

Fall 2018



*Thursday,
November 15
Clark Student Center*

2018 Spring Undergraduate Research and Creative Activity Forum
Thursday, November 15, 2018
Clark Student Center

Oral Presentations

Time	Session	Room
9:00 – 10:55 am	1A	Comanche Suites
10:00 - 10:55am	1A	Special Fain Elementary Presentations
9:00 – 10:15 am	1B	Kiowa
11:30 am – 1:30 pm	2A	Comanche Suites
11:00 am – 1:00 pm	2B	Kiowa
11:00 am – 12:40 pm	2C	Wichita I & II
1:00 – 2:30 pm	3B	Kiowa
1:30 – 3:30 pm	3A	Comanche Suites
2:45 – 3:15 pm	Break	Cheyenne

Poster Presentations
Clark Student Center Atrium

Session	Time*	Poster No
I	9:00-10:30 am	1-6
II	10:30--12:00 pm	7-12
III	12:00-1:30 pm	13-18
IV	1:30-3:00 pm	19-25
V	2:00-4:00 pm	26-33

* Presenters must remain at their posters during evaluation session time.

Poster Hang times: Wednesday 3-7 pm, Thursday 8:00-8:45 am

Presenters are responsible for hanging and removing their own poster. Presenters are asked to break down the poster stand when they remove their poster and put it away in the storage box in the UGR office as a courtesy.

Award Announcements
5:00 pm
Comanche Suites

Oral Presentations

Comanche Suites

Session 1A

9:00 – 10:40 am

MODERATOR: MAGALY RINCÓN-ZACHARY

- 9:05-9:25 O1 *The Effects of Childhood Trauma among College Students*
Morelle McIntyre, Taylor Murphy, Cristina Muñoz and Shontay Tatum, Social Work, Gunn College of Health Sciences & Human Services
Mentor: Dr. Arumugham Packiaraj
The purpose of this research was to explore the effects of childhood trauma among social work and nursing students. The study participants (n=30) were selected by following purposive sampling method. Data was collected by administering a questionnaire consisting of the Child Abuse and Trauma Scale of Becker-Lausen, Sanders, and Chinsky (1995) and socio-demographic items. The collected data was entered into and analyzed using SPSS 25.0 version. The preliminary data analysis has revealed that there is no significant difference between study participants' race and ethnicity and their childhood trauma. Implications of the study and directions for future research are discussed.

Special Presentations by Fain Elementary 10:00-10:40

- 10:00-10:10 OF1 *How to Enhance and Promote our “Fain-tastic” Neighborhood*
Lawson Berend, Juliette Bindel, Georgia Humphreys and Cole Snodgrass
2nd Grade, Fain Elementary. Mentor: Ms. Robbie Kelly
Land for Edgemere Park was donated to the City of Wichita Falls. The family wanted a park where friends and families could gather. We are children who have benefitted from their generosity and would like to make a difference too. We would like to enhance the park so that it will be a cool place to play. We learned about what it takes to make changes in our local community through online research on parks and interviews with Mayor Stephen Santellana, Principal Clarisa Richie and the City of Wichita Falls Parks and Recreation Board. Surveys were given in order to give people an opportunity to have a voice and become involved. We discussed resources that will help us. We developed a plan to enhance our park by adding to it. We will have a family “Party at the Park” with local food trucks and oversized games to promote it. It is important to be involved in our community. It takes kids like us to dream of making changes. It also takes other people to make it happen.
- 10:15-10:25 OF2 *Why is Wind Important as a Natural Resource?*
Flora Berre, Reese Garner, Owen Davis, Alex Chase, Patrick Chavez, Aaiden Esquibel, Onyx Reeder and Ian Harvey, 3rd Grade, Fain Elementary
Mentor: Ms. Harley James
We need and care about wind, which is what led us to the question, “why is wind important?” We are studying natural resources so we decided to focus on wind and it’s an importance. We thought, many people don’t take the time to understand why wind is valuable. We learned a lot about wind and its importance throughout our research. We used websites such as epic.com. Our group read many online books, watch educational videos and studied many topics that relate to wind. We also studied wind energy, which led us to study windmills and how they work to turn wind into wind energy. Air moves from high pressures to low pressures and that causes wind. Wind is renewable. No matter how much you use it, it is always there. Wind also cools us off when we are hot, by reacting to the sweat our body produces. This wonderful natural resource also helps spread seeds. Wind is important because it is a renewable, natural resource. Wind also helps with pollination. We should take advantage of all that wind has to offer, it is free after all!

10:30-
10:40

OF3 *Today a Reader, Tomorrow a Leader*, **4th Grade, Fain Elementary**

Mentors: Ms. Lucy Alvarez, Ms. Jennifer Anderson, Ms. Tammie Tarver, and Ms. Laura Wetzel

How can we as authors and readers promote the importance of literacy in our community? In our community we have a growing number of people who cannot read or write. The population of American adults who struggle with literacy is 45% or 93 million citizens. In Texas alone 3.8 million people need services of an adult literacy program. 43% of adults with the lowest literacy rates live in poverty. Our purpose is to bring awareness by communicating the importance of reading and to raise money for the Wichita Adult Literacy Council.

As the 4th grade class at Fain Elementary, we will create a PBL project with the goal of promoting literacy toward our community. We will sell books of short stories from each homeroom class in order to raise money for the WALC. Our stories are fictional characters that struggle with reading. Our intent is to sell these books to our friends and family.

Our results with this project will be overall profit we make from the proceeds of the short stories. Another result we will accomplish is to bring awareness to ourselves and the community with the importance of reading and writing. We would like to educate the audience by communicating to people the importance of literacy beginning at a young age.

Fain's 4th grade class will conclude that 100% of our profits will go toward materials, books, and tutoring expenses which are needed at the Wichita Adult Literacy Council.

10:45-
10:55

OF4 *Launch into Learning*

Paige Worley, Reagan Hicks, Shawn Chandler, Kyrie Ruiz and Violet Chavez 5th Grade, Fain Elementary

Mentor: Mr. Frank Tarver

The objective of our study was to build a functional catapult. The methods used to achieve our objective were (a) researching types of catapults; (b) building and testing a model catapult; (c) visiting the Career Education Center to learn about the types of materials we need as well as the process of building a catapult; (d) building our full size catapult; (e) testing our catapult and (f) making changes to our catapult to improve its launch distance. Our research showed that a trebuchet style of catapult would give us maximum power when launching. Also, we discovered that 2x4's and 1x4's were the best type of wood to use in the construction of our catapult. Our projections are a functional catapult that can launch a potato 35 ft.

Oral Presentations

Kiowa

Session 1B

9:00 – 10:15 am

MODERATOR: MELISSA NEVINS

9:05-
9:25

O2 *Midwestern's O-Wa-Ki-Ya and the Feminist Rhetorical Perspective*

Emma Labedis, English, Prothro-Yeager College of Humanities and Social Sciences

Mentor: Dr. Melissa Nivens

This project examines archived issues of Midwestern's early literary journal, the *O-Wa-Ki-Ya*, and explores how its creative submissions reflect views of marriage during the 1930's and 40's. A qualitative research approach was used for this project, as it critically examines pieces from Moffett Library's Special Collections archives at Midwestern State University. Drawing on feminist rhetorical scholarship, this project recovers several student pieces to explore how women viewed marriage during the early years of the journal and how this perspective offers insight to the historical time period. Various stories and prose pieces are analyzed using feminist rhetorical practices to determine student perspectives regarding marriage and women's social standing during the 1930's and 40's. Of the entries that are examined, many show that the writers of the literary journal had progressive and sometimes

even radical - views of marriage for the era. Like well-known writers of the time such as Virginia Woolf and Charlotte Perkins Gillman, many of the student pieces show women who were questioning their traditional gender roles and expectations. Several writings include narratives that portray women who struggle to choose between education, work, or marriage.

9:30-
9:50

O3 *Norton I, Emperor of the United States*

Yujin Yoshimura, History, Prothro-Yeager College of Humanities and Social Sciences

Mentor: Dr. Whitney Snow

Joshua Abraham Norton is the first and the only 'emperor' in the United States. Norton was a successful businessman, but one day his business underwent bankruptcy. Then Norton, who had resentment over the politics, realized that the United States did not have an emperor, so he decided to assume the 'title' in 1859. Norton's proclamation was never officially recognized by the government. Some people thought him insane or eccentric. But many citizens of San Francisco welcomed Norton as an emperor and he loved that city. Local restaurants, theaters, and railroad company treated Norton as emperor. Local printing company cooperated to let Norton use their printer for free, to print his own money, which was accepted as a local currency. Policemen saluted for Norton whenever they found Norton patrolling. When Norton died in 1880, 30,000 people lined for his funeral. Norton left a lot of legacy with his proclamations. Norton had a talent of foresight, which some of the things we think its ordinary are actually proclaimed by Norton. The biggest legacy Norton left is a proclamation of San Francisco and Oakland Bay Bridge and Transbay Tube. A Police Chief left a quote, 'that he had shed no blood; robbed no one; and despoiled no country; which is more than can be said of his fellows in that line.'

9:55-
10:15

O4 *A Synopsis of Ancient Africa*

Kerdell Cuffy, Finance, Dillard College of Business Administration

Mentor: Dr. Whitney Snow

There is a common misconception that pre-colonial Africa was a continent of no history, no culture and no value. This misconception is further aided by the fact that most of Ancient Africa's history was brought down through oral tradition. When European explorers encountered numerous ruins of great Ancient African Empires they afforded these structures to lost white civilizations who mysteriously disappeared on the continent of Africa. This paper seeks to strike down this notion and provide a brief analysis of Ancient African empires. The timeline of this project spans from 4000 B.C.E to the 5th Century A.D. To give greater focus, this paper analyzes these empires population, social relations, and culture to name a few. One great empire that is mentioned in this paper is Ancient Egypt. The Ancient Egyptians were the first civilization of peoples to introduce the first practical calendar- designed much like the modern-day calendar completed with 396 days. This civilization was also one of the earliest to use precise astronomical calculations, evident in the construction of The Great Pyramids at Giza- which are almost precisely in line with the stars. This research was conducted mainly by secondary research methods which is the summary, collation and/or synthesis of existing research. Using references such as [The Lost Cities of Africa](#) by Basil Davidson, this paper brings historically accurate information that establishes that indeed Africa was a continent that participated in vast trade, had high culture and gave significant contributions to the shaping of mankind's history.

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

- 9:05-9:25 O5 *A Pulley Based Movable Apparatus for the Biology Department*
Johnny Cognasi, Jason Perkins, Joseph Randall and Melanie Ronoh
Mechanical Engineering, McCoy College of Science, Mathematics & Engineering
Mentors: Drs. Jeong Tae Ok and Zeki Ilhan
Botanists and Biologists remain in search of ways to control the environment in which experiments are conducted in order to collect data for research and teaching. The objective of this project is to provide biological researchers with a way to control grow light positioning that is efficient, simple, and repeatable for data collection. The most effective way to accomplish this is a freestanding frame with a centralized pulley system that will raise and lower a full spectrum light-emitting diode (LED) grow light with respect to plant growth, thus keeping the light intensity in an optimal position. Preliminary experiments and simulations result in a system that will be controlled by an Arduino interface. This interface will communicate with ultrasonic sensors that measure vertical distance to keep the light at a constant height above any vegetation. Initial power calculations for the design of the lifting apparatus indicate that a low voltage DC motor is appropriate to power the gears in an enclosed housing. Thermal calculations for the gear and light housings show that a polymer, such as high-density polyethylene (HDPE) is structurally sufficient and will dissipate any heat generated by the motor or the light. Prefatory simulations conclude an extruded aluminum material will provide a stable frame structure. This device will be presented to the Biology Department at MSU to conduct experimental seed bank projects. Confirmation for this objective will be declared with the findings of the Biology Department.
- 9:30-9:50 O6 *Study of Deflection in GPHE Products under Hydropressure*
Chenai Sukume, Joseph Munholland, Brian Blair and Chengxiang Xiao
McCoy School of Engineering, McCoy College of Science, Mathematics & Engineering. Mentor: Dr. Salim Azzouz
This project is a collaboration between Tranter and MSU to study the deflection of gasketed plate heat exchanger (GPHE) plates under high levels of pressure. The purpose is to improve the Tranter GPHE product development process. An experimental study will be conducted in three stages. The preliminary test is a qualitative proof of concept test using a slow forming resin which will be used to determine the positions where the highest plate deflections occur. These positions will indicate where the second and third test should be conducted. The second test will make use of a Vernier micrometre to obtain an initial set of quantitative results of the plate's deflection that takes place. The final test will be another quantitative test using a miniature linear variable displacement transducer (LVDT) to obtain values for deflection. At this stage of the study, preliminary experiments have been conducted to observe the gel time of the resin to be used as well as the effectiveness of the releasing agent initially under no pressure and then under slight pressure in a secondary experiment. Some drawings have also been made in preparation for the second and third tests which will both require a method of mounting in order to obtain reliable results from the system. Preliminary results indicate that the choice of resin and releasing agent is viable for the first test. We expect to obtain results that complement each other and provide a detailed study of the deflection that occurs in these GPHEs under high pressure.

9:55-10:15 O7 *Arconic Engines - Dip Seal*
Julie Goforth, Heather Goolsby, William Mendez and Khoa Tran
McCoy School of Engineering, McCoy College of Science, Mathematics
& Engineering. Mentor: Dr. Salim Azzouz
Arconic Engines is a manufacturing plant that produces turbine components for the aerospace industry using an investment casting process. The purpose of this collaborative project is to create an automated machine that will improve the ergonomics of the current manual wax dipping process and increases the production rate. Precision measurements of the equipment and the components were obtained at Arconic. The brainstorming sessions resulted in several ideas and initial sketches for the projected machine were established. These sketches were further refined into two mechanisms called P1 and P2 and turned to preliminary designs using the SolidWorks CAD software. The animations showed that the two mechanisms were able to mimic the movements of the worker during the free-hand wax process procedure. The two mechanisms were then shown to a panel of Arconic Engineers and their Health and Safety team. After gaining their approval, the team is currently working on finalizing the mechanisms design process. At this point 3-D models were printed to validate both mechanisms concepts, with which initial testing and analysis will be conducted. A Finite Element Analysis will be performed on critical components to test their reliability and to achieve a comfortable factor of safety. Additionally, the spring and cam theories will be used to dimension the springs and cams in both mechanisms. Once the designs meet the requirements given by Arconic Engines, models P1 and P2 will be constructed and tested. It is expected that the models will be operational by the end of the spring 2019 semester.

10:20-10:40 O8 *Multi-phase Flow Performance in the Wellbore*
Abigail Reyes, Till Gebel, Tapiwa Gasseler and Abdulhadi Alsadi
McCoy School of Engineering, McCoy College of Science, Mathematics
& Engineering. Mentor: Dr. Mahmoud Elsharafi
Multi-phase flow is found in various places both in nature and in practice, but multiphase flow is especially seen in the oil field operation. It occurs in oil and gas wells, gathering systems and many piping systems. The presence of liquid (oil/water) and gas must be accounted for when designing and predicting flow patterns in both wells and pipelines. Gas-liquid two phase flows are generally difficult to examine, model and predict in that the interactions between the phases are fairly complex and at times chaotic. Due to these complexities experimental as well as theoretical studies will be conducted in order to fully understand the relationship of gas-liquid phases. Experimental studies will consist of studying and examining flow regimes in a complex piping system that models wellbore flow behavior. Furthermore theoretical studies will consist of complex two-phase flow simulations. These experimental and theoretical studies will help to build systems that reduce production losses as well as further understand the complexities of multi-phase phenomenon.

Oral Presentations
Comanche Suites
Session 2A
11:30 am – 1:30 pm
MODERATOR: GEORGE LIANG

11:30- 11:50 O9 *Design and Implementation of a Bionic Robot Arm*
Nicholas Wolf, Michael Sweeting, Jomarie Leblanc and Omar Clarke, McCoy School of Engineering, McCoy College of Science, Mathematics & Engineering
Mentor: Dr. Yu Guo

A bionic robot arm is essentially a robot arm that is designed to function similarly to a human arm. The scope of this project includes the design, fabrication, assembly and programming of a bionic robotic arm. The design of our bionic robot arm is centered on implementing both aluminum for structural support, and lightweight 3-D printable material to act as housing around the internal components. Robotic arms are one of many entities that are encompassed by the field of robotics, a field that has existed for many decades, and is widely studied. Robotic devices have been implemented in numerous applications, such as robot assisted surgery, autonomous vehicles, robots used for machining and manufacturing, and the list of applications grows as time passes. One, more specific, field of robotics that is currently being studied is the field of humanoid robotics. The objective of humanoid robotics is to develop human-like machines that can mimic the functionality of our biological limbs. Our robotic arm features five degrees of freedom, and uses five servo motors to achieve these degrees of freedom. Our bionic robot arm utilizes a Raspberry Pi, programmed with Python, to control the movements of the servo motors. Each motor, and therefore each degree of freedom, can be controlled individually and simultaneously. This design results in fluid movements, resembling the movement capability of the human arm.

11:55- 12:15 O10 *PLC Operated Pick and Place Pneumatic Robotic Work Cell*

Jenom Pyeng, Bryan Rutledge, Mi'kyle Percentie, Frankline Akech

McCoy School of Engineering, McCoy College of Science, Mathematics & Engineering

Mentor: Dr. Jan Brink

The purpose of this project is to design and build a non-servo, pick and place, pneumatic robot as part of a larger work cell, which will include a hopper that feeds work pieces into the work envelope. The robot will be controlled using a programmable logic controller (PLC), and will feature additional inputs and output displays on a Human Machine Interface (HMI). The robot will be able to perform simple pick and place actions that would be applicable in the manufacturing industry. The authors' plan consists of developing Solid-works drawings and model for the robot and then have the required parts made in the McCoy School of Engineering machine shop. The design of the pneumatic circuit will also be considered, and will feature a pneumatic cylinder, a rodless cylinder, a rotary actuator, a rack and pinion type rotary actuator, and solenoid operated directional control valves. The expected results are a fully functional work cell, which features a robust robot, controlled by PLC and HMI with four degrees of freedom. These degrees of freedom are: raise and lower; rotate left and right; extension and retraction; and wrist roll clockwise and counterclockwise. It will also feature a hopper and cylinder that will insert the work pieces into the work envelope. The authors are in the process of ordering the required parts to build the overall design and will begin construction, which will conclude next semester.

12:20- 12:40 O11 *Bionic Hand with Force Feedback*

Kenneth Griffin, Constance Anih, Chance Craig, Dieonna George

McCoy School of Engineering, McCoy College of Science, Mathematics & Engineering

Mentor: Dr. Yu Guo

Bionic hands such as the Dexterous Hand from Shadow Robot Company, can be used in many industries to replace dangerous or repetitive jobs previously completed by humans. A bionic hand imitates the functions of a normal human hand. However, there still exists potential for bionic hands to improve. In this project, we have produced a new design of robotic hand which not only moves with precision and speed, but also incorporates one of the main senses of the human body. With the thin profile and unique mechanical design of our bionic hand, we expect to successfully create a bionic hand that is closely related to the human hand. To build a new bionic hand, we first researched hundreds of other versions of bionic hands. From our research and our experience in robotics, we were able to design a bionic hand with 22 degrees of freedom, which is 2 more than the Shadow Dexterous hand. With our new design, we also implemented a force feedback to our control system. By combining Force Sensing Resistors, and a strain gauge, the bionic hand can simulate a sense of touch.

12:45- O12 *Automated Pencil Sharpening Robotic Work Cell*
1:05 **Calvert Aaron, Parth Sagpariya, Jedeshkeran Chandrasegaran, Afolabi Adereti**
Mechanical Engineering, McCoy College of Science, Mathematics & Engineering
Mentor: Drs. Jan Brink and Yu Guo
This project is about an automated pencil sharpening work cell with the help of a robot, sensors and a camera vision inspection system. The servo robot used for this project is a Kawasaki RS005LA. The goal of this project is to learn about the robotics AS programming language, the robot, vision inspection programming and setup, pneumatics and the construction of the work cell. The steps in the work cell consist of: 1. The operator will place sixteen unsharpened pencils in a pallet.2.The robot will pick a pencil from this pallet.3.A color sensor will detect first if the pencil is pointing in the correct orientation.4.The pencil will be rotated by the robot if the pencil was not originally placed in the correct orientation.5.The pencils will be clamped and sharpened using a cylinder that pushes them into a pencil sharpener.6.The sharpened pencils will be placed in a pallet after this.7. One pencil will be picked randomly by the robot from the finished pallet and the robot will write the letters 'MSU 2018-2019' on a piece of paper that will be fed into the work envelope of the robot.8.The written document will be pushed by the cylinder towards the vision system for inspection. At the inspection station we will use the Cognex In-Sight Explorer camera to check whether the intensity of all the letters are sufficient. 9. This process can be repeated by removing finished pallets and loading empty pallets.

1:10- O13 *Mobile Wireless Surveillance System with Unpredictable Motion*
1:30 **Virgil Henry, Jewel Williams, Darrell Middlesworth, Mamgoree Sock**
McCoy School of Engineering, McCoy College of Science, Mathematics & Engineering
Mentor: Dr. Sheldon Wang
Many companies struggle to keep important information and products safe due to theft and are often forced to employ security personnel or traditional camera systems at a high cost in order to secure their assets. The aim of our project is to help better protect the critical assets of companies by implementing a 'Mobile Wireless Surveillance System with Coherent and Unpredictable Motion' which will reduce the issues of theft and the cost of traditional surveillance equipment. The System is made up of a compact mobile vehicle (surveillance drone on rails) designed to move horizontally along a track (similar to a train) in a random/unpredictable motion. This vehicle will be equipped with a high-resolution camera inclusive of digital zoom and night vision which will be used to monitor the property even under the cover of darkness. A single vehicle will cover a much wider range when compared to traditional camera systems. The system will be programmed to operate with a coherent and unpredictable motion in order to ensure that the vehicle keeps moving along the track in a way that makes its location/position difficult to predict by persons trying to gain illegal entry into the companies. The system will be powered with clean 'green' energy via a compact solar power and wind turbine system.

Oral Presentations
Kiowa
Session 2B
11:30 am – 12:40 pm
MODERATOR: SALLY HENSCHEL

- 11:30- 11:50 O14 *Analysis of the Effect of Yeast Extract Content on Cell Surface Hydrophobicity of Candida albicans.*
Melissa Rose, Biology, McCoy College of Science, Mathematics and Engineering
Mentor: Dr. James Masuoka
Candida albicans is an important part of the microbiome of humans and is found inhabiting the gastrointestinal and genitourinary tracts of healthy humans. In immunocompromised individuals this dimorphic pathogen can opportunistically cause diseases such as vaginal and oral candidiasis ('yeast infections' and thrush respectively) as well as more severe disseminated disease. The first step in colonizing the host is adherence, and cell surface hydrophobicity is an important factor in adhesion. Hydrophobic cells adhere better to mouse tissues are more resistant to phagocytic killing than are hydrophilic cells. Adherence and resistance to phagocytosis greatly contribute to the ability of *C. albicans* to cause disease. Previous experiments have shown that environmental conditions such as growth temperature affect cell surface hydrophobicity. We hypothesized that another growth condition, the growth medium composition, would influence hydrophobicity since this has been found to potentially affect other cellular processes especially the length of log phase and the cells ability to quorum sense. Previous experiments completed in yeast peptone dextrose broth and glucose yeast extract peptone showed differences in hydrophobicity. Based on these results and the composition of the two media, I hypothesized that the difference was due specifically to the amount of one component, yeast extract. I predict that higher concentrations of yeast extract will lead to higher percent cell surface hydrophobicity measurements. By understanding how cell surface hydrophobicity changes with the varying parameters within the human body we will gain a better understanding of how *Candida albicans* successfully colonizes multiple niches within the human host.
- 11:55- 12:15 O15 *Reducing Chromosomal Antibiotic Resistance in Escherichia coli*
Bethany Ann Russell, Biology, McCoy College of Science, Mathematics & Engineering.
Mentors: Drs. James Masuoka and Jon Scales
Antibiotic resistance is a clinical catastrophe. Bacteria often gain resistance through transfer of resistance genes from one cell to another. In some cases, these genes are encoded on extrachromosomal segments of DNA that can be naturally lost in a bacterial population. However, clinical studies suggested that chromosomally-located resistance factors can also be lost when patients are treated with an antibiotic to which the strain is susceptible. We hypothesized a similar loss of resistance could occur in vitro. We further hypothesized that loss of resistance is influenced by the targeting mechanism of the treatment drug. An *E. coli* strain isolated from seagulls was erythromycin resistant and tetracycline susceptible. This 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. 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. Subsequent treatment with tetracycline and with other antibiotics to which the strain is susceptible resulted in large repetition of the large insertion mutation in the erythromycin resistance gene. Further, changes in a penicillin resistance gene after treatment were also observed. We are currently analyzing these genetic changes to characterize these mutations, which will help explain the observed increase in antibiotic susceptibility. Through this research, we hope to identify mechanism(s) of reversion that could inform us of antibiotic use strategies that may increase the lifespan of drugs.

- 12:20-12:40 O16 *Vegetation Analysis in Middle Holliday Creek Sub-watershed: Applications toward Lake Wichita Revitalization*
Alex Nelson, Kimbell School of Geosciences, McCoy College of Science, Mathematics & Engineering. Mentor: Dr. Marcy Brown Marsden
Lake Wichita, located in the Middle Holliday Creek Sub-watershed, has lost depth due to sedimentation. While sedimentation is natural, its rate can be reduced by riparian vegetation which slows the path of water and reduces sediment transport. Vegetation analysis within the sub-watershed can indicate areas where vegetation management can improve lake lifespan and health. Dominant vegetation and tree density was determined by mixed-methods biodiversity sampling. Point-quarter sampling (to assess dominant tree species) and quadrat sampling (to evaluate forb diversity) were executed along transects at 10 and 30 m each side of the stream channel. Qualitative observation using aerial photos and visual inspections was used at some sites. A comprehensive plant list was compiled and categorized according to regional wetland indicators from the National Wetland Plant List. Point-quarter sampling assessed species importance as measured by relative density, dominance and frequency. Plant richness was lower in areas influenced by grazing, and dominant plant species were typically not indicative of riparian zones. The non-native species *Tamarix* spp. (salt cedar) was dominant in areas near the lake in mixed salt cedar-mesquite associations. Future actions of the Lake Wichita project can address several goals, including water levels, lake health, grazing, ecosystem function, and recreation. Actions range from invasive plant removal to expanding the range of functional wetland to creating more natural riparian areas. Preferred actions depend on multiple points of view including those of project managers and landowners and can inform a long-term plan for the future of the lake.

Oral Presentations
Comanche Suites
Session 3A
1:45 – 4:10 pm

MODERATOR: CLAUDIA MONTOYA

- 1:45-2:05 O17 *Economic Impact of the SBDC at MSU on Regional Economic Growth*
Simon Ospina, Economics, Dillard College of Business Administration
Mentors: Drs. James Owen and John Martinez
The aim of this paper is to estimate the economic impact of the SBDC at MSU on regional economic growth by using a sample of 130 long-term new venture and established business clients that received SBDC assistance. The results suggest the SBDC through its entrepreneurial support services help promote entrepreneurship in the local economy. Based upon our research we conclude the America's SBDC at MSU has a positive influence on the creation and retention of area business clients. Furthermore, our findings indicate the America's SBDC at MSU has a positive and significant impact on regional economic growth. Each dollar invested by state and local entities through the SBDC has more than paid for itself in local economic benefits.

- 2:10-2:30 O18 *A Comparative Study of the Cashless Societies' Progress and their Efficiency*
Shayne Matambanadzo, Finance, Dillard College of Business Administration
Mentor: Dr. Qian Li
In recent years a number of countries have made significant steps towards cashless societies. It is vital to understand how individuals and business are affected by this non-cash trend. This project aims to evaluate the progress that the U.S.A, U.K and India have made with initiatives for a cashless society. In each of these countries we aim to collect and analyze data on the average annual transactional value of debit/credit card usage, the number of businesses with majority electronic transaction activity as well to find the usage of various forms of wireless and their growth trend. All the data will then be used to evaluate the overall impact on consumers, businesses, and governments of cashless progress in the mentioned countries, including the benefits and drawbacks.
- 2:35-2:55 O19 *An Empirical Analysis of the Effect of Remittances on Income Inequality, Education, and Health in Developing Countries*
Hanna Gebel and Luka Gebel, Finance/Economics, Dillard College of Business Administration. Mentor: Dr. Pablo Garcia-Fuentes
This research assesses the effect of remittances on income inequality, education and health. It uses an unbalanced panel data set covering the period 1990-2015 for a sample of 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: is secondary school enrollment, is income inequality, is personal remittances/GDP, is poverty gap at \$1.90 a day, is the under-five mortality rate per 1,000 live births, is GDP per capita, SSA, LAC and MENA are regional dummies, and is the i.i.d error term. The next model assesses the effect of remittances on health is the under-five mortality rate per 1,000 live births, and is the i.i.d error term. The last model assesses the effect of remittances on income inequality: is income inequality and is the i.i.d error term. We expect remittances to complement the effect of decreasing income inequality on improving education and health; of improving education on health and reducing income inequality; and of improving health on education and reducing income inequality.
- 3:00-3:20 O20 *What Are the Social Impacts of Technology on Middle School Students?*
Jennifer Cope, Education, West College of Education. Mentor: Dr. Suzanne Lindt
The purpose of the research was to understand the social impacts of technology on middle school students' social development and to prepare a manuscript for publication to a professional journal. Every several years, a new label is generated to describe the latest cohort of young people, such as Generation X, Millennials, the iGeneration, etc. Researchers seek to understand whether the children today truly are different from the children of 10, 20, or 50 years ago, and if so, understand how they are different. A university database search was conducted and utilized Google Scholar and Academic Search Complete. Search terms included: technology impacts on learning, middle school students, technology effects on middle school students, technology in the classroom, and social development, which resulted in numerous articles. To narrow down the results, we limited results to scholarly journals, academic journals, and looked at publications from 2015 through 2018. These limits were chosen to yield relevant and trusted journals pertaining to our question. The research included both positive and negative outcomes of technology's influence on middle school students. The final selection of articles included topics to explain how technology impacts the classroom and everyday life communication for middle school students. Some of the findings showed that technology has benefited the classroom and created an engaging learning environment for the classroom. The current research in this area suggests that technology is a great learning tool to use in the classroom, but we should educate our teachers on ways to keep our students safe.

3:25-3:45 O21 *Meeting the Needs of Freshman in the Professional Programs of Education and Respiratory Care*
Staci Morgan and Madison Dodd, Education/Respiratory Care, West College of Education/Gunn College of Health Sciences & Human Services
Mentors: Drs. Suzanne Lindt and Jennifer Anderson

The current research study sought to understand the needs of freshmen students in the professional programs of Education and Respiratory Care. We wanted to know how to increase recruitment and retention efforts in these programs by identifying current freshmen in the programs and asking students what recruitment efforts were successful and which ones may need improvement. After identifying current freshman majors (education, n =112; respiratory care, n =17), researchers recruited freshman students from these majors to participate in focus groups and one-on-one interviews to discuss their experiences and beliefs as freshmen. Trained undergraduate student researchers led the focus groups, which lasted one hour each. One-on-one interviews ran by the student researchers lasted 15 minutes. Responses were transcribed and coded by the researchers. Following analysis of transcriptions, emerged themes were identified through cross-validation. Education themes that were successful included Mustang Rally, College Fairs, and student teaching programs offered in high school. Efforts that needed improvement included more information online, having alumni or students come talk to freshmen students, and conduct monthly meetings for declared majors to meet other students who they could potentially be in the program with. For Respiratory, more recruitment may be needed because few students entering college are aware of the newer profession. Conclusion: It was recommended by freshmen that more information be offered about the profession online and faculty visit science classes to tell students about the profession. Overall, we hope to improve recruitment and retention rates within our programs for years to come.

3:50-4:10 O22 *Pre-Service Teachers Noticing of Struggling Students' Mathematical Thinking*
Connie Ginnings and Amanda Latham, Special Education, West College of Education. Mentors: Drs. Emily Rutherford and Dittika Gupta

The purpose of this study is to examine pre-service teachers' noticing and understanding of work of students struggling in mathematics to help them plan instruction based on students' needs. In addition, the researchers hope this framework will be useful for planning individualized instruction for all content areas. The study uses a qualitative methodology and examines pre-service teachers work samples collected at different points in the study. Additionally, pre and post surveys were also examined for validating the themes emerging from open and axial coding of the data. Researchers hope that the results of the study will show increased awareness of examining student work samples and an improvement in pre-service teachers' understanding of students' mathematical thinking to better plan instruction. The researcher hope to provide a framework for pre-service teachers to implement in their classroom so that they can build instruction based on struggling student needs across all content areas.

Poster Presentations

Atrium

Session I

9:00 – 10:30 am

P1 *Periodic Motions in a Duffing Oscillatory Circuit*

Abigail Reyes and Tyler Cadette, Mechanical Engineering, McCoy College of Science, Mathematics & Engineering. Mentor: Dr. Yu Guo

By nature, most systems tend to be nonlinear. Nonlinear dynamical systems appear chaotic, unpredictable or counterintuitive. This means that the system's initial conditions lead to arbitrarily large divergences as the system evolves over time. Therefore, also making the system impossible to reproduce the same initial conditions twice. These nonlinear dynamical systems are found everywhere in practice and are highly important for many industries such as the airline industry, automotive industry, and all other industries whose course of work is unpredictable and highly dependent on its initial conditions. Due to the interest in these nonlinearities, circuit design has been used to experimentally model chaotic behavior. Furthermore, computational methods will be used to analytically predict the complex periodic motions. Complete stable and unstable solutions of periodic motions will be obtained for better understanding of the nonlinear behavior. Bifurcations, chaos, symmetric and asymmetric phenomenon will also be investigated. Conclusively analytical solutions for nonlinear dynamical systems will be investigated through discretization.

P2 *Building a 2-DOF Duffing Oscillatory Circuit*

Rojitha Goonesekere and Abigail Reyes, Mechanical Engineering, McCoy College of Science, Mathematics & Engineering. Mentor: Dr. Yu Guo

Extension power chord near the poster if possible (to demonstrate live PCB printing) Nonlinear dynamical systems appear chaotic, unpredictable or counterintuitive. This means that the system's initial conditions lead to arbitrarily large divergences as the system evolves over time. Therefore, also making the system impossible to reproduce the same initial conditions twice. These nonlinear dynamical systems are found everywhere in practice and are highly important for many industries such as the airline industry, automotive industry, and all other industries whose course of work is unpredictable and highly dependent on its initial conditions. Due to the interest in these nonlinearities, circuit design has been used to experimentally model chaotic behavior. Our objective here was to compare the relationship between theoretical results obtained using a program that solved the Duffing equation with a set of parameters to the results obtained utilizing the physical build of the Duffing circuit. After this comparison was done we extended our approach to printing a custom printed circuit board to observe any deviations between the hardwired circuit and PCB.

P3 *Data Collection and Analysis from a Wind Turbine and a Photovoltaic Solar Panel*

Melanie Ronoh and Constance Anih, McCoy School of Engineering, McCoy College of Science, Mathematics & Engineering. Mentor Dr. Salim Azzouz

A long term study is being conducted to monitor the impact of climatic parameters on the power generation of a wind turbine and photovoltaic solar panels. The purpose of the data collection is to establish correlations between the power output of the two systems and the climatic parameters. This ongoing research is using existing and already installed monitoring weather sensors. This Fall 2018 semester, the team is focused on establishing the wire connections between the dual solar panel and the wind turbine with the components of the LabVolt trainer. The connections involve the use of a solar charge controller which controls the battery charge and prevent it from overloading. The circuit has also two kilowatt hour meters, one for the solar panels and one for the wind turbine. They count the kWh consumed by a loading device. A voltage divider on the outdoor solar panels is deemed necessary to be able to connect an inverter converting 24 VDC to 120 VAC voltages. Currently, all the connections of the solar panel circuit has been finalized and the device is up running. The team is currently focused on establishing the connections for the wind turbine. The trainer integrated solar panel produced 12VDC and lit up a 120VAC light bulb through an inverter. When the circuit is closed, the kilo-watt hour meter was able to start counting the energy consumed by a light bulb. The wind turbine circuit is expected to be running by the end of the fall semester.

P4 *UAV-based Autonomous Payload Delivery using Computer Vision*

Don Wijesinghe and Michael Sweeting, McCoy School of Engineering, McCoy College of Science, Mathematics & Engineering. Mentor: Dr. Yu Guo

The objective of our project is to develop a drone with the capability of delivering an object without any external support. This requires the drone to be able to pick the object, transport the object and finally deliver it autonomously. This semester we will focus on improving the software developed from our previous involvement in the EURECA drone projects and building a completely new system to pick, carry and drop an object. Once both these tasks are achieved, we will introduce autonomous payload delivery for UAV's through the perfect execution of software and DCS (drone carry system). Currently we've been working on the software aspect of the drone to program it to fly in pre-determined flight paths. Our next step is to write the software algorithm to pick up and drop an object in the desired location (previous work involved us carrying out recognition which we will use to implement this). Then we will focus on building the DCS (drone carry system) to pick up and drop the object. The approach to building the DCS involves the application of the venturi principle to build a pneumatic system to hold on to the object and then release it when required. Once these objectives are achieved, we will implement the software and DCS in the hopes of building a drone that can pickup and deliver an object autonomously.

P5 *Building an Experiment Set-up to Analyze Different Types of Materials using a Portable Spectrometer*

Brian Blair and Grantley Samuels, McCoy School of Engineering, McCoy College of Science, Mathematics & Engineering. Mentor: Dr. Salim Azzouz

The purpose of this research was to design an experiment that enables students to determine and analyze the composition of different types of materials, namely metals, rocks and plastics, using a portable X-ray spectrometer. This research has produced a manual that will be used in the Material Science Lab at the McCoy school of Engineering. Along with identifying the types of elements composing the materials, and their composition proportions, the capabilities of the spectrometer were further explored. The quantum mechanics Rydberg equation was used to show how the wave length spectrum of a hydrogen atom was determined theoretically and a double slit method was proposed to determine the elements wave-length spectrum experimentally. A holster holding the spectrometer during the experiments was designed using the SolidWorks CAD software. It was found that the spectrometer can determine the wave-length spectrum of a large number of elements on the periodic table with the exception of the elements having a very tight wave length spectrum. It was also found that the exact composition percentage of the elements can be determined. From obtained the results, graphs and tables were create for stainless and carbon steels, as well as several rocks and one plastic sample. A printed holster for the spectrometer has been 3-D printed. The results were archived in the manual for the purpose of being used in the materials science lab to identify unknown materials.

P6 *Energy from Saltwater Mud*

Kelton Vidal, McCoy School of Engineering, McCoy College of Science, Mathematics & Engineering Mentor: Dr. Mahmoud Elsharafi

There is a growing need for energy throughout the world and this increase in demand for energy has now also put a strain on the current sources of energy. In the process of oil/gas production, there are large amounts of water released into the atmosphere as well as into the ground or soil. This water contains chemicals such as Sulphur and Nitrogen oxides, Bitumen, Calcium, Base oil, and Sodium. It is commonly referred to as 'wastewater' and is disposed of. The goal of this project is to investigate the possibility of acquiring energy from this wastewater. This is can be done by using various types of soils and water. Various mixtures were created using soils mixed with different percentages of clay and water with varying salinity. A small source of electricity was then applied to the saltwater mud to provide a voltage to the experiment. The chemicals in the mud are then expected to amplify the input voltage and create enough energy to power electrical devices. To prove this, a bulb or small fan will be connected to the mud via an electrode. It was found that clay soil produced more energy than sandy soil. Also, an increase in water volume would dilute the mixture and this would slow down the transfer of energy in the mud. The results of this work can be useful for the environment and the decreasing energy sources.

Poster Presentations
Atrium
Session II
10:30 am – 12:00 pm

P7 *Dynamic Filtration*

Jenom Pyeng, Tapiwa Gasseler, Jedeshkeran Chandrasegaran, and Gayal Hewakuruppu

McCoy School of Engineering, McCoy College of Science, Mathematics & Engineering

Mentor: Dr. Mahmoud Elsharafi

The purpose of this project is to conduct a Dynamic Filtration Test to Investigate the Effect of Preformed Particle Gels (PPGs) on Un-swept, Low-Permeable Zones/Areas. A filtration test is a simple means of evaluating formation damage. This work use schematically dynamic filtration test experiment design apparatus to carry out the various filtration test experiments. It use different core samples, various brine concentration, and various gel types. The permeability of each sandstone core samples is calculated before and after the filtration test. Experiments are still being observed. The objective of this study is to find methods that minimized the damage caused by PPGs on un-swept, low-permeable zones/areas, thus improving PPG treatment efficiency. This approach will identify the best properties of the PPGs, which can neither penetrate conventional solid rocks nor form cakes on the rocks' surface.

P8 *Comparison of Several Different Hydraulic Rapid/Traverse Feed Circuits*

Calvert Aaron, Mechanical Engineering, McCoy College of Science, Mathematics & Engineering

Mentor: Dr. Jan Brink

Hydraulic Rapid Traverse/Feed Circuits are commonly used in industry for automated manufacturing processes to allow cylinders to move fast to a work piece and then to decelerate to a slower feed rate when the work piece is contacted and formed, drilled, tapped etc. in order to prevent the tool and/or work piece from getting damaged. The purpose of this study is to investigate several different types of hydraulic rapid traverse feed circuits by comparing speed, force capabilities, horsepower efficiency and relative cost. To accomplish this investigation, a conventional circuit with a fixed displacement pump, a pressure compensated variable volume pump circuit system, a hi-lo system and a regenerative and conventional system was built, simulated and studied using Automation Studio software. In addition, the conventional circuit with a fixed displacement pump and the combination of regenerative and conventional circuit will be built in the engineering hydraulic laboratory. Several formulas were used to calculate speed, horse power efficiency and max force. These circuits consist of different hydraulic pumps, an electric motor, pressure relief valve, direction control valve, flow control valve, 2-way valve, normally passing valve, and doubling acting cylinder with loading device. Preliminary findings show that the conventional circuit has the least horsepower efficiency while the pressure compensated variable volume pump system has the most horsepower efficiency. However, the pressure compensated variable volume pump is the most expensive. Also, the regenerative system has the same rapid traverse velocity compared to the other circuits, while using a smaller cylinder and a smaller pump.

P9 *Robot Soccer Using Artificial Intelligence*

Joshua Washington and Carson Conrady, McCoy School of Engineering, McCoy College of Science, Mathematics & Engineering. Mentors: Drs. Yu Guo and Jeong Tae Ok

Robot soccer incorporates robotics and artificial intelligence, two fields of study with a wide range of applications. Techniques learned in this project could potentially be applied to self-driving cars, aerial drones, or other intelligent machinery. In robot soccer, a robot player is trained to recognize objects within an environment without human assistance. It is also trained to autonomously decide an appropriate action to take, both from an individual and team perspective. We perform visual recognition training by using an artificial neural network and supervised learning. By creating labelled training datasets, we can use OpenCV to train the network to recognize relevant objects such as a ball. We use this trained network on a Raspberry Pi microcomputer to provide sensory data to programs we have written, such as a distance-detection and positioning algorithm. A robot will calculate distance by measuring the apparent size of a recognized object relative to the entire field of view. This algorithm will provide the necessary starting position for the robot's decision-making algorithm. We designed and printed custom adapters to attach hardware to the robot. A camera provides video to the Raspberry Pi, and the Raspberry Pi controls the robot's motions. Visual recognition training and programming are currently underway. This project

combines engineering and computer science to provide better familiarity with the approaches and tools used in the fields of robotics and artificial intelligence. It may also serve as a bridge to higher-level advances in technology.

- P10 *Targeting the mdtE Gene of E. coli Via Cas9/CRISPR to Investigate its Role in Erythromycin Resistance*
Natalie Ragland and Anahi Palacios, Biology, McCoy College of Science, Mathematics & Engineering
Mentor: Dr. Jon Scales

Studying the causes of antibiotic resistance in bacteria is essential in understanding how to treat infection. *Escherichia coli* (*E. coli*) is a bacterium found naturally in the human digestive tract, although several strains are considered pathogenic and are responsible for a multitude of diseases. One of the ways that *E. coli* can become resistant to antibiotics is through the multidrug resistant protein (mdtE) gene which confers resistance to a variety of drugs including erythromycin. In order to study the effects of mdtE, we will disrupt the mdtE gene using the CRISPR/Cas9 gene editing system. Currently, we have determined the appropriate region of the mdtE gene to target for disruption and have determined the appropriate targeting vector to deliver the CRISPR sgRNA to the bacteria.

- P11 *Characterization of Escherichia coli Population Diversity in Locally Resident Canada Geese*
Tarrah Miller and Shanice Toussaint, Biology, McCoy College of Science, Mathematics & Engineering. Mentor: Dr. James Masuoka

The emergence and dissemination of antibiotic resistant pathogens continues to plague healthcare causing an increase in healthcare costs and mortality rates. Migratory birds are able to transfer antibiotic resistant strains to local organisms. We hypothesized that the seasonal seagulls that arrive each winter serve as a source of new strains of bacteria and that are then introduced into the local environment and then picked up by our resident waterfowl. By comparing strains of *Escherichia coli* (*E. coli*) from both resident Canada geese and migratory seagulls, we will be able to test this hypothesis. Fecal samples were collected from two separate Canada goose individuals, then used to inoculate a selective medium to encourage *E. coli* growth. Ten presumptive *E. coli* colonies were selected and transferred to a non-selective medium. Biochemical testing was carried out to confirm identity of the bacterial strains. Of the ten isolated colonies, nine were identified as *E. coli* and one was *Enterobacter cloacae*. Biochemical testing also revealed that the bacterial strains of *E. coli* isolated from two different goose samples varied in the way they fermented sugars, suggesting that the geese are colonized by more than one strain of *E. coli*. Current work will involve testing for antibiotic susceptibility. Analysis of DNA and cell protein profile will allow us to observe differences at the molecular level. These results, along with correlation with antibiotic resistance patterns, will help us understand how microbes from seasonal animals can impact local populations.

- P12 *A Study of the Effects of Ground Thyme on the Growth of Escherichia coli (E. coli)*
Venus Shirazy, Ila Y. Kamath, Mesonma A. Anwasi, Mikayla R. Bailey, IB Biology & Chemistry/Biology, Hirschi High School and McCoy College of Science, Mathematics & Engineering
Mentors: Drs. Magaly Rincón-Zachary and James Masuoka

This study examines the effect of the common herb thyme (*Thymus vulgaris*) on the growth of the common bacteria *Escherichia coli* (*E. coli*). Thyme has been used throughout history for medicinal purposes, dating as far back as 460 BCE when Hippocrates, “the father of Western medicine,” recommended it for treatment of respiratory conditions. The medicinal use of thyme does have a scientific basis; thyme leaves contain up to 50% thymol, a potent antiseptic. Past studies have demonstrated the effect of thyme on various media. *E. coli* was chosen for this experiment due to its availability in Midwestern State University's stock, as well as its abundance in the environment, foods, and the intestines of humans and animals. Most strains of *E. coli* are harmless and help maintain digestive tract balance, but there are some exceptions. Certain strains of *E. coli*, commonly ingested through contaminated food and drink or through contact with animals, have been known to cause severe cramps and diarrhea. Our experiment will fulfill the requirements of the IB Group 4 project and will also allow us to gain an understanding of antiseptic properties of the compound thymol in regards to *E. coli*. We hypothesized that ground thyme would inhibit the growth of *E. coli* and its inhibitory effect would be directly proportional to the amount, in milligrams, of the thyme powder used. We tested the hypothesis using standard bacteriological protocols to grow bacteria in a laboratory. We will discuss our preliminary results.

Poster Presentations

Atrium

Poster Session III

12:00-1:30 pm

P13 *Alteration of Mount Scott Granite as Determined by X-Ray Powder Diffraction*

Sonasha Gehashi Perera, Kimbell School of Geosciences, McCoy College of Science, Mathematics & Engineering. Mentor: Dr. Jonathan Price

The alteration of rocks, a process that changes the mineral composition due to interaction with aqueous fluids including meteoric waters (weathering), is an interesting geological phenomenon. To document alteration in the well-characterized Mount Scott Granite of southwestern Oklahoma, I examined portions of samples from a shallow borehole (123 m total depth) through X-Ray Powder Diffraction (XRPD) on a Rigaku MiniFlex 600 using PDXL2 software. Prior work showed decreasing fractures and increasing magnetic susceptibility with depth. The study revealed that alkali feldspar dominates all samples. The near-surface samples contain most of the minerals found at all depths along with two new minerals, clinocllore and hematite, which are found to a depth of 28 meters. Results also revealed the percentage of edenite and phlogopite increase with depth. XRPD analyses reveal that edenite and phlogopite have altered into clinocllore and hematite due to near surface weathering because of increased fracture density.

P14 *Hydration on Grand Anse Beach*

Julianne Plambeck, Wilson School of Nursing, Gunn College of Health Sciences & Human Services
Mentors: Drs. Jennifer Anderson, Tammy Kurszewski and Michael Mills

Purpose: the reason for pursuing this research project was to find out if people are obtaining hydration for their body on the island's most popular beach. Grand Anse beach is where families, college students, locals, and every other person on the island hangout, either to workout, have fun, sun tan, etc. which all involve sweating and losing bodily fluids. Methods: A systemic data approach was used to collect data. Qualitative data was obtained through observation of a blind study of the researcher going to the beach at various times of the day, usually morning, noon, and evening, to observe different subjects on the beach. Data the researcher gathered were typically recorded by typing notes on an iPhone to make it look like texting as too not raise suspicion from people on the beach. Result: The main consensus was that the majority of the people on the beach were not receiving the proper hydration, they were losing more fluids than they could replace at the time. The observations of the study may not apply to different time of the year on the island, different factors may alter the researcher's findings and observations.

P15 *Programming Your Heart*

Julianne Plambeck and May Trinh, Wilson School of Nursing/Computer Science, Gunn College of Health Sciences & Human Services/McCoy College of Science, Mathematics & Engineering
Mentor: Dr. Tina Johnson

The goal of this project is to create a unique learning experience for students by producing a virtual reality (VR) model of the human heart. This model will be used to provide an in-depth learning experience for nursing students. To achieve this goal, one student from the Department of Nursing and one student from the Department of Computer Science are working collaboratively to research the anatomy and physiology of the human heart and implementing their findings in a Virtual Reality environment. Unity 3D software is being used to simulate a beating heart with various functions such as zoom in/out, take apart, and display educational information. The simulation is being developed for use with the Oculus Go, a standalone VR headset. Both students are working independently during the week on their portions of the project and then meeting on Thursdays to integrate their progress. Currently, the animated heart has been imported into Unity 3D and zoom in/out has been implemented. Additionally, the Oculus Go has been ordered and testing will begin as soon as the Go is received.

P16 *Evaluation of Computer Performance*

Tyler Roop and Ravishka Rathnasuriya, Computer Science, McCoy College of Science, Mathematics & Engineering. Mentor: Dr. Nelson Passos

Our research will test whether the basic components of computer architecture, cache memory, pipeline, and branch prediction, can cause a computer to perform worse in certain instances: such as slowing down programs or causing bugs or vulnerabilities that wouldn't otherwise be accessible. First we tested separately the performance of the cache memory, pipeline, and branch prediction by writing programs to attempt to slow each one down. Then we tested the results of Meltdown and Spectre; computer bugs that utilized flaws in the computer architecture to access data that is usually protected. Then we wrote a program to combine the others and attempt to slow down all at once, experimenting in a Windows and a Linux like environment. We were able to show some results for the cache memory, pipeline, and branch prediction software individually. However, when testing a complete slow down, the system was able to overcome the flaws we tried to introduce. We believed that the initial system we were using was able to predictively fix the problems. To remedy this issue, we moved to a Linux environment. Computers today have been built up to be better than previous models. Even with known bugs, it is difficult to replicate results. Investigating Spectre and Meltdown helped us to understand how problems can arise, but even when using the code to access the bugs, they didn't always work. We were unable to circumvent the basic architecture with our code, but we have some new options planned for the future.

P17 *Deciphering the Mechanism of Protein Targeting Machinery in Chloroplasts*

Kameron Shrum and Tyler Jones, Chemistry, McCoy College of Science, Mathematics & Engineering
Mentor: Dr. Fu-Cheng Liang

The primary goal of this project is trying to understand the dynamics of membrane protein chaperones, whose function is to prevent membrane proteins from aggregation, restore aggregated proteins, and transport these proteins to their final destination at the membrane. A chloroplast contains approximately 3,000 known proteins. However, only a small fraction are encoded inside the organelle. Most of the proteins are synthesized in the cytosol of the plant cell and, therefore, must transport across the cell membrane to reach their final destination inside the organelle. The light harvesting chlorophyll a/b-binding proteins (LHCPs) localize in the thylakoid membranes with chlorophyll to perform photosynthesis. However, LHCP is nuclear encoded and made in the cytosol. The sheer abundance of LHCP and their hydrophobic nature demands highly effective chaperones that protect it from aggregation as they travel through the aqueous space. There are several types of chaperone proteins to protect the LHCP from aggregation and keep the LHCPs in a translocation competent state before they reach the thylakoid membrane. We will investigate the properties of two particular chaperones, LHCP Translocation Defect (LTD) and the cpSRP complex and cpSRP43 and cpSRP54 that function in the process of transport of LHCP to the thylakoid membrane. We perform FRET analysis to test the hypotheses that the LTD is a membrane protein chaperone that captures LHCP upon entry into the stroma and delivers LHCP to the cpSRP complex.

P18 *Advanced Via Individual Determination (AVID) Program: High School Students' Perceptions*

Hailey Hall, Social Work, Gunn College of Health Sciences & Human Services.

Mentor: Dr. Packiaraj Arumugham

The purpose of this study is to explore the effectiveness of the Advanced Via Individual Determination (AVID) program and the level of college readiness as perceived by the high school students. The study participants (n=47) were selected by following purposive sampling method. Data was collected by administering a questionnaire consisting of socio-demographic items, items pertaining to current grade level/ classes and, students' views regarding the various aspects of AVID. The collected data was entered into and analyzed using SPSS 25.0 version. The preliminary data analysis has revealed that majority of the study participants consider the AVID program to be effective in improving their GPA and in preparing them for college education. Implications of the study and directions for future research are discussed.

Poster Presentations

Atrium

Poster Session IV

1:30 – 3:00 pm

P19 *Mental Illness and the Right to Die*

James Lue and Mikaela Cloyd, Psychology, Prothro-Yeager College of Humanities and Social Sciences. Mentors: Drs. Teresa Tempelmeyer and Beverly Stiles

The purpose of this study was to assess whether people support Right to Die for individuals with mental illness and if support changes based on type of mental illness. Additionally, we attempted to investigate whether the perception of cause of mental illness had an impact on the support of Right to Die. Some states define the Right to Die as giving mentally competent adult patients with a terminal illness and a prognosis of six months or less to live the ability to request and receive a prescription medication to bring about their death. Data was collected from the Midwestern State University undergraduate student body. Participants (n=382) responded to an anonymous online survey powered by SurveyMonkey and were randomly assigned to one of four scenarios: severe depression, schizophrenia, severe anxiety, and Alzheimer's disease. The difference between supporters and non-supporters was non-significant across all four mental illness scenarios. For severe depression, familiarity with depression and the belief that depression was related to the individual's own bad character were significant predictors of support for the Right to Die. For schizophrenia, if participants believed that the condition was caused by the individual's own bad character, they were less likely to support Right to Die. Type of mental illness was not found to be related to support of Right to Die. Familiarity with the illness and belief of an individual's bad character were significant predictors of Right to Die for severe depression and schizophrenia, but not for severe anxiety and Alzheimer's disease.

P20 *Physical Disability and Support for Right-to-Die: Selfishness and Religiosity as Predictors*

Andrew Coyne and Maggie Wyatt, Sociology, Prothro-Yeager College of Humanities and Social Sciences. Mentor: Dr. Beverly Stiles

This research examines stigma, selfishness, and religiosity as predictors for support for the right-to-die among those individuals who possess a physical disability. Disabilities examined are paraplegia, facial disfigurement, and being AIDS+ or HIV+. Therefore, we have measured two visible disabilities and two non-visible disabilities. The right-to-die was defined in three ways for the purpose of this study: Physician-Assisted Suicide; Euthanasia, and Dying with Dignity. This presentation is part of a larger research project of 871 student respondents who were surveyed at Midwestern State University in the spring and fall of 2018. The current presentation contains data on 346 of the students who responded to the survey questions on physical disability. We found that selfishness and religiosity predicted that one would support the right to die for those who had a physical disability. Perception of responsibility was not a predictor. Individuals with disabilities are often stereotyped and categorized solely by their disability. Medical professionals tend to view severe disability as a tragedy. Stereotyping is often negative and tends to lead to prejudice, stigma and discrimination. Stereotypes of those with disabilities may be positively assessed, or negatively assessed as entailing pity or unnecessary dependence. Regardless, the literature indicates that persons with disabilities are often viewed as being responsible for their own condition (Smart 2015). The visibility of a disability can influence how one is stigmatized because persons with a non-visible disability have the option to disclose their disability, whereas someone with a visible disability does not have this option (Watson, 2002).

P21 *Stress and Anxiety among College Students*

Caytlin Bronaugh, Colleen Browning, Amor Carrillo and Lauren Bagley, Social Work, Gunn College of Health Sciences & Human Services. Mentor: Dr. Packiaraj Arumugham

The purpose of this study was to find out the perceived stress and anxiety among college students. The study participants (n=50) were selected by following stratified random sampling method. Data was collected by administering a questionnaire consisting of Cohen's Perceived Stress Scale (1994), Spitzer, Kroenke, Williams, and Lowe's Generalized Anxiety Disorder Scale (2006), and socio-demographic items. The collected data was entered into and analyzed using SPSS 25.0 version. The preliminary data analysis has revealed that there is a significant moderate positive correlation between study participants' GPA and their perceived stress and anxiety. The

preliminary analysis has also revealed that there is a significant low negative correlation between participants' age and their perceived stress, while there is no significant correlation between their age and anxiety.

P22 *Conceal/Reveal*

Autumn Bellar, Tanner Slavens, Gwyndalyn Gonzalez, Samantha Mitchell and Patrick Rowland, Art/Radiology, Fain College of Fine Arts /Gunn College of Health Sciences & Human Services

Mentor: Drs. Mandy Sedden, Kimberly Onstott, Catherine Prose and Morgan Page

The purpose of this project is to explore the forgotten relationship between art and science by opening up a new avenue of interdisciplinary collaboration with art and radiology students. The art students utilized barium, which is a radiographic contrast, by either mixing it with a paint medium or lightly coating images with the contrast. Some of the art pieces are two layers; the first (hidden) layer is painted with barium and the second (visible) layer is a beautiful image using acrylic paint. After the images were finished, three radiology students took x-rays of the images to see how well the contrast appeared. Preliminary findings have shown water-based paints do not mix well with barium contrast. However, barium contrast did mix well with oil-based paints, and they did well being 'painted' on top of pencil drawings. After several trials, certain x-ray techniques allowed the scanned images to mimic the original or display the hidden image behind the paint. The art students gained a better understanding of the scientific qualities of their profession, and the radiology students gained a respect for the importance of art in science while they developed their technical skills.

P23 *The Effects of a Bus on Social Lives*

Amanda Threlkeld, Alexandra Lewis and Brian Lang, Gunn College of Health Sciences & Human Services. Mentors: Drs. Jennifer Anderson, Tammy Kurszewski and Michael Mills

On the island of Grenada, St. George's University has a bus system available to its students and faculty. The purpose of this study was to analyze the effects of bus transportation on social lives. A systematic data approach was used to collect data. Qualitative data was obtained through observation by a blind study of the research riding the bus at various times of the day, usually noon and evening, to observe different subjects and their interactions on the transportation system. To avoid suspicion, the researchers recorded the data on the Notes app on their iPhones. The study showed that there were no correlations between the passenger's outward appearance, their point of departure, or belongings they carried and their level of communication. The dominant themes of this observation are that younger females were more likely to interact on the St. George's busing system. Another theme demonstrated in this study was that individuals riding the bus alone or wearing earbuds were less likely to interact. Young people were less likely to interact with other passengers while listening to music, but older people showed no correlation between listening to music and passenger interaction. From this study, the researchers concluded public transportation on college campuses has no effect on social lives or the mental health of the passengers. Further observation research should be conducted during a long semester when more students are on campus to determine if public transportation could benefit social lives, and in turn, overall mental health.

P24 *Nursing Students Attitude Towards Inter-professional Teams and Team Approach to Care*

Tina Nguyen, Wilson School of Nursing, Gunn College of Health Sciences & Human Services

Mentor: Dr. Kathleen Williamson

Nursing programs work collaboratively with other health disciplines in the pursuit of health and wellness promotion. Therefore, there is a call for IPEC (Inter-professional Education Collaborative) competencies to be integrated into healthcare providers' education and practice. However, the IPE paradigm is not fully actualized in nursing. Health profession educational programs should promote and encourage efforts that would enhance inter-professional learning experiences. There is a lack of research on the interdisciplinary education in nursing in the academic setting. This descriptive study involved 300 undergraduate nursing students' in the WSON BSN program. The aim of the study was to investigate the attitude toward inter-professional teams and team based care and to adjust teaching and curricula to meet the IPEC competencies. The purpose for the study was to measure nursing students' attitudes of inter-professional education and inter-professional collaborative practice. The project focused on both early learners as well as the change in attitudes and perceptions as a foundation. Students were asked about their attitudes toward inter-professional teams and the team approach to care using the SPICE-R2 instrument. This project will contribute

to the creation of a system that allows health professions to possess a set of core competencies regardless of their discipline. Some core competencies includes working in interdisciplinary teams, employing evidence-based practice, and applying quality improvement in care, which is needed for any healthcare profession. The rationale for IPE and to study IPE is to improve our health outcomes, which can be done by strengthening our health system.

P25 *Empowering Patients to Reduce Lumbar Puncture Associated Spinal Headaches*

Stephanie Lindsay, Wilson School of Nursing, Gunn College of Health Sciences & Human Services

Mentors: Drs. Stephanie Baker and Robin Lockhart

Objective: To determine risk factors for developing post-lumbar puncture headaches, interventions to prevent them, and interventions to relieve them. Design: Systematic review of the research literature Setting: Health-care facilities performing lumbar punctures Participants: Forty-one research articles evaluating randomized controlled trials, quasi-experimental interventions, case-control, and cohort studies targeting lowering post lumbar puncture headache incidences. Main Outcome Measures: Interventions for lumbar puncture, treatment, risk factors, and outcome expectations. Analysis: Systematic search of 553 articles and review of 41 articles meeting search criteria. Results: Interventions that lower incidences of lowering post-lumbar puncture headaches after a lumbar puncture include smaller gauge needles, use of atraumatic needles (pencil-point or Whitacre), and less fluid being removed. Interventions that have minimal differences are increasing fluid intake, prolonged periods of rest after procedure, and administering intravenous caffeine. Low body mass index, female, and an age of younger than 35 years old increase incidences of headache. Conclusions and Implications: A number of intervention approaches lessen the incidence of a post lumbar puncture headache. Much of this research has methodological limitations, rendering it difficult to deduce conclusions across studies and further research needs to be done that includes subject. However, using smaller gauge atraumatic needles and removing a small amount of fluid has considerable support in the literature. Key Words: lumbar puncture, headache, risk factors.

Poster Presentations

Atrium

Poster Session V

2:30 – 4:00 pm

P26 *Analysis of Consumption Patterns in Grenada*

Bailey Smoot, Rachel Morgan, Austin Martin Wilson School of Nursing, Gunn College of Health Sciences & Human Services. Mentors: Drs. Anderson, Tammy Kurszewski and Dr. Michael Mills

Purpose: The purpose of this study was to analyze the consumption patterns of the Grenadian population to determine if there was a correlation in their habits and the statistics found regarding the high burden of diabetes and heart disease in the Caribbean Islands. Method: The researchers obtained data by visiting the local supermarket on various days of the week at different times and taking notes of the subjects and items in the notepad of their smart phones. The researchers would discretely take pictures of the subjects' carts for data completion. The research group would always purchase at least one item in order to blend in as an average student shopper. Results: This study showed that all of the consumers who purchased drinks had at least one sugary drink in their cart and almost all of the drink purchases were full sugar drinks instead of water. The researchers also noted that there were no purchases of reduced sugar or diet drinks during the duration of the study and very limited amounts of these products were sold in the store. Lastly, the researchers noticed that many of the local Grenadian shoppers purchased large amounts of starchy complex carbohydrate foods. Conclusion: The researchers concluded that a large amount of sugar filled food and drinks were purchased at the local grocery store in Grenada. This should provide substantial information to support the idea that the nutritional intake for individuals in Grenada plays a significant role in the prevalence of diabetes and heart disease on the island.

P27 *The Socio-emotional Contagion Effects in the Spread of Feminist Digilantism (The case of a Texas university): Literature review and Netnography.* **Justice Munroe**, Management, Dillard College of Business Administration. Mentors: Drs. Niyati Kataria and Beverly Stiles

Recently, there has been a spate of social movements calling out violence against women and girls (VAWG) that all seek justice online (#MeToo, #Times Up). This has been variously termed digilantism, e-vigilantism, cyber vigilantism, netilantism etc. (Jane, 2017; Chang & Poon, 2017). Such online activism allows vigilantes to inform and invite large audiences with specific interests to achieve a social change by drawing support through collective action (Kende, Zomeran, Ujhelyi, & Lantos, 2016). Additionally, 'horizontal violence' is defined as intergroup conflict that is manifested in overt and covert non-physical hostility such as sabotage, infighting, scapegoating and criticism (Duffy, 1995). Recently, researchers have suggested that horizontal violence should be renamed 'horizontal action' (Tambe, 2017) to capture the phenomenon of why women are increasingly choosing to speak out online about sexual violence. Tambe suggests that the election of Trump caused women who had experienced sexual violence to react to that violence in their immediate environment (horizontally) because they were helpless to react to that violence vertically (i.e. towards the U.S. President). Our study investigates whether horizontal action may have influenced the recent #ComplicitMSU movement through social and emotional contagion over social media. We present the results of our extensive literature review on feminist digilantism as well as the initial findings of our netnographic research (Kozinets, 2002) on the #ComplicitMSU twitter feed. Next semester, we will conduct a survey of MSU students to understand the potential social and emotional contagion that this movement may have had on campus.

P28 *Reverse Title IX*

Rebecca Goodman and Robert Kitchen, Kinesiology, West College of Education.

Mentor: Dr. Sandra Shawver

Title IX is a part of the Education Amendments and was passed in 1972 as a federal civil rights law. It was enacted to eliminate sex discrimination in educational programs and activities receiving federal funding. The purpose of our research is to review and analyze available literature related to the negative impact the law has had on men's collegiate athletics. Through our pilot study, we will gather and present information based on current literature as a narrative literature review. Title IX opened up opportunities for the growth and inclusion of females in collegiate sports. This growth helped to bring about new facilities and improved equipment, along with increasing the amount of individual participation. In some cases, Title IX has had the opposite effect on men's collegiate athletics at the same level as male sports have been cut so that their female counterparts can have an equal opportunity. With the elimination of male sports some administrators have taken their fight to the legal system. Many of the lawsuits have attempted to reverse the negative impact that Title IX has had at their institution. Organizations such as the National Wrestling Coaches Association have also filed lawsuits due to men's programs being cut to make room for women's sports. To date many of these lawsuits filed and ruled on were unsuccessful. Throughout this pilot study, we anticipate gaining a clearer perspective on the reasons behind the disappearance of some collegiate male sports.

P29 *How Best to Learn World Languages Vocabulary: Comparing Published Research and Student Surveys*

Frida Arredondo, World Languages and Cultures, Prothro-Yeager College of Humanities and Social Sciences. Mentor: Dr. Jeffrey Oxford

In spite of the high, and growing, number of non-English speakers in the U.S. and Texas (U.S. Census figures indicate some 20% and 35%, respectively) as well as the many advantages of having a world language as a minor or major listed on their diploma, students are often reluctant to take such classes during their university career. The reasons for this vary, but one frequently mentioned is that 'learning a foreign language is so hard.' At MSU, both faculty and the language tutor can offer suggestions on how to learn foreign-language vocabulary, but we have a desire to be able to offer more authoritative advice and techniques based on research and student experiences/perceptions. To that end, we have been studying the topic through published research in professional literature, seeking out particular studies that detail various learning techniques and their effectiveness in the world-language classroom. In particular, we have been researching strategies that students can employ in their study time to enhance their learning of world language while reducing the stress, or affective filter, that they normally experience in first-semester language classes. This poster presentation, then will be in two parts: 1) a summary of the literature review, and the various techniques and methods that can be useful for students in learning world-language vocabulary, and 2) a detailed description of the second part of the research (student surveys), in which we want to investigate what current MSU students do to study the vocabulary and obtain their reactions to the various techniques.

P30 *Movement in the Classroom- impact on Reading Fluency*

Gabrielle Browning, Special Education, West College of Education. Mentor: Dr. Emily Rutherford

Purpose: The purpose of this study is to determine if incorporating movement in the classroom will increase reading fluency levels in 3rd grade students with learning disabilities. In addition to increasing reading fluency, the goal is

to give teachers a new tool to use in their classroom to help struggling readers. Method: Principal researcher will go into the participating elementary special education class once a week for 30 minutes each time, lasting four weeks. Participating students will take a pretest and posttest to analyze results. Results: The results of this study are expected to increase reading fluency levels among 3rd graders with learning disabilities.

P31 *Annotated Translation of Zamyatin's We with Scholarly Apparatus*

Lane Riggs, English, Prothro-Yeager College of Humanities and Social Sciences.

Mentor: Dr. Kirsten Lodge

I will present a poster on my research on Yevgeny Zamyatin's *We*, a dystopian novel completed in the Soviet Union in 1921. My research will be included in an introduction of a translation which Dr. Lodge, in partnership with Broadview Press, will publish. *We* is an influential modernist work as Zamyatin portrays a future totalitarian society based on elements of the Soviet society, since the novel included surveillance, terror, the transformation of humans into machines, and the rational regimentation of all aspects of life. In my research, I look at texts that might have influenced Zamyatin to write *We*, like novels by H.G. Wells or the novel *The Scarlet Empire* by David Parry, 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. As a part of my project, I am planning to write papers for two possible conferences, where I will look at either the relationship between works by Wells and Zamyatin or by Parry and Zamyatin. Similarly, I am researching how *We* is a modernist work and comparable to Russian Futurist and Constructivism artworks. I will present all of my research on this project to date.

P32 *Classroom Management: Engaging Today's Students in the Elementary Classroom*

Mackenzie Barnard, Curriculum and Learning, West College of Education.

Mentor: Dr. Phillip J Blacklock

The purpose of this research project is to review literature to identify effective strategies to engage today's elementary students in learning. The primary research questions guiding the review are: 1) What conceptual schema emerge as classroom management textbooks are reviewed through the lens of elementary student engagement?; 2) How do these schema define relate to strategies which can be used to actively engage today's elementary school students in learning? The research has been done through a systematic review of literature analyzing elementary school classroom management textbooks from the last 10 year period. Several common strategies have emerged thus far. First, students need to be intrinsically motivated to learn. While the teacher can't teach this, they can foster an environment that encourages it. Secondly, grouping is another strategy that can be used to engage learning. Within a group, each student has a particular role. Having to work together increases engagement amongst children. Thirdly, incorporating learning styles into a lesson can encourage engagement. Children learn differently. By using kinesthetic, visual, and auditory aspects in a lesson, students will be engaged. These strategies fall within two major categories: behavior management and instructional practices.

P33 *Three Phase Teacher Success Strategy Training Program: Persona Development, Entrepreneur Skills, and Organizational Administrative Skills*

Carl J. Alfert, Curriculum and Learning, West College of Education.

Mentors: Dr. C. Janise McIntyre, Daphney L. Curry and Emily K. Reeves

Teachers are quitting by the thousands annually during their first five years (Haynes 2014), and studies reveal the top reasons behind why untenured teachers, once filled with dreams of making the world a better place, are leaving: low job satisfaction, perception of low pay, and excessive administrative duties (Haynes 2014). This leads to a question, Can a workshop focused on creating a charismatic teacher persona help the motivation to succeed in pre-service educators? This study will focus on phase one of a three-part program: Charismatic Persona Development Workshop. Phase one includes interdisciplinary literature in education, psychology, and performing arts. An hour-long version will be presented to pre-service teachers during their classroom management course. Upon completion of the presentation, two formative assessments will be administered: The Positive and Negative Affect Schedule (PANAS) and Teacher Concerns Questionnaire (TCQ). The presentation will be evaluated for its effectiveness indicated by an increased valence in goal characteristics and decreased psychological distance ultimately leading to growth in the participant's motivation to succeed, an indicator of retention (Ramlall 2004).

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Office of Undergraduate Research

