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SWOSU Research and Scholarly Activity Fair 2017

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Description

Welcome to the **Twenty-Fourth SWOSU Research and Scholarly Activity Fair!** On display today are 158 poster presentations and 11 oral presentations, involving 314 student researchers, writers, presenters, and artists, and 47 faculty sponsors encompassing scholarly activity from the SWOSU Departments of Art, Communication, and Theatre; Biological Sciences; Business & Computer Science; Chemistry and Physics; Engineering Technology; Language & Literature; Music; Pharmaceutical Sciences; Psychology; and Social Sciences; and SWOSU School... [Read More](#)

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The Twenty-Fourth Annual



April 13, 2017
Pioneer Cellular Event Center
12:00 - 3:00 p.m.

**Twenty-Fourth Annual
SWOSU Research and Scholarly Activity Fair
Thursday, April 13, 2017**

Welcome to the Twenty-Fourth SWOSU Research and Scholarly Activity Fair! On display today are **158** poster presentations and **11** oral presentations, involving **314** student researchers, writers, presenters, and artists, and **47** faculty sponsors encompassing scholarly activity from the SWOSU Departments of Art, Communication, and Theatre; Biological Sciences; Business & Computer Science; Chemistry and Physics; Engineering Technology; Language & Literature; Music; Pharmaceutical Sciences; Psychology; and Social Sciences; and SWOSU School of Nursing and Allied Health Sciences. In addition, there are poster presentations from the Western Technology Center Biomedical Academy, Francis Tuttle Technology Center, El Reno Public Schools, and BlueSTEM AgriLearning Center.

I wish to extend my personal thanks to all who played vital roles in making this event happen, particularly: President Randy Beutler and Provost James South, for their support of research and scholarly activity at all levels throughout the University; Dr. Yolanda Carr, Director of the Office of Sponsored Programs (OSP), for spearheading the organization of this event, and the welcome assistance of C.J. Smith, Grant Specialist (OSP); Dr. Siriporn Peters for designing the new Fair logo; Mr. Nate Downs, Mr. James Skinner, and their staff for setting up our facilities; the Department of Biological Sciences for loaning display boards; and Mr. Duncan Taylor for providing refreshments. We also appreciate donations from Ratcliff's, the University Bookstore, SWOSU Admissions and Recruitment, Public Relations and Marketing, University Press, Collegiate Activities Board (CAB), Athletics, and the many SWOSU Departments which generously supplied giveaways for the scavenger hunt and for visiting high school students. Last but certainly not least, I would like to recognize the members of the University Research and Scholarly Activity Committee for their dedication and hard work to make this event a reality – especially at a new location!

Most of all, *congratulations* to all faculty, staff, and administrative sponsors who dedicate significant time and effort toward integrating students into various forms of research and scholarly activity. Student research is an essential ingredient in undergraduate education. It fosters independent, critical, and creative thinking skills, plus it provides the unique opportunity to apply knowledge and skills accumulated in the classroom toward problem solving in the real world. And, from the student's perspective, there is the added excitement of potentially being the first to make a discovery, understand a problem, provide a solution, and/or make a creative contribution to the world. We trust this experience will foster new ideas, enthusiasm, and collaborations for future research and scholarly activity endeavors. *Enjoy the Fair!*

Sincerely,



Dr. Lisa Appeddu, Chair
University Research and Scholarly Activity Committee (URSAC)



URSAC Committee Members

Dr. Becky Bruce

Dr. Denise Landrum-Geyer

Dr. Trisha Wald

Gwen Burgess, A & S Student Rep

Dr. Yolanda Carr, OSP Director

Dr. Rickey Cothran

Mr. Ed Klein

Ms. Kim Zachary

Adriel Fillippini, CPGS Student Rep

Mr. C.J. Smith, OSP Grants Specialist

Dr. Jared Edwards

Ms. Erin Ridgeway

Poster Presentations

Students on odd numbered panels are asked to be present their posters at a minimum from 12:45-1:30 pm; students on even numbered panels are asked to present their posters at a minimum from 1:30-2:15 pm.

1. **Patch location preference during foraging in fruit flies (*Drosophila melanogaster*).** Courtney Curless. (Dr. Jimena Aracena, SWOSU Department of Biological Sciences).

Fruit flies (*Drosophila melanogaster*) have a particular foraging behavior on patches, which depends on food quality and their physiological state. The purpose of my experiment was to determine the preference of feeding position for the flies on a small patch of food. Specifically, we were interested in testing their preference for feeding on the side, middle, or corners of a patch. Groups of fifty flies were allowed to feed on a patch of wells filled with sucrose solution for ninety minutes. They were filmed from above to record their location on the patch. The number of flies on the patch increased over time. In a second test, we placed different colored sugar solutions on the corners, sides, and middle of the patch. We froze the flies after feeding and recorded which sugar solutions the flies fed. We concluded that the flies have a significant preference for feeding on the sides and the corners of the patch. One of the possible explanations for this behavior is thigmotaxis during foraging behavior.

2. **Effects of 3-Dimensional Orientation on *Drosophila* Feeding Patterns.** Tyler Watson. (Dr. Jimena Aracena, SWOSU Department of Biological Sciences).

Fruit flies (*Drosophila melanogaster*) are negatively geotactic - they tend to move upward. The present study intends to determine if the upward taxis pattern applies to foraging behavior in a container. We hypothesized that fruit flies prefer to feed at the top of a container, compared to feeding at the bottom. To test the hypothesis, two arenas (large petri dishes) were set up with two feeding patches each; one, containing 9 filled wells of red sugar-water, the other blue sugar water. One arena had one patch with red food on the bottom and one patch with blue food at the top of the arena (facing down); the second arena had reversed colors. 50 flies were starved 24 hours and introduced into each of the arenas, and allowed to feed 1 hour in darkness. Afterward, flies were killed and frozen, and were sorted by sex and abdomen color (based on the feeding dye). Three two-arena trials were completed. Of flies analyzed, 68% preferred to feed on the bottom food patch. This outcome was the opposite of hypothesized. It is possible the flies do not prefer to feed while upside-down, despite negative geotactic tendencies.

3. **Where are the Invaders? Wanted Dead, Not Alive.** Jacob Bellamy, Ashna Dhoonmoon, Forrest Witt, and Sarah Gore. (Dr. Lisa Castle, SWOSU Department of Biological Sciences).

Invasive plants are plant species that are not native to an ecosystem and cause harm to the environment, economy, and even human health. Problems associated with invasive plant species are often made worse because population of the invaders are not documented until the plants are out of control. SWOSU Terrestrial Ecology students are aiding the Oklahoma Invasive Plants Council by documenting the current status of the invasion of several species in and around Weatherford, Oklahoma. We have mapped hundreds of Trees of Heaven (*Ailanthus altissima*, an invasive tree native to China) near the SWOSU campus.

4. **Random Generations, What's Wrong with my Plants.** David Castellanos, Jayme Tuck, and Taylor King. (Dr. Lisa Castle, SWOSU Department of Biological Sciences).

Students at Southwestern Oklahoma State University are monitoring the population of *Cyclanthera naudiniana* (*Naudiniana's cyclanthera*, Cucurbitaceae) in a riparian woodland in Western Oklahoma. By measuring and mapping all individuals for seven years while investigating interspecific interactions and environmental tolerances, we seek a more complete understanding of the population dynamics of this weedy native annual vine. *Cyclanthera naudiniana* was chosen because of its interesting characteristics: populations reportedly "popping up" out of nowhere, dispersal through forcible ejection, and potential edible and medicinal properties; and also because of practical concerns: it flowers and fruits during the school year, the seeds are large, and the plants are easy for undergraduates in general biology classes to learn to identify. While the species does have many unusual traits, it is not unusual among native or invasive plant species in being poorly studied. We hope to establish baseline data for "normal" population parameters. This information can be then used to better gauge the effects of environmental changes on native plants and serve as a case study representative of the many other poorly-investigated species. During the seven seasons of the study, we have found dramatic fluctuations in population size (ranging from 14 to 408 individuals), reproductive output and plant size. We found evidence for a seed bank and population limitation due to both abiotic (drought and early freeze) and biotic (disease and herbivory) processes. Future studies will include pollination limitation studies to determine relative importance of different potential pollinators and seed germination studies.

5. **Management Strategies for the Medicinal Plants Goldenseal (*Hydrastis canadensis*) and Ramps (*Allium tricoccum*).** Jay Garber, Amy Vega, Zachary Cravens, and Jaci Peetoom. (Dr. Lisa Castle, SWOSU Department of Biological Sciences).

Plants that are harvested in the wild, for medicine, food or fiber, may be vulnerable to over-harvest for a wide range of reasons. In order to better establish conservation priorities, the United Plant Savers, a conservation non-profit, has developed a tool that leads to a numerical score for each species, with higher scores indicating a greater risk of being over-harvested. Plants are scored on five broad categories: life history, effect of harvest on the individual, population size, habitat vulnerability, and demand for the organism. SWOSU Terrestrial Ecology students are helping facilitate better conversations about conservation by documenting and synthesizing the information used to score plants. By emphasizing the sub-scores for each category, in addition to the total score, we are highlighting the need for different management strategies. Here we compare scores and risk-factors for goldenseal (*Hydrastis Canadensis*) and ramps (*Allium tricoccum*) as case studies.

6. **The Medicinal Frontier: Uses of Wild Harvested Plants.** Jesse Velasco, Lindsey Hendricks, Brady Burke, and Rahaf Al-Johani. (Dr. Lisa Castle, SWOSU Department of Biological Sciences).

Humans have always used plants for medicine. Even with advantages in cultivation and pharmaceutical medicine, plants continue to be wild-harvested in the United States today, sometimes at rates that are not sustainable. The United Plant Savers, A conservation non-profit group, seeks to protect populations of wild-harvested plants while promoting sustainable use. SWOSU Terrestrial Ecology students are helping the organization by compiling data and documenting the current state of knowledge about medicinal plants that may be vulnerable to over-harvest. Here we address the importance of plants as medicine and problems that come from over-harvesting, focusing on species SWOSU students have investigated at the request of the United Plant Savers.

7. **The Ugly Cousins of the Dirty Dozen.** Ashley Watson, Taylor King, and Taylor McBee. (Dr. Lisa Castle, SWOSU Department of Biological Sciences).

Given that over \$100 billion dollars is spent annually on the control of invasive species in the United States, invasive organisms should occupy a central focus in the public's interest. The Oklahoma Invasive Plants Council has identified twelve plant species that cause problems statewide, the infamous Dirty Dozen, but problems with invasive plants are not limited to these species. Students in SWOSU Terrestrial Ecology are investigating potentially problematic species not on the dirty dozen list including the Scotch Thistle, Alligator Weed, Tree of Heaven, and Purple Nutsedge.

8. **Pick Your Poison: Sublethal Effects of Pesticides on Amphipod Life History, Physiology and Behavior.** Lindsey Hendricks. (Dr. Rickey Cothran, SWOSU Department of Biological Sciences).

Understanding sublethal effects of pesticides is critical because most pesticides are found in low concentrations in nature, which may harm organisms but not kill them. Sublethal effects are understudied and we know little of how they affect ecosystems. I explored the sublethal effects of malathion on life history traits of *Hyalella* amphipods. Two populations were collected in western Oklahoma, that differ in proximity to agriculture, and were exposed to one of three concentrations of malathion: a no malathion (0 µg/L), a low sublethal concentration (0.005 µg/L), and a high sublethal concentration (0.02 µg/L). Amphipods that had reached reproductive maturity were chosen for the experiment and monitored until two broods of offspring were produced. For both sexes, I measured growth rate. For each female, I recorded the number of offspring to measure fecundity. For males, I measured gnathopod (a claw-like appendage) size, which is a sexually selected trait. I predict that the amphipods in the high concentration treatment will have slower growth rates, lower fecundity, and smaller claws than those exposed to lower concentrations. I also predict that the population closest to agriculture will be less affected by the pesticide. If malathion negatively affects amphipod life history traits, amphipod populations will decrease. Changes to the populations can also affect community and ecosystems because amphipods are grazers, detritivores, and prey for fish and predatory invertebrates.

9. **Foraging Preferences in Aquatic Hemipterans.** Allison Statton. (Dr. Rickey Cothran, SWOSU Department of Biological Sciences).

Belostoma sp. and *Ranatra* sp. are two groups of predatory hemipterans that are commonly found in the littoral zones of aquatic environments. Both species are known to feed on a variety of other macro-invertebrates such as amphipods, snails, and damselfly naiads, which could lead to competition between the two species. A shift in resource utilization through species-specific prey preferences may lessen competition and allow for both species to occupy the same habitat. We hypothesized that differences in predator shape (beak length and foreleg structure) could

influence foraging preferences because of variability in the shape and size of prey species. We tested for differences in foraging preferences by setting up arenas containing two predators of the same species and seven each of the three prey species (amphipods, snails, and damselfly naiads) with Elodea to provide structural complexity for both the predators and prey. The systems ran until approximately sixty percent of the prey had been consumed. We found that *Belostoma* sp. exhibits a preference for snails and an avoidance of damselfly naiads, while *Ranatra* sp. exhibits a preference for amphipods and a strong avoidance of snails. Our results suggest that *Belostoma* sp. and *Ranatra* sp. primarily feed on different prey items, which may contribute to long-term coexistence in the littoral zone of lakes.

10. Stimulation through innate immune receptors selectively upregulates co-receptor expression on B cells. Ashna Dhoonmoon. (Dr. Christopher Horton, SWOSU Department of Biological Sciences).

T lymphocytes require two signals for appropriate activation - signal one is obtained via antigen presentation to the T cell receptor and signal two is provided by a co-receptor. In the absence of signal two, T cells remain unresponsive, thus these accessory proteins serve an essential purpose in an immune response. Co-receptors include two primary classes: co-stimulatory molecules and co-inhibitory molecules. Co-stimulatory molecules including CD80 and CD86, interact with CD28 to promote T cell proliferation and survival, while co-inhibitory molecules such as B7-DC, B7-H3 and B7-H4 limit the strength and duration of immune responses. In addition to orchestrating an immune response against pathogens, co-receptors have also been implicated in several diseases. Numerous studies have revealed abundant expression of inhibitory co-receptors in tumor microenvironments, contributing to tumor immunosuppression. Furthermore, lack of inhibitory signals in mouse models leads to lupus-like autoimmunity. While the rudimentary functions of these receptors are somewhat clear, the contexts in which they are expressed are incompletely understood. In this study, we aimed to fill this knowledge gap by investigating the effects of innate immune stimuli on expression of B7-family co-receptors. Our data demonstrate that stimulation of mouse splenocytes with synthetic Toll-like receptor agonists leads to selective alterations in co-receptor expression, most notably among B lymphocytes. These data suggest an avenue by which detection of conserved microbial motifs may modulate adaptive immunity through regulation of co-receptor expression on antigen presenting cells.

11. Modulation of CD4⁺ T cell polarization using non-canonical co-receptors. Matt Meeks. (Dr. Christopher Horton, SWOSU Department of Biological Sciences).

CD4⁺ T helper cells are a diverse group of cells promoting target cell death and production of antibodies. These cells acquire one of several fates following signals through the T cell receptor, co-receptors, and cytokines. The cytokine requirements inducing the polarization of T cell fate has been heavily evaluated and reasonably well defined. However, the influence provided by co-receptors has not been completely elucidated. Traditionally, *in vitro* T cell polarization assays utilize CD28 stimulation as the primary co-receptor signal required for differentiation. Others have observed the importance of supplementary co-receptors in activation of T helper cells, though little is known about their function in early stage polarization. We hypothesized that the addition of signaling through supplemental co-receptors would alter T helper cell polarization. To conduct these studies, we isolated naive T cells and polarized them towards Th1 or Tfh fates in the presence or absence of recombinant B7-DC Fc chimera or recombinant B7-H4 Fc chimera. We observed a significant and selective alteration in T helper cell polarization in the presence of these non-canonical co-receptors. These data suggest a complex interplay between cytokine and co-receptor signals that cooperate for robust Th cell polarization. Furthermore, these findings illustrate the potential for novel mechanisms of T cell manipulation for vaccine design and treatment of T cell-mediated diseases.

12. The role of NahG, a putative salicylic acid hydroxylase, in induced plant resistance. Bradly Burke. (Dr. Regina McGrane, SWOSU Department of Biological Sciences).

Previous research suggests *Pseudomonas putida*, a bacterium that colonizes the rhizosphere, can induce plant resistance to *Pseudomonas syringae*, a bacterial pathogen that causes halo blight. The previous literature shows *P. putida* induces jasmonic acid and ethylene defense pathways, as well as the salicylic acid-mediated plant defenses in *Arabidopsis thaliana*. This is unique because systemic resistance brought about by most bacterium triggers only the jasmonic acid and ethylene mediated-defenses. We found that *P. putida* encodes a putative salicylic acid hydroxylase gene (*nahG*), PP_3944, which functions in salicylic acid degradation in other rhizosphere bacteria. We hypothesize *P. putida* uses salicylic acid as a carbon source via NahG and in turn primes a variety of plants against infection. Our preliminary data shows that *P. putida* can utilize salicylic acid as the sole carbon source for growth. Moreover, we are assessing the regulation of *nahG* under various conditions commonly encountered by bacteria in the rhizosphere by introducing the *nahG* promoter into a bioreporter plasmid to control GFP expression. We are also working to construct *nahG* deletion and overexpression strains to evaluate NahG's role in inhibiting *P. syringae* infection.

13. **The Induction of Resistance to *Pseudomonas syringae* Infection by *Pseudomonas putida* in the Model Organism *Arabidopsis thaliana* and the crops *Solanum lycopersicum* and *Phaseolus vulgaris*.** Sarah Gore and Jay Garber. (Dr. Regina McGrane, SWOSU Department of Biological Sciences).

Pseudomonas putida has been shown to stimulate defenses against infection by *Pseudomonas syringae* in *Arabidopsis thaliana*; however, its ability to induce plant defenses in crops has not been evaluated. Our objective was to further investigate the mechanism of *P. putida* stimulated resistance to *P. syringae* infection of *A. thaliana* and determine its ability to stimulate resistance in *Solanum lycopersicum* and *Phaseolus vulgaris*. We hypothesize *P. putida* not only decreases *P. syringae* mediated symptoms in *A. thaliana* but also inhibits *P. syringae* colonization, and the ability of *P. putida* to colonize a range of plants suggests it can induce resistance in other plants. We grew *A. thaliana*, *S. lycopersicum*, and *P. vulgaris* seeds in the presence or absence of *P. putida* and then inoculated test and control plants with *P. syringae* by spraying a bacterial solution on the leaves. *P. syringae* populations were evaluated via serial dilution plating. Following inoculation, significant variances between the *P. syringae* populations on the test and control *A. thaliana* and *S. lycopersicum* plants were observed with test plants having decreased bacterial populations. These results support our hypothesis that *P. putida* induces resistance in *A. thaliana* and *S. lycopersicum* allowing for the inhibition of *P. syringae* populations. In analysis of *P. vulgaris*, results were inconsistent. These differences in resistance may be due to variations between the *P. syringae* strains.

14. **Analysis of Surface Motility Regulation in the Phytopathogen *Pseudomonas syringae*.** Sara Hutchinson and Chelsea Miller. (Dr. Regina McGrane, SWOSU Department of Biological Sciences).

Pseudomonas syringae, an opportunistic plant pathogen, senses its environment and alternates between flagella-mediated motilities: swimming, in which the individual bacterium exhibits free range movement in liquid, and swarming, an organized effort to travel across viscous surfaces. Our objective is to introduce bacteria to different stressors to analyze conditions modulating changes between swimming and swarming. We hypothesize *P. syringae* responds to environmental cues like osmotic stress to change between liquid and surface motility behaviors, and this change is partially regulated by switching between low (MotAB) and high (MotCD) powered flagella stators. To test our hypothesis, we inoculated media of varying agar and sodium chloride concentrations. Our results demonstrated cells in 0.25% agar exhibited swimming, while those exposed to 0.3 and 0.35% agar swarmed. Additionally, cells exposed to sodium chloride exhibited enhanced motility on 0.25 and 0.3% agar but were inhibited at 0.35% agar, suggesting osmotic pressure causes a premature switch to swarming on low agar plates. To determine if this switch occurs due to a change from the low to high powered flagella stator, expression of motAB and motCD was evaluated in varied agar concentrations and osmotic stresses. Future studies will evaluate the role of motility regulation in pathogenicity.

15. **Investigating the role of biosurfactants in *Pseudomonas syringae* motility and attachment.** Laci Johnston. (Dr. Regina McGrane, SWOSU Department of Biological Sciences).

Pseudomonas syringae, a recognized pathogen of economically-important crops, utilizes a coordinated movement called swarming during leaf colonization. Studies of this organism are considered meaningful because they enhance our understanding of plant-bacterial interactions and help prevent pathogen destruction of crops. *P. syringae* is a nutritionally-adaptable, opportunistic pathogen that flourishes and is able to seek out heterogeneously distributed nutrients by moving on the leaf surface. *P. syringae* produces two distinct biosurfactants which reduce surface tension and serve as lubricants, syringafactin and 3-(3-hydroxyalkanoxyloxy) alkanolic acid (HAA), which have both been implicated in swarming. RhlA is responsible for the synthesis of the biosurfactant HAA, and SyfA is required for the synthesis of syringafactin. In an effort to further investigate the role of these biosurfactants in pathogenicity behaviors, deletion strains Δ rhlA, Δ syfA, and Δ rhlA Δ syfA were compared to the wild type strain in swarming conditions, and migration measurements and tendrill formation were quantified. We observed Δ rhlA had similar migration capabilities to the wild type and that the wild type and Δ rhlA exhibited greater swarming than Δ syfA or Δ rhlA Δ syfA, which both demonstrated little to no movement. Additionally, we demonstrated Δ rhlA produced significantly fewer tendrills compared to the wild type, which leads us to hypothesize that HAA plays a repulsive role in tendrill development. Due to the dual roles of many motility factors in early stages of biofilm development, deletion strains were also compared to the wild type in their ability to attach to leaf surfaces. We hypothesize the altered swarming capabilities of Δ rhlA, Δ syfA, and Δ rhlA Δ syfA will negatively impact their ability to form firmly attached aggregates on common bean leaves. Future work will evaluate the ability of deletion mutants to form biofilms, colonize protected leaf sites, and induce disease symptoms. Collectively, this project provides insights into the importance of biosurfactants in the *P. syringae* life cycle.

16. **A Handful of Antibiotic Resistant Bacteria.** Reem Almutairi. (Dr. Eric Paul, SWOSU Department of Biological Sciences).

Human hands carry several types of microorganisms. Most of these microbes are derived from our interaction with other humans and the environment in which we live. These include normal microbes like *Staphylococcus epidermidis* and *S. aureus*. Antibiotics provided the basis for infectious disease control and the misuse of these drugs has handicapped our warfare against them. It would be interesting to determine if we carry these antibiotic resistant microbes on our hands on a daily basis. The purpose of this research is to measure the percentage of the bacteria that might be carried on a student's hand that could be antibiotic resistant. In this experiment, we counted the antibiotic resistance bacteria by using agar plates with antibiotics. The antibiotics used in this study include Neomycin, Tetracycline, Kanamycin, Chloramphenicol. The participants inoculated the dominant hand into agar plates and let them grow for a period of 48 hours. The number of colonies was counted and tabulated.

17. **Bacteriophages in the Treatment of Antibiotic Resistant Bacteria.** Brittney Le. (Dr. Eric Paul, SWOSU Department of Biological Sciences).

Decades after the discovery of antibiotics, pathogenic bacteria have progressively become more resistant to the drugs available today. The reemergence of phage therapy research has thus become prominent. Phages are viruses that specifically kill bacteria and can be used to treat antibiotic resistant strains. The objective of this study is to identify bacterial phages that can be used as an alternative to antibiotics.

Raw sewage from the Weatherford Water Treatment Plant was used as a source for bacteria phages that infect *Escherichia coli*, *Pseudomonas aeruginosa* 01, *Pseudomonas aeruginosa* 14, and *Proteus vulgaris*. Fresh sewage sample was filtered through a 0.22-micron filter, mixed with the bacteria and used for the plaque assay. Of the four types of bacteria used, only *E.coli* B and *P. aeruginosa* 14 produced clear non-turbid plaques. The results show that there are several different phages that infected *E. coli* and PA 14. Future research will isolate these viruses and challenge them with antibiotic resistant strains.

18. **Do Sewage Treatment Practices Contribute to Rising Numbers of Antibiotic Resistant Bacteria?** Lauren Panenica. (Dr. Eric Paul, SWOSU Department of Biological Sciences).

According to the CDC antibiotic resistant bacteria cost the US Healthcare system more than \$20 billion in excess direct health care costs, with additional costs to society for lost productivity as high as \$35 billion a year. These bacteria may be produced in humans and livestock due to the overuse of antibiotics and antimicrobial agents in our daily lives. The internal and external normal flora of humans is constantly exposed to antimicrobial soaps, food preservatives, and antibiotic medications. When normal flora of the gut are excreted they make their way to sewage treatment plants where they are further exposed to antimicrobials and later released into the environment. To test this link, water samples from natural water, raw sewage, treated effluent and downstream of the effluent were collected and tested against four types of antibiotics on three separate types of media. It was observed that all samples contained bacteria capable of surviving at 8X the standard antibiotic concentration. It was hypothesized that the effluent would have the highest averages of antibiotic resistance, however, this was not the case. The raw sewage contained the highest averages of resistant bacteria. If sewage treatment practices are contributing to the rise in antibiotic resistance it was also hypothesized that the numbers of resistant bacteria should be higher in the sample taken downstream of the effluent when compared to the sample of natural water taken upstream. This was also found to not be the case and the upstream samples actually had higher rates of antibiotic-resistant bacteria than the downstream sample.

19. **Streaking in the Union: What microorganisms are you on a lunch date with?** Jocelyn Garcia, Kara Vincent, Trevor Sanders, Bryce Wolters, Jeremiah Tahah, M. Elizabeth Webb, and Geovany Zatarain. (Dr. Denis Trubitsyn, SWOSU Department of Biological Sciences).

Variable microorganisms are found on areas we think are sanitary. Microorganisms can be spread by contact and live just about everywhere. What about where most of us eat? The SWOSU Cafeteria and Diner are governed by laws that regulate cleanliness and health. Our goal was to identify the bacteria that were growing in the Student Union. To enumerate bacteria found in the common use areas we swabbed seven surfaces in the Student Union and analyzed the colonies that grew on agar Petri plates. The isolated colonies were used to identify microbial species using both traditional methods (Gram staining) and polymerase chain reaction for amplification and sequencing of 16S rRNA genes. Our preliminary data suggests that the condiment dispenser had the most bacteria while the serving trays were the cleanest. We will continue to work on the identification of isolated microorganisms and would like to test well-known fast food restaurants in the area.

20. **The effect of washing on the surface bacteria of produce.** Hailey Harborth, Michael Flinn, Brock Chance, Ethan Do, Nicholas Wheeler, Memory Phiri, Jiji Lu, Garrett Gaunt, and Robert Rhynes. (Dr. Denis Trubitsyn, SWOSU Department of Biological Sciences).

Health is becoming a higher priority in our society every day with research on the effects of our daily diet and activities, but how well are we treating our bodies when we treat ourselves to delicious fruits and vegetables? Doctors and health experts are highlighting the importance of eating enough of the fruits and vegetables that fuel our bodies with healthy nutrients. In this open-ended research class project, our team investigated the risk of bacteria found on the surface of our everyday produce to see if washing is a necessary step or if it can be disregarded. We swabbed five kinds of produce that were obtained from the local supermarket; blueberries, apples, pre-washed baby carrots, romaine lettuce, and strawberries. Bacterial samples were cultured on nutrient agar plates and quantified. We determined that there was a significant amount of decrease in numbers of viable bacterial cells between the washed and unwashed produce, except for the baby carrots which had very high numbers of cells both before and after washing. In addition to the traditional methods of identification, we are using a polymerase chain reaction to identify the microbial species. If we were to continue this study, we would research the numbers of bacterial species on pre-washed produce and whether isolated bacteria are potentially harmful to the consumer.

21. **Oral microbiota: Do you kiss your dog with that mouth?** Peyton Isbell, Morgandy Benson, Lana Spandley, Abbey Morton, Brienne Riggs, Madison Herrera, Connor Pelzel, Lydia Rife, Mikka Vap, and Ntxhees Vahchuama. (Dr. Denis Trubitsyn, SWOSU Department of Biological Sciences).

Humans and pets have maintained a close relationship throughout history, but how sanitary are these companions we hold so near? There is an old wives' tale that says that dogs' mouths are cleaner than humans' mouths. We decided to test the validity of this statement by assessing and comparing oral microbiota of dogs and humans. We collected samples from student volunteers and their pet dogs for this study. Buccal swabs were obtained from each subject and plated on blood agar for further analysis. It was determined that there were more species of microbes in dogs' mouths compared to humans' mouths. In addition, hemolytic bacteria were found only in the mouths of the dogs. We are working on identifying specific species of oral bacteria using polymerase chain reaction (PCR) to determine 16S rRNA sequences. Results of this experiment disprove the misconception of the general public about "man's best friend". In the future we plan to include other pets, such as cats, in this study on oral microbiota.

22. **What's in Your Yogurt? A Comparison of Probiotic Products.** Joshua L'Hommedieu, Jaci Peetoom, Maddi Stuart, Mia Tran, Jenna Thomason, Kaylee Dobbs, Dillon Chaloupek, and Bryce Tabb. (Dr. Denis Trubitsyn, SWOSU Department of Biological Sciences).

Many brands of yogurt and dietary supplements claim to have billions of live bacteria in each serving, but it is unclear if these products legitimately do contain as many living cells as the companies advertise. This study aims to determine the actual number of live bacteria in the probiotic yogurt and probiotic pills, and to determine how numbers of living cells compare between those products. Bacterial cultures from two commercially available yogurts, a probiotic supplement pill and a homemade yogurt were plated on Lactobacilli agar using serial dilutions to determine the original number of cells in the sample. It was determined that one of the commercially produced probiotic yogurt had the highest number of viable bacteria, followed by the probiotic pill then the other two types of yogurt. Based on our calculations the probiotic yogurt contained as much as the packaging claimed, while the probiotic pill advertised to have more than it actually contained. The species of the isolated organisms are being determined using 16S rRNA phylogenetic analysis. This work is going to be continued to investigate the number of cells that survive in the acidic environment of the human stomach.

23. **Construction of the Expression System for Recombinant Bovine Lambda Interferon for use in Veterinary Medicine.** Jaci Peetoom, Rahaf Al-johani, and Kathryn Cornell. (Dr. Denis Trubitsyn, SWOSU Department of Biological Sciences).

Interferons (IFN) are a type of cytokine involved in cellular mediated immunity. They are produced by cells during an invasion by a pathogen, and are secreted by the affected cells to stimulate an immune response in neighboring cells. Currently, recombinant human IFNs are used in veterinary medicine to treat various viral, bacterial, and parasitic conditions. However, IFNs are species specific, and may have significantly different activity levels when used across species. The lambda IFN is the recently discovered IFN restricted to interactions with epithelial cells. This characteristic makes them of interest as pharmaceuticals against bovine dermatological disorders. The goal of this study was to design and test the expression system in *Escherichia coli* for production of recombinant bovine lambda IFN. The gene sequence was codon optimized, synthesized and cloned into pET24 vector. The generated plasmid was transformed in *E. coli* BL21-CodonPlus for analysis of expression under control of T7 promoter. The level of

target protein expression was assessed by protein gel electrophoresis. This work will be advanced by experiments on protein isolation and purification. Once sufficient amounts of soluble lambda IFN are obtained, the protein will be tested for its immunomodulating activity. The increasing number of antibiotic-resistant bacteria and spread of viral infections makes species-specific IFN medications a promising alternative to existing substances used in veterinary.

24. Analysis of the Expression Profiles of Magnetovibrio blakemorei MV-1 Under Different Culturing Conditions. Jaci Peetoom. (Dr. Denis Trubitsyn, SWOSU Department of Biological Sciences).

Magnetotactic bacteria (MTB) are a diverse group of prokaryotes that produce nanosized crystals of magnetite or greigite termed magnetosomes. Magnetosomes are arranged in chains that allow cells to be passively aligned along Earth's geomagnetic field. Magnetovibrio blakemorei strain MV-1 is a marine MTB that biomineralizes truncated hexa-octahedral magnetosomes and grows microaerobically with oxygen or anaerobically with nitrous oxide as the terminal electron acceptor. In this study, we used total RNA sequencing and bioinformatics to investigate genes involved in magnetosome biomineralization in *M. blakemorei* by examining changes in gene expression levels when cultured with nitrous oxide versus oxygen and at very low and high concentrations of iron (required for magnetosome formation). Moreover, we used computational analysis to identify additional genes involved in biomineralization. In addition, this study determined that low iron availability in the environment up-regulates expression of magnetosome genes and that many magnetosome genes are co-transcribed as has been shown in other magnetotactic bacteria. Overall, total transcriptome analysis improves our understanding of the mechanisms of magnetosome biomineralization ultimately allowing for commercially viable production of bacterial magnetic crystals.

25. Breast Cancer: Searching for the Legacy of Life. Patron Catherine. (Dr. Muatasem Ubeidat, SWOSU Department of Biological Sciences).

Breast cancer claims approximately 42,000 lives of men and women a year in the U.S. alone. Scientists are researching new proteins and pathways every day, while discovering new drugs to fight this insipid disease. One such protein is HER2. HER2 is Human Epidermal Growth Factor Receptor 2, the overexpression of this protein can influence how a breast cancer reacts. HER2 receptors grow on normal breast cells and guide the way those cells grow, dSangaivide, and repair themselves. However, in approximately 20-25% of all breast cancers the gene for HER2 does not respond correctly and makes too many copies of itself growing and dividing uncontrollably, creating havoc and leading to many deaths each year. Scientists are working diligently for answers. A cure has not been found but, with advancements in research and therapy, prognoses are improving.

26. Effect of Aleve on growth and development of Dictyostelium discoideum. Ashley Popejoy. (Dr. Muatasem Ubeidat, SWOSU Department of Biological Sciences).

Dictyostelium discoideum is a powerful eukaryotic biomedical model organism to study developmental regulation and cellular signaling because of the ease of genetic, biochemical and cell biology approaches. Upon starvation, single-celled amoebae emit cAMP and migrate toward aggregation centers. This gives rise to a discrete multicellular structure called the "slug". In the migrating slug, the precursors for stalk and spore cells become recognizable and are localized in specific regions. Prestalk cells are located in the anterior 20% of the slug and prespore cells occupy the remainder. The developmental process of this organism depends on environmental and internal signals and can be divided into two phases; the formation of a moving slug from solitary amoeba upon starvation and the switch from a slug to fruiting body that holds the spores, for dispersal, on an aerial stalk. In this study, we are investigating the effect of Aleve on the growth and development of Dictyostelium. Ibuprofen and Aleve are nonsteroidal anti-inflammatory drug (NSAID). It works by reducing hormones that cause inflammation and pain in the body. When we treated growing Dictyostelium cells with different concentrations of Ibuprofen, growth was impacted and delayed as concentration increases. Studies on Aleve and the effect of NSAID on the development of Dictyostelium is being studies and results will be reported upon completion.

27. Preparation of a Novel Ni(II) Chelating Trifluoromethyl Containing Ligand for the Dynamic Resolution of α -Amino Acids. Elisabeth Allbritton, Devin Widick, Samantha Hamburger, and Wright Payton. (Dr. Trevor Ellis, SWOSU Department of Chemistry and Physics).

The preparation of optically active α -amino acids remains an extremely active area in the field of organic chemistry. While challenges remain for synthesizing new amino acid derivatives in which the three-dimensional shape of the α -center, the racemic preparation of these molecules followed by separation of the resulting enantiomers is much more feasible and general approach to their preparation. While there is preliminary evidence that ligands derived from optically active N-phenyl ethyl glycine and 2-amino-benzophenones are useful in the separation of enantiomers of racemic α -amino acids, little research has been directed toward refining the approach to dynamic resolution of these

molecules. With this in mind, new ligands have been prepared to discern if the process could be improved by increasing the acidity of the α -center.

- 28. Synthesis of N-(2-benzoylphenyl)-2-methyl-2-((R)-2-phenylethyl)-amino-propylamide as a Ligand for the Dynamic Kinetic Resolution of α -Amino acids.** Abbagale Bond, Elizabeth Hicks, Samantha Hamburger, and Payton Wright. (Dr. Trevor Ellis, SWOSU Department of Chemistry and Physics).

Unnatural and natural α -amino acid synthesis remains one of the more challenging areas in organic chemistry. However, the utility of these unique molecules allow for an extremely broad application of the products, which range from agricultural applications to pharmaceutical agents. While the asymmetric preparation of these targets remain economically challenging and highly specialized, the dynamic kinetic resolution of racemic α -amino acids is an emerging field, which may prove more economically feasible and robust. While the process involves the formation of metal complexes, it remains environmentally promising due to the overall atom economy of the process. Within this poster, we will be presenting a ligand that can be used for the separation of enantiomers of α -amino acids through a metal chelated diastereomeric approach.

- 29. The Design and Preparation of a New Ligand System Which has Electron Withdrawing Groups Strategically Incorporated to Expedite the Dynamic Kinetic Resolution of Amino Acid Enantiomers.** Sarah Crone, Kenneth Kemp, David Tresp, Samantha Hamburger, and Payton Wright. (Dr. Trevor Ellis, SWOSU Department of Chemistry and Physics).

The strategic incorporation of trifluoromethyl groups into the skeleton of the ligand system of the Ni(II) complexes of amino acid Schiff's Bases have been utilized to increase the acidity of the α -protons of α -amino acids. However, this discovery has yet to be incorporated into the area of kinetically controlled resolution of racemic α -amino acids. Therefore, a new ligand system, which incorporates the electron withdrawing trifluoromethyl groups has been prepared. It is expected that these new ligands will be more reactive than previous generations of this process and will expand the scope and decrease the time necessary to realize the preparation of optically pure α -amino acids.

- 30. Synthesis of Gamma Butyrolactone Derived Chemical Signaling Agents.** John Woods. (Dr. Trevor Ellis, SWOSU Department of Chemistry and Physics).

With antibacterial resistance on the rise, it is becoming increasingly important that we identify new antibiotics and antibiotic sources. To do so, we are working toward unlocking silent biosynthetic pathways that will lead to secondary metabolite production, in *Streptomyces*, that are suppressed under normal laboratory conditions. Thus, we're utilizing the cell's machinery to manufacture unidentified antibiotics. Specifically, we will be using substituted gamma-butyrolactones (GBL), which are signaling agents involved in the up-regulation of biosynthetic pathways that are directed at antibiotic production. Therefore, we worked on synthesizing a general series of signaling agents that can be used towards this endeavor.

- 31. Experiments to determine the amount of ammonia in soil samples.** Greco Beach, Luke Carpenter, John Eze, Nkengasong Ntonghanwah, Christopher Pham, and J. Aaron Tanifum. (Dr. Sylvia Esjornson, SWOSU Department of Chemistry and Physics).

SWOSU Environmental Chemistry students present their investigation of the ammonia in soils analysis. In this project based learning, which plays out over the semester, the students work in teams with limited instruction and under their own direction to implement the analytical method. Student leaders emerge to guide the team in troubleshooting and optimizing the practical steps and to explain the chemistry involved in working with ammonium ion and ammonia gas. Chemical knowledge is developed to understand the intricacies of the reaction sequence, the stoichiometric analysis associated with it, and the quantitative determination of the amount of nitrogen in a sample. Knowing the nitrogen content in each soil sample is important because nitrogen is a necessary factor for agricultural growth; however, fertilizer is expensive, and too much nitrogen is wasteful economically and contributes to the negative effect of runoff from the fields and subsequent pollution of waters downstream. The team will present details about the equipment, instruments, and chemicals necessary to complete the analysis, and they will elaborate about the nitrogen cycle and agricultural impacts.

- 32. Bis-nitrile Dirhenium compounds and carbon-carbon bond formation.** Gareth Crispin. (Dr. David Esjornson, SWOSU Department of Chemistry and Physics).

Preliminary X-ray data from the Service Crystallography at the Advanced Light Source (SCrALS) indicates the possible reductive coupling of nitrile ligands attached to Rhenium dimers. Nitriles react with $\text{Re}_2\text{Cl}_4(\mu\text{-dppE})_2$ to

produce the asymmetric dirhenium complexes $[\text{Re}_2\text{Cl}_3(\mu\text{-dppE})_2(\text{RCN})_2]\text{PF}_6$, where $\text{R}=\text{CH}_3$, CH_2CH_3 , $\text{CH}(\text{CH}_3)_2$ and $\text{dppE} = 1,1\text{-bis}(\text{diphenylphosphino})\text{ethane}$. Reactions of these bis-nitrile complex with additional nitrile seems to lead to coupling of two nitriles to form a either a coordinated di-imine or a coordinated ene-diamine ligand.

- 33. Preparation of some novel cyclic compounds containing phosphorus and nitrogen.** Jessica Rose Vo. (Dr. David Esjornson, SWOSU Department of Chemistry and Physics).

Both phosphorus and nitrogen containing compounds have been used to synthesize a variety of metal complexes. Often the phosphorous atom dominates the coordination of these mixed ligands with metals. The synthesis of nitrogen macrocycles where one or two of the nitrogen atoms has been replaced by phosphorus atoms has been attempted. A new small ring compound, 1,3-phenylcyclohexylphosphinane, has been prepared and characterized. Additionally, larger mixed heteromacrocycle precursors have been made.

- 34. Real World Synthetic Biology: Production of Arsenic Biosensors and Aspirin Producing Bacteria.** Madison Duckwall. (Dr. Lori Gwyn, SWOSU Department of Chemistry and Physics).

BioBrick technology can be utilized to build an infinite number of biological tools. The production of arsenic (As) biosensors for identifying micro quantities of As in various water sources will help determine drinking water safety. Construction of aspirin producing bacteria is also underway as an alternative method to manufacture medications. Arsenic is toxic at high concentrations (>10 ppb) in drinking water. Medications are complicated and can be dangerous to make. Utilizing synthetic biology to modify bacteria to become sensors and synthesizers can help alleviate some of these problems. Synthetic biology is an emerging field that applies engineering principles to biological systems to solve problems. Biobricks, a molecular toolbox of a wide selection of genes with varied functions, have compatible enzyme sites that function as cut and paste locations so that one can "build" bacteria to accomplish a specified purpose. Arsenic biosensors capable of detecting micro to nano quantities of As in drinking water was the first goal. To make this sensor three different parts were used: an As promoter, a red reporter, and destination. The promoter is the on switch activated in the presence of micro to nano As concentrations, which then signals the reporter to make the bacteria grow red/pink. The destination is a place to seal the promoter and reporter together in a predicted manner as well as provide antibiotic resistance to further select only desired bacteria. BioBrick parts were also used to develop aspirin synthesizing bacteria. Proposed parts for this purpose include an isochorismate synthase and acetyltransferase. Controls indicate *E. coli* can grow in the presence of the precursor molecules-acetic acid and salicylic acid. Experiments are underway to test activity of the proteins produced by the parts. It is expected that the bacteria will utilize their own waste byproducts (salicylic acid) to make aspirin as an overall "waste product" to be secreted. This project is a proof of concept that drugs can be synthesized with bacteria. Medications made in this way can cut the cost of drug synthesis as well as decrease lab dangers.

- 35. Protein Engineering: Exploration of Synthetic Methods for the Construction of New Biological Tools.** Sequojah O'Neal-Johnson, Megan Oertel, Madison Duckwall, Abbagale Bond, and Micah Morehart. (Dr. Lori Gwyn, SWOSU Department of Chemistry and Physics).

In recent years, there has been a heightened interest to imitate nature to make innovative biological tools. Our lab has focused on two original tools: 1) construction of molecules to make modular nucleases and 2) use of BioBricks to make an Arsenic Sensor. First, the production of artificial nucleases (DNA scissors) will allow for cutting and pasting DNA for different purposes including antibacterial resistance. To date we have characterized the DNA cleavage ability of novel metal complexes including cobalt, copper, iron, nickel and zinc with -cyclen and -cyclam ligands. Each of these metal complexes have the ability to cut DNA under different reaction conditions demonstrating that they work by differing mechanisms. In future studies, these complexes will be covalently linked to short DNA strands to cut larger specific DNA targets. Our second focus has been the use of BioBricks to construct an Arsenic Sensor. BioBricks are genes with known sequence and function that can be cut and pasted in an infinite number of ways. We have successfully constructed a simple Arsenic Biosensor using three BioBricks-an Arsenic sensitive promoter, a Red Fluorescent Reporter Gene, and a destination plasmid. Growth of the *E. coli* containing the biosensor shows that the bacteria turn red in the presence and absence arsenic. We hypothesize that the growth media still contains trace amounts of arsenic. Future work will involve quantitating the sensitivity of our current sensor.

- 36. Monitoring Changes in Microbial Metabolite Profiles under Co-Culture Conditions.** Gwendolyn Burgess. (Dr. Jon Henrikson, SWOSU Department of Chemistry and Physics).

It is known that there are "silent" biosynthetic pathways for the production of microbial secondary metabolites. These represent an important resource in developing pharmaceuticals. The purpose of this research is threefold: observation of interactions in microbial co-cultures through produced zones of inhibition (ZOI), examine changes in

the extra-cellular secretions via differential HPLC analysis of the mono and co-cultures, and develop methods for LC-MS analysis of culture extracts through multidimensional statistical analysis. Mono and co-culture agar plate samples were prepared by plating 39 microbial strains with *Bacillus*. The co-cultures were examined for ZOI, and if present, agar was collected from the ZOI as well as a similar area of the plate from the monoculture. All agar was lyophilized and extracted with a 64:36:8 mixture of dichloromethane:methanol:water and then vacuum dried. Samples were then re-suspended in 50:50 methanol:water. Currently, we are investigating metabolite profile changes by LCMS and UV-Spectroscopy. Compounds present in the co-culture samples will be compared with those in the monoculture samples. 20 of the strains showed a ZOI when plated with *Bacillus*, and 10 show morphological changes in the growth of *Bacillus*. Small-molecule chemical signals have been shown to activate antimicrobial biosynthetic pathways. We plan to use synthetic versions of native small-molecule signals to induce changes in the microbial secondary metabolite expression. This process will offer an approach to evaluate changes based on media conditions in the presence or absence of the native chemical signaling molecules.

37. **1,4,7,10,13-pentaazacyclopentadane: novel transition metal complexes and glyoxal-based cross-bridging.** Elisabeth Allbritton, Faith Okorochoa, and Alina Shrestha. (Dr. Tim Hubin, SWOSU Department of Chemistry and Physics).

Tetraazamacrocycles, those with four nitrogen atoms, have been ubiquitously exploited as transition metal ligands for a variety of purposes, including catalysis, medical imaging, pharmaceuticals, etc... However, the pentaazamacrocycles, those with 5 nitrogen atoms, are much less commonly used for similar purposes because of unavailability, difficulty in synthesizing them, and largely unknown metal coordination properties. We set out to explore this type of macrocycle and its transition metal complexes. A well respected synthetic route to parent pentaazamacrocycle 15aneN5 was useful, but appeared unnecessarily long and complex. We simplified and shortened this synthetic route without a drop in yield. Eight different transition metal complexes were made using typical complexation methods. Electrospray mass spectra and elemental analyses were used to initially characterize the complexes. A cross-bridging strategy for 15aneN5 based on its glyoxal condensate was successfully designed and carried out.

This work was made possible by Grant Number P20RR016478 from the National Center for Research Resources (NCRR), a component of the National Institutes of Health (NIH). We also acknowledge the Oklahoma Center for the Advancement of Science and Technology through Health Research award number HR13-157 for partial funding of this work.

38. **H3- and H1Tos2- Cross-bridged pentaazamacrocycles and their transition metal complexes.** Terin Fletcher, Megan Whorton, and Rachael Lamar. (Dr. Tim Hubin, SWOSU Department of Chemistry and Physics).

Our research group has recently discovered a synthetic path to synthesize Me3- cross-bridged 15aneN5 using glyoxal condensation of the 15aneN5 macrocycle, followed by exhaustive methylation, then reductive ring cleavage with sodium borohydride to give the Me3-CB-15ane5 ligand. After discovering this chemistry, we later found a literature method for synthesizing H3-CB-15ane5 in a 1995 Malinkrodt patent that directly reacts triazacyclonone with the tetraosylate of HOCH₂CH₂NHCH₂CH₂NHCH₂CH₂OH, followed by detosylation in sulfuric acid. Although skeptical that this method would be efficient, we explored the reaction and found that yields of the initial reaction were close to 100%! This afforded H1Tos2-CB-15ane5, which has now been complexed with a wide range of transition metal ions (Ru, V, Cr, Mn, Fe, Co, Ni, Cu, Zn). Exploration of the detosylation of this compound in sulfuric acid is underway. We will present our results of this reaction, and the complexes made from the resulting H3-CB-15ane5 ligand, if successful.

39. **Alcohol pendant armed cross-bridged tetraazamacrocycles.** Phillip Nguyen and Cable Jacobsen. (Dr. Tim Hubin, SWOSU Department of Chemistry and Physics).

Ethylene cross-bridged tetraazamacrocycle complexes of manganese and iron are mild oxidation catalysts that can react through a diverse range of oxidation mechanisms. We have embarked on a program of modifying the parent ligand by: (1) adding pendant arms, and (2) exploring derivatives with new metal ions. In this work, we introduce a series of cross- and side-bridged derivatives with alcohol pendant arms. The pendant arms are intended to modify the electronic properties of the metal complexes, perhaps leading to new and/or different oxidation reactivity. Additionally, alcohol pendant arms can also interact through hydrogen bonds with substrate and/or oxidant molecules, perhaps stabilizing reactive intermediates. Side-bridged derivatives are likely less kinetically stable than the original cross-bridged catalysts, but appear likely to have modified coordination geometries that may lead to new reactivities and may be stabilized by the additional pendant arm donors.

40. **New cross-bridged cyclam and cyclen ligands and complexes: 4-methyl-1,4,8,11-tetraazabicyclo[6.6.2]hexadecane and 4-methyl-1,4,7,10-tetraazabicyclo[5.5.2]tetradecane.** Zane Rulon and Isabella Seay. (Dr. Tim Hubin, SWOSU Department of Chemistry and Physics).

Dialkyl cross-bridged cyclam and cyclen complexes have made a significant impact in applications such as oxidation catalysis, chemokine receptor antagonists, and medical imaging. Due to the synthetic process typically used to make these ligands, alkyl groups are required on the unbridged nitrogen atoms. If these alkyl groups are benzyl groups, they can be removed to make the "parent" ligands with two secondary nitrogens, which can then be alkylated with a variety of pendant arms. These ligands are typically symmetric with two of the same pendant arms. In this study, we are targeting unsymmetric cross-bridged cyclams and cyclen with only one pendant arm. Useful intermediates in synthesizing these kinds of ligands would be mono-methyl mono-hydro cross-bridged cyclam and cyclen. These molecules could then be appended with only a single pendant arm added at the single NH site. We will present our synthetic approaches and our resulting ligands. We have also made a number of first-row transition metal complexes of these ligands and will discuss their structures and characterization.

41. **An Evaluation of Zero-Point Energy Scaling Factors in the M-11 Density Functional in Combination with Correlation Consistent Basis Sets.** Daniel Ramirez. (Dr. William Kelly, SWOSU Department of Chemistry and Physics).

One of the most important uses of theory-based computational quantum chemical models is the accurate prediction of thermodynamic parameters such as bond dissociation energies. Recent computational models such as the Minnesota-11 (M-11) Global Hybrid Meta-GGA Density Functional developed by Truhlar suggest that the computational "Holy Grail" of fast, efficient and accurate calculations of thermodynamic values is near at hand. However, accurate vibrational zero point energy (ZPE) is the principle remaining source of uncertainty in calculations of molecular energetics due to the fact that the harmonic potential used in computation only approximates the anharmonic potential of the true chemical bond. To correct for this source of error an empirically determined correction factor is used. Calculated ZPE values for a small set of molecular structures are fitted to experimentally determined zero-point energies for these same structures to obtain a scaling factor that is then applied to all calculations of that type. ZPE scaling factors for a number of different quantum chemical methods and basis sets are available in the literature. However scaling factors for recently developed methods are limited. Our work using the new M-11 density functional employing Dunning's large, augmented and polarized correlation-consistent basis sets (aug-cc-pVTZ and aug-cc-pVQZ) to examine the potential energy surface for radical anion decomposition required accurate ZPE's in order to obtain suitable accuracy. Despite the availability of scaling factors for a large number of method and basis set combinations, scaling factors for these methods are not published. To determine the appropriate zero-point energy scaling factors we used the standard set of 24 small molecules studied by Schaefer in 1991, augmented by an additional 16 small molecules obtained from the published work of Irikura in 2007. Computations were carried out using the Gaussian 09 suite of ab initio methods on a small cluster of PC's. Calculations employed the M-11 method utilizing the basis sets described. A linear least-squares fit was used to compare experimentally derived ZPE's with those derived from computation. R2 values for all methods examined ranged from 0.9996-0.9998 and ZPE root-mean-squar-error ranged from 0.22 - 0.25 kcal mole.

42. **Computational Study of Amino Acid Conformers.** Will Davis. (Dr. Doug Linder, SWOSU Department of Chemistry and Physics).

In this research we investigate the relative energies and properties associated with different conformers of several amino acids in the gas-phase. Specifically, using computational methods, five of the most common amino acid structures: Glycine, Alanine, Valine, Serine, and Cysteine are analyzed. The software program GaussView 5.0 creates 3-D structures, and Gaussian 09 calculates the relative energies associated with each conformer. Geometry Optimizations are used to find stationary points on the potential surface, and force constants and vibrational frequencies are then calculated. The Density Functional Theory (DFT) method B3LYP/6-31G(d,p) is used to calculate the relative energies associated with each amino acid conformer. Structures showing no imaginary frequencies are used for comparison. Several conformers from each amino acid were obtained and relative energies are calculated to determine the relation within the set of known conformers. Significant Energy differences are found amongst each structure, which can be explained by steric interference, torsion, bond strain, and other relative bonding interactions.

43. **Evidence-Based Practice: Reducing Adult Hospital Readmissions.** Sonia Amabo, Gina Harnois, Kylie Morgan, Ashleigh Seale, Emily Smith, Jaby Varughese, and Stephanie Voss. (Mrs. Mary Carrell, SWOSU School of Nursing and Allied Health Sciences).

Reducing hospital readmissions is imperative to lowering the mortality rate associated with hospitalization. In the

year 2013, approximately two-thirds of hospitals were fined \$280 million dollars because of an increase in readmission rates (Guerrero et al., 2016). This statistic led to the following scholarly activity project question: What is the best evidence-based practice to help reduce adult hospital readmissions? Methods included conducting a literature review, a policy and procedure review, and observations of readmission interventions in the clinical setting. Although the literature review recommended several evidence-based interventions for reducing readmissions, it did not identify one specific intervention as superior over the others. Findings suggested that medication reconciliation and telephone calls paired with home visits can lead to lowered readmission rates in adults. The policies, procedure, observations of preventative interventions for readmission were consistent with the findings in the literature review. Implications for nursing practice, education, and research were provided.

- 44. Evidence-Based Practice: Maintaining Contact Isolation Precautions.** Brittany Brewster, Cassandra Dirickson, Tanner Holsted, Elvis Mbatu, Matthew Mendoza, and Kaylin Trompeter. (Mrs. Mary Carrell, SWOSU School of Nursing and Allied Health Sciences).

Maintaining contact isolation precautions is a critical part of preventing infections in hospitals. Compliance among hospital staff is not always implemented. For example, according to Fuller et al. (2011), doctors use gloves 4.5% of the time, and nurses use gloves 31.2% of the time. According to Croft and Liquori et al. (2015), it is evident that contact precautions do indeed prevent the incidence of adverse events while in the hospital. These findings led to the following scholarly activity project question: What is the best evidence-based practice to maintain contact isolation precautions in the hospital setting? Methods included conducting a literature review, a policy and procedure review, and observations of compliance with contact isolation precautions in the clinical setting. The literature review revealed a need for a standardized protocol amongst hospital facilities, and a need for enforced compliance with protocols designed for contact isolation precautions. Observations revealed poor levels of compliance with contact isolation precautions in the clinical setting as compared to set protocols. Implications for nursing practice, education, and research were provided.

- 45. Evidence-Based Practice: Preventing Nosocomial Infections.** Madison Carter, Kylee Gregston, Adrienne Nwankwo, Sheldon Perry, Peyton Tadlock, and Jentri Thompson. (Mrs. Mary Carrell, SWOSU School of Nursing and Allied Health Sciences).

Nosocomial infections are a significant issue in health care facilities across the United States. On average, about two million hospital-acquired infections occur annually costing 45 billion dollars, according to Jacoby and De Angelis (2014). Recent studies show that there is a strong correlation between the occurrence of nosocomial infections and noncompliance with hand hygiene, lack of education, and improper cleaning techniques of the facility and supplies. The following project question arose from this collection of data: What is the best practice to prevent patient nosocomial infections? Methods included conducting a literature review, a policy and procedure review, and observation of cleanliness - both personal hygiene and facility surfaces. The literature review concluded that practicing proper hand hygiene techniques and facility use of antimicrobial agents to clean hospital surfaces reduced the incidence of nosocomial infections. A study also showed that continuing education was important in improving the numbers of hand hygiene compliance. The policy, procedures, and observations were consistent with the findings in the literature. Implications for nursing practice, education, and research were provided.

- 46. Evidence-Based Practice: Site Selection of Intramuscular Injections in Adults.** Dominic Blue, Christian Buckner, Kristy Hulett, Kevin Mbatu, Jennifer Rodriguez, and Lauren Spencer. (Mrs. Barbara Danker and Dr. Kathy Wolff, SWOSU School of Nursing and Allied Health Sciences).

Site selection in adult patients receiving an intramuscular injection is imperative to prevent injury to the patient in the clinical setting. Walsh and Brophy (2011) indicated that 80% of nurses who have actively practiced over the last four years chose the incorrect intramuscular injection site. This disturbing statistic led to the following project question: When promoting patient safety, what is the best evidence-based practice to prevent patient injury while administering intramuscular injections in adults? Methods included conducting a literature review, a policy and procedure review, and observation of intramuscular injection administration. The literature review revealed that permanent nerve or tissue damage can result from improper site selection for an intramuscular injection. In addition, if the site contains a large amount of subcutaneous tissue, a standard length needle will not actually reach the muscle. Analysis of hospital policy and procedure suggested that injection sites should be selected based on multiple factors including, but not limited to absorption rate, type and amount of medication, and the degree of subcutaneous tissue. Lastly, clinical observations revealed that not all nurses follow the latest evidence-based practice for intramuscular injection site selection. Implications for nursing practice, education, and research were provided.

47. **Best Evidence-Based Practice to Prevent Urinary Tract Infections in Adults with Foley Catheters.** Sarah Butcher, Nicole Donato, Matalyn Haney, Allison James, Emily Kessler, and Morgan Rozell. (Mrs. Barbara Danker and Mrs. Mary Carrell, SWOSU School of Nursing and Allied Health Sciences).

Catheter Associated Urinary Tract Infections (CAUTI) account for a large number of inpatient infections. Though CAUTI is widespread, it is known to be preventable. According to one nursing infection control specialist, "Forty percent of healthcare infections are due to urinary tract infections (UTIs) and 80 percent of these UTIs are attributed to indwelling catheters" (Gesundo, 2016, p.32). Due to the astonishing rates of CAUTI in adult inpatients, the scholarly project posed the following question: What is the best-evidence based practice to prevent catheter associated urinary tract infections in adults with foley catheters? Methods included conducting a literature review, protocol and procedure review, and clinical observations of CAUTI prevention techniques. The literature review advocated for several interventions to reduce CAUTI, such as sterile technique, and continuous nursing education on prevention. There were some parallels between clinical observations, procedures and the literature review as well as juxtaposed hospital policies. In conjunction with the literature review, the scholarly project included nursing implications, research, and education.

48. **Evidence-Based Practice: Prevention of Childhood Obesity.** JaKeldon Babers, Jeewa Ching, Tasha Clewell, Mikayla Cooper, Kylie Evans, and Cailey Herrera. (Dr. Kathy Wolff, SWOSU School of Nursing and Allied Health Sciences).

Obesity prevention during childhood is becoming a major component in preventing further health issues throughout the lifespan. As the Centers for Disease Control and Prevention (2016) explained that in 2014, 17% of American children were obese, which translates to 12.7 million children. These alarming statistics led to the following evidence-based project question: What is the best evidence-based practice to prevent childhood obesity? To answer this project question, methods included conducting a literature review, policy and procedure review, and observation of obesity prevention techniques in the clinical area. Although research suggested several evidence-based interventions for obesity prevention, no two children are the same. Therefore, interventions need to be individualized in order to be successful. Findings also suggested that successful interventions included healthy diet, parent education, physical activity, family support, early diagnosis by primary care provider, and community involvement. Evidence-based interventions have been most successful with the combination of multiple approaches based on the child's needs. The healthcare facility policies, procedures, and observations mirrored the findings from the literature review. Implications for nursing practice, education, and research were provided.

49. **Evidence-Based Practice: Determining Appropriate Nurse-Patient Ratios.** Brett Baldwin, Caitlin Coker, Miranda Constant, Jasilin Hall, Kenzie Lind, and Chelsea Rackley. (Dr. Kathy Wolff, SWOSU School of Nursing and Allied Health Sciences).

Finding balance in determining nurse-patient ratios has a direct effect on patient safety and quality of care. Higher nurse-patient ratios lead to an increase in adverse patient outcomes (Aiken et al., 2011), readmission rates (Tubbs-Cooley, Cimiotti, Silber, Sloane, & Aiken, 2013), failure-to-rescue cases (Unruh & Zhang, 2012), and unsatisfied patients (Yu, Ma, Sun, Lu, & Xu, 2015). These findings led to the following scholarly activity project question: What are the best practice method(s) to determine safe nurse-patient ratios? Methods included conducting a literature review, a policy and procedure review, and clinical observation concerning facility staffing policies in the clinical setting. Although the literature review did not identify specific universal staffing levels, it suggested that lower nurse-to-patient ratios are vital to increasing patient safety. The consensus that a specific method for determining the most successful nurse-patient ratio, however, was unestablished. The policy, procedures, and observations of facility nurse-patient ratios were consistent overall with findings in the literature. Implications for nursing practice, education, and research were provided.

50. **Evidence-Based Practice for Developing a Therapeutic Nurse-Patient Relationship.** Ryle Danker, Jenna Lee Hays, Justine Labrador, Selene Nino, Kristen VanTuy, and Marisa Word. (Dr. Kathy Wolff, SWOSU School of Nursing and Allied Health Sciences).

Therapeutic relationships are an essential component to patient health care. Although each nurse may have his or her own style to relationship development, one's approach must be customized based on the patient's individual needs. However, due to the many factors involve in relationship development, there is a need to pursue evidence-based practices, which led to the project question: What is the best evidence-based practice method to develop a therapeutic nurse-patient relationship? Methods for this project included a literature review, a policy and procedure review, and observation of direct nurse-patient interaction in the clinical setting. Although the literature review suggested several evidence-based interventions, it did not specify any intervention as being more effective than the

others. Findings suggested a multifaceted approach including the use of open communication, honesty, listening, and maintaining professionalism, to foster a therapeutic nurse-patient relationship. The policy & procedures and observations of therapeutic relationship development were consistent with the findings in the literature. Implications for nursing practice, education, and research were provided.

51. The Relationship Between Salivary Measures and Perceived Stress and Anxiety in First Semester Pharmacy Students. Breanna Hughes, Emma Leffler, and Nicholas Lockyear. (Dr. Lisa Appeddu, SWOSU Department of Pharmaceutical Sciences, and Dr. Melinda Burgess, SWOSU Department of Psychology).

The objective of this study is to evaluate stress and anxiety levels in first semester student pharmacists, and to evaluate the potential of relaxation to reduce those levels. In Fall 2015, baseline survey measures and salivary samples (n = 41) were taken at the start of the semester. Next, subjects were randomly assigned to a meditation technique (body scan, n= 10; mindfulness, n= 11; or 4 x 4, n= 10) or comparator (power posing, n= 10). For three and a half weeks, subjects were encouraged to conduct their technique at least twice per week. Survey measures and salivary samples were collected again. For the next 8 weeks up to finals, subjects could keep, modify, or change their assigned technique. Two more sets of survey measures and salivary samples were taken. Salivary samples were analyzed using commercial kits (Salimetrics, LLC) for hormones of empowerment (Testosterone) and stress (Cortisol and Amylase, a surrogate measure for the Sympathetic Nervous System) via the Synergy H1 Hybrid microplate reader (BioTek Instruments, Inc.). We previously reported students perceived having a significantly greater amount of stress and anxiety later in the semester as compared to the beginning. Therefore, we will investigate correlations between salivary measures and survey results. In addition, we will use salivary measures to evaluate potential differences among relaxation techniques. Results will be used to encourage students to mitigate stress and anxiety levels.

52. The Effects of Relaxation Techniques on Salivary Measures in Student Pharmacists. Emma Leffler, Breanna Hughes, Nicholas Lockyear, and Heather Kelley. (Dr. Lisa Appeddu, SWOSU Department of Pharmaceutical Sciences, and Dr. Melinda Burgess, SWOSU Department of Psychology).

The primary objective is to investigate changes in physiological measures of stress (alpha-amylase, an indicator of sympathetic nervous system stimulation, and cortisol) and power (testosterone) when student pharmacists conduct relaxation and non-relaxation techniques. The secondary objective is to determine whether physiological measures relate to survey results, as previously reported by Leffler et al. (2016). Eighty-six student pharmacists were randomly assigned to conduct one technique for eight to ten minutes: body scan (n=16), mindfulness meditation (n=16), 4x4 breathing (n=16), power posing (n=19), or app gaming (n=19). Subjects provided pre- and post-technique salivary samples. Cortisol and testosterone were determined via Enzyme Immunoassay Kits, and alpha-amylase via Enzyme Kinetic Kits (Salimetrics, LLC). Intra-assay and inter-assay coefficient of variations for cortisol (5.32% and 7.30%) and testosterone (5.23% and 11.94%) were within acceptable limits. SPSS GLM univariate analysis was used to evaluate the primary objective, with treatment, gender, and meditation experience as independent variables. The secondary objective was evaluated utilizing Spearman's correlation. An increased percentage change was found for testosterone (P<0.05) with body scan (34.8 +/- 11.6%; mean +/- SEM) versus power posing (-9.9 +/- 7.1%) and app gaming (-8.2 +/- 8.4%). Across treatments, a greater decline in alpha-amylase (P<0.05) was found in subjects with meditation experience (-25.9 +/- 9.4%) versus without (-5.4 +/- 3.0%). Cortisol decreased similarly (P=0.27) for all treatments (-19.14 +/- 3.75%). Cortisol changes were directly correlated to testosterone (r=+0.43; P<0.01) and self-reported stress levels via survey (r=+0.232; P<0.05). Results suggest contracting and relaxing muscles during body scan increased testosterone secretion, whereas salivary stress measures decreased across all treatments. Only cortisol was associated with survey results. However, large variations in these salivary measures made it difficult to detect changes. Findings will enable us to plan future studies and ultimately make evidence-based recommendations to mitigate stress in student pharmacists.

53. Standardization of Lab Methods to Determine Total Phenolic Content and Antioxidant Activity. Colton Sharp and Breanna Hughes. (Dr. Lisa Appeddu and Dr. Les Ramos, SWOSU Department of Pharmaceutical Sciences).

Polyphenols are naturally occurring compounds which have demonstrated antioxidant activity. This includes the ability to scavenge free radicals and, therefore, block the damaging effects of these reactive molecules on cells. Dietary intake of polyphenols may have potential health benefits, including prevention of cardiovascular disease and cancer. Several years ago, Ramos and coworkers employed the Folin-Ciocalteu method to determine polyphenol content via Gallic Acid equivalents and the DPPH conventional method to determine antioxidant activity via TROLOX equivalents. However, these methods were conducted full scale, utilizing large amounts of reagents and readings via a traditional spectrophotometer. Therefore, the objectives of this research are to: (1) transform these procedures

to quantify total phenolic content and antioxidant activity in various plant and food extracts via microplate methods; and (2) compare results to a commercial kit (Antioxidant Assay Kit, Sigma CS0790, Sigma-Aldrich®). First, steps will be established for preparing reagents and standards. Next, conventional assay procedures will be elucidated from the previous work of Ramos and coworkers. These will be transformed to microplate methods, using a proportional reduction in samples, standards, and reagent amounts pipetted. The work of Bobo-Garcia et al. (2015) will be used to aid in this transformation (DOI 10.1002/jfsa.6706). Third, the Synergy H1 Hybrid microplate reader (BioTek Instruments, Inc.) will be set-up to read absorbances, develop a standard curve, and to interpret sample absorbances into Gallic Acid and TROLOX equivalents. Last, the transformed procedures will be tested, modified, and repeated to achieve a valid standard curve ($R^2 > 0.95$), controls which repeat between assays ($CV < 15\%$), and standards and controls which repeat within duplicates ($CV < 10\%$). The ultimate application of this study is to develop methods to extract samples from fruits and food products to efficiently run through these procedures and to achieve repeatable results. In the future, these methods can be applied to evaluate potentially medicinal foods, specifically those native to Oklahoma and the surrounding geographical areas.

- 54. Potential Benefit of Abuse-Deterrent Opioid Analgesics to Reduce Addiction and Their Coverage by Prescription Drug Plans in Oklahoma.** Jessica Gomez (Pharm.D. Candidate), Dr. Kalie Kerth, Dr. Randy Curry (Rural Health Center, SWOSU College of Pharmacy), Dr. David A. Ralph, and Dr. Scott F. Long (SWOSU Department of Pharmaceutical Sciences).

Misuse and abuse of opioid analgesic prescription drugs is a growing problem in the United States. Moreover, opioid abuse and drug diversion are greater in Oklahoma (8.1% incidence) than the national average (4.8%). The resulting therapeutic, medical emergency, and law enforcement outlays of monies associated with this high rate of abuse in Oklahoma creates a burden of higher costs to patients, insurance companies, and the State. Recently a class of drugs approved for the treatment of chronic pain has been approved as abuse-deterrent opioids (ADO). ADO are formulated to reduce the abuse potential of this highly addictive group of drugs. The current project is designed to ascertain 1) if ADO are effective in reducing abuse of the addictive component of the product and 2) if ADO are available to Oklahomans through their insurance prescription drug plans as a means to reduce abuse. A literature review was performed to address the first question of the project and reviews of insurance claims for opioids and of drug plan formularies to determine their availability to Oklahomans. The results indicate that ADO formulations are at least partially effective in reducing abuse rates (30-60%). Declines were also noted in other indicators of opioid abuse including emergency room visits, rates of drug diversion, and street prices of the drugs. A review of files claimed for ADO indicated that near 100% of such claims filed were paid by the insurance carrier. Drugs with similar abuse-deterrent formulations, but not labelled as such, were also covered by insurance plans in the great majority of files claimed (96%). The review of prescription plan formularies indicated that most plans cover ADO at least partially, although the co-pay or patient cost may be more than non-abuse-deterrent alternatives. The results of the research indicate that ADO are at least partially effective in reducing medical and social consequences of opioid abuse. The results also indicate that ADO are available to Oklahomans through their insurance prescription drug plans.

- 55. Analysis of the FDA Approved drugs in the past decade.** Kayley Humann. (Dr. Hardeep Saluja, SWOSU Department of Pharmaceutical Sciences).

The Pharmaceutical industry is one of the major contributor to the U.S. economy. The top ten pharmaceutical industries revenue for 2016 was a combined 423.02 billion dollars, yet the worldwide industries revenue is almost 1 trillion dollars. The success of pharmaceutical industry relies on the developing new treatments to meet the unmet medical need. The purpose of our study is to analysis the approval trends of Food and Drug Administration (FDA) in the past decade. On an average, FDA has approved 30 novel drugs in the past decade. We analyzed the number of applications filed to number of approvals granted, number of drugs approved in different disease states including orphan diseases, number of small molecules, biologics and combination products approved in the past decade. The aforementioned analysis will help us envision the future direction of pharmacy practices and overall health care system.

- 56. The Hassle of Remembering: Do Sustained Release Drug Dosage Forms Help To Improve Patient Compliance?** Sierra Mullen and Brooke Lizotte. (Dr. Hardeep Saluja, SWOSU Department of Pharmaceutical Sciences).

An estimated 33.3%-50.0% of all patients in the United States do not take their medications as prescribed by their physician. This non-compliance causes the disease state to be poorly controlled, or in some cases exacerbate patient's disease condition that causes significant financial burden to the overall health care cost. According to New England Healthcare Institute "Nonadherence has been shown to result in \$100 billion each year in excess

hospitalizations alone." An effective way to improve patient compliance is through providing a simplified drug regimen along with proper patient education. Mounier and coworkers showed that patients receiving once daily dose of an antihypertensive drug demonstrated 11 percent improved compliance than patients receiving twice daily dose of the drug. An effective way of providing a simplified drug regimen is by using extended release medications; that reduces the frequency of drug administration and therefore improves patient adherence. Our study focuses on exploring the two ground breaking parenteral extended release dosage forms "Invega Sustenna" and "Invega Trinza" for treating of schizophrenia and schizoaffective disorder. According to a study "The national rehospitalization cost in the USA attributable to antipsychotic nonadherence was estimated at approximately \$1,500 million per year in 2005." Invega Sustenna was approved by FDA in year 2009 and is injected once a month. In year 2015, FDA approved Invega Trinza which is injected seasonal i.e. every three months. Both injections are injected intramuscularly in the upper arm or buttocks. The base for these medications uses an aqueous solution to suspend the medication and certain excipients to cause the long term effect. The once a month and every three-month drug products significantly increases compliance because the patient does not have the opportunity to forget or intentionally escape from taking their medication. For chronic conditions, extended release dosage forms offer myriad of advantages and pharmacists and pharmaceutical scientists should investigate ways to develop newer and better extended release formulations to improve patient care.

57. **"Nitrogen Hypoxia- The New Face of Capital Punishment."** Brittany Cano and Mary Iliff. (Dr. Dan Brown, SWOSU Department of Social Sciences).

The purpose of this research is to identify an alternative method for capital punishment in America. The aspects of this research explore current and possible procedures for capital punishment, such as drugs, costs, administration, and quantity. We are finding that Nitrogen Hypoxia is a cheaper and more abundant drug that can be administered as a method of execution by asphyxiation, as opposed to our current methods of lethal injection. Nitrogen Hypoxia is currently being debated by other countries as well as efficient and humane method of execution.

58. **Issues in Civil Liberties.** Ty Normand. (Dr. Dan Brown, SWOSU Department of Social Sciences).

My poster for this fair will be covering issues that occur and have occurred in the United States. These issues will cover violations of the amendments in present time as well as similar examples of such things from our nations past.

59. **Crisis in Corrections: The impact of the Oklahoma Truth in Sentencing Law on Oklahoma Corrections.** Dalyanna Parker. (Dr. Dan Brown, SWOSU Department of Social Sciences).

The impact of the Oklahoma Truth in Sentencing Law on Oklahoma Corrections. The Legislature passes the Truth in Sentencing Act in 1999. Oklahoma gets tough on crime when this passes. How this has impacted Oklahoma prison system. The rate of Oklahoma incarcerated is in the millions. The cost per inmate to house is in the thousands. And the cost for privately owned prisons is more than what the state should be spending. There have been many riots throughout the years in our prison systems whether it's private or state. The prisons are all understaffed and this causes a lot of grief because of security issues. There needs to be a reinvestment initiative in the justice system. Especially with the prison system.

60. **Problems in Oklahoma Jails.** Lupe Nicholas Vidaurri. (Dr. Dan Brown, SWOSU Department of Social Sciences).

Analyzing issues in reference to inmates medical concerns, safety issues, visitation rights, food, recreation/leisure time and etc.

61. **Compulsory DNA Testing: Pursuit of Justice or an Injustice.** Dr. Dan Brown, SWOSU Department of Social Sciences.

This presentation will examine the current public policy on compulsory DNA testing in the American criminal justice system. The presentation will analyze the laws in various states with regard to compulsory DNA testing and challenges in federal courts with regard to violations of the 5th Amendment of the U.S. Constitution. The presentation will conclude with an analysis of the future use of compulsory DNA testing in the American criminal justice system.

62. **The USIA: American Image During the Eisenhower Administration.** Colleen Garrett. (Dr. Becky Bruce and Dr. David Hertz, Department of SWOSU Social Sciences).

Following World War II, Supreme General of the Allied Forces Dwight D. Eisenhower became President of the United States. Eisenhower created the United States Information Agency (USIA) in August of 1953 to focus the government's

public diplomacy and propaganda efforts. Using the USIA, the Eisenhower Administration hoped to improve the American image abroad with burgeoning communist countries, but due to internal conflicts, their attempts were not successful.

63. **From Barbary to Pastime: The Reform of Football in the Progressive Era.** Bailey McKay. (Dr. Becky Bruce, SWOSU Department of Social Sciences).

Collegiate football in the late nineteenth century was not the multi-billion-dollar spectator industry Americans know today. The origins of the sport can be traced back to 1869 to the historic match between Rutgers University and New Jersey College, known today as Princeton University. As the sport gained popularity among young men, it also gained infamy within academic circles. To the intellectual elite, football was a device to teach young men "courage, coolness, steadiness of nerve, quickness of apprehension, resourcefulness, self-knowledge, and self-reliance." However, as football became more of a spectator sport that brought in an increasing amount of revenue, the intellectual elites of the governing academic boards of the universities, began criticizing the sport. They discerned that the intermixing of the outside world, namely football, with the academic setting tainted the purpose, which they thought was the training of young men's minds and bodies to apply the attributes above to their studies, the academic elites saw for the game. They believed the increasing interaction between the civilian population and the athletes diminished the role football played in the academic setting. Elites also concerned themselves with the growing brutality of football as injuries and even deaths increased each season. Due to the increasing casualties, the elites advocated for the immediate reform of football or threatened to facilitate the downfall of the game. The push for reform of the sport of football in the Progressive Era developed from the combination of the adversarial relationship between athletic departments and university boards as well as the brutality of early forms of the game.

64. **The Root to The United States' Response to the Russian Revolution.** Cole Smith. (Dr. Becky Bruce and Dr. David Hertz, SWOSU Department of Social Sciences).

The changing status of the Russian Government at the end of World War I caused the Wilson administration to make a decision on what steps they would take in helping the new Provisional Government. The Wilson administration did not send troops to Russia at the beginning of the Russian Revolution to support the Provisional Government but did send a well thought out group of distinguished men in a commission to try to prevent Russia from abandoning World War I. In 1917, the Provisional Government was in control of Russia after the February Revolution but even with the Root commission, the establishment of a democracy was unsuccessful and the Bolshevik group gained power.

65. **Dawgs in Debt.** Sarah Brown, Mason Pitts, Abel Abame, and Gage Bouziden. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

For our editorial cartoon we will be representing the concept of debt. We are studying this subject particularly because it pertains to us as college students. Many college students take out loans with the hope of being able to pay off their debt with their eventual career. Although being debt free is the eventual goal, quite a few people find themselves remaining in debt years after they have obtained a college degree. Debt is an interesting issue because although it is a common problem, it is generally not discussed openly among people, especially college students. Debt is an important concept related to macroeconomics because it affects the economy as a whole. Whenever people are in debt, they tend to be more cautious with their money causing them to not spend as much. When consumers aren't spending money, it causes a change in supply and demand, thus affecting the economy.

66. **Inflation in the United States.** Rachel Burns and Eduardo Iturregui. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

I will be addressing the popular macroeconomic topic of inflation. I will study this subject because I believe that it is important to keep up with the latest inflation rates in the United States because it affects everyone. This is an interesting topic because inflation not only affects the government but it also affects the buyers and sellers of the world. This is an important issue because we, as the people of the United States, need to be informed about such issues as inflation because it affects a lot of aspects of our lives. I will be addressing this issue in an editorial cartoon.

67. **The Use of Automation and Technology to Increase Efficiency and Patient Safety in Health Care Systems.** Madison Erman and Courtney Chedester. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

Keywords: computerized physician order entry (CPOE), electronic health record (EHR), pharmacy robotics, carousels, automated dispensing devices (ADDs), mobile medication cabinets, bar code point of care (BPOC) technology, electronic discharge summary technology, and controlled drug substances (CDSs).

Purpose: The purpose of this article is to assess the impact that technology and automation has on the medication use process. The components of the medication use process are prescribing, preparation, dispensing, administration, and monitoring of a drug. The medication use process involves all members of the health care team including physicians, pharmacists, nurses, etc.

Methods: Through analyzing multiple articles we will assess the implementation of various technologies such as; computerized order entry, electronic health records, pharmacy robotics, bar code scanning, cabinets, etc. We will study the use of these technologies by various health care professionals in different settings of the hospital, such as the pharmacy and the patient care floors. All of these systems are involved in the medication use process and directly impact patient outcomes. We will look at how implementing these technologies could decrease medication errors, increase patient safety, increase profitability, improve inventory management, increase documentation accuracy, and raise the level of security involving controlled drug substances. The use of these technologies could also improve employee task efficiency, allowing implementation of additional services to the patient. Allowing employees to step away from simple tedious tasks and become more involved in valuable clinical services increases their overall engagement and ultimately the quality of their work.

Scope of Application: The studies that we analyzed involved multiple acute care hospitals varying from small to large in size, and from rural to urban locations. The findings from our analysis show that technology, if implemented correctly, could have a huge impact on the quality of care in multiple types of health care settings. Many hospitals are evaluated routinely by Joint Commission or other organizations for accreditation. The measures that can potentially be improved by the implementation of these technologies are analyzed by Joint Commission when approving hospitals for accreditation. Therefore, implementing these technologies can allow hospitals to better meet these measures.

68. Inflation Causes Unemployment. Joshua Nichols. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

The economic abstract I chose is unemployment, specifically the ties between unemployment and inflation. While inflation is a much larger concept, one of inflation's downfalls is that it can lead to unemployment due to increase in market prices. We should study this subject because one unemployment in the United States should be taken very seriously especially because unemployment rates have been at an increase in the last few years, also because it is a cause due to inflation, inflation itself should be looked at and all its downfalls. I think this is an interesting issue in macroeconomics because it is a very real scenario in the world. It is also important because we should want unemployment rates to slowly diminish throughout the future. I will address this issue in an editorial cartoon.

69. Boomer Goners. Shaun Garner and Collin Spangler. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

1. Baby boomer generation retiring and the impact on economic growth.
2. To see what the effects of the mass numbers of baby boomers retiring and the lack of eligible workers to replace them will have on the production possibilities of goods.
3. It allows an opportunity to look at our economic P.P.F. and how to keep it steady or moving outward despite a very large amount of skilled labors leaving the workforce.
4. With the loss of mass quantities of production producing laborers our output of goods could start declining, hurting our economic growth as a country.
5. I will address it using a comic strip.

70. The Impact of the Cost of Living. Natanya Hernandez, Kaci Pennington, and Makenzie Lovett. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

Macroeconomic principles are seen all over the world and encompass all aspects of our economy. It is interesting to see how one aspect may influence many others in several other economies around the globe. The differences in economic theories can also be seen throughout several time periods. One economic theory related to macroeconomics is the cost of living which we will show in a comic strip. The cost of living is significant to other concepts associated with macroeconomics. Inflation, trade-offs and opportunity costs, taxes, the housing market, the standard of living, and income are all examples of facets through which the cost of living is seen. The standard of living, for instance, is greatly affected by the cost of living. When the prices of mortgages, food items, and other necessities rise, causing inflation, the standard of living also changes and reflects economic standing. When the economy changes, tradeoffs and opportunity costs can be seen in many instances. If, for example, the housing market is not doing well so the prices of houses increase and income is also not rising, some families may face decisions involving investments that need to be considered as a trade-off. In these cases, such families will need to weigh the opportunity costs of each investment and see which presents more value and outweighs the benefits of other investments. This give-and-take relationship exists throughout all aspects of life and in different places. All of

these tradeoffs and opportunity costs may become more difficult if the cost of living is higher because the stakes of losing something that is a vital asset are higher. Focusing on the impact of the cost of living, the study of this topic is important because of its broad encompassment of the economy. Looking at the cost of living provides insight on the current state of the economy in a particular region. This value can vary based on many other elements in the economy and can drastically affect the standard of living that can be attained on a fixed income. This issue is not only relevant to economists or a certain section of people, but each person across the globe experiences the effects of the cost of living on a daily basis. The cost of living is an important issue in macroeconomics because it is something that affects people everywhere. No matter where you go there are people living in some sort of housing or shelter type environment. This housing or shelter always comes at cost.

71. Tax Havens. Sarah Madden. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

Tax havens -- while it has many definitions, the one I will be using is "A nation or subnation jurisdiction that has substantially lower taxation." This subject is studied to better understand the implications, which are imposed on the U.S. when companies or criminals use the tax haven in off shore accounts to bypass the higher tax laws in the United States. Research shows the implication of these tax havens in the United States is a higher individual tax for each American tax payer, loss of budgeting for schools, roads, and national defense. This issue is important and interesting to macroeconomics because of the large role taxes play in our economy by fulfilling necessary needs of the everyday American. For example, let look at tax incidence, which deals with how tax is distributed amongst the people who make up an economy. When trying to distribute taxation in America, the government looks at income for an individual among several other things and bases your yearly taxes on your income for that taxation period. When companies or individuals place their money in off shore tax haven accounts it enablement them to take money made in the United States and transfer it to another nation to be taxed. This causes a problem for America because money is then leaving the country and often times never being seen in a legal manner again. One economic theory this deals with is the Principle of Territoriality. The Principle of Territoriality states that the government of a given geographic area has the right to tax their people within the specific geographic area they have defined. Meaning that country is solely responsible for the taxation of the people within their jurisdiction. What this means for companies or individual outside of their jurisdiction is that they are able to send money as a means of establishing residency, and therefore send money to be taxed at the rates of said country in which they have gained residency. Through these tax havens, even though they are using their money as a means of residency, they are treated as non-residents. This meaning they don't have to follow the exchange controls. Those using tax havens and bypassing the exchange controls are able to move their money to an off shore account, leaving it undocumented.

72. Uber's effect on wages and unemployment. Trevor McClure. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

1. Uber's effect on wages and unemployment to all taxicab drivers. Taxicab drivers includes both taxi and Uber drivers. This study examines unemployment and wages which are both large factors in macroeconomics.
2. I am studying this subject because the unemployment side of macroeconomics interests me. I like that this comparison between Uber and normal taxis shows a different perspective on the unemployment rates and wages within a certain industry, transportation.
3. This topic is interesting because it touches on multiple aspects of a certain industry. As a new innovative idea arises the other industries must attempt to cope and adjust to the new circumstances in the industry. In this case, taxicab companies must adjust to the new competitor, Uber, as it takes workforce and income. These are the two factors, unemployment and wages, that surround this topic. It is interesting to see how the two correlate. They have a direct or indirect effect on each other which shows the versatility of macroeconomics. Macroeconomics is everywhere because of the connections made within it.
4. This issue is important in macroeconomics because it is feature two underlying themes in macroeconomics, wages and unemployment. Wages and Unemployment effect every person is why this is an important topic. They are both important subsets of macroeconomics that helps to explain the big picture.
5. I will address this issue in the form of current issues in economics. I will use presentation slides to address the subject.

73. Inflation vs. Wages. Cara McWilliams. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

Inflation, when there is more money out there chasing the same number of goods and services. In the last 50- 60 years, inflation has made it to where instead of one wage-earner in the family, it now takes two wage earners to make ends meet. When extra money is printed out and put into circulation it slowly starts to lose its value. Inflation is a serious subject and deserves to be studied because it affects the value of money and indicates the overall stability

of a country's economy. One should understand how it can affect their money in the future and prepare for it. This cartoon will show how inflation eats away at wages, causing them to lower in value. This cartoon will contain a person with the title "wages" swimming in the ocean and a shark titled "inflation" swimming toward them. It is implied that inflation will attack wages and thus lower their worth.

74. **Economic Thirst: Never-ending Inflation.** Michelle Taylor, Delmi Menendez, Dalhae Park, and Gloria Choi. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

Inflation is best described as an upward movement of prices, that happens from one year to the next. The percentage change in price indices from the Consumer Price Index (CPI), Producer Price Index and GDP Deflator. The key concept with inflation is decision making and cost. This issue happens to be very interesting not just us, but also to anyone that studies Macroeconomics. Considering that everyone spends money daily, inflation is an issue that affects people all over the world. Inflation is a never-ending issue, since it is known as one of the cruelest tax because it takes away from not just our savings but also our paychecks. If the rate of inflation exceeds the rate of growth in our paychecks, that means our purchasing power and real income is declining. There are 3 theories of inflation: Market-Power Theory, Conventional Demand-Pull Theory, and Structural Theories of Inflation. Market-Power is a small number of producers that can increase the price even if the demand does not rise. Conventional Demand-Pull Theory is inflation that is caused by excess of aggregate demand over aggregate supply. Structural Theories are explanations of inflation in developing countries. We will be addressing this issue through a hand drawn cartoon, in which we will explain the subject, what it means, the purpose and how the cartoon relates to the topic we have chosen, which is inflation.

75. **The negative impact on brand imaging in the lodging industry.** Radhika Patel. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

The importance of Hotel and Business Management is vital in our generation and many generations to come. To succeed in this industry can be very challenging if you aren't aware of the needs and services that one can provide. My topic for this research is to discuss the negative impact on brand imaging in the lodging industry. My research will be different in a way that I will compare hotels from my own family businesses to the ones in big cities and how they are different with the branding. In my research project I will be discussing the hotel industry in the Recession and how the brand image planned a role. The other topic I will be discussing is the research is the customer loyalty with the brand image in big cities and small rural areas.

76. **Inflation and Consumer Price Index's Effect on the U.S.** Austin Seabourn. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

In the United States, many consumers find themselves living paycheck to paycheck due to a variety of reasons, one being inflation. Inflation is the increase in overall level of prices in the economy. Current inflation rates are just above the inflation equilibrium due to the nation's poor economy, but remains to dig its hands into our pockets clutching every coin we have earned. Inflation and the consumer price index are the key components to what makes up our economy. We can improve our economy if we simply enlighten ourselves on the issues. Inflation is a certain issue that annually presents itself and United States citizens are left immobilized by its pocket-wrenching clutches. It is often foreseen by economists that inflation and its measurement (CPI) are key components to what affects individuals and their nation's economy. Economists believe that if our government chooses to implement a stable annual 6% inflation rate, it will not only decrease national debt but not financially cripple individuals as well. If inflation rates were to exceed 6%, it would result in higher unemployment rates. Consumer price index (CPI) is the standard measurement of inflation in the United States. The consumer price index and inflation affect my family, friends, and myself daily. If I were to conduct research and learn more about these subjects, I feel I can spread the knowledge and help others become more financially stable and create less stress. Our current consumer price index (CPI) is moderately high and money value is considerably low. Marc Davis concludes that "if the average price of all goods and services in the CPI were to go up 3% over the previous year's level, for example, then inflation would be pegged at 3%. This also means that the purchasing power of the dollar would have declined by 3%." In 1976, twenty U.S dollars would allow consumers to purchase a "cart full" of items at a local grocery store. As of today's economy, twenty dollars can only buy a gallon of milk, a loaf of bread, a case of water, and a fair-priced bottle of shampoo.

77. **Unemployment in the U.S.** Mary Tippens. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

Unemployment has been an issue for decades. All over the U.S. and especially in our own state. The reason I want to do this topic is because it has had a direct impact on my family and loved ones. My Uncle and my Grandpa got laid off this last year because the oil field was slowing down. Even though the unemployment rate has gone down

in the last year. It is still an issue people don't have the money to help other businesses like movie theaters and other leisure activities IE: Sporting events and shopping at mall. The people that are unemployed contribute less to the economy because they can't pay for things also they don't pay taxes because lack of jobs. I work at an employment office so I see many people come in looking for jobs. It affects the way the U.S. economy functions- supply and demand. I plan on doing an editorial cartoon or a cartoon strip. Haven't decided yet.

78. Internet access and energy security. Dr. Jieun Chang, SWOSU Department of Social Sciences.

This paper explores the relationship between Internet access and energy insecurity in the United States. The federal government implements such bill assistance program as low-income home energy assistance (LIHEAP) to reduce energy insecurity. However, low-income households may face higher utility bills led by the rising average temperatures in summer and severe weather condition. Moreover, because of insufficient LIHEAP funds, eligible households may not receive the assistance. Because Internet access decreases information search costs, households with Internet access are more likely to be aware of their eligibility status for bill assistance programs and apply for them online. Based on residential energy consumption survey by the US Department of Energy, this paper uses bivariate probit model to examine the question that Internet access of a low-income household reduce energy insecurity in 2005 and 2009.

79. Executive Search: How Contestable Markets Affect Branding. Shelbey Trawick. (Dr. Amanda Evert, SWOSU Department of Business & Computer Science, and Dr. Carlos Baldo, SWOSU Business & Computer Science).

Previously, academic researchers in branding and marketing noted that corporations were beginning to shift the taxonomy of their names from "abstract" to "conceptual" in nature to portray their company values to the public. However, in this study we argued that some industries or sectors do not necessarily follow this trend. Some markets' characteristics, like the level of rivalry or contestability in a specific sector, may lead organizations to keep a particular name or taxonomy as opposed to following the precedents set by other companies. An example, which supports our hypothesis, is the industry of Executive Search or headhunting. For the examination, the taxonomies of over 500 executive search firms' names in Oklahoma and surrounding states (Colorado, Texas, Kansas, Missouri, Arkansas) were analyzed to test our central hypothesis. Some important theoretical and practitioners' implications are indicated in our findings.

80. Association between Military Personnel with Socio Economic and Behavioral Factors. Kristi Burghardt. (Ms. Kristin Woods, SWOSU Department of Psychology).

Factors related to military personnel suicide include experiences during deployment, injuries acquired, killing anyone during combat, number of deployments, and time spent on deployment (Reger et al., 2015). Several soldiers and veterans stated that the stigma of being weak was a major reason they did not seek out counseling. Not getting help can lead to PTSD, sleeping issues, suicide, and other related factors (Dickstein, Vogt, Handa, & Litz, 2010). The goal of this research was to examine the association between military personnel and socio economic and behavioral factors. A secondary analysis was conducted on publicly available data collected in 2008. The sample consisted of 351 participants that had or were currently serving in the military. Males represented 81% with 60% Caucasian. The results of this study found that soldiers having suicidal thoughts find it harder to fall asleep if they live alone ($p < 0.0009$) or live with someone ($p < 0.0001$), and soldiers having suicidal thoughts receiving psychological or emotional counseling for those living alone ($p = 0.0006$) or with others ($p < 0.0001$). The results of this study support previous findings that family and friends can play a large role in suicidal thoughts of the soldiers, as well as if they will seek out counseling help. Soldiers are under a lot of stress and put in difficult situations while in combat, support from friends and family, and destigmatizing counseling goes a long way in preventing them from harmful behavior.

81. Association Between Civilians, Veterans, & Military Members, with the Number of STI's Reported Across Race and Sex. Guillermo Defranc. (Ms. Kristin Woods, SWOSU Department of Psychology).

In today's American society, Sexual Transmitted Infections are becoming a great concern among young adults, with the number of new infections growing at alarming rate. In 2008 the number of STIs were around 110 million, with 22.1 million new infections, predominant in African Americans, and Latinos (Mojola & Everett, 2012). When comparing sex, the same results showed that African American females are the ones more likely to receive a STI diagnosis (Mojola & Everett, 2012). The current research hypothesized that minority veterans, and military females would report the highest number of STIs. A secondary analysis of publically available data from the National Longitudinal Study of Adolescent to Adult Health was conducted, resulting in a nationally representative sample of young adults age 24 to 33, 52% female and 57% Caucasian. Chi square analysis showed no significant association between the three groups ($p = 0.2061$) and STIs, but showed significant association between race and STIs ($p = 0.001$)

with African American at higher STI diagnoses. When testing sex as a moderator, there is a strong association for females ($p=0.0005$) only. Female civilians, veterans, and active duty are 2, 3, and 4 times more likely to have an STI than their male counterpart. The results of this study are consistent with previous research, finding that female minorities are more likely to be diagnosed with a STIs, than males, with a higher probability in veterans and active military.

82. The Association Between Economic Status and Attractiveness. Whitney Roper. (Ms. Kristin Woods, SWOSU Department of Psychology).

It's well known that attractive people are viewed as more economically stable, especially women (Little, Jones, & DeBruine, 2011). The main factors when looking at attractiveness aren't only facial features, but also weight, our personality and our ability to provide. The more pleasing to the standards set by today's society, the better a person is able to survive in the world. It has been shown that it is more difficult to get a job based on weight because we find a larger person less acceptable than a skinnier person (Averett, & Korenman, 1996). While quite a bit is known when looking into the physical aspects of research on this topic, not much has been explored regarding how personality relates to attractiveness. It is hypothesized that the more positive personality, attractive, and perceiving oneself as more attractive, the more successful a person will be economically. A secondary analysis of publically available data was conducted on the 5,114 participants, aged 24 to 33, from the fourth wave of the National Longitudinal Study of Adolescent to Adult Health. Chi-Square analysis revealed a statistically significant relationship for a person's income before taxes and if they got angered easily, if they were sympathetic, or if they found themselves attractive ($p<.0001$). No moderators were found. When reviewing the results, the hypothesis was supported. Not only does this coincide with previous research but also adds in a new variable to consider for future research.

83. Religiousness and Happiness: Is One Required to Have the Other? Kendra Hess. (Ms. Kristin Woods, SWOSU Department of Psychology).

Past research has shown that those who practice spirituality have greater self-esteem, positive physical health effects, greater stress relief, and positive mood overall (Rowold, 2011; Green, & Elliott, 2010). Religiousness provides a greater amount of social interactions, which also lead to greater levels of positivity and self-reported happiness (Sillick & Cathcart, 2014). The current study aimed to gain a better understanding of those who claim to be happy and how their relationships are with other people, where they fall on a political spectrum, and feelings of control over one's life. A secondary analysis of publically available Wave IV data from the National Longitudinal Study of Adolescent to Adult Health was conducted. The sample of 2,865 adults was comprised of 48% male, 67% White, 16% Black or African American, 9% Multiracial, 4% Hispanic or Latino, 3% Asian or Pacific Islander, 1% Other. Chi-square analyses showed a statistically significant association between religious participation & desired level of education ($p=0.0008$); feelings of control & stress ($p<0.0001$); feelings of control & political affiliation ($p=0.0002$); and feelings of connectedness to others & volunteer work ($p=0.0020$). Examination of confounding variables supported some and contradicted other previous findings. Associations between overall happiness and religiousness were not supported. This study supports the conclusion that a person can find happiness and well-being with or without religion.

84. Parental Smokers: Sexual Abuse, Risky Behaviors, & Undesirable Personality Characteristics in their Teenager. Drew Hilliary. (Ms. Kristin Woods, SWOSU Department of Psychology).

Secondhand Smoke (SHS) is still a problem today; 40% of U.S. non-smoking adults have been significantly exposed to SHS at some point in their life (Gan, et al., 2015). Exposure to SHS during the early years of life was linked to a decrease in cognitive ability amongst adolescents (Abidin et al., 2014). Using this research as a starting point, the objective of this study was to look in a less conventional direction. The current research hypothesized that participants who were exposed to SHS by a parent during adolescence would report higher rates of sexual abuse, risky sexual behavior, and undesirable personality characteristics compared to those whose parents did not smoke. A secondary analysis was conducted of 5,114 participants from publically available Wave IV data from the National Longitudinal Study of Adolescent to Adult Health. Chi-square analysis showed a significant relationship between parental smoking and physical abuse by an adult caregiver ($p=.0002$), and parental smoking and self-reported frequent mood swings ($p=.0001$). ANOVA revealed that as the number of parents that smoked increased the age the adolescent first had vaginal intercourse significantly decreased ($p<0.001$). Adolescents' lack of judgement and egocentric thinking leads to risky behaviors, based on the findings of this study; exposure to SHS could exacerbate the problem. Future research should explore strategies to combat the effects of SHS on adolescents'.

85. The Association Between Successful First Generation College Students and Familial Support. Helen Shobie Nimsey. (Ms. Kristin Woods, SWOSU Department of Psychology).

The rapid integration of advanced technology into everyday life has led to a need for a more highly educated workforce. For Americans to stay relevant and employable, a minimum of a Bachelor's Degree or higher is required for a stable income. To meet the rising demand for educated and skilled workers, there has been a surge of First-Generation college students. The most important factor seems to be the amount of family support received by the student (What Works Clearinghouse, 2014; Lightweis, 2014). While the financial aspect of college is what most of us identify as "support", it appears that the emotional support from family is more of an indicator of whether the student will be successful or not. A total of 5,114 participants from the National Longitudinal Study of Adolescent to Adult Health Wave IV database were used, which is approximately 80% of the originally surveyed participants. Of the participants surveyed, 23% claimed they had reached their desired level of education, while 76.8% said they had not. Of the 76.8% that claimed they had not reached their desired level of education, 67.6% felt they would eventually reach their goal. In fact, after looking at ethnicity, sex, feelings of closeness to parents, and satisfaction with education level, it appears that those who have a closeness (translating into a supportive relationship) with their mother report being more satisfied with their current education level, or their ability to complete their education to their desired level. The instance was high, with 67% of respondents reporting feeling close to Mom and 49% feeling close to Dad. A statistically significant Anova $F(6,4813)=11.26, p<.0001$ with a Duncan post hoc test show support for the need for a close maternal relationship, regardless of the ethnic background, while an Anova for Dad $F(6,4224)=1.55, p<.1590$ was non-significant. Going forward, studies on how to keep the families of first-generation college students engaged and supportive would be useful to increasing the number of student completing their desired degrees.

86. The Association Between Father-Daughter Relationships and Knowledge on Contraceptives Among Female Adolescents. Shelly Pierce. (Ms. Kristin Woods, SWOSU Department of Psychology).

Forty eight % of new sexually transmitted infections occur in adolescents (Deptula, Schoeny, & Henry, 2010). The U. S. has one the highest teenage pregnancy rates (Commendador, 2011). Good knowledge on contraceptives can help with STDs and unwanted pregnancy. Teens have acknowledged that their parents are the most influential piece to their sexual behavior (Commendador, 2011). The current research hypothesized that a strong father-daughter relationship will correlate with the daughter having more knowledge on contraceptives. A secondary analysis of publically available data was conducted, which used a school-based, clustered sampling design to identify a nationally representative sample of 9th- to 12th-grade students, with oversampling of underrepresented groups. The sample consisted of 3,356 students all females aged 14-19. Chi-square analysis showed a significant relationship between knowledge on condom use and closeness to father ($p<.001$) and knowledge on the rhythm method and relationship satisfaction with their father ($p=.0035$). A chi-square analysis showed a statistically significant relationship for the withdrawal method and relationship satisfaction with their father ($p=.0019$). However, when controlling for father's feelings towards contraceptives the relationship was no longer statistically significant. The results of this study do contradict previous research findings of more involvement more knowledge. This research suggests the father's feelings are what matters.

87. The Association between Education and Sleep Patterns across Religion. Jamorion Rose. (Ms. Kristin Woods, SWOSU Department of Psychology).

A strong relationship is evident between good sleep quality and high academic performance (Mohammed & Ahmed, 2015). The relationship between religion and health has been a subject of interest also, in the past and in the latest years becoming increasingly visible in the social, behavioral, and health sciences (Alves, Barboza & Souto, 2010). Investigations of religion and health have ethical and practical implications that should be addressed by the lay public, health professionals, the research community, and the clergy (Alves, Barboza & Souto, 2010). If religion was found to be positively correlated to health, it could be used as a therapy for many things including people suffering from insomnia or sleep deprivation. The goal of this study was to examine if sleep problems correlated to academic achievement or underachievement and did that change across religion. A secondary analysis of publically available Wave I data from the National Longitudinal Study of Adolescent Health was conducted, which used a school-based, clustered sampling design to identify a nationally representative sample of 7th- to 12th-grade students, with oversampling of underrepresented groups. The sample of 6,504 adolescents was comprised of 51.61 % female, 57.32 % Caucasian, 22.57 % African American/Black, 10.75 % Multiracial, 4.83 % Hispanic/Latino, 0.62 % Native American/American Indian, 3.20 % Asian/Pacific Islander, and 0.72 % other. After adjusting for potential confounding factors (RELIGION), graduation status (Beta parameter estimate=.267, $p<.0072$) was significantly and positively associated with sleep pattern variables. A Chi-square test revealed a significant difference between trouble falling asleep and those that did complete high school (93.62%) compared to those who didn't complete high school

(6.38%), $X^2 = 26.90$, 1 df, $p < .0001$. For the results above, religion was found to be a moderator for falling asleep and graduation status. Religion was based on the simple question, how important (if at all) is your religious faith to you? My hypothesis was supported throughout this study, which stated that people with low levels of education will experience negative sleeping patterns. Future studies examining tools to overcome the negative aspects of not completing high school are needed.

88. Neurologic Music Therapy, Improvisational Music Therapy, and Behavioral Approach in Music Therapy: A Healthy Blend of Approaches. Didier Khoo. (Dr. Yu-Ling Chen, SWOSU Department of Music).

The presentation gives a detailed overview of a music therapy session that utilizes therapy techniques from two different schools of thought: Improvisational Approach, Neurologic Music Therapy, and the Behavioral Approach. The rationale and background of using these approaches will be provided. This study is a case report about how the different approaches can yield better results in a music therapy session for a child with autism. Music therapy techniques from both approaches, and examples of interventions used in sessions will be presented.

89. The Use of Live Music vs. Computer-Generated Music When Taking the Montreal Battery of Evaluation of Amusia. Jenna Adcock. (Dr. Sophia Lee, SWOSU Department of Music).

When testing for congenital amusia, recorded music is generally used. This study compares the use of recorded music to live music while taking the Montreal Battery of Evaluation of Amusia, to see if there is a difference in scores and the opinions of the subjects.

90. Elements of an Effective High School Band Rehearsal. Anthony Bertolozzi. (Dr. Sophia Lee, SWOSU Department of Music).

This presentation will break down the common elements seen in an effective high school band rehearsal by focusing on the preparation of the director, warm-up strategies, and rehearsal techniques. It will compare the amount of time spent on each category, as well as the specific exercises used on a daily basis to improve the effectiveness of each part of a rehearsal.

91. The Benefits of Music for Child Development. Chelsea Chargualaf. (Dr. Sophia Lee, SWOSU Department of Music).

Due to budget cuts in the arts and music educators fighting for music's right to be taught in public schools, the study of adolescent musical training has become a popular topic. Being introduced to music at a young age is associated with cognitive and physical benefits. Along with these benefits, music also plays an important role in the socialization of children and adolescents. Through the prolonged study of both musical and non-musical children aged 5-18, we conclude that early musical training prepares a foundation for a range of skills, and thus fosters both cognitive and physical development.

92. Performance Anxiety: Analysis & Coping. Alexander Davis. (Dr. Sophia Lee, SWOSU Department of Music).

Performing effectively and managing the stress that inevitably arises as a by-product of this endeavor is a process that confounds many amateurs and professionals across a myriad of fields. Only through understanding contributing factors such as cognitive, sociological, physiological, and behavioral functions can individuals and groups begin to develop techniques for efficient stress management. This presentation provides insight into the human condition and discusses methods for coping with and overcoming performance anxiety.

93. Effects of Music on the Development of Children. Tiffany Piper. (Dr. Sophia Lee, SWOSU Department of Music).

Research shows that music has a profound effect on a child's development in three primary ways. Once the child is exposed to music, behavior, body temperature, blood pressure, and pulse are all positively affected. Furthermore, children exposed to music demonstrated higher brain activity and cognitive abilities, as well as an increase in social abilities. Once the musical stimuli is removed, the retention of these effects and increased abilities is discussed. This presentation reviews the literature to determine how music affects children's development in three primary categories: cognitive, behavioral, and psychologically.

94. Think. Eat. Save: Reduce Your Footprint. Taiwo Ademayowa Ayodele and Samuel Ofure Goodness. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

In this poster presentation, the presenters, Taiwo Ademayowa Ayodele and Samuel Goodness from Nigeria, will

provide their observations on food wastage. The presenters also hope to raise awareness among their audience members by providing useful food waste facts. Most of all, they will share key information on how to end hunger and save the planet.

95. **The Survival of the Fittest: Inuits on Ice.** Ruth Akonna Egbom. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

In her poster presentation, Ruth Akonna Egbom from Nigeria, will shed some interesting light on the food, clothing, culture, homes, weapons, and culture of the Inuit people. The presenter will also share some of her findings on the Inuits' view of life that has helped them sustain life and order.

96. **How a Female Rodeo Athlete from Canada is Thriving on SWOSU Campus.** Erika Chartrand. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

In her poster presentation, Erika Chartrand from Canada, will address what it takes to be on the SWOSU rodeo team, what kind of mental training and workouts are involved, and what are the expenses that may incur in order to care for and maintain her horse. Furthermore, she will also share some of the challenges that she has faced while still being able to reach her academic goals at SWOSU.

97. **How Drug Usage Leads to Teenage Pregnancies?** Okenye Chioma Esther and Besong Oruoh Martha. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

In this poster presentation, Okenye Esther from Nigeria Chioma and Besong Martha from Cameroon, will share their compare-and-contrast study on statistical evidence based on how drug usage often leads to teenage pregnancies. The presenters will also shed light on types of drugs with the strongest evidence that they are to a linked to an increase in teenage pregnancies.

98. **20 Facts You Didn't Know About Ebola.** Gwen Chioma Ukeje. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

In this poster presentation, the presenter, Gwen Ukeje of Nigeria, will share some background information as well as facts on Ebola and address its past, its present, and its "unknowable future." In addition, the presenter hopes to answer questions about Dr. Ian Crozier and his research work at Kenema General Hospital in Sierra Leone.

99. **Golf: Is it a glamorous game?** Gustavo Enrique Tineo. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

A golfer himself, Gustavo Enrique Tineo from Venezuela will share his personal experiences as well as his research findings on the history of golf, and the types of equipment used. The presenter will also address growing number of studies that show how these golf courses can provide valuable wildlife habitat in a "rapidly urbanizing world."

100. **Itaipú Dam: The World's Largest Generator of Renewable Clean Energy.** Smeyder Steffani Ferreira Silvera. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

In her poster presentation, Smeyder Silvera of Paraguay, will discuss her compare-and-contrast study of the main hydroelectric plants and generator set in the world and the world's largest hydroelectric project, Itaipú Dam, located on the border between Brazil and Paraguay. The presenter also hopes to share some interesting facts and figures pertaining to this "hollow gravity" reservoir.

101. **The Secrets of the Mayans That You Didn't Know.** Jessica Janet Hernandez. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Lanague & Literature).

In this poster presentation, Jessica Janet Hernandez from Mexico will share some unknown facts about the Mayans such as their belief systems, their incredible mathematical skills, and other aspects of their civilization.

102. **Story-Telling: How Does it Benefit a Child's Development?** Deborah Ifechukwu Ugwu. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

In her poster presentation, Deborah Ifechukwu Ugwu from Nigeria, will discuss her research findings on how story-telling affects the minds of children. Most of all, this presenter will make clear why story-telling is a skill that's worth learning.

- 103. Morocco: The Five Elements of Economy Based on The Law of Supply And Demand.** Mohammed Ihab Kamli. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).
- Mohammed Ihab Kamli of Morocco will provide details about The Law of Supply and Demand, the policy observed by the government of Morocco. He will address the sound liberal economic management and the five most important elements of the economy that Morocco relies on.
- 104. Fish With "Humanoid" Teeth.** Sanga Rosaria Kasere and Ayomide Edward Afolabi. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).
- In their poster presentation, Sanga Rosaria Kasere from Malawi and Ayomide Edward Afolabi from Nigeria, will share their findings on different types of fish which have an "eerie resemblance" to human teeth. The presenters will illustrate the similarities.
- 105. Sumo Wrestling: 5 Things You Never Knew about The Lords of the Ring.** Rempei Kikuchi. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).
- In his presentation, the author, Rempei Kikuchi from Japan, who is a big fan of sumo himself, will focus on the history of sumo, the sumo rules, the rituals in the ring, the lifestyle, and how the wrestlers observe strict diets in order to develop their "chubbiness." The presenter will also explain the hierarchy of sumo wrestlers (and salary) and life after retirement.
- 106. Ondol: The Ancient Korean Heating System with Modern Application.** Hannah Kim. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).
- In her poster presentation, Hannah from South Korea, will narrate her personal story about how she felt about the heating system in her dorm when she first arrived at SWOSU. The presenter will then share some interesting facts about "ondol" (or "baked stone"), and how it evolved in Korea around 200 B.C.
- 107. The Kyoto Protocol: What has it Accomplished So Far?** Adeniyi Ifeoluwa Moyinoluwa. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).
- In his poster presentation, Adeniyi Ifeoluwa Moyinoluwa from Nigeria, will illustrate the fact that even though this protocol had been in effect since 1992, very little seems to have been done about climate change and its adverse effects on earth. Hence, his research is aimed at what this protocol really entails, what has been accomplished so far, and what is yet to be done.
- 108. A Woman in Transition: From an Arranged Marriage in Saudi Arabia to Freedom of Education in America.** Munirah Muneer Alotaibi. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).
- In her poster presentation, the presenter, Munirah Muneer Alotaibi of Saudi Arabia, will narrate the story of how she, as a young Saudi woman, went through an arranged marriage and how she was given the privilege to get past the traditional norms and get an education here in America. Most of all, the presenter hopes to answer questions and dispel myths about "arranged marriages" in the context of Saudi Arabia.
- 109. Temporary Tatoo: What is Henna Art?** Wejdan Musaqlab. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).
- In her poster presentation, Wejdan Musaqlab of Saudi Arabia, will discuss about henna, its history, and the traditional uses of henna. The presenter hopes to share her personal experience on why and how she learned henna art. She will introduce the teacher who mentored and taught her this body art and describe her busy schedule especially during henna bridal nights. She hopes to pique her audience's interest by doing little demonstrations to show her henna drawing prowess.
- 110. A Unique Yoruba "Engagement" Wedding in Nigeria.** Zanna Olamide Quadri and Omotoyosi Oyeperu Banjo. (Ms. Thanges Kesnan and Dr. Fred Alsberg, SWOSU Department of Language & Literature).
- In this poster presentation, Zanna Quadri and Omotoyosi Banjo from Nigeria, will narrate the unique modern and traditional Yoruba wedding (or "engagement" as it's called in Nigeria.). The presenters will also share the interesting process of the ceremony which begins with a mind-blowing "engagement list" and ends with plenty of food and fun.

- 111. It's not a Tiger. It's Not a Lion. It's a Liger.** Ayomide Olayemi. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

Ayomide Olayemi from Nigeria has always been intrigued with ligers. Hence, in his poster presentation, Olayemi will address the history of ligers, their appearance, their size and growth, zoo policies, and so on. The question the presenter has for you is "Should animals of different species be deliberately mated in captivity to produce hybrids?"

- 112. Welcome to Busan!** Dalhae Park. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

Taking on the role of a "tour guide" in her poster presentation, Dalhae Park of South Korea, will take you on a memorable 4 days 3 nights imaginary "tour" of Busan, South Korea. Audience members are expected to "see," learn, and discover startling information which will include hidden gems known only to the locals.

- 113. A Spectacle of Nature: Phong Nha - Ke Bang National Park.** Nguyen Vu Quang. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

This presentation focuses on one of the world's oldest and the most stunning UNESCO world heritage sites. The presenter, Nguyen Vu Quang from Vietnam, will address his findings on the many endangered species that live in the park.

- 114. The Beauty and the Coffee Bean: The Inside-Outside Jolts and Perks of Caffeine.** Reem Saad Almutairi, Afaf Munawir Almutairi, and Shamaa Hazazi. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

The purpose of this study is to investigate the unique properties of caffeine in coffee, and why it is used as one of the key ingredients in so many skincare products today. In their presentation, Reem Almutairi, Afaf Almutairi, and Shamaa Hazazi from Saudi Arabia will also share a well-kept "secret mask recipe" using ground coffee which was handed down by their mothers and grandmothers.

- 115. Child Marriage in Nepal and Nigeria: How and Why Does It Happen, What are the Bizarre Effects, and Why It's Time to Change the Story?** Sajjan Shresta and Daniel Blessing Akinloye. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

Concerned about this topic which is prevalent in their respective countries, the presenters, Sajjan Shresta from Nepal, and Daniel Akinloye Blessing from Nigeria, have embarked on this joint research project to investigate the reasons why child marriages happen and how it endangers the child bride's livelihood, health, and wellbeing. The presenters will also provide solutions as to what can be done to overcome this crisis.

- 116. A Trip to the Night Markets of Taiwan.** Su Hong-yu, Li Yi-syuan, and Chang Chai-yu. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

In their interactive poster presentation, the presenters, Su Hong-yu, Li Yi-Syuan, and Chang Chia-yu from Taiwan, will discuss the formation of the night markets, the location of the famous cargo terminal, and the types of vendors. They will also explain why the Taiwanese love going to the night markets to eat a popular delicacy called "Stinky Tofu."

- 117. Yarchagumba: Is it a Plant or an Insect?** Anishma Thakali and Gurung Shenphen Chonz. (Ms. Thanges Kesnan and Mr. Fred Alsberg, SWOSU Department of Language & Literature).

In their poster presentation, Anishma Thakali and Gurung Shenphen Chonz of Nepal, will introduce to the audience what "yarchagumba" is and its scientific term. They will also unpack facts about its morphological stages' features, and most of all, share their findings on its uses, and the market demand for these "summer plant-winter insects" found China, Tibet, and Nepal.

- 118. Higher Education For Single Parents.** Maggie (Nhu) Tran. (Dr. Siriporn Peters, SWOSU Department of Art, Communication & Theatre).

According to Custodial Mothers and Fathers and Their Child Support: 2009, there are approximately 13.7 million single parents in the United States today, and those parents are responsible for raising 22 million children. Nearly 25 percent of college students in the U.S., or four million students, have dependent children. Among low-income and

first-generation college students, more than a third are parents, and students of color are especially likely to be balancing parenting and college, with 37% of African American, 33% of Native American, and 25 percent of Latino students raising children. Among low-income college students with children, parents are 25% less likely to obtain a degree than low-income adults without children. Student parents operate under often crushing time demands, with more than 40% working full time or more, and over half spending 30 hours per week on care-giving activities. Even in the face of these pressures, students with children, like other students who are older than average, have higher GPA's than non-parents. The role of parenthood in postsecondary outcomes needs greater focus from the higher education reform community. Unless the care-giving responsibilities of low-income adults are actively acknowledged and addressed, efforts to improve postsecondary access and completion for low-income adults, be they through online learning, improved on-ramps, developmental education, institutional accountability, financial aid, or curriculum reform, are likely to fall short of their full potential for change. Colleges, universities, and their surrounding communities must take steps to help students succeed in their work as both students and parents. Improving educational attainment among low-income parents will have long-term multigenerational benefits in addition to immediate family economic returns. Higher education is paramount for achieving family economic security, and parental education yields powerful two-generation benefits, by improving children's economic, educational, and social outcomes. SWOSU Single Parent's Network (SPN) is an on campus organization dedicated to the support of SWOSU non-traditional single parent students. SPN is able to aid current SWOSU single parent students throughout their academic journey, through support, pairing resources, life skills workshops, family activities, and community outreach. SPN believe strongly that you can "Elevate Your Future" through education.

- 119. Design for All: Touch and See Your Park.** Dr. Siriporn Peters (SWOSU Department of Art, Communication & Theatre), Kevin R. Bowles Mohr (Washita Battlefield National Historic Site, National Park Service), Frederic Murray (SWOSU Al Harris Library), Dr. Henrietta Mann (Former President of Cheyenne and Arapaho Tribal College), and Nathan Brooks (SWOSU Department of Engineering Technology).

This is a collaborative research project with the Washita Battlefield National Historic Site (WBNH), the National Park Service (NPS), in Cheyenne. The project was funded by the Western National Parks Association and SWOSU Foundation between 2016-2017. The objective of this project was to create an interactive design with tactile surface and audio for the young visitors and the visitors who have visual impairments at the Washita Visitor Center in Cheyenne and Southwestern Oklahoma State University (SWOSU) in Weatherford. The research methodology was Mixed-Methods Research (MMR), which combines qualitative and quantitative methods. The Participatory Design (PD) and Universal Design (UD) were employed as the design approaches and strategies. The participants and stakeholders were the descendants of Washita survivors and the local government officers of the WBNH, NPS. The research outcomes reveal that the MMR is the most effective research methodology because it enables the researcher, participants and stakeholders to have deeper understanding of the research problems and outcomes. The PD and UD were effective design approaches and strategies.

- 120. Italian Candy.** Samantha Titone. (Dr. Tugba Sevin, Department of SWOSU Language & Literature).

Italy is well known from all around the world. Many people go to Italy for their vibrant lifestyle. Italian is a easy language to learn. Italian is known as the romance language from the translation of Vulgar Latin, which was spoken during the Roman Empire. Over 50 million people travel each year to this beautiful country. Italians are loved for their cooking. From their delicious pastas to their scrumptious pizza, Italians are well known for their love of food. As a group we are going to investigate some of these aspects. Our group topic is Italian candy. we will research over what Italian candy is made of, what industries they contribute to, and where their products are made. The researchers in our presentation group are Samantha Titone, Savannah Osmond, Cody Manning, Kenneth Beck, Baily Kephart, Jessica Tortotelli, and Ramone Robertson.

- 121. Italian Festivals.** Mustafa Alm Mustafa, Lauren Kleinpeter, Monica Green, Stephanie Moreno, Cecilia Ramirez, and Kenya Rosales. (Dr. Tugba Sevin, Department of SWOSU Language & Literature).

From the oldest film festival in the world held in Venice, Italy to the annual Capodanno (New Year). Our Presentation will introduce you to popular and fun festivals held in Italy. Our presentation displays three of our teams favorite out of hundreds of festivals held in Italy. Find out about these unique celebrations and their purpose with us.

- 122. The Roman Empire: "I Came, I saw, I Conquered" (Julius Caesar).** Amanda Adney, Ahmed Alghamdi, Abdullah Alyami, Ali Alyami, Omar Baghlaif, Mason Lancaster, and Roy Ward. (Dr. Tugba Sevin, SWOSU Department of Language and Literature).

Italy as a whole is known for its breath taking scenery, waterways, and hospitality making Italy a wonderful getaway place for couples and families alike. However, one of the most visited and most historical cities in all of Italy is Rome, also known as the "Eternal City." Rome carries nearly 3000 years of art, culture, and tradition. Most of today's society, whether it is in terms of government, language, art, or theatre, has been influenced by this great city. The purpose of this study is to educate students about the extraordinary history of the Roman Empire: birth, life, and death. Key research topics include: Julius Caesar's destruction of the Republic; Augustus Caesar's establishment of the Empire; the Roman Conquest of the Middle East, Europe, and Africa; the events leading to the demise of the empire; and the actual death of the empire. Through this research, we hope to discover the rich history of the once great Roman Empire that undeniably changed the course of Western culture and world languages.

123. Engineering Technology Senior Capstone Project, "Governair Plan for Every Part." Amanda Adney and David Garza. (Mr. Brad Fitzgerald, SWOSU Department of Engineering Technology).

Governair is a Oklahoma City industrial HVAC manufacturing company. These large units have over 115 different parts that must be produced and assembled in exactly the correct sequence. Since these are custom designed and produced units each assembly plan is unique requiring a great deal of specific documentation of the one of a kind unit. Our assignment was to learn how exactly the flow of parts from machine to machine would occur. We would then create an Excel model or PFEP (23 page excel spread sheet depicting the machine, day, time, and order in which all the parts should pass through the factories fabrication processes).

124. Engineering Technology Senior Capstone Project, "Terex Lifting Assembly." Daniel Butcher and Husein Alshammari. (Mr. Brad Fitzgerald, SWOSU Department of Engineering Technology).

Terex Corporation in Yukon produces telehandlers under the Genie product name. These devices are as large as a car requiring special systems for assembly. One of the problems they experience in the assembly of the Genie is that an operator has to crawl under the unit with an impact wrench to install bolts for the axle to the chassis. This is a safety issue and requires significant force to accomplish. Our goal was to design and fabricate a lifting assembly that will prevent the operator from going underneath the cart. The wrench would be raised by a mechanical lever and be operated remotely.

125. Engineering Technology Senior Capstone Project, "Terex Mast Pin Lift and Installation." Tyler Follis and Landen Carson. (Mr. Brad Fitzgerald, SWOSU Department of Engineering Technology).

Terex Corporation in Yukon produces Aerial Work Platforms. These devices are as large as a car and have subassemblies that can weigh 90 pounds or more making assembly very difficult. One such component is a mast pin that is 3.5 inches in diameter, 30 inches long, and weighs around 90 lbs. An operator would have to install this pin at over six feet from floor height creating a significant lifting and ergonomic hazard. Our objective is to design and fabricate a lifting device that requires no lifting over the head of the operator and to provide documentation and training in the use of this device.

126. Engineering Technology Senior Capstone Project, "Kodak Square-ness of Flexcell." Ingrid Law and Jorge Wberth Avila. (Mr. Brad Fitzgerald, SWOSU Department of Engineering Technology).

Kodak produces very large sheets of coated film for the printing industry. For these sheets to perform satisfactorily they must fit on large printing presses squarely. To make square sheets Kodak goes through multiple steps and then tests random sheets in a gauge designed for much smaller sheets. We were asked to devise an accurate method of measuring square-ness on very large sheets of coated film. The specifications for square-ness is +/- 0.8mm. To do this we needed to understand the process and to study the process to determine where any variability in square-ness might be coming from. This translates to defining the process capability today.

127. Engineering Technology Senior Capstone, "HSI Sensing." Derek Lawrence and Brittany Mason. (Mr. Brad Fitzgerald, SWOSU Department of Engineering Technology).

HSI Sensing based out of Chickasha Oklahoma is a manufacturing company producing customized reed switches and proximity sensors. A reed switch is a magnetically actuated switch. When a magnet comes into close proximity with the switch it either opens or closes depending on the switch type. Today all reed switches are tested using a mT testing unit to a pass/fail test protocol known as attribute testing. Our project was to transform the testing system from attribute test data, pass/fail, to variable test data exhibiting the digital test information. This will permit HSI to analyze the output to optimize the manufacturing process.

- 128. Engineering Technology Senior Capstone Project, "Mars Petcare Inventory System."** Tyler Lenhart and Ibrahim Almutairi. (Mr. Brad Fitzgerald, SWOSU Department of Engineering Technology).

Mars Petcare in Clinton Oklahoma produces tons of dog and cat food for the US market. With tons of output comes tons of inventory dispersed over 50 or more raw materials. Some of these components are stored in silos while others come in much smaller units. If Mars runs out of any of the components the plant is shut down and customers are not served resulting in lost business. Our project was to study the demand requirements for all the raw materials and the history of inventory for 2016 for each of the raw materials. In this evaluation we were to propose how to improve the inventory accuracy and reliability therefore improving the inventory control system for the plant.

- 129. Engineering Technology Senior Capstone Project, "Wall Grain Bin Lifting Device."** Reece Pfenninger, and Austin Palmer. (Mr. Brad Fitzgerald, SWOSU Department of Engineering Technology).

Wall Equipment is a locally-owned, independent equipment company located in the Weatherford area. They produce and install grain bins across the state. As a small manufacturer they have grown in the past few years and need to improve the method used to lift the bins during installation. Our project was to design and build a new grain bin lifting device designing in equal tension control, easier clamping to the ring and quick attachment to the crane. We will document our work in CAD.

- 130. Engineering Technology Senior Capstone Project, "Weatherford Dock."** Dylan Seitter and Brandon Wrobbel. (Mr. Brad Fitzgerald, SWOSU Department of Engineering Technology).

The dock that was previously floating at the "Old Fishing Hole" was a fixture on the pond for over twenty years. The city had to remove it earlier last year due to safety concerns. Our goal was to redesign the dock to present day safety standards and to construct and install the new dock. We will use eco-friendly materials that will last over 20 years.

- 131. Engineering Technology Senior Capstone Project, "Wall Grain bin Hopper Reverse Engineering."** Javier Torres and Kelby Cook. (Mr. Brad Fitzgerald, SWOSU Department of Engineering Technology).

Wall Equipment is a locally-owned, independent equipment company located in the Weatherford area. They produce and install grain bins across the state. As a small manufacturer they have grown in the past few years and needed to create documentation on their grain bin line. Our assignment was to complete CAD drawings for each hopper, generate assembly drawings of the manhole and hatch, generate CAD drawings of the concrete pads and pillars and generate the bill of materials. A secondary project was to do static load and weight calculations.

- 132. A Weighted Discriminative Dictionary Learning Method for Depression Disorder Classification using fMRI Data.** Dr. Neal Xiong, SWOSU Department of Business & Computer Science).

In this paper, we present a novel depression disorder classification algorithm, named weighted discriminative dictionary learning (WDDL), based on functional magnetic resonance imaging (fMRI) data. The underlying relationship between samples and dictionary atoms is exploited by introducing an adaptive weighting scheme. Tested on fMRI data of 29 patients with depression and 29 healthy controls, our algorithm outperforms all other classification methods compared in this work. Furthermore, we detect the discriminative brain regions of patients which can reveal the pathogenesis of depression disorder.

- 133. High Performance Computing Environment without the fuss: Parallel and Distributed Computing Education on the move.** Prabhjyot Saluja. (Dr. Jeremy Evert, SWOSU Department of Business & Computer Science).

In today's world there are supercomputers that cost up to and beyond 215 million dollars. As cool and as powerful as these machines are the majority of universities cannot afford these monster computers, but still want to have a supercomputer on campus. With this system a university can make a mini supercomputer and apply High Performance Computing (HPC) for less than 500 dollars. A Pi3 individually costs 35 dollars, each Pi3 computer individually is a simple and very small machine that is not very powerful. However, if a university has a dozen or so of these and clusters them the University would then have a usable mini supercomputer. In order to effectively utilize HPC techniques and supercomputing as a whole the cluster needs an Operating System (OS). Which is exactly what we have here, an OS that is based off of Linux, called BCSD (Bootable Cluster SD), which is a flavor, or variant of Linux. BCSD is an OS optimized for HPC, clustering, and on ARM Processors. An OS that can run MPI and Open MP codes. Setup clusters from a head node with a single command, and make setting up clusters easier for future generations to come. Because BCSD is so agile it can be used for more than just Pi3 clusters, it can work on any and all clusters. BCSD can work on most ARM based devices.

134. Porting a parallel program from the NASA Center for Climate Simulation (NCCS) Discoverer supercomputer to desktops for validation of the Multi-sensor Aerosol Products Sampling System (MAPSS). Charles Sleeper. (Dr. Jeremy Evert, SWOSU Department of Business & Computer Science).

The National Aeronautics and Space Administration (NASA) produces nearly two gigabytes of data per second. NASA researchers leverage millions of dollars of computing hardware to analyze this data. NASA shares this data with the rest of the world. Advances in computer technology have provided modern desktop computers more powerful than the fastest supercomputers in the world from two and three decades ago. This provides many possibilities for greater use of NASA data. A lack of education materials for undergraduate research in high performance computing limits these possibilities. This research addresses this need by presenting the methodologies used to translate the NASA MAPSS software system from supercomputers and software engineers to desktops and undergrads. Undergraduate student researchers studied the MAPSS software system, created for the NASA Goddard Space Flight Center supercomputers, to conduct a validation study of NASA Earth Atmosphere aerosol data. Undergrads rewrote parts of the software allowing it to run on an Intel i7 processor running a Linux system. The students completed translation of four of the seven satellite sensors, and developed automation software allowing MAPSS to be portable between individual computers. The students provided documentation of this process allowing future students to complete the translation of the remaining sensor systems and the validation study. This should provide greater use of the data that streams from NASA every day.

135. Macroeconomics: The Business Cycle. Noor Albasry. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

The business cycle is an important concept in macroeconomics, because it represents the fluctuation in economic activity that a particular economy experiences over a certain period of time (Picardo). It is defined by periods of either expansion or recession, where expansion signals economic growth, and recession indicates economic decline (Picardo). It is measured by changes in indicators such as employment, industrial production, sales, and personal income (Picardo). The business cycle is an important macroeconomics concept for a number of reasons. One of the things that business cycles help with is to judge how certain other economic indicators are being or will be affected. Arthur Burns and Wesley Mitchell stated in their book *Measuring Business Cycles* (which codified business cycles as we know them today) that economic indicators tend to move in groups (Romer), so it follows that by understanding what factors affect business cycles, we can understand approximately how these individual factors may respectively affect other factors in the same group. So for instance, during periods of expansion, new construction may often occur, while unemployment usually falls and employment rises (Romer). These factors usually occur together, and inflation is also closely related. So it follows that rises in employment and new construction could be independent indicators of expansion, and could be interpreted to suggest that inflation could rise soon. This is an interesting issue in macroeconomics because it shows there is at least some sort of consistency in markets. That is, a lot of people tend to look at economics and see a lot of randomly moving parts, but the reality is that they are much more linked than they are independent. The business cycle concept shows this, not just through the inherent cyclic nature of the concept, but also in the utilization of the factors that make up the business cycle. It is also interesting because, as a periodic measure, it is capable of highlighting how specific trends, such as social or cultural developments, may also influence markets by attributing these factors to certain time periods.

136. NAFTA and how it affects the economies of the countries involved demonstrated by PPF. Nathan Bengel, Bailey Patton, Kaitlyn Lehrman, Cooper Murley, and Brandon Matter. (Dr. Jieun Chang, SWOSU Department of Social Sciences).

Our project is to show the PPF curve along with possible changes the changes are going to relate to NAFTA (North America Free Trade Agreement) and the United States potentially pulling out of the trade agreement. The curve will show how many products and services will be affected if the United States ceases to trade with Canada and Mexico. The Production Possibilities Frontier is important because a company, business, or government can view and compare two goods or services they manufacture and the trade-off of specializing in a certain good and or moving resources from one product to another. The focus of this project will be the United States which trades many goods or work related services such as apparel and textiles to automobiles with Canada and Mexico. The poster board will show the PPF line and potential changes that could arise from the United States no longer having access to those goods or labor to manufacture them. The project should make people think over the choices the president and his advisers must make and what individuals need to be prepared for. The project will show many positive and negative aspects of NAFTA along with potential good and bad outcomes of the future. The North American Free Trade Agreement was formed in 1994 and now involves how many countries provide and develop goods. The current president of the United States made some remarks about the United States potentially pulling the United States out of NAFTA. The information we learned on the project was insightful to us and hopefully helpful to others. The project

should have around 3 panels with charts, statistics, figures, and research about NAFTA and the PPF curve predictions. The panels will range from current economist's viewpoints, heavily researched facts to an in-depth and detailed PPF graph of the United States economy. The poster should be able to explain, show, and demonstrate what a Production Possibilities Frontier is and the multiple ways to use it.

137. Youth Unemployment. Jessica Jackson, Christopher Jackson, and Brendon Hines. (Dr. Jieun Chang, Department of SWOSU Social Sciences).

A 2016 report from the Bureau of Labor Statistics stated as of "The July 2016 unemployment rates for young men (12.0 percent), women (10.8 percent), Whites (9.9 percent), Blacks (20.6 percent), Asians (10.0 percent), and Hispanics (11.3 percent) also showed little or no change from last July" (BLS). "Losing a job can be the most distressing economic event in a person's life. Most people rely on their labor earnings to maintain their standard of living, and many people also get a sense of personal accomplishment from working. A job loss means a lower living standard in the present, anxiety about the future, and reduced self-esteem."(Mankiw) Although some unemployment is inevitable and it varies over time and places. We believe that one major key to having better work options would increase by getting further education. However, another issue arises due to the lack of consistent work experiences. "The BLS defines the labor force as the sum of the employed and the unemployed: Labor Force= Number of employed + Number of unemployed The BLS defines the unemployment rate as the percentage of the labor force that is unemployed: Unemployment Rate= Number of unemployed / Labor force X 100. The labor-force participation rate measures the percentage of the total adult population of the United States that is in the labor force: Labor-force participation rate= labor force/ adult population X 100" (Mankiw). "The youth unemployment rate (11.5 percent) and the number of unemployed youth (2.6 million) in July 2016 were little changed from a year earlier. Of those 2.6 million Unemployed 16- to 24-year-olds, 1.9 million were looking for full-time work in July 2016, down 222,000 from July 2015" (BLS).

We study this subject due to it pertaining directly to our age groups and being one of the biggest fears in most young adults. Most young adults are trying to figure out what career path they want and should take. It is a huge decision that every single person faces and we want to figure out why unemployment in youth is so high. We believe that youth unemployment is an interesting and important issue in macroeconomics because it is a worldwide issue. Most people face unemployment sometime in their life. The fact that every country faces some sort of unemployment, making this issue very important and interesting! We want to figure out the best possible way to reduce those percentages. We will address the issues of youth unemployment using presentation slides.

138. Effects of Conventional Management and Soil Health Management on Soil Microbial Biomass. Ben Bosler, Kylee Carroll, and Massey Beard. (Dr. Kristy Ehlers, Teacher/Community Partnerships, El Reno Public Schools).

As climate change increasingly impacts agriculture, there is interest in how many farmers can continue farming and make their operations more resilient to anticipated changes. Research suggests that one way to do this is to convert from conventional till to no-till. However, converting is not simple, and the actual benefits of doing so have not been tested in a comparative manner across a wide range of mean annual temperatures and precipitations. To begin answering the questions of how no-till and conventional till compare in terms of soil health across the southern plains, we worked with producers to identify and sample an initial set of three locations. We focused on this portion of the study on microbial biomass of three sites on conventional till and no-till soils. We sampled them in fall of 2016 and analyzed them using the chloroform fumigation technique. The samples came from three locations, residing in Oklahoma, Kansas and Texas. Samples were collected in five areas, then split into conventional-till or no-till groups, then once again split into three groups depending on the depth of the sample. Preliminary results show differences in the microbial biomass carbon and nitrogen between health management of soil and conventional management fields. More detailed results will help clarify the strength of these differences as well as designate likely implications for current farmers in the area.

139. Genomic Instability in Novel Lolium Hybrids. Ben Houston. (Dr. Kristy Ehlers, Teacher/Community Partnerships, El Reno Public Schools, and Ann Marshall, BlueSTEM AgriLearning Center).

Utilizing genome ploidy estimations through flow cytometry is one approach toward elucidating the behavior of unstable genetics in various plant species. A unique "inducer" Lolium multiflorum line has recently been identified to induce genome instability in novel interspecific Lolium sp. Hybrids. In this research, we evaluated genome instability in the offspring of a series of inducer x L. perenne diploid and tetraploid hybrids. Leaf samples were collected from rapidly dividing leaf whorls. The leaf tissue was then partially digested to a single cell level and the ploidy level was estimated through flow cytometry. The results of the flow cytometry revealed vast differences in ploidy across numerous Lolium individuals. Due to the unstable genomic changes that were occurring, phenotypes of specific

seedlings were noticeably different and were associated to their estimated flow cytometry results. Since the genome instability was observed in somatic tissue, it is hypothesized that the instability regulates cellular mitotic process, possibly due to a single gene mutation found in the inducer line. It is hoped that further use of the inducer line can be optimized for use across all members of the *Lolium* genus.

- 140. Frequency in genome instability in different temperature variation.** Anna Jeffrey. (Dr. Kristy Ehlers, Teacher/Community Partnerships, El Reno Public Schools).

Utilizing genome ploidy estimations through flow cytometry the effect of temperature change on the behavior of unstable genetics in "plant name" This experiment was conducted to get a better understanding of the instability in genomes during different seasons throughout the year. In the research that was conducted, it was evaluated genome instability in the offspring of a series of inducer x *L. perenne* diploid and tetraploids hybrids. Leaf samples were collected from very quickly separating leaf whorls. From there the leaf samples were then partially digested to a single cell level and the ploidy level was estimated through flow cytometry. The results of flow cytometry showed a drastic change in the results from November 2016 to January 2017. According to the research conducted in November 2016 and January 2017, temperature variation did not affect genome instability.

- 141. Does the amount of sleep affect our cognitive ability and reflexes?** Josh Boman. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

The purpose of this project is to gain a better understanding of what sleep deprivation does to the mind and its effects in real time. To demonstrate this in the project, the participants will be administered two tests from two different sources. These tests will target the key aspects of which sleep deprivation is associated with affecting. This, in turn, should give a reasonable result at the conclusion of the project. It was hypothesized that when the participant received less amounts of sleep, their reflexes and cognitive ability would be negatively affected. At the end of the experiment, the averages for the cognitive test are listed from the least amount of sleep received to the control: 4 or less hours - 5.733, 5-7 hours - 6.867, and 8+ hours - 7.8. The averages for the reflex test are as follows in the same order (in milliseconds): 338.067, 329, and 314.933. After the t-test, all but one set of data was found to not be statistically significant, thus the null hypothesis failed to be rejected.

- 142. Smell and Taste.** Brooklynn Fricks. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

The purpose of this research is to test how much of what one tastes is really based on the sense of smell. Can smelling one thing while tasting another impact a person's ability to determine what food is being eaten? This project will take twenty individuals that are between the ages of fifteen and twenty year's old, different genders, and ethnicity groups. Subjects will be blindfolded while smelling vanilla perfume and simultaneously tasting a Life Saver. The results of the taste test will determine if subjects are capable of identifying the correct flavor of the Life Saver. Subjects will be tested three consecutive days with the same flavor each time. Data will be recorded and analyzed to determine the number of correct responses. Seven participants got one taste correct, two participants got two taste correct, and one participant got all three tastes correct. At the end of the project, results proved to be statistically significant and it rejected the null hypothesis. In conclusion, smelling one thing while simultaneously tasting something else, does have an impact on a person's ability to identify a correct flavor.

- 143. What Do You Know About Genetically Modified Organisms.** Tori Gilreath. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

This experiment is being done to further understand people's knowledge and opinion over a modern innovation to produce better food know as Genetically Modified Organisms. The purpose is to see if the subject's answers have a correlation with the age, gender, race, and ethnicity. The methods of my research were to collect general data about the subjects and give them a short ten question test over their knowledge and opinion of Genetically Modified Organisms. After they test the questions are scored and put into graphs based on how they answered, then they are reviewed to determine if there is a significant correlation or not. After conducting this experiment, 76% of the tested subjects felt knowledgeable about GMO'S while 68% of them were still undecided. It was discovered that people over the age of 40 had more solid opinions answering either Pro GMO or Anti GMO compared to people under the age of 40 that answered primarily undecided. Due to the prior knowledge that the subjects had over this topic it is determined that it can not be held as valid information due to the results being skewed. Additional research will need to be conducted to validate these results. The hypothesis is considered theoretical until further research has been performed.

144. The Effects of Light on Circadian Rhythm in Goldfish. Maegyn Grubbs. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

Circadian rhythm is an organism's 24-hour cycle that controls its sleep and wake habits. Most living things (animals, plants, and many tiny microbes) have circadian rhythms including goldfish. Previous studies have shown goldfish to be very reactive to light during feeding times. This experiment will test the relationship between light and circadian rhythm in common goldfish. Five goldfish will be placed in complete darkness for ten days, five will be placed in complete light for ten days, and five will be placed in a setting with natural lighting for ten days. The five fish kept in darkness will be exposed to ten minutes of light twice a day for feeding and observation. Every day at 7 am and 7 pm the goldfishes' activity will be recorded by counting the amount of fin movement in one minute. All the fish will be placed in three individual containers (one container for each setting) with equal amounts of food and water. The hypothesis for the experiment is if goldfish have constant lighting, then they will sleep less and be less active and if goldfish have constant darkness, then they will sleep more and be less active. The first day of observation (Day 1, 7 am) the average activity level was 73.8 fin flips per minute for the natural light fish, 73.2 fin flips per minute for the constant light fish, and 72.6 fin slips per minute for the constant dark fish. The last day of observation (Day 10, 7 pm) the average activity levels was 58.8 fin flips per minute for the natural light fish, 44.7 fin flips per minute for the constant light fish, and 44.75 fin flips per minute for the constant dark fish. At the end of the research, both the constant dark fish and constant light fish had lower activity levels when compared to the natural light fish.

145. The Effect of Music on the Body. Larissa Odom. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

The purpose of this research was to determine the effectiveness of music therapy on lowering cardiovascular vital signs. Twenty high school students were tested by sitting for three minutes, having their vitals taken, listening to a song, and then having their vitals taken again. The information was recorded in an Excel document as it was collected. Of the fifteen numbers looked at (systolic blood pressure, diastolic blood pressure, and heart rate for each of the five genres of songs), all showed a difference; eight were lowered and the remaining seven were raised. With an alpha value of .05 and nineteen degrees of freedom, the critical value was 1.729 for all sets of numbers. Six of the numbers in this experiment were significant. The systolic blood pressure category was significant in four of the five genres, suggesting that music may be effective at lowering systolic blood pressure, but more testing would need to be done to determine the effectiveness when applied to diastolic blood pressure and heart rate.

146. Does Lifting More Weights During Exercise Make a Difference? Alfredo Posas. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

Training with weights causes resistance, and doing this can build muscles overtime. It can keep you in better mood and help with your health. This experiment will determine which is healthier doing a regular workout or doing more lifting after a standard workout. The standard workout includes: bench, incline, cleans, and squats, while the extra part of it is, curls, box jumps, and shoulder press. It is hypothesized that doing more after a regular workout, will benefit an individual more than a standard workout. Two groups will be asked to do a standard workout, while one of the two groups does some extra workouts after the standard one. Both groups showed improvement in weight being pulled and pushed, but the group doing the extra work did not push or pull more weights than the group doing the standard workout. These results were unexpected but may be explained by factors such as the mood the participant was in, how strong he was mentally, or even if the individual was just too lazy one of those days.

147. A Short Term Memory Experiment. Brianna Rush. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

This research project demonstrates some of the limitations of short-term memory. According to researcher George A. Miller, the typical storage capacity for short-term memory is seven plus or minus two items. However, memory rehearsal strategies such as "chunking" can significantly increase memorization and recall. A simple memorization experiment can test this statement by giving subjects two lists to memorize (one random and one categorized) and documenting the amount of items they remember each time. Randomly selected 10 male and 10 female high school students with a GPA of at least 3.0 will perform this memorization exercise. The students will be given a list of words to look at for two minutes and then be asked to write down the words they remember. They will then be given a second list that is categorized and repeat the procedure. A critical value of 1.734 produced from a two-tailed t-statistic test was needed to prove that the data was statistically significant. With a t-statistic value of 4.29 for females and 2.04 for males, the data was proven to be statistically significant and the null hypothesis was rejected.

148. The Effect of Essential Oils on Plant Growth. Savannah Walker. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

This study aimed to determine the effects of essential oils on plant growth. Essential oils that are commonly used as green pesticides were applied to five indoor ivy plants. Each plant was sprayed with a different essential oil; basil, peppermint, eucalyptus, lavender, and rosemary. Another plant was given only to act as a control. 20 drops of each essential oil were placed in individual 12 oz. spray bottles filled with purified water. The ivy was potted with Trueliving Professional Potting Mix and was kept indoors. Each pot was sprayed with a different essential oil, and one plant was sprayed with only water in order to act as a control. Each plant received the same amount of water and sunlight. The height of the plants were measured every Friday evening for five months. It was hypothesized that there would be little to no difference between the growth of the plants. At the end of the experiment, the average growth rate of each plant was 33.18 for the control, 56.195 for lavender, 42 for basil, 50.575 for peppermint, 29.685 for eucalyptus, and 27.87 for rosemary. According to the results of the t-test, the results were statistically insignificant, thus the hypothesis was accepted.

149. Hand Dominance Capability of Increasing Strength. Darienne Bailey. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

This research was performed to attempt to determine the capabilities of different hand dominances. Is one hand dominance more capable of increasing strength in their non-dominant hand than the other? Ten left handed and seven right handed participants were given the materials and protocol. Initial hand strength was taken using hand dynamometers and Logger Pro. Each week, on Tuesday and Thursday, participants executed the task of tracing the alphabet, expanding a restrictive rubber band, and using a website to practice mouse skills with their non-dominant hand. Once a week, results were recorded so that they could later on be compared to previous data. To analyze the data provided, the dependent t-test was used. It can be concluded from this research that there is a difference between being left-handed or being right-handed; however, the exact difference has not been determined. For both the dominant and non-dominant hands of right-handers, the t-statistic was statistically insignificant; these values were 1.12 (dominant) and 1.15 (non-dominant) versus the critical value of 1.833. The left handers' dominant hand was statistically significant with a value of 1.85 while their non-dominant hand was statistically insignificant with a t-statistic of 1.04; these values were also compared to the critical value of 1.83. Overall, the research failed to reject the null hypothesis with the exclusion of left handers' dominant hand. For further research, it is recommended to reinforce the importance of the exercises and obtain as many randomly chosen participants as possible.

150. Comparing Bacterial Growth from Public and Private Toilets. Destiny Brown. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

Bacteria can be transferred from toilets to humans when they utilize the restroom and several of these bacteria can be harmful to humans. This research project is being conducted to determine if public toilets or private toilets contain more bacteria and if that bacteria is harmful to humans. The researcher took specimens from three different groups, containing 10 toilets each. These groups were classified as public toilets, private toilets without children, and private toilets with children. The swabs were then streaked onto petri dishes and allowed to cultivate for 48 hours. After the growth time, the dishes were analyzed and the data was recorded. The private toilets proved to be statistically significant when compared to the public toilets. The researcher can conclude that private toilets contain more species of bacteria than public toilets. The researcher can also conclude that private toilets from homes with children contain the most species of bacteria out of all the toilets swabbed.

151. Contrasting Oral Health of Similar Aged Canines and Homo Sapiens. Whitney Carter. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

The purpose of this research is to provide an in-depth look at bacteria in Homo sapiens' mouths and Canis lupus familiaris' mouths, as well as to see if the saying "A dog's mouth is cleaner than a human's mouth" is true. This research will be beneficial to society, human health, and animal health by proving further investigation is needed to find a splendid solution for dental health. It is also anticipated that the research will educate the human race to take care of their dental health as well as their dog's dental health. For this three-week study, twenty humans' mouths and twenty dogs' mouths were swabbed. After swabbing, the petri dishes were streaked and left for forty-eight hours to grow. After the forty-eight hours, the bacteria cultures were analyzed and the number, shape, and color of the colonies were recorded. When analyzing the data, it was found that in every case the human did have more bacteria in their mouth than the dogs did. The results showed that just because you are an older human does not always mean you have more bacteria in your mouth... This also applies to dogs. It was hypothesized that Homo Sapiens' mouths would have substantially more bacteria growth than the Canines' mouths. The twenty dogs' mouths that were swabbed had

a total of 1,193 bacterial colonies. The twenty humans' mouths that were swabbed had a total of 2,519 bacterial colonies. The t-statistic was 1.686 whereas the critical value was 1.910. This being said, the null hypothesis has been rejected and the results are statistically significant. Although, this research concluded the way it was predicted there are many ways this project could have been superior such as, more subjects, and swabbing dogs' mouths that live in different environments rather in the same one.

152. Effects of Hand Washing. AmberLea Greeson. (Mrs. Dana Goss, Biomedical Sciences, Western Technology Center).

The purpose of this research is to see what temperature of water is the best one to wash one's hands. The reason for this is because lots of people do not worry about letting the water to warm up to the right temperature that it is supposed to be at. The first phase performed is to make sure we have warm and cold water. The next thing done is to have people wash their hands with regular soap in the water to see how well it works. The last phase performed is to see how many bacterial colonies have grown on the Petri dishes. A comparison is made to see how many colonies have grown on all the plates will be measured. The results of the warm and cold water were unexpected but showed that warm and cold water both work the same way and kill the same amount of bacteria.

153. The Effects of Energy Drinks on Heart Rate and Blood Pressure. Kristen Page. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

The research being study is how energy drinks effect blood pressure and heart rate. This can help parents understand the health issues that can come from drinking just one energy drink. First, there will be ten to twenty randomly selected test subjects from the age groups of sixteen to eighteen selected around Western Technology Center Campus and Hammon High School. The age groups are similar therefore, the results will be easier to compare and more accurate. Consent forms for the subjects are saved so that parents are informed of the study. Logger pro was used to test heart rate and blood pressure. For the research, a group will consist of three test subjects. Each group will drink one of the following energy drinks; Monster, Noss, Red Bull, or Kick Start. A control group will drink water. Each subject will only be tested one time. Their heart rate and blood pressure will be measured before they consume the beverage. Thirty minutes after they consume it, another reading will be taken. Each subject will complete a survey on how much caffeine they had consumed after and before they drank one of these energy drinks. They will also take a survey on their mood before and after consumption of the energy drinks and water.

154. How the Food You Eat Affects Heart Rate. Leslie Sanchez. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

The purpose of this research named "How does the food we eat affect our heart rate?" is to see how different foods affect the heart differently. There are different categories of food that will be consumed by the subjects every week they are being tested. Some examples are fast food, dairy products, energy drinks, and caffeine rich foods. It was hypothesized that the heart rate would increase or decrease in subjects depending on what food they were eating that week. Initial heart rate will be taken and then a few minutes after consumption heart rate will be taken again. Data will be recorded and put into a graph to compare all the results. The people being tested will be similar in age and different genders. The results can be compared due to the similarity in age and gender. Final results show that t-statistics for group 1 was 0.0093 which is lower than the critical value of 1.734, in conclusion group 1 is statistically insignificant. Group 2 had a t-statistic of 0.0756 which is also lower than the critical value of 1.734 so it is also statistically insignificant. In conclusion, null hypothesis is failed to be rejected.

155. The Truth About Fast Food. Candace Tipton. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

The Truth About Fast Food

The purpose of this research project is to search for the most pure ground beef patty at any fast food chain. One will take a Hamburger from Braums, Sonic, McDonalds and a homemade hamburger patty this will be done to measure and count the amount of bacterial or mold growth on the meat. The following fast food chains claim to have 100% pure beef used in their hamburgers yet their burgers are hypothesized to show little to no growth or breaking down. After analyzing the data it was found to have a t-statistic of 0.9256 (Braums and homemade), 0.841 (McDonalds and homemade) with this number being below the critical value of 2.015; one fails to reject the null hypothesis making them both statistically insignificant. Upon analyzing the t-statistic of 142.6664 (Sonic and homemade) with this number being above the critical value of 2.015 one can reject the null hypothesis making this statistically significant. Further research could be done to determine the percentage of whole foods used in packaging.

156. Radioactive Energy in Cell Phones. Hope Webb. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

The purpose of this research project named "Radioactive Energy in Cell Phones" is to see if cell phones give off more radioactive energy than they used to. The radioactive energy that comes from phones that are older, like Nokias, and flip phones is measured and compared to the phones we have now, like the iPhones or Androids. The frequency of radiofrequency radiation ranges from 30 kilohertz to 300 gigahertz. Fifteen iPhones, fifteen Androids, and fifteen Nokias/Flip phones. An Electromagnetic field detector is used and detects fields emitted by moving electrically charged objects that will determine exactly just how much radioactive energy is in each cell phone. Electromagnetic field theory lies at the combination of an electric field, produced by a charged object, and the magnetic field created when the charged object moves. Radioactive energy in iPhones and Androids has an increasingly difference between the radioactivity in flip phones and Nokias. Therefore, radioactivity is higher than it used to be. Final results show that the t-statistic is higher than the critical value which means this experiment is statistically significant. In conclusion, the null hypothesis is able to be rejected.

157. Geological Location's Effect on Cognition. Joshua Reed. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).

From the moment of birth, humans perpetually develop cognitive reflexes. The capacity to comprehend motives extending beyond those grasped by oneself, theory of mind, proves largely deficient in young children, but many researchers dismiss existing documentation on the matter as geologically biased. Contemporary research must strive for clarification on the dispute by way of conducting a study perfectly reflecting the original in all but location. This procedure performed the false-belief task, a short activity which explains and quizzes the involved youth over a basic scenario, on 35 Oklahoma children in order to compare results to that of the previous study on 27 London children. Whether or not the child passed the task was recorded. Results will aid in further broadening the horizon of knowledge surrounding the development of cognitive abilities. It was anticipated that Oklahoma children would exhibit lower false-belief task pass rates to those of London children. The results concurred with this prognostication, detailing pass rates of 17% in Oklahoma children and 85% in London children.

158. Increased Personal Computer Security through Keyboard Revision. Aksah Cherian. (Mrs. Julie Smiley Foster, Francis Tuttle Technology Center).

Every day, cases are known about how hackers have breached security of health professionals' and government officials' computer systems. Computer hacking is a safety and hazardous concern that can tremendously affect the future of a patient and country. The addition of a fingerprint reader to a touchscreen keyboard is proposed to make computer hacking less prevalent. Through extensive research and many studies previously conducted, it is seen that the use of fingerprint testing is highly accurate and difficult to forge. Fingerprint readers enable an individual to put one or more fingers onto the sensor, then the sensor reads the fingerprint. If the sensor accepts the fingerprint, the person is granted access to the computer. With the addition of a fingerprint reader integrated into a keyboard, this will decrease the easy access to important information, files, and documents. This software must accept every finger's print before the individual is granted access to the computer system. The need for a better solution is crucial because there still are many computer hackers trying to get a hold of patient health records and government files.

Podium Presentations

The following oral presentations will begin at 12:45 in the SkyView room. The SkyView Room has been divided into two halves to in order to conserve on time.

- 159. Waiting in the Wings: Femininity and Bird Symbolism in The Awakening.** Kwyn Bollinger. (Dr. Kevin Collins, SWOSU Department of Language and Literature). **West SkyView** **12:45 PM**

An important yet perhaps unexpected or overlooked symbol in Kate Chopin's *The Awakening* is a bird. Birds show up in many different forms in this novel—secluded in cages, hiding in dialogue between characters and in the names of locations, and, finally, struggling for flight above the ocean. Chopin, calling on an earlier tradition of representing the female condition with bird imagery, expertly weaves these winged creatures into her novel. A closer look at this symbol may not only yield evidence for this book as a naturalistic text but also shed light on how it portrays women's roles. Chopin uses the bird symbolism in *The Awakening* to differentiate among the three types of femininity represented by Edna Pontellier, the Farival twins, and Adèle Ratignolle.

- 160. Edna's Fortress in Kate Chopin's The Awakening.** Makenzie Riddle. (Dr. Kevin Collins, SWOSU Department of Language and Literature). **West SkyView** **1:00 PM**

In *The Awakening*, Kate Chopin presents her protagonist, Edna Pontellier, as a woman who could have benefitted from the gender stereotyping of American society at the turn of the twentieth century. Despite this, Edna finds voices that shroud her from the society's predisposition to believe that women were nothing but bloodline-preserving means to an end, fragile, and incapable of self-expression. Guided by these voices, she discovers herself as well as what it means to stay true to herself, and she builds with stones of defiance a small fortress within which she may cultivate a better, truer self. In response, society tirelessly bashes against the walls of this fortress with bludgeons made not of wood, but of ideals voiced through others who are close to Edna. In the end, this conflict makes her entire effort to act on her awakening an absolutely crushing responsibility.

- 161. Edna's Subconscious Self in Chopin's The Awakening.** Bailey Thomas. (Dr. Kevin Collins, SWOSU Department of Language and Literature). **West SkyView** **1:15 PM**

In Kate Chopin's revolutionary novel *The Awakening*, she introduces the world to the extraordinary character of Edna Pontellier. Throughout the novel readers are given the opportunity to watch Edna go from an unhappy, unmotherly figure to a completely carefree, sexually uninhibited woman. While it is interesting to watch her transformation, it is even more perplexing to realize the shift she undergoes is a result of her learning to swim. Sigmund Freud suggests in his studies that the sea is an unconscious representation of one's deepest desires, but also is a calming factor. This essay will explore the notion that the Edna, her "new" self, and her actions while she is in the sea all represent the different aspects of her mind: her Id, Ego, and Super Ego.

- 162. Transcending the Noble Savage: James Fenimore Cooper's Uncas.** Jarrod Ford. (Dr. Kevin Collins, SWOSU Department of Language and Literature). **West SkyView** **1:30 PM**

James Fenimore Cooper made clear statements with his portrayals of Native American characters in *The Last of The Mohicans*. With the sinister Magua and the benevolent Mohicans, Cooper made no small gestures in expressing his views regarding the their respective tribes. However, just how highly Cooper regarded the Natives who chose the "right" side of the War of 1812 is a little unusual. In the political environment that lead to the election of Andrew Jackson, Cooper develops his Native hero Uncas beyond any concepts of "noble savage" into an American frontier legend that Richard Slotkin describes in his work *Regeneration Through Violence*.

- 163. Thoughtful Teachers: Erich Fromm's On Disobedience as a Philosophical Backdrop for Teachers (review essay).** Parker Long. (Dr. Ken Hayes, SWOSU Department of Language and Literature). **West SkyView** **1:45 PM**

On Disobedience: Why Freedom Means Saying "No" to Power is a collection of four of Erich Fromm's essays that outline his socio-political philosophy. Though his political philosophy is interesting and deserves attention, this review focuses primarily on the social aspects of Fromm's essays. These essays were published during the 60s, and though the Cold War is no longer a major concern of the Western world, contemporary readers may readily make comparisons to a world that is divided not into Communist and Capitalist camps, but into camps of religious and

political extremism and the largely ineffective moderate camp. Teachers who pick up this collection might find precious little within the text that helps them in the day-to-day activities of the classroom, but much of *On Disobedience* would function well as a philosophical backdrop for pedagogic strategies.

- 164. "And His Name Was Emmett Till": How Emmett Till's Death Inspired a Movement.** Kyra Schmidt. (Dr. Sunu Kodumthara, SWOSU Department of Social Sciences).
West SkyView 2:00 PM

When Emmett Till left Chicago in 1955 en route to Mississippi to visit his uncle, no one could have foreseen that this fourteen-year-old and his experience in Mississippi would be the catalyst that would spark the Civil Rights Movement. The publicized images of the murdered Till in his casket and the complete acquittal of the accused drew immense outrage from across the United States. Till's murder pushed all the tension and frustration within the African American community to a breaking point, and four short months later the first major campaign of the Civil Rights Movement, the Montgomery Bus Boycott, began. Till's murder was not only the catalyst that sparked the Civil Rights Movement but also inspired many people to participate in the movement. His death showed young people that racism affected every member of the African American community, and they needed to fight it with all of their abilities. Others inspired by his death began protesting injustices through other platforms such as music and sports. The significance of his death also continued with Martin Luther King, Jr. and the March on Washington, and even can be seen in the nomination and election of Barack Obama as the 44th President of the United States of America. Although not a direct participant, Emmett Till was essential to participation in the Civil Rights Movement.

- 165. Graphic Design Practices as Scholarly Activities.** John Herring, Hafith Uresi, Calli Kaiser, Meagan Hensley, and Maggie Tran. (Dr. Siriporn Peters, SWOSU Department of Art, Communication and Theatre).
East SkyView 12:45 PM

A group of SWOSU graphic design students have worked and presented their design project at the National Student Show and Conference in Dallas since 2015. The main goals are to promote the graphic design program at SWOSU and scholars activities. Students were encouraged to work collaboratively with/for local organizations and communities to work with a group of SWOSU graphic design students to solve design problems each year. Each year the graphic design students present their annual graphic design conference and exhibition at the student union. This year, they intend to share their design experience with publics.

- 166. Do bilingual individuals have more developed cognitive and linguistic skills than monolingual individuals?** Jose Diosdado. (Mrs. Danna Goss, Biomedical Sciences, Western Technology Center).
East SkyView 1:00 PM

Many individuals in today's society are bilinguals. Yet, there is limited research comparing bilingual and monolingual cognitive skills and linguistic skills. Cognitive skills are the core skills that your brain uses to think, read, learn, remember, reason, and pay attention. The brain's cognitive skills also include long- and short-term memory, auditory processing, processing speed, and logic and reasoning. These are also the same skills that IQ tests measure in order to determine IQ. Cognitive abilities or skills are supported by specific neuronal networks. For instance, memory skills rely mainly on parts of the temporal lobes and parts of the frontal lobes (behind the forehead). Cognitive skills were tested by running several tests, to determine: perception, attention, memory, motor skills, language, visual and spatial processing, and executive functions. The first part of this examination was given on paper and pencil and includes three cognitive abilities. These three cognitive abilities are Perception, Language, and Visual and Spatial Processing. The second part of the examination was given through the computer and tests four main cognitive abilities. These main abilities are fast counting, executive, attention and memory. It was hypothesized that bilinguals have more developed cognitive skills than monolinguals. After analyzing the data, for the visual and spatial, perception, language tests, the results were unexpected and showed that bilinguals and monolinguals have similar cognitive abilities. After analyzing the data for perceptual, executive, memory, and attention, the results were statistically significant. In conclusion, bilinguals and monolinguals both have different cognitive abilities that are more developed.

- 167. Veterinary Clinical Pharmacy: Providing exceptional patient care beyond human species.** Shanna Simmons. (Dr. Hardeep Saluja, SWOSU Department of Pharmaceutical Sciences).
East SkyView 1:15 PM

Pharmacy is an ever evolving science, branching into different areas of specialty in different settings, treating different diseases, and different species. Veterinary pharmacy is geared towards treating large and small animals, exotic species, as well as wildlife. These pharmacists must be equipped with skills to deal with a much broader role in their patient care. They must especially be knowledgeable in animal disease states. Exercise induced pulmonary

hemorrhage (EIPH) is a condition affecting an estimated 40-85% of equine athletes in a range of breeds and disciplines. First noted as early as 1688, it is characterized by blood found in the nasopharynx, larynx, or trachea, believed to originate from pulmonary capillaries which have burst due to exercise. Severe cases lead to epistaxis and although rare, death. Diagnosis is confirmed using endoscopy or bronchioalveolar lavage (BAL). Causes of EIPH include upper airway obstruction, airway disease, blood hyperviscosity during exercise, mechanical breathing stress, and pulmonary hypertension. Studies have also demonstrated temperature, rapid acceleration, and effort could contribute to incidence. No effective treatments have yet been established, though a few drugs are used to control the condition. I aim to show the importance of veterinary pharmacists' roles in not only compounding and dispensing medications, but also research for new drugs to treat arising animal conditions, such as EIPH that are not yet addressed.

168. Biosimilar Drugs: The New Generic. Riley Harkey. (Dr. Hardeep Saluja, SWOSU Department of Pharmaceutical Sciences). **East SkyView 1:30 PM**

Biologic medications, unlike normal chemical drug products, are large complex molecules derived from living cells. Generally unknown to the public many medications used today are biologics and several have been used for decades, like insulin for treating diabetes. Biologics such as Humira and Enbrel are used to treat rheumatoid arthritis and Crohn's disease respectively. Other biologics such as Rituxan is used for cancer treatment and Premarin is a hormone replacement therapy. New biologics are being designed to treat cancer, multiple sclerosis, and many other debilitating diseases with the help of innovations in genetics. However, unlike the classic chemical drug product, making a generic for a biologic is no easy task. Biologics are exceedingly more complex and even down to the organism it is derived from can change the drugs ability to act efficiently in the body. Because of the strenuous process of producing a bioequivalent, the market has been deprived of competing generic drugs, and gives drug manufacturers a large foot hold when it comes to pricing. For example, the global sale for Remicade (infliximab) and Avastin (bevacizumab) in year 2011 were \$7.19 billion and \$5.98 billion respectively¹. When producing a biosimilar product, there stringent testing in search for safety and that it is biologically similar to the original product. It can take up to 8 years and \$100 million to \$250 million dollars to develop a biosimilar compared to \$1 to \$4 million to develop a generic drug product¹. Biosimilar drugs is a fresh market, and many manufacturers have already began the process of developing these biosimilar products. US FDA approved the first biosimilar Zarxio (filgrastim-sndz) in year 2015. According to allied market research, it is estimated that the biosimilar market will reach up to \$35,032 million by 2020 globally². Increased number of biosimilars will help both increase availability of biologic drug products and reduce the cost by making the market more competitive. With such great strides in medicine, biologics and biosimilars may reach the forefront of modern medicine.

169. Cloud-based Service. Dr. Neal Xiong, SWOSU Department of Business and Computer Science.

East SkyView 1:45 PM

HPC is very important to deal with intelligent computing, and in this report, we try to use HPC technology to implement intelligent medical applications. Specifically, we present a novel depression disorder classification algorithm named Weighted Discriminative Dictionary Learning (WDDL), based on functional Magnetic Resonance Imaging (fMRI) data. The underlying relationship between samples and dictionary atoms is exploited by introducing an adaptive weighting scheme. Tested on fMRI data of 29 patients with depression and 29 healthy controls, our algorithm outperforms all other classification methods compared in this work. Furthermore, we detect the discriminative brain regions of patients, which can reveal the pathogenesis of depression disorder.

Index of Students and Faculty

Student / Faculty*	Poster/Podium #
Abame, Abel.....	65
Adcock, Jenna.....	89
Adney, Amanda.....	122, 123
Afolabi, Ayomide Edward.....	104
Al-Johani, Rahaf.....	6, 23
Albasry, Noor.....	135
Allbritton, Elisabeth.....	27, 37
Almutairi, Afaf Munawir.....	114
Almutairi, Reem Saad.....	114
Alotaibi, Munirah Muneer.....	108
Alghamdi, Ahmed.....	122
Almustafa, Mustafa.....	121
Almutairi, Reem.....	16
Almutairi, Ibrahim.....	128
Alsberg, Mr. Fred*.....	94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117
Alshammari, Husein.....	124
Alyami, Abdullah.....	122
Alyami, Ali.....	122
Akinloye, Daniel Blessing.....	115
Amabo, Sonia.....	43
Appeddu, Dr. Lisa*.....	51, 52, 53
Aracena, Dr. Jimena*.....	1, 2
Avila, Jorge Wberth.....	126
Ayodele, Taiwo Ademayowa.....	94
Babers, JaKeldon.....	48
Baghlaif, Omar.....	122
Bailey, Darienne.....	149
Baldo, Dr. Carlos*.....	79
Baldwin, Brett.....	49
Banjo, Omotoyosi Oyepero.....	110
Beach, Greco.....	31
Beard, Massey.....	138
Bellamy, Jacob.....	3
Benge, Nathan.....	136
Benson, Morgandy.....	21
Bertolozzi, Anthony.....	90
Blue, Dominic.....	46
Bollinger, Kwyn.....	159
Boman, Josh.....	141
Bond, Abbagale.....	28, 35
Bosler, Ben.....	138

Bouziden, Gage	65
Brewster, Brittany	44
Brooks, Mr. Nathan*	119
Brown, Dr. Dan*	57, 58, 59, 60, 61
Brown, Destiny	150
Brown, Sarah	65
Bruce, Dr. Becky*	62, 63, 64
Buckner, Christian	46
Burgess, Gwendolyn	36
Burgess, Dr. Melinda*	51, 52
Burghardt, Kristi	80
Burke, Bradly	6, 12
Burns, Rachel	66
Butcher, Daniel	124
Butcher, Sarah	47
Cano, Brittany	57
Carpenter, Luke	31
Carrell, Mrs. Mary*	43, 44, 45
Carroll, Kylee	138
Carson, Landen	125
Carter, Madison	45
Carter, Whitney	151
Castellanos, David	4
Castle, Dr. Lisa*	3, 4, 5, 6, 7
Catherine, Patron	25
Chai-yu, Chang	116
Chaloupek, Dillon	22
Chance, Brock	20
Chang, Dr. Jieun*	65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 135, 136, 137
Chargualaf, Chelsea	91
Chartrand, Erika	96
Chedester, Courtney	67
Chen, Dr. Yu-Ling*	88
Cherian, Aksah	158
Ching, Jeewa	48
Choi, Gloria	74
Chonz, Gurung Shenphen	117
Clewell, Tasha	48
Coker, Caitlin	49
Collins, Dr. Kevin*	159, 160, 161, 162
Constant, Miranda	49
Cook, Kelby	131
Cooper, Mikayla	48
Cornell, Kathryn	23

Cothran, Dr. Rickey*	8, 9
Cravens, Zachary	5
Crispin, Gareth	32
Crone, Sarah	29
Curless, Courtney	1
Curry, Dr. Randy*	54
Danker, Mrs. Barbara*	46, 47
Danker, Ryle	50
Davis, Alexander	92
Davis, Will	42
Defranc, Guillermo	81
Dhooonmoon, Ashna	3, 10
Diosdado, Jose	166
Dirickson, Cassandra	44
Do, Ethan	20
Dobbs, Kaylee	22
Donato, Nicole	47
Duckwall, Madison	34, 35
Egbom, Ruth Akonna	95
Ehlers, Dr. Kristy*	138, 139, 140
Ellis, Dr. Trevor*	27, 28, 29, 30
Erman, Madison	67
Esjornson, Dr. Sylvia*	31
Esjornson, Dr. David*	32, 33
Esther, Okenye Chioma	97
Evans, Kylie	48
Evert, Dr. Amanda*	79
Evert, Dr. Jeremy*	133, 134
Eze, John	31
Fitzgerald, Mr. Brad*	123, 124, 125, 126, 127, 128, 129, 130, 131
Fletcher, Terin	38
Flinn, Michael	20
Follis, Tyler	125
Ford, Jarrod	162
Foster, Mrs. Julie Smiley*	158
Fricks, Brooklynn	142
Garber, Jay	5, 13
Garcia, Jocelyn	19
Garner, Shaun	69
Garza, David	123
Garrett, Colleen	62
Gaunt, Garrett	20
Gilreath, Tori	143
Gomez, Jessica	54

Goodness, Samuel Ofure	94
Green, Monica.....	121
Gregston, Kylee	45
Gore, Sarah.....	3, 13
Goss, Mrs. Danna*.....	141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 166
Greeson, AmberLea.....	152
Grubbs, Maegyn.....	144
Gwyn, Dr. Lori*.....	34, 35
Hall, Jasilin	49
Hamburger, Samantha.....	27, 28, 29
Haney, Matalyn	47
Harborth, Hailey	20
Harkey, Riley.....	168
Hamois, Gina	43
Hayes, Dr. Ken*	163
Hays, Jenna Lee	50
Hazazi, Shamaa.....	114
Hendricks, Lindsey	6, 8
Henrikson, Dr. Jon*.....	36
Hensley, Meagan	165
Hernandez, Jessica Janet.....	101
Hernandez, Natanya	70
Herrera, Cailey.....	48
Herrera, Madison	21
Hertzell, Dr. David*	62, 64
Herring, John.....	165
Hess, Kenda.....	83
Hicks, Elizabeth.....	28
Hilliary, Drew	84
Hines, Brendon	137
Holsted, Tanner.....	44
Hong-yu, Su	116
Horton, Dr. Christopher*	10, 11
Houston, Ben	139
Hubin, Dr. Tim*.....	37, 38, 39, 40
Hughes, Breanna	51, 52, 53
Hulett, Kristy.....	46
Humann, Kayley.....	55
Hutchinson, Sara	14
Iliff, Mary.....	57
Isbell, Peyton.....	21
Iturregui, Eduardo	66
Jacobsen, Cable	39

Jackson, Christopher	137
Jackson, Jessica	137
James, Allison	47
Jeffrey, Anna	140
Johnston, Laci	15
Kamli, Mohammed Ihab	103
Kaiser, Calli	165
Kasere, Sanga Rosaria	104
Kelley, Heather	52
Kelly, Dr. William*	41
Kemp, Kenneth	29
Kerth, Dr. Kalie*	54
Kesnan, Ms. Thanges*	94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117
Kessler, Emily	47
Khoo, Didier	88
Kikuchi, Rempei	105
Kim, Hannah	106
King, Taylor	4, 7
Kodumthara, Dr. Sunu*	164
Kleinpeter, Lauren	121
L'Hommedieu, Joshua	22
Labrador, Justin	50
Lamar, Rachael	38
Lancaster, Mason	122
Law, Ingrid	126
Lawrence, Derek	127
Le, Brittney	17
Lee, Dr. Sophia*	89, 90, 91, 92, 93
Leffler, Emma	51, 52
Lehrman, Kaitlyn	136
Lenhart, Tyler	128
Lind, Kenzie	49
Linder, Dr. Doug*	42
Lizotte, Brooke	56
Lockyear, Nicholas	51, 52
Long, Parker	163
Long, Dr. Scott*	54
Lovett, Makenzie	70
Lu, Jiji	20
Madden, Sarah	71
Mann, Dr. Henrietta*	119
Martha, Besong Oruoh	97
Matter, Brandon	136

Marshall, Ann*	139
Mason, Brittany	127
Mbatu, Elvis	44
Mbatu, Kevin	46
McBee, Taylor	7
McClure, Trevor	72
McGrane, Dr. Regina*	12, 13, 14, 15
McKay, Bailey	63
McWilliams, Cara	73
Meeks, Matt	11
Mendoza, Matthew	44
Menendez, Delmi	74
Miller, Chelsea	14
Mohr, Mr. Kevin Bowles	119
Morehart, Micah	35
Moreno, Stephanie	121
Morgan, Kylie	43
Morton, Abbey	21
Moyinoluwa, Adeniyi Ifeoluwa	107
Mullen, Sierra	56
Murley, Cooper	136
Murray, Mr. Frederic*	119
Musaqlab, Wejdan	109
Nguyen, Phillip	39
Nichols, Joshua	68
Nimsey, Helen Shobie	85
Nino, Selene	50
Normand, Ty	58
Ntonghanwah, Nkengasong	31
Nwankwo, Adrienne	45
O'Neal-Johnson, Sequojah	35
Odom, Larissa	145
Oertel, Megan	35
Okorochoa, Faith	37
Olayemi, Ayomide	111
Page, Kristen	153
Palmer, Austin	129
Parenica, Lauren	18
Park, Dalhae	74, 112
Parker, Dalynna	59
Patel, Radhika	75
Patton, Bailey	136
Paul, Dr. Eric*	16, 17, 18
Payton, Wright	27, 28, 29

Peetoom, Jaci	5, 22, 23, 24
Pelzel, Connor.....	21
Pennington, Kaci.....	70
Perry, Sheldon	45
Peters, Dr. Siriporn*	118, 119, 165
Pfenninger, Reece	129
Pham, Christopher.....	31
Phiri, Memory	20
Pierce, Shelly	86
Piper, Tiffany	93
Pitts, Mason	65
Popejoy, Ashley	26
Posas, Alfredo.....	146
Quadri, Zanna Olamide.....	110
Quang, Nguyen Vu.....	113
Rackley, Chelsea	49
Ralph, Dr. David*	54
Ramirez, Cecilia.....	121
Ramirez, Daniel.....	41
Ramos, Dr. Les*	53
Reed, Joshua	157
Rhynes, Robert	20
Riddle, Makenzie.....	160
Rife, Lydia	21
Riggs, Brianne.....	21
Rodriguez, Jennifer	46
Roper, Whitney	82
Rosales, Kenya	121
Rose, Jamorion	87
Rozell, Morgan	47
Rulon, Zane.....	40
Rush, Brianna	147
Saluja, Dr. Hardeep*	55, 56, 167, 168
Saluja, Prabhjyot.....	133
Sanchez, Leslie.....	154
Sanders, Trevor	19
Seabourn, Austin.....	76
Seale, Ashleigh	43
Seay, Isabella.....	40
Seitter, Dylan.....	130
Sevin, Dr. Tugba*	120, 121, 122
Sharp, Colton	53
Shresta, Sajjan.....	115
Silvera, Smeyder Steffani Ferreira.....	100

Simmons, Shanna.....	167
Spencer, Lauren.....	46
Shrestha, Alina.....	37
Sleeper, Charles.....	134
Schmidt, Kyra.....	164
Smith, Cole.....	64
Smith, Emily.....	43
Spandley, Lana.....	21
Spangler, Collin.....	69
Statton, Allison.....	9
Stuart, Maddi.....	22
Tabb, Bryce.....	22
Tadlock, Peyton.....	45
Tahah, Jeremiah.....	19
Tanifum, J. Aaron.....	31
Taylor, Michelle.....	74
Thakali, Anishma.....	117
Thomas, Bailey.....	161
Thomason, Jenna.....	22
Thompson, Jentri.....	45
Tineo, Gustavo Enrique.....	99
Tippens, Mary.....	77
Tipton, Candace.....	155
Titone, Samantha.....	120
Torres, Javier.....	131
Tran, Maggie.....	165
Tran, Maggie (Nhu).....	118
Tran, Mia.....	22
Trawick, Shelbey.....	79
Tresp, David.....	29
Trompeter, Kaylin.....	44
Trubitsyn, Dr. Denis*.....	19, 20, 21, 22, 23, 24
Tuck, Jayme.....	4
Ubeidat, Dr. Muatasem*.....	25, 26
Ugwu, Deborah Ifechukwu.....	102
Ukeje, Gwen Chioma.....	98
Uresi, Hafith.....	165
Vahchuama, Ntxhees.....	21
VanTuyl, Kristen.....	50
Vap, Mikka.....	21
Varughese, Jaby.....	43
Vega, Amy.....	5
Velasco, Jesse.....	6
Vidauri, Lupe Nicholas.....	60

Vincent, Kara	19
Vo, Jessica Rose	33
Voss, Stephanie	43
Walker, Savannah	148
Ward, Roy	122
Watson, Ashley	7
Watson, Tyler	2
Webb, Hope	156
Webb, M. Elizabeth	19
Wheeler, Nicholas	20
Whorton, Megan	38
Widick, Devin	27
Witt, Forrest	3
Wolff, Dr. Kathy*	46, 47, 48, 49, 50
Wolters, Bryce	19
Woods, John	30
Woods, Ms. Kristin*	80, 81, 82, 83, 84, 85, 86, 87
Word, Marisa	50
Wrobbel, Brandon	130
Xiong, Dr. Neal*	132, 169
Yi-syuan, Li	116
Zatarain, Geovany	19

Things to do after the SWOSU Research & Scholarly Activity Fair:

1. **Complete the Exit Survey:** There is a short online survey to provide feedback regarding your experience with the Fair – this will help us to make future events better.

The survey may be found here: <http://bit.ly/2oTSiXT>

Or by scanning the QR code to the right:

In addition, we will be emailing out this link after the Fair with a reminder.



2. **Look for your photo:** The SWOSU Office of Sponsored Programs will post photos from the SWOSU Research & Scholarly Activity Fair on its website.

Go to: <http://www.swosu.edu/administration/osp/> → **Research Fair** → **Photo Gallery**

3. **Check out the video:** The SWOSU library will be videotaping events at the SWOSU Research & Scholarly Activity Fair.

Look for the video on the **SWOSU Library Facebook** page ([SWOSU Libraries](#)), or on...

Digital Commons at the Library Website (<http://dc.swosu.edu/>)

4. **Post your own Pictures and Video:** We encourage you to share your photos and videos via social media.

Please tag them with: **#SWOSUResearch** and **@SWOSU**

5. **Report and even publish your work:** Check with your mentor about reporting and publishing your poster or oral presentation. Options include:

Completing a **Scholarly Activity & Academic Activity Report** for the office of sponsored programs at <http://www.swosu.edu/administration/osp/scholarly-activity-report.aspx> ;

Publishing your work on **Digital Commons** via the SWOSU Libraries (<http://dc.swosu.edu/>) ;

Writing and submitting a paper to the SWOSU Journal of Undergraduate Research – see: <http://www.swosu.edu/academics/jur/index.aspx> ; or

Finding a venue within your own discipline to submit your work for publication.

6. **Get ready for next year:** It is never too early to prepare for the 2018 Fair!

If you were judged at this Fair, **review the feedback** on your evaluation with your mentor.

Find other events at which to present your work – this make include Oklahoma Research Day in Spring 2018 in Enid, Oklahoma, or other local, national, or international meetings within your own discipline.

Work with your mentor or find a new mentor to **do more research and scholarly activity**.

Continue to share and tag your accomplishments via social media.

We congratulate you for participating in the SWOSU Research & Scholarly Activity Fair, and look forward to seeing you next year!

