of a (voluntary) class-project in Dr. Kataria’s #Think class, we started a social movement on campus to raise awareness about the importance of net neutrality. We began by understanding both sides of this issue in order to decide what ideas we wanted to support. We then gathered relevant information into a pamphlet that we distributed through booths we set up in DCOBA and beyond. The pamphlet explained what net neutrality is and what its repeal means for the U.S. We conducted a survey of approximately 200 people with the objective of determining how knowledgeable the MSU community is about net neutrality and how concerned or not they are regarding its repeal. We gathered over 250 signatures from people who came to our booths and listened to what we had to say about net neutrality. Finally, we contacted the mayor of Wichita Falls in order to stress the importance of net neutrality for our community and shared with him the signatures we gathered supporting this issue. We aim to help the mayor of Wichita Falls understand the importance of this issue and want him to use his position to advocate
for opposing the recent alarming repeal of net neutrality. In this poster, we summarize the creation and execution of our social movement. Besides explaining the basics about net neutrality, the poster also captures the execution of our social movement and presents a snapshot of the support we gathered toward opposing the repeal of net neutrality.

P24  
**Reimagining the Elementary Classroom: Implementation of the Kinesthetic Classroom**

**Kelsey Laake, Keelie Ralston**, West College of Education, Curriculum and Learning

**Mentors:** Drs. Emily Reeves & Stacia Miller

The purpose of this project is to support and strengthen classroom practices by explaining and demonstrating how one elementary school facilitated kinesthetic classrooms to actively engage and empower the 21st century student in the learning process. Traditionally, classrooms are a reserved and passive setting; therefore, the teachers are creating engaging and creative learning spaces where students are encouraged to move. The WCDE is regularly involved in collaborations with WFISD to improve instruction and learning for the k-12 students. A case study approach is being used to investigate implementation of the kinesthetic classroom. The teachers are currently in a preparation phase, receiving training and general information to plan for their classrooms. Thus far, data was collected on teacher perceptions and concerns from workshops and a Google classroom site. Preliminary findings suggest that classroom teachers have a positive attitude and belief regarding the kinesthetic classroom, and that many of the teachers have already integrated flexible seating and physical activity in the classroom. Although the current school climate is positive, with support from administration, some general concerns expressed by the teachers included student behavior, spreading of lice with flexible seating, and using flexible seating during testing. These findings accentuate the importance of targeting organizational level support and providing professional development for these types of interventions. Ultimately, our goal is to provide the elementary educators with the appropriate tools, time, and resources needed to facilitate the implementation of kinesthetic classrooms to foster student learning and engagement.

P25  
**Decadence Across Cultures: England, France, Russia, and Central Europe**

**Garrison Horton**, Prothro-Yeager College of Humanities and Social Sciences, English, Humanities, and Philosophy

**Mentor:** Dr. Kirsten Lodge

Dr. Kirsten Lodge and her mentee have been contracted by Dr. Alex Murray to participate in the writing of a volume that compiles the history of Decadent literature. The part of the mentee is to assess multiple works of French and English Decadent and proto-Decadent literature to determine what influence, if any, Russian Decadent and proto-Decadent writers had on the literary movement in France and England. The focus is on English Decadent journals such as The Yellow Book, the Pall Mall Gazette, and Cosmopolis, and English Decadent authors such as Oscar Wilde. Influence is determined as prominent mentions of Russian culture, authors, works, or themes from any Decadent Russian works. Preliminary analysis yields little in the way of influence, as The Yellow Book is void of any significant Russian influence. Oscar Wilde's The Picture of Dorian Gray and Essays and Lectures are similarly void of any influence. If this trend continues and the Pall Mall Gazette and Cosmopolis are similarly void, the researchers will conclude that the influence of Russian Decadence on English and French Decadence is minimal or inconsequential.

P26  
**Effects of Music on the Listener's Moods and Emotions**

**Katherine Pendergrass**, Fain College of Fine Arts, Music

**Mentor:** Dr. Ruth Morrow

The purpose of this project was to review research literature to determine the different effects that music has on a listener's moods and emotions. Research has shown that music can impact a listener's moods and emotions. Music has been shown to have the ability to increase happiness and well-being, induce feelings of sadness, and reduce stress and anxiety. Different types of music and musical pieces serve these roles. Music described as having a happy tone, typically characterized by a fast tempo in a major key, is known to increase a person's well-being and happiness. Music with a sad tone, typically characterized by a slow tempo in a minor key, has been shown to induce feelings of sadness within an individual. Paradoxically, music with a sad tone has also been shown to provide comfort by reminding the individual of past memories or events. Finally, music can reduce anxiety and stress. Research has shown that music with 60 to 80 beats per minute is best suited for this purpose. While a substantial amount of research has been conducted on the effects music can have on a listener's moods and emotions, more research is needed to determine the full extent of music's impact in this manner.

P27  
**Does a Relationship between CEO’s and CFO’s Compensation and Firm Performance Exist?**

**Yenifher Valenzuela**, Dillard College of Business Administration, Finance/Accounting

**Mentor:** Dr. Paul San Miguel

Executive scorecards are contracts used to evaluate executive performance and determine bonus compensation. The latter have become increasingly complex incorporating numerous financial and non-financial measures. Agency theory suggests that these
scorecards can reduce asymmetric information between principals and agents to maximize firm profits. However, consistent with moral hazard literature, extant research provides evidence suggesting executives use earnings management and other tools to maximize their compensation (rent extraction). This research attempts to provide insight into these constructs by examining the relationship between earnings management, executive compensation and firm performance. Specifically, using panel data and regression analysis for publicly traded firms, this research explores the hypothesis that executives of low/medium size companies have a stronger pay performance relationship, less accrual earnings management (AEM) and more real earnings management (REM) when compared to executives of large companies. We find preliminary evidence which indicates that CEO’s and CFO’s of smaller companies exhibit stronger pay performance relationships, more REM as measured by positive changes in revenues and expenses and less AEM than CEO’s and CFO’s of large companies. We further demonstrate that AEM is greater for CFO’s than CEO’s suggesting that CFO’s may direct AEM decisions.

Annotated Translation of Zamyatin’s We with Scholarly Apparatus

Lane Riggs, Prothro-Yeager College of Humanities and Social Sciences, English
Mentor: Dr. Kirsten Lodge
My project is to conduct research on Yevgeny Zamyatin’s We, a dystopian novel completed in the Soviet Union in 1921, but not published until 1927 in Czechoslovakia. My research will be included in an introduction of a translation which Dr. Lodge, in partnership with Broadview Press, will publish. I will look at texts that might have influenced Zamyatin to write We, like Frederick Winslow Taylor’s Principles of Scientific Management and novels by H.G. Wells, and how Zamyatin, in turn, helped to influence the dystopian novel we know today. George Orwell, since the publication of 1984, has acknowledged that Zamyatin directly influenced him to write the novel. It is believed that Aldous Huxley’s Brave New World was also directly influenced by Zamyatin. As a part of my project, I am also researching any articles, letters, manifestos that Zamyatin published before or after We, articles and letters from others in the same literary circles, and articles on Zamyatin by other authors and vice versa. By researching Zamyatin, I will look at the general response to his novel and how the Soviet Union regarded it, as the novel pokes fun at the Soviet regime; because of this, Zamyatin was imprisoned a couple of times and was eventually exiled to France. In We, Zamyatin portrays a future totalitarian society based on elements of the Soviet society, as the novel included surveillance, terror, the transformation of humans into machines, and the rational regimentation of all aspects of life.

Challenges of Piano Technique: An Individuated Analysis
Nahye Byun, Fain College of Fine Arts, Music
Mentor: Dr. Ruth Morrow
Each pianist has their own technique, created by both physical abilities and musical imagination. Since piano technique is individual, the author is researching habitual technical issues she has uncovered in her playing, and is seeking solutions based on observation of her own practice. Issues discussed will include fingering (what works and what doesn’t from both musical and physical viewpoints), hand extension (octaves, filled octaves, control when playing octaves), and the struggle which occurs when one hand is markedly of a different size than the other. Issues will be illustrated through examples from standard repertoire, as will solutions and/or “work-arounds” discovered by the author. Besides these findings, the author expects to find more difficulties and analyze them in accordance with the structure and abilities of her body parts.
P29  Antibiotic Resistance Due to Changes in the Drug Target  
**Anahi Palacios, Natalie Ragland,** College of Science and Mathematics, Biology  
Mentor: Dr. Jon B Scales  
Research on antibiotic resistance is critical due to antibiotics becoming obsolete as they are no longer able to kill certain bacteria. There are three ways bacteria can become resistant to antibiotics. The bacteria can change enzymes to degrade the drug, pump the drug out of the cell, or mutate the target of the drug. The antibiotic erythromycin is toxic to bacteria because it binds to ribosomes and disrupts normal protein synthesis. Mutations in the ribosomal RNA (rRNA) of *Escherichia coli* cause resistance to the antibiotic, erythromycin. The *E. coli* genome contains seven separate copies of the rRNA gene. In order to identify any possible mutations, we first analyzed each of the seven rRNA gene sequences based on the reference sequence of the *E. coli* genome in order to design primers perform polymerase chain reaction (PCR). PCR will be used to amplify the rRNA genes from both susceptible and resistant bacteria so that their DNA sequences can be cloned, sequenced, and compared to identify alterations.

P30  Bacterial Endophytes in Seeds with Varying Melatonin Content: Verification and Exploring the Possible Roles for Bacterial Endophytes in Seeds  
**Alaska Carrillo-Bell, Mi’Kaila Billinger,** College of Science and Mathematics, Biology  
Mentors: Drs. Magaly Zachary-Rincón & James Masuoka  
Bacterial endophytes reside inside plants without causing any harm. Based on published literature endophytes may provide plants with metabolites that serve as precursors for the synthesis of plant hormones, antioxidants, and other vital biomolecules. Also, endophytic bacteria may aid plants in nutrient acquisition, fight off pathogens, withstand adverse environmental conditions, etc. Previous EURECA scholars identified 12 distinct bacterial endophytes isolated from white mustard, wolfberry, milk thistle, and celery seeds. Among the 12 bacterial endophytes, we chose *Exiguobacterium acetylicum*, which was isolated from white mustard, because it is able to grow within a broad temperature range (4°C-50°C). We are exploring if *E. acetylicum* may be a good candidate to introduce into crop plants to increase yields under field conditions that are less than optimum. The approach for setting the experiment includes identifying the growth period of *E. acetylicum* colonies and growing Arabidopsis thaliana plants to prepare them for the inoculation with the bacterium. Arabidopsis seedlings are inoculated with *E. acetylicum* and exposed to 4°C or 37°C. We expect non-inoculated Arabidopsis plants to die after exposure to either temperature and *E. acetylicum*-inoculated plants to survive. We also expect to find *E. acetylicum* in the shoots and to appear in the offspring due to vertical transfer.

P31  Data Collection and Analysis from a Wind Turbine and Photovoltaic Solar Panel  
**Melanie Ronoh, Nchetachu kwu Anih,** College of Science and Mathematics, McCoy School of Engineering  
Mentor: Dr. Salim Azzouz  
A study is being conducted to monitor the impact of many climatic parameters on the power generation of an MSU installed wind turbine and photovoltaic solar panel. The purpose of the data collection is to establish correlations between the power output of the aforementioned systems and the climatic parameters. This new research project is using many existing and already installed monitoring weather equipment, which include a wind turbine, a sun-tracking solar panel, an energy training system, and a set of many data collecting weather outdoor sensors. Most of this equipment is located in the McCoy engineering building and its immediate neighborhood. Weather conditions such as temperature, pressure, humidity, and rainfall are monitored using a Davis Vantage Pro 2 data collecting system. A LabVolt Networking Data Acquisition System (NDAS) is used to measure the solar irradiance impacting the solar panel. The Davis and the NDAS systems have the ability to create real-time webpages to monitor the wind turbine, solar panel and weather conditions which are the main purpose of this project. Currently, LabVIEW software produces graphs of the produced power versus weather conditions instantly. This data will be channeled to an Excel sheet and analyzed for correlation purposes. This analysis constitutes the second goal of the project. The data analysis system will be used to teach upcoming mechanical engineering students about renewable energies and inspire creative ideas for the future.
**P32 Dynamic Contact Angle Measurements**

**Rumelia E. Thomas, Kelton Andre Vidal**, College of Science and Mathematics, Mechanical Engineering  
Mentor: Dr. Mahmoud Elsharafi

Contact angle measurements are important to determine surface and interfacial tension between solids and fluids. It is very important to have a 'water-wet' condition on the rock face in order to extract oil. In this research, the objective is to determine the wettability (water-wet or oil-wet), analyze how different brine concentrations will affect the wettability, and study the effect of the temperature on the dynamic contact angle measurements. This will be carried out using the Cahn Dynamic Contact Angle Analyzer DCA 315 to measure the contact angle between different fluids such as surfactant, alkaline, and mineral oil. This instrument is also used to measure the surface properties such as surface tension, contact angle, and interfacial tension of solid and liquid samples by using the Wilhelmy technique. In our research, surfactant is desirable as it maintains a high surface tension even when mixed with different alkaline concentrations. We managed to complete all the reactions between surfactant and alkaline. We used alkaline concentration from 20 ml to 1 ml, whilst keeping the surfactant concentration constant at 50 ml. It was observed that contact angle measurements and surface tension increase with increased alkaline concentrations. Therefore, we can deduce that they are directly proportional. We noticed that changing certain values on the software affected our results. It was found that after calculating the density and inputting it into the CAHN software, we got more accurate readings for the surface tension. We anticipate that the surfactant and alkaline can change the surface tension of the solid surface.

**P33 Energy from Saltwater**

**Chiedza Tokonyai**, College of Science and Mathematics, McCoy School of Engineering  
Mentor: Dr. Mahmoud Elsharafi

In the process of oil and gas production, there are large amounts of water released into the atmosphere as well as into the ground or soil. Chemicals such as sulfur and nitrogen oxides, Bitumen, calcium, Base oil, and sodium are released along with the water used in the processes. The water, combined with these chemicals, is commonly referred to as 'wastewater' and is disposed of. In this project, we look at ways to manage this wastewater and produce energy from it. Different types of soils are used as well as water with distinct brine concentrations or 'saltwater', which have properties that closely resemble or mirror the wastewater. Presently, there is a growing need for energy throughout the world. The demand for energy has put a strain on the current sources of energy and made energy of any form more expensive to attain. The goal of this project is to investigate or explore the feasibility of generating energy from this saltwater or wastewater. This will be done using the theory of a filtration cake. A filter cake is formed when substances are preserved on a filter and becomes thicker as it is retained. Increasing the thickness of the layer will increase the flow resistance of the filter cake. Data will be collected and analyzed by conducting experiments on different kinds of soil when it is exposed to saltwater. Ultimately, the expectation is that each type of soil produces different levels of voltage which will be measured with a voltmeter.

**P34 Experimental Study of the Nonlinear Dynamics in a Duffing Oscillatory Circuit**

**Zeltzin Reyes, Abigail Reyes**, College of Science and Mathematics, McCoy School of Engineering  
Mentor: Dr. Yu Guo

The goal of this project is to build on the precious investigation of the analytical solutions for nonlinear dynamical systems through discretization. Most systems naturally have a nonlinear tendency to them, making them appear chaotic, unpredictable or counterintuitive. Meaning that the system's initial conditions, such as time and position, lead to arbitrarily large divergences as the system evolves over time. This also makes it impossible for the system to reproduce the same initial conditions twice. If two identical setups were set with initial conditions as close as possible to each other, each system's course of motion would look entirely different once set in motion. Nonlinear dynamical systems like these are found all around us and are extremely important for industries such as cars, heavy duty machines, airplanes, and other large machinery whose course of motion is unpredictable and whose unpredictability is highly dependent on its initial conditions. Building from previous work, we will continue to use computational methods to analytically predict complex periodic motions. Complete stable and unstable solutions of periodic motions will be obtained for better understanding of nonlinear behavior. Bifurcations, chaos, symmetric and asymmetric phenomenon will be investigated. Using previous circuit design methods, we will take the single degree of freedom Duffing circuit to a 2 degree of freedom Duffing van der Pol oscillator circuit to simulate a more complex system.
Rapping Up Math Fluency: A Multi-Sensory Approach to Improve Math Fact Fluency
Sheri Speegle, West College of Education, Special Education
Mentor: Dr. Emily Rutherford
The purpose of this study is to determine if repeated use of rapping music and wrapping manipulatives will increase math fluency in students with learning disabilities. In addition to increasing math fluency, the goal is to give teachers a new tool to use in their classroom to help those struggling in math. Principal researcher will go into the participating elementary class Monday, Wednesday, and Friday for 20 minutes each time, lasting 4 weeks. Participating students will take a pretest and posttest to analyze results. The results of this study are expected to increase math fluency among 3rd and 4th grade graders with learning disabilities. The researcher will use this study to provide a new tool for teachers to use in their classroom to help improve math fluency levels among those struggling in math.

Identifying Impactful Practices in Learning Communities
Brianna Manning, West College of Education, Curriculum and Learning
Mentor: Dr. Kym Acuña
The purpose of this study is to identify any practices in the learning communities which are perceived by students and faculty to be the most impactful academically and socially. The idea is as specific, impactful practices are identified, they can be helpful in planning and implementing of future learning communities. As Midwestern State University works to solidify and grow learning communities across campus, an understanding of successful practices will strengthen the learning community design. We are interested in understanding the perspective of both students and faculty, not just the practices that are impactful, but why they believe these contribute to student success. Learning communities act to increase student engagement by increasing the quality and quantity of interaction among faculty and students, which should lead to increased positive attitudes that help with corresponding behaviors. We are using a mixed-methods approach in this study. We interviewed students who took a learning community course in Fall 2016 or 2017. Faculty who taught a learning community in Fall, 2016 or 2017 were surveyed. Results are pending as this is an ongoing project.
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