

2019 SPARC Festival  
Poster and Lightning Talk Abstracts



SPARC

FESTIVAL

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# BIOCHEMISTRY

## CHRISTOPHER HOMICK

### *Validating candidate mRNA gene targets of the mRNA mir-124*

**Mentor: Michael Turner**

#### **Lightning Talk**

MiRNAs are single stranded RNA molecules that regulate gene expression in the cell by binding to mRNA and suppressing gene translation. MiRNA recognize their target mRNA through nucleotide base-pairing interactions. The biological role of miRNAs is directed by the mRNAs that they target. MiRNAs do not perfectly base-pair with their target mRNA, meaning that there are a variety of probable locations for binding to occur. The experimental goal is to determine what mRNA genes are targeted by mir-124 and the nucleotide sequences that are interacting at the 3' UTR region of the mRNA. The greatest task is to experimentally establish rules for mRNA chemical interactions with miRNA. This validation lacks experimental evidence therefore determining correct binding interactions between these molecules to record successful targets will benefit future research. By validating candidate genes that miRNAs target, it will enable closer analysis of miRNA and mRNA interactions. This experiment will first predict mRNA binding sites of mir-124 using online resources such as mirbase, Pictar, and targetscanworm. The candidate target will be identified using bioinformatics and further cloned into reporter constructs for ligation, PCR, cell transformation, and restriction enzyme digestion. The DNA will be transformed into bacterial colonies to be co-transfected with p-mirglo to measure translation levels in the presence of both molecules. If fluorescence is suppressed it implies that mir-124 has bound to the gene and suppressed its translation. By validating target genes, the biological field will benefit from having experimentally verified miRNA/mRNA interactions. This research will aid in the further experiments done with RNA, including advancements in research regarding leukemia, uveal melanoma, and neurodegenerative diseases, and if well studied it can further human knowledge of these diseases. So many diseases originate from gene mutations during protein synthesis. If we can determine experimentally where particular miRNA's bind to then when binding is not working properly, we can analyze the miRNA and the mRNA gene that it binds to each other in order to find the cause. This project is being continued from previous work done with mir-124 candidate target validation.

## ELAINA PERRY

### *Confronting Gene Therapy: Explications of Genetic Research in the Altering of Humanity*

**Mentor: Patrick Lombardi**

#### **Lightning Talk**

“Confronting Gene Therapy: Explications of Genetic Research in the Altering of Humanity” proposes an explanation for what it means to be human and how genetic studies intrude on moral culture. Through the identification and understanding of genetic advancements exists an analysis of genetic studies in society, and the effects they have on cultural value. It articulates significance for society, questioning the evolution and further advancement of gene editing while respecting the scientific assets that the discovery has proposed. Provided examples offer an alternative view on genetic engineering to increase awareness of the loss of human value, while simultaneously searching for the point at which this seemingly valuable technology becomes too invasive.

**DHANE SCHMELYUN, HANNAH ORLAND, KATE BURKE, LAUREN GRAY, KAYLA KEBREAU & EMMANUELLA OSEI-ASANTE**

*Determining the structural basis for recruitment of the ALKBH3-ASCC repair complex to sites of DNA damage*

**Mentor: Patrick Lombardi**

**Poster Presentation**

Recognition and correction of damaged DNA prohibits widespread genetic mutation and plays an important role in ensuring proper cellular function. Recent studies have shown the protein ASCC2 recruit the ALKBH3-ASCC DNA repair complex to sites of DNA alkylation damage by binding chains of the protein ubiquitin assembled in proximity to DNA damage. Interestingly, ASCC2 has enhanced affinity for polyubiquitin chains despite containing a single CUE domain, a subunit known traditionally for binding only monoubiquitin. The basis of ASCC2's enhanced affinity for polyubiquitin chains is unclear, and a second, previously uncharacterized ubiquitin binding site is suspected to be present. Professor Lombardi and his collaborators at the Johns Hopkins School of Medicine have constructed a model depicting ASCC2 simultaneously binding two ubiquitin proteins using a well characterized ubiquitin binding site and a novel ubiquitin binding site. This binding model was tested by mutating the putative binding interface and comparing the affinities for both mutant diubiquitin and ASCC2 constructs to wild-type ASCC2 and diubiquitin. ASCC2 and ubiquitin proteins were expressed and purified from E. Coli. Polyubiquitin chains were assembled by our collaborators at Professor Cynthia Wolberger's Lab at the Johns Hopkins University School of Medicine. Isothermal titration calorimetry shows that diubiquitin with E64A and T66A mutations at the proposed novel interaction interface binds to wild-type ASCC2 two times weaker than wild-type diubiquitin. This data suggests that the interaction between residues E64 and T66 of the ubiquitin at the novel binding site and residues within ASCC2's CUE domain are important for polyubiquitin chain recognition. The lab is currently trying to identify ASCC2 residues that interact with E64 and T66 of the ubiquitin at the novel binding interface. If the correct ASCC2 residues are found, we will have a more complete picture of how ASCC2 targets the ALKBH3-ASCC repair complex to sites of DNA damage.

## **BIOLOGY**

**NATASHIA AKOMEAH & ASHLEY KEGLEY**

*MDA-MB-231: The Impact of Triple Negativity*

**Mentor: Dana Ward**

**Poster Presentation**

MDA-MB-231 is a cancerous cell line that originates from epithelial cells. This specific cancer cell arose in the mammary glands or breast tissues. This cell line is highly aggressive, invasive and poorly differentiated because it lacks estrogen receptors, progesterone receptors, p53 and has amplification of the human epidermal growth factor receptor. Additionally, it is negative for the HER2/Neu. Together, these features promote its status to that of a triple-negative breast cancer cell line. In this study, we will examine MB-231 cells along several different parameters including proliferation rate, mitotic index, anchorage independent growth, and response to chemotherapies. To assess these metrics, we will use a CyQuant assay, fluorescence microscopy, and tumor spheroid

culture. We will compare our data to data obtained from other laboratory groups using other cancer cell lines and to a normal control (MCF-10A cells).

### **VERONICA BALICK & RACHEL KEIFER**

#### ***Comparison of Cancer Cell Lines to Healthy Tissue Reveals Severity of the Cancer***

**Mentor: Dana Ward**

#### **Poster Presentation**

While all cancer cells display certain “hallmark” characteristics, each type of cancer represents a different cell type of origin and a different combination of mutations, and therefore behaves in a unique way both in the human body and in vitro. It is very important to be able to compare different cancers to each other and also to normal healthy cells to see how each cancer acts in different ways. MCF-10a cells are a cell line derived from benign proliferative breast tissue, and they are commonly used to model healthy breast tissue in scientific studies. Here, we compare cancer cell lines of varying degrees of invasiveness and harm to the MCF-10a cells in order to show how different cancers can vary very little or drastically to healthy tissue. Through tests which model cell proliferation, mitotic index, anchorage-independent growth, and response to chemotherapy, we show that certain cancers reveal a substantial deviance from normal cell growth and regulation while some do not, correlating to the severity of the cancer.

### **EMMA GEHRINGER**

#### ***Notes from the Emergency Department: My Time as a Medical Scribe***

**Mentor: Danny Miles**

#### **Lightning Talk**

A medical scribe is a position which is considered a “personal assistant” to the physician; they perform documentation throughout the patient’s stay in the Emergency Department, gather information during the patient’s visit, and partner with the physician in the patient’s care. This semester, I maintained an internship as a medical scribe and worked about 30 hours weekly. In this presentation, I will explain what a medical scribe is, what daily tasks and duties come with being a scribe, and why I chose to become a scribe. I will touch upon some of my experiences during my time as a scribe, both the positive and negative aspects of the job. I will also discuss some of the many skills I have acquired from working in a high acuity environment with critical patients. I will investigate some data surrounding the affinity medical schools and other graduate health professions have with admitting and/or hiring those that have scribing experience. Finally, I will give examples of how I brought my knowledge from the classroom into a real-world job.

### **MITCHEL GERAGHTY**

#### ***Developing Fitness Training Routines- Special Olympics Maryland***

**Mentor: Christine McCauslin**

#### **Poster Presentation**

For my last internship with Special Olympics Maryland I started my research into the psychology behind fitness training for individuals with special needs. I gathered knowledge into the field of athletic training and the constant push for self-efficacy within athletic training for intellectually disabled people. This was the main goal much of my research directly addressed, and the answer to this question was seemingly right in front of me. Imitating the theory behind the SO Fit model I have developed training programs for the SOMD summer games which help promote self-efficacy and health among Special Olympics Maryland athletes. These games include kayaking, tennis,

bowling, and bocce ball. Within my SPARC presentation I will detail the steps I took to create these programs and how they will be implemented within the Special Olympics Organization.

### **MALIK KADIR**

#### ***Testing Calcium Propionate (CaP) efficiency as an anti fungal agent on turf grass phytopathogens***

**Mentor: Christine McCauslin**

#### **Poster Presentation**

This research is about testing the efficacy of calcium propionate (CaP) as an antifungal agent on turfgrass phytopathogens such as fungal organisms that causes disease in plants. Turfgrasses are important in the ecosystem because they provide oxygen for humans through photosynthesis and they aid in stabilizing the nutrients in the soil. They also have significant commercial importance because of their common use in recreational landscaping including golf courses. Because of their commercial value, control of turfgrass phytopathogens is a billion-dollar industry. CaP is an anti-fungal agent that is approved for use in baked goods where it acts to prevent fungal (mold) growth and extend shelf life. CaP has good record of safety for human consumption at low concentrations, suggest it might be an environmentally friendly treatment to prevent and or control phytopathogen infection. Because CaP can be consumed at low concentrations, we wanted to test CaP efficiency as an antifungal agent on turf grass phytopathogens. To determine whether CaP is effective as an antifungal agent against turf grass phytopathogens, four common fungi were grown in the presence and absence of CaP. Our data suggest that CaP may offer an environmentally friendly alternative to common turf grass infection treatment. These findings have been used to support filing of a provisional patent for CaP use in phytopathogen control.

### **ANGEL MADARIAGA, DANIEL COLEMAN, & CHRIS HOMICK**

#### ***Examination of MDA-MB-435 Cancer cells***

**Mentor: Dana Ward**

#### **Poster Presentation**

This semester in cancer biology (BIOL 435) my lab group was assigned the cancer cell line MDA-MB-435. This cancer cell line was discovered in the late 1970s and was originally believed to be of a breast cancer origin due to its isolation from breast tissue. Contrary to this, recent genetic studies have demonstrated that it is actually of a melanoma origin. This cancer cell has characteristics which are hormone unresponsive as does not express estrogen receptors. It has a spindle-shaped morphology, consistent with many aggressive cancer types. In lab this semester, we will analyze the cell proliferation rate, the mitogenic index, and the anchorage independent growth properties of the transformed cells. These characterization analyses will allow the group to observe the aggressiveness of this cancer cell line compared to normal cell line (MCF-10A). Aside from these analyses, the MDA-MD-435 cancer cell will also be examined for its responsiveness with treatment to chemotherapy drugs.

### **BIRHAN NEGA ALEMAYEHU, SARAH FROUH & EMMANUEL KESSE**

#### ***Analysis of ovarian adenocarcinoma through testing of cell proliferation, mitotic index, cell growth and chemo response of OVCAR3 cell line.***

**Mentor: Dana Ward**

#### **Poster Presentation**

Cancer is a clinical condition that is manifested by the presence of one or another type of neoplastic growth. Cancer cells are abnormal, have a high proliferation rate and divide uncontrollably. They

often also acquire the ability to metastasize and thus spread to other sites within the body. In this set of experiments, the cancer cell line OVCAR3 obtained from a patient with progressive adenocarcinoma of the ovary was examined for its proliferation rate, mitotic index, anchorage-independent growth, and response to chemotherapeutic agents. We hypothesize that the OVCAR3 cell line would have a higher proliferation rate, mitotic index than the normal control (MCF-10A breast epithelial cells). We also hypothesize that it will show anchorage-independent growth. So far this semester, we have observed that indeed the OVCAR3 cells have a higher proliferation rate as measured by CyQuant assay. This result was expected because the patient from whom OVCAR3 was extracted from was in the late stage of her cancer. We will continue to collect data over the course of this semester that will ultimately assess the level of aggressiveness and response to chemotherapy of this cancer cell line as compared to others and to a normal control.

### **ELIZABETH O'HARE & KATELYN COMEAU**

#### ***Analysis of MCF-7 breast cancer epithelial cells in culture***

**Mentor: Dana Ward**

#### **Poster Presentation**

MCF-7 cells are the most widely utilized breast cancer cell line used for culture in research labs worldwide, known for their somewhat close resemblance to normal tissue and non-aggressive nature. These were isolated from the pleural effusion of a 69-year old woman with breast adenocarcinoma. They are positive for ER/PR/Her2 and express glucocorticoid receptors and have wildtype p53. This project seeks to compare the proliferative capacity, anchorage-independent growth, and response to chemotherapeutics of MCF-7s to a number of other commonly cultured cancer cell lines. In doing so, we can determine the relative aggressiveness of MCF-7 cancer cell line to other cancer cell lines and to a normal breast epithelial control (MCF-10A). Based on some of the known characteristics of the MCF-7 cell line in the scientific literature, we hypothesize that MCF-7 will show lower more anchorage-dependent growth and greater response to therapeutics relative to other more aggressive cancer cell lines, such as HCT-116, an aggressive colon cancer, and PC3, a prostate cancer with high metastatic potential. We have performed a CyQuant assay to measure the proliferation rate of MCF-7 cells over a 4-day time course and have found, against our initial hypothesis, that MCF-7 cell line showed significantly higher proliferative capacity than all other cell lines, except OVCAR3, a late-stage ovarian cancer. We will continue to collect data over the course of this semester to assess other parameters of cancer cell phenotypes to more broadly evaluate the MCF-7 cells in terms of their aggressiveness and response to chemotherapy.

### **NICOLE PINTO & KEZIAH ADABRAH**

#### ***T47D Human Breast Tumor***

**Mentor: Dana Ward**

#### **Poster Presentation**

This semester our cancer biology lab group was assigned to the T47D cell line from a human breast tumor. It was derived from a 54 year old female with ductal carcinoma of the breast and it is estrogen receptor and progesterone receptor positive. These adherent cells were taken from their metastatic site in the lung to be studied. With these cells, we are examining two measures of growth rates, including a time course of cell proliferation as well as mitotic index. We are also examining these cells for their ability to have anchorage-independent growth, a hallmark of many cancers. Lastly, we are examining the response of this cell line to several commonly used chemotherapeutic agents. Our results for the T47D cell line will be compared to other cancer cell lines from other

laboratory groups, as well as with a normal breast epithelial control. In doing so, we can map the aggressiveness and response to chemotherapy of this cell line compared to other cancers.

### **FRANCES PATRICIA STUMP**

#### ***In vitro and in vivo miRNA 238: target validation study***

**Mentor: Michael Turner**

#### **Lightning Talk**

miRNAs are small non-coding RNA molecules involved in regulation of gene expression or gene silencing. Post transcription, the miRNA attaches to the 3' UTR of the target mRNA and silences translation. MiRNAs are responsible for normal function of genes and responsible for diseases. *C. elegans* with abnormal amounts of miRNA 238, the *C. elegans* express Parkinson- like symptoms. The binding of miRNA to mRNA is imperfect. Therefore, computer algorithms can only predict target genes. This study serves to experimentally prove the target genes of mir 238. To experimentally determine what candidate genes the miRNA 238 target, 3' UTRs of the candidate target genes will be clones into a reporter construct. This recombinant plasmid will then be cotransfected into HeLa cells and florescence will be a measure of gene expression. The experiment uses *C. elegans* as the model organism. However, mir 238 is common to humans and *C. elegans*. Validating the mRNA targets will help understand the interaction of miRNA and mRNA. This preliminary study will also provide insight to the structure and function of miRNA, which will aid current research on using miRNA as biomarker, drug targets, and ways to regulate miRNAs.

### **FRANCES STUMP, KELLY MAJEROWICZ, JOSEPH RENNA & THOMAS RICHARDSON**

#### ***Determination of the aggressiveness of the HCT 116 cancer cell line***

**Mentor: Dana Ward**

#### **Poster Presentation**

The HCT 116 cell line originated from a 48-year-old male, who had colorectal carcinoma. HCT 116 is one of the fastest growing colorectal carcinomas. The cell line is commonly used because of its growth rate, its ability to metastasize in xenograft models, specifically mice, and because the genome is nearly diploid with 45 chromosomes. Based on the scientific literature, HCT 116 appears to be an invasive and aggressive colon cancer. In this study, we will examine how HCT 116 compares to other cancer cell lines, as well as a normal cell line, MCF- A cells. The study first measured the cell lines proliferation rate using a CyQuant Assay, which determined that the cell line had a fast proliferation rate, but comparatively to other cancer cell lines was slow. Another measure of proliferation is calculating the mitotic index, which will be done using fluorescent microscopy. Lastly, the cell line's anchorage independent growth and response to common chemotherapies will be measured. The results of these experiments will help visualize the how aggressive HCT 116 is compared to normal and other cancer cells. The study will also determine how treatable HCT 116 is with common cancer chemotherapies.

### **SASHA-GAY WILLIAMS & EMMA GEHRINGER**

#### ***The Cell Line PC3***

**Mentor: Dana Ward**

#### **Poster Presentation**

The cell line that our group is researching is PC3 which is a stage IV prostatic adenocarcinoma. This cell line has a high metastatic potential and was derived from the metastatic site of the bone.

The cell line lacks PSA (prostate specific antigen) expression and is tumorigenic. Throughout this semester-long experiment we will be focusing on measuring proliferation rate and mitotic index, whether the cells are anchorage dependent or independent, and their response to chemotherapy. So far in our experiment, we examined the proliferation rates by CyQuant assay which showed that our cell line had a moderate proliferation rate compared to other cell lines in the class. Through this experiment, we hope to gain an appreciation of the relative level of aggressiveness of this cancer compared to other types of cancers.

## CHEMISTRY

### PABLO BADIA

#### *More Energy for Less Time*

**Mentor: Danny Miles**

**Poster Presentation**

The purpose of this experiment is to provide a potential solution to finding a faster way to charge energy, specifically for electric cars. The potential solution is the use of electrical capacitors. Electrical capacitors store energy just like batteries. But unlike batteries, a capacitor can charge and discharge a lot faster than a rechargeable battery. A super-capacitor is a special type capacitor that has capacitance values much higher than other capacitors. A super-capacitor can provide voltage to power a motor. To research this solution, I plan to conduct an experiment where I will be designing different circuit diagrams on an electrical breadboard and with different amounts of super-capacitors (every circuit will have either 2, 3, or 4 super-capacitors connected). Every circuit will have two 150 kilo-ohm resistors and will be connected in different spots in each circuit. I will test each circuit on an electric toy car and test to see which circuit-design can charge the super-capacitors and provide energy to the car the fastest. My hypothesis is that the diagrams with 4 super-capacitors and the resistors evenly spread out in the circuit, will make the car go the fastest. I will test each circuit for three trials. During each, super-capacitors will be charged for 5 seconds, 10 seconds, 15 seconds, and then 20 seconds. Once the super-capacitors are charged, the motor of the toy car will be connected to the circuit and the car will be timed for how long it takes to get from one end to the other end of a three-five yard racetrack.

### JULIA BAER & JOEL BOWMAN

#### *Cinnamon, Spice, and Everything Nice: Synthesis of trans-E-Cinnamaldehyde from Aldol Condensation*

**Mentor: Patricia Kreke**

**Poster Presentation**

### EMILY DAVIS

#### *The Synthesis of Propyl m-nitrobenzoate*

**Mentor: Patricia Kreke**

**Poster Presentation**

The three-step sequence experiment yielding either ethyl m-nitrobenzoate or methyl m-nitrobenzoate is one of three projects that MSMU organic chemistry students complete in the spring semester. This research project focuses on the development of the final sequence step for a new three step-sequence experiment: the synthesis of propyl m-nitrobenzoate. Unlike previous sequence syntheses, the product of this nitration step is a liquid with a high boiling point. Protocol for the isolation and purification of the product has been developed including appropriate washes and vacuum distillation. To assess the project, the yield, percent yield and purity of the product were collected. Purity is assessed using the distillation temperature and IR spectra collected on a Shimadzu IR Affinity-1 with an ATR reflection adaptor. Once an effective procedure is developed, the second step of this new sequence reaction will be explored.

### **THOMAS DOLINAR & CHRIS GOODEN**

#### ***Effect of Salicylic Acid in Aspirin Synthesis***

**Mentor: Patricia Kreke**

#### **Poster Presentation**

This research explores the effect on the purity and final percent yield of aspirin when the starting reagent of salicylic acid is altered. Salicylic acid is the limiting reagent in the synthesis of aspirin, so it is hypothesized that changing the amount will result in different yield but are unsure of the effect on percent yield and purity. A total of nine trials will be completed. The first set of trials will use the standard amount of 15 mmol salicylic acid. The subsequent trials will alter the starting amount of salicylic acid, using half the standard amount (7.5 mmol), double (30 mmol) and then triple (45 mmol) the starting amount of salicylic acid. These trials will be conducted three times to ensure accurate data collection. In fall 2018, the experiment was conducted using 7.5mmol salicylic acid with a percent yield of 31.26%. with a melting point of 138.8-144.9°C. The expected melting point of aspirin is 138-140°C. When observing other data collected in the fall, the majority who conducted the control experiment, had relatively similar data to the data above. Those who did roughly half the standard amount, ended with very little yield (0.0248 g) and substantially less pure product (128.2-133.6°C). The goal of this experiment is to understand the effect of changing the starting amount of salicylic acid and how this reagent contributes to the percent yield and purity of the synthesis of aspirin. Preliminary fall 2018 data suggests that increasing salicylic acid does alter the percent yield. However, this data was collected early in the fall 2018 semester, before the lab groups were skilled in laboratory technique, so it will be interesting to see if the unexpected trend continues. If the altered amount of salicylic acid were to increase the final percent yield greatly but decrease the purity, it might not be a suitable change. This is also the case if the purity was increased but the percent yield was greatly decreased. In analysis of the trials, further information will be understood about how efficiently aspirin is being made and if altering the amount of salicylic acid has a substantial impact.

### **CHARLOTTE ELROD & LAURA KINGHAM**

#### ***Influence of Reflux Time on the Synthesis of Banana Oil***

**Mentor: Patricia Kreke**

#### **Poster Presentation**

These experiments were conducted to determine the effect of heating the reaction of isopentyl alcohol, glacial acetic acid, and sulfuric acid under reflux for for different periods of time on the percent yields of isopentyl acetate, more commonly called banana oil. This an important area of study because when there is a greater percent yield there is less waste of reactants, resulting in a

greater reaction efficiency. In addition to heating under reflux, this experiment also utilized the techniques of separation with a separatory funnel, simple distillation, and IR spectrometry. The results of this experiment presented evidence to support our research group's hypothesis that reflux time of the reactants is directly related to the percent yield of isopentyl acetate. The experiments that were carried out by Control Groups 1, 2, 3, and 4 presented a greater average percent yield, which performed reflux for the most amount of time, than each of the Experimental Groups, which performed reflux over times decreasing from 60 minutes by 15, 20, and 30 minutes, respectively.

### **DANIEL JOHN COLEMAN**

#### ***Manufacturing of 3D Printers***

**Mentor: Garth Patterson**

#### **Poster Presentation**

Over the course of the semester, I set up an original Prusa i3 MK3 3D printer. The printer uses files downloaded onto a SD card to print a 3D object in plastic that corresponds with the file chosen. After the printer is set up, I will attempt to make structurally sound designs for useful items in the labs such as spatulas, funnels, test tube racks, tweezers, etc that could then be mass produced.

### **ASHLEY KEGLEY**

#### ***Response Efficiencies of Smoke and Thermal Sensors in Various Fire Situations.***

**Mentor: Garth Patterson**

#### **Lightning Talk**

The two most commonly used smoke detectors in a household are photoelectric and ionization detectors, however, the two work differently and are more useful for certain types of fires. Ionization detectors are more responsive to flaming fires while photoelectric are more responsive to smoldering fires. Ionization sensors have a charged plate that ionizes air allowing current to flow to the plates. Photoelectric sensors deflect light from its sensing chamber when there is a high smoke concentration. The contradicting sensing elements of the two detectors generates an impact on the response time when a fire occurs. This can potentially be impactful for fire-related death and/or construction damage when a sensor fails to work. Photoelectric (Kidde P9050) and ionization (Kidde i9040) sensors were tested in a controlled fume hood and then compared to a thermal imager (FLIR One Gen) to measure the efficiencies of the sensors based on the type of smoke in different fire situations. Various methods were used to gather data including Fluke 123 industrial voltage ScopeMeter to conduct a positive alarm sensor and track recognition time. The test fixture that mounted the sensors were fabricated by using a 3D printer.

### **SCOTT LAWRENCE KORTE**

#### ***A study of sourness in beers and its dependence on pH***

**Mentor: Garth Patterson**

#### **Lightning Talk**

Brewed alcoholic beverages come in a wide variety of flavor palates; sweet, sour, salty, bitter, and many more. All of these flavors are entirely dependent upon their respective chemical makeup in order to be perceived by the human body. As such, a chemical analysis of a given brew can be telling of how exactly a flavor profile is composed. Anything from the composition of the sugars used in the initial stages of brewing to additional flavoring agents added in the final stages of the process can affect the chemistry which composes the final product. pH is a quality which is associated with acids and bases. As such, measuring this will indicate the acidity of the chosen beers. When talking

in terms of taste, most sour foods are high in acids, which are known to produce the trademark sour pucker that goes with foods like lemons and other citrus fruits. By this logic, a measurement of pH in beers will be indicative of relative sour taste. The goal of this project is to create a statistically significant link between measured pH values and the qualitative taste test which defines sourness. Beers studied will include Lambic style beers, which are native to Belgium and are noted for their distinctly sour taste, as well as classically available IPA beers known for bitter and sour tastes.

### **ZACH LAWSON & MIKE HOCHSTEIN**

#### ***The Synthesis and Characterization of CTA-4 and CTA-3,5 through IR and NMR spectroscopy and Dynamic Light Scattering***

**Mentor: Patricia Kreke & Danny Miles**

#### **Lightning Talk**

This research developed a procedure to synthesize cetyltrimethylammonium-4-chlorobenzoate (CTA-4) and cetyltrimethylammonium-3,5-dichlorobenzoate (CTA-3,5) from cetyltrimethylammonium bromide (CTAB). The product of each reaction was characterized through IR and NMR spectroscopy. Using dynamic light scattering (DLS), the critical micelle concentration (CMC) for both CTA-4 and CTA-3,5 was determined. Along with determining the CMC, DLS was used to verify the size of gold nanoparticles, which will be implemented into the micelles of CTA-4 and CTA-3,5 to see how they will change and grow. In determining the growth of the gold nanoparticles through DLS, the anticipated effect caused by CTA-3,5 is that they will grow in a monodisperse way, whereas the CTA-4 will cause them to grow in a polydisperse way.

### **GIANNA POMYKACZ & CHARDANE LOGAN**

#### ***Scaling Down The Esterification of Benzoic Acid***

**Mentor: Patricia Kreke**

#### **Lightning Talk**

In the spring semester, students enrolled in the MSMU organic chemistry course complete a three-step sequential synthesis experiment to reinforce laboratory skills. The second step of the sequence, the esterification of benzoic acid, is the focus of this research. In this research, the second step reagent amounts were adjusted to conduct the experiment on a smaller scale with a decrease in all reagent amounts. Typically, the limiting reagent amount is 0.1228 moles of benzoic acid. This research explored trials completed with 0.0409 and 0.0246 moles of benzoic acid. On average, a sufficient amount of product has been produced with the 0.0409 mole modification to move on to the last step of the three-step sequential synthesis. Reducing reagent amount is one of the primary principles of Green Chemistry. The 0.0409 mole modification is being piloted in the organic chemistry lab during the spring, 2019 semester. During the spring 2020 semester, the 0.0246 mole modification will be piloted. Purity is assessed by distillation temperature and IR spectroscopy, using a Shimadzu IR Affinity-1 with an ATR reflection adaptor. The spring 2018 data will be analyzed and presented.

### **NICHOLAS STARVAGGI & ETHAN PHAM**

#### ***Running Tylenol out of Business: Synthesis & Purification of Acetaminophen***

**Mentor: Patricia Kreke**

#### **Poster Presentation**

This independent project for Organic Chemistry II closely analyzes the chemical reaction between 4-aminophenol (C<sub>6</sub>H<sub>7</sub>NO) and acetic anhydride ((CH<sub>3</sub>CO)<sub>2</sub>O) in the synthesis and purification

of acetaminophen (C<sub>8</sub>H<sub>9</sub>NO<sub>2</sub>). An active ingredient in many common painkillers, acetaminophen can be synthesized in the organic laboratory through a traditional reflux and purified through recrystallization. This study will explore the effect of varying the starting amount of 4-aminophenol. The control experiments will begin with 0.014 mol of 4-aminophenol and subsequent variable groups will increase this starting amount by 0.003 mol for each successive group. There will be three control trials (0.014 mol), three trials for Variable #1 (0.017 mol), three trials for Variable #2 (0.021 mol), and three trials for Variable #3 (0.024 mol) for a final total of twelve trials. Crude acetaminophen product will be recrystallized from distilled water. After each trial, the purity of the final acetaminophen yield will be assessed through a melting point determination. IR Spectroscopy will also be employed with a Shimadzu IR Affinity-1 with an ATR reflection adaptor in each trial to compare the purity of an acetaminophen yield to that of a pure, reference sample. The percent yields and percent recoveries across all trials will be compared to determine the effect, if any, of varying the starting amount of 4-aminophenol.

### **NICHOLAS STARVAGGI**

#### ***Ligand Modification of Iridium (III) Complexes towards Solar Energy Conversion Applications***

**Mentor: Isaac Mills**

#### **Poster Presentation**

This independent research project, sponsored by the university's Summer Research Internship Award (SRIA) program, was conducted over the summer of 2018 under the guidance of Dr. Isaac Mills. Twenty-first century America's over-dependence on a limited supply of precious fossil fuels has prompted the scientific community to discover and harness a new, preferably renewable, alternate to fossil fuels to power a rapidly developing world. The main objective of this project was to advance the preexisting research in extending the life of iridium (III) complexes in solution to further evaluate their potential in future solar cell technologies. This was accomplished through searching for new ways to limit antibonding behavior through the joining of pyrimidine based ligands to larger, metallic complexes via coordinate bonding. The nature of the project was threefold: synthesizing a multitude of different ligands, developing metal complexes, and also constructing dye-sensitized solar cells (DSSC) to test synthesized products. Complexes were prescreened as potential photocatalysts via Density Functional Theory (DFT) computational methods. Catalytic studies on proton reduction, which incorporate proton reduction photosensitization and zinc reduction, were also conducted throughout the summer. Finally, these complexes were proven useful for photoredox catalysis and were tested in dye-sensitized solar cells to evaluate their potential effectiveness in useful, real-world solar energy applications.

### **KRISTINA WINKELER & LAUREN GRAY**

#### ***Synthesis of Tetraphenylporphin***

**Mentor: Patricia Kreke**

#### **Poster Presentation**

In this project we will synthesize tetraphenylporphin, a large cyclic organic molecule. In this synthesis, benzaldehyde, pyrrole, and acetic acid reflux for 30 minutes and the product is isolated via vacuum filtration. This research explores the effect of changing the concentration of acetic acid on the purity, yield, and percent yield of our product. Trials will be conducted using 0.1M, 0.27M, and 0.4M acetic acid. Additional trials at a higher or lower concentration will be explored based on our data. Purity will be assessed using melting point, IR and <sup>1</sup>H NMR spectroscopy.

# COMMUNICATION

## GRACE BOVARD

### *1 in 3: An Analysis of Sexual Assault Awareness on Mount St. Mary's University's Campus*

**Mentor: Mary Catherine Kennedy**

#### **Lightning Talk**

Sexual assault is a major problem on university campuses nationwide. According to the Association of American University's Report on Sexual Assault and Sexual Misconduct (2015), 11.2% of all students experience rape through physical force, violence, or incapacitation while an undergraduate student (as cited in RAINN, 2015). Moreover, they report that specifically, 1 in 3 women between the ages of 18 and 24 will experience sexual assault (as cited in RAINN, 2015). The Department of Justice's Office of Statistics also reports that 4 out of 5 female students will not report that they have experienced sexual assault, according to their study on Rape and Sexual Victimization on College-aged Females (as cited in RAINN, 2015). In order to better understand the culture surrounding sexual assault and sexual misconduct on campus at Mount St. Mary's University, a survey was distributed to Mount community members, including students, faculty, staff, and administration, to examine the following research questions:

RQ1: Do members of the Mount community understand the difference between sexual assault and sexual misconduct?

RQ2: Does the Mount community feel safe on campus?

RQ3: How does the Mount community understand sexual assault and sexual misconduct policies?

Based on the first two research questions, the following hypotheses were advanced:

H1: Members of the Mount community will not understand the difference between sexual assault and sexual misconduct.

H2: Mount community members feel safe on campus.

In this paper, I will analyze the national culture surrounding sexual assault from other surveys conducted on university campuses, through my training for victim advocacy, and through the lens of the #MeToo movement. I will argue that with better and more frequent education and training in sexual assault awareness, the Mount Community will be better prepared to combat this national crisis facing college campuses.

The survey results will guide the planning of a series of informational events for a Sexual Assault Awareness Campaign set to occur during the month of April. This campaign will serve to educate people about sexual assault and sexual misconduct and to identify ways to prevent it from occurring on our campus. Finally, I will use the information gathered to create a list of recommendations that can be used to modify university policies in order to better inform the campus community.

# COMPUTER SCIENCE

## MARQUS I. CHAMBERS

### *Landlord Tenant Intercommunication*

**Mentor: Scott Weiss**

#### **Lightning Talk**

I am creating a website application using html, css, and javascript for my senior project class. I am creating a real estate application. This is an application that will help tenants connect with landlords in an easier way. It will also make it easier for landlords to connect with tenants as well. This site will allow tenants to connect with landlord and put in a ticket for any problems they have. Based on the different tickets the landlord will decide how urgent or the priority level of the tickets based on when they came in or what type of problems the tenants are having. The priority will be based on when the ticket came in and the type of problems they are having in their home. This system will allow them to keep a log of information and time log so that there are not any issues. What this means is that if either the tenants or landlord have any concerns about dates things were accomplished or payments were made they can look back and be able to track the log history. This system will also allow scheduling for appointment meetups. This basically will give the tenant the chance to send their landlord a request for a time they want to meet up. They can accept that request or send a counter with a better time or date that fits into my schedule. As the landlord you will be able to go into each of your tenants profiles and who is living there, check whether they have made their payments, and see if they have any issues or have had any issues in the past. Landlords can also click the tickets option and see which tickets they have completed and see which ones still need completion.

## JUSTIN DENNIS

### *Make it Better - An RPG Game*

**Mentor: Scott Weiss**

#### **Lightning Talk**

During my freshman year I designed a program that was a 2D text-based RPG that was based by progressing by answering questions correctly to deal damage. Though since I didn't have a engine, it was missing a lot of core aspects of an RPG that i wanted to. I wanted this game to be more interactive with a graphical interface the player could enjoy. This was something i wanted to improve upon by using a better program and the knowledge of techniques I learned over the years. This project is for people who like these types of games with a bit of a trivial twist to it. Adventure and RPG games pulls people in with its story-telling and game-mechanics. Some people have an adoration of sprite art and game developers making games.

The main goal of the game is to implement a trivia-based battle system that is based on accuracy of questions answered. This game is to be an game with multiple sections, where players can explore areas with starting with a town to rest and restore their health and get new items to help their base damage. In the starting hostile areas, the type of questions will be middle school grade questions that are easy to answer and will be harder as they move into harder areas.

**BRYAN DORBERT*****Musician's Utilities Program*****Mentor: Scott Weiss****Lightning Talk**

For my computer science senior project, I am creating a program that integrates a chromatic tuner, metronome, and ear training tool into one Android program. The chromatic tuner uses the phone's microphone to listen for a pitch from a musical instrument. It tells the user the frequency of the sound and whether it is too high or too low which allows the user to tune the instrument accordingly. The metronome is given a tempo in beats per minute (BPM) from the user and plays a click sound at a consistent rate matching that given tempo. This is used for practicing rhythmic precision when playing an instrument. The ear training tool is a quiz that gives two different frequency sounds and asks the user the relative note distance between the sounds.

**CHRISTIAN DOVEL*****Alumni Engagement Calendar - Android*****Mentor: Scott Weiss****Lightning Talk**

For my senior project in the Computer Science major, I have decided to work with the Alumni Engagement Center, specifically Emily Myers, to create an app for the Alumni Engagement Weekend. The app will be replacing a non-function app that exists already. Alumni Engagement Weekend occurs once every year and is a great way for the Mount to connect with Alumni. The Weekend is packed with events for the alumni to attend and it can be hard to keep track of all of them. The app will create a way for the returning Alumni to be notified of the events with ease year after year. My task will be the development of the Android software for the application. The application will be getting the information about the events from a database, which only Emily Myers or another Alumni Engagement officer will have access to. Through this they will be able to update the events for future years. Details about each event such as the title, time, description, and location will be available. The app will be structured with a home page, a calendar view where users can see all events for the week broken up into different days, and individual details about each event happening. Upon clicking on an event on the calendar view page, the details will be brought up. The app will be Mount-themed including Mount colors and links to the Alumni Engagement social media sites. I plan on publishing the application to the Android app store for anyone interested to be able to download.

**ANTHONY DRAKE*****Snack Scanner*****Mentor: Scott Weiss****Lightning Talk**

Snack Scanner is a barcode scanning app that makes looking through food ingredients much easier for the user. The user is prompted to create a profile entering their name and check off ingredients that they cannot eat, which will then be stored into a database. There are also options for the user to select if they are vegan or vegetarian, or gluten-free. After they create their profile they are given the option to either scan a barcode, which opens the camera to scan the barcode of that product. Which will then search the product of that item using an API called Chomp which provides data on food products such as barcodes, nutrition labels, ingredients, trace ingredients and allergen warnings. The app will compare the ingredients of the food to the restrictions that the user has in their profile,

and if any of the restricted ingredients is in the scanned item then the app will notify the user that the food item isn't safe to eat. Otherwise, the app will say that the food item is safe to eat. Regardless of whether the food was safe to eat or not, the scanned item will be placed into a database where the user can look through archived scans. The second option that the user has after making their profile is looking at archived scans, which removes the redundancy of scanning the same item. This can be cleared up if it becomes cluttered. This project will be created using Android Studio and Chomp.

### **JOSHUA KAUFMAN**

*Konnexion: A connect game with an unbeatable AI*

**Mentor: Scott Weiss**

#### **Lightning Talk**

I am writing a program wherein the user can play against an AI. The program will be designed so that a user may play a game similar to tic-tac-toe or connect four, against an AI. The user will select the size of the board, no smaller than 3 squares x 3 squares and no larger than 8 squares x 8 squares, and they will select the number of squares in a given row will need to be filled, no less than 3. There will be 3 difficulty settings for the AI with the hardest being impossible to win against, wherein only a draw may be reached at best. After which the winner will be declared, or if it's a draw a draw will be declared, and the user can start a new game or quit. The AI uses the mini-max algorithm and Alpha-Beta pruning to determine the post possible move in any given scenario whilst allowing for the best possible efficiency. My purpose with this project is to hopefully improve upon the basic AI algorithm by making the board modular, forcing the program to take into account multiple possible scenarios for any given board state. While not overly innovative inherently, as the algorithms already exist, this will hopefully push the boundaries of efficiency. My research will take me into find other pruning methods similar to that of Alpha-Beta pruning to better the response time of the AI.

### **MATTHEW LUBY**

*MyCafé*

**Mentor: Scott Weiss**

#### **Lightning Talk**

This project has the goal of creating an app in which students can order food from the on-campus café via their phones. It will be a mobile application any student or faculty/staff member could potentially download, log in to, and use. Once a user is logged into their respective account, they will be able to place an order to either the café, Starbucks, or both. The app will include the entire menu that the Mount Café and Starbucks offers. Within the app they will be able to create an order, edit it, place it, pay for it, and receive confirmation that their order has been placed. The application will keep track of the users order history, as well as the user defined favorites. There are two applications to the project. One, used by the customer to place the order. The other, used by the café to receive and process orders. The mobile application utilizes both local and cloud hosted databases to store information and to keep the app up-to-date. The café application is a simple Java app that will receive an order placed and display it. This project is a proof-of-concept. No actual CC or payment data will be accepted or processed.

### **THIEN MAI**

*Voting Web Application*

**Mentor: Scott Weiss**

### **Lightning Talk**

I'll be showcasing my voting web application that was made using Django for my client Dr. Dye. the application features a registration and login system. When logged in, users who are permitted to vote will see ballots that are available to vote on. My client will be able to edit users and create ballots through an administrative account. Details of ballots are stored in a database and will be pulled from and update the database when the forms are submitted.

### **JEREMY PARAOAN**

#### ***Your Guide to Victory: Your TCG Guide***

**Mentor: Scott Weiss**

### **Lightning Talk**

As a senior project as a computer science major, this is an application for Android devices, mainly targeted at the Card Game players for games like Yu-Gi-Oh!, Magic: The Gathering, and Cardfight: Vanguard. Being the ultimate gaming assistant, this app is able to keep track of life points throughout your battles, gives you online access to guides and tournament style resources, and space for you to keep notes on battles that make an impact and for you to make your next battle a victory!

### **ZACH ROBERTS**

#### ***DoseControl - Android Application***

**Mentor: Scott Weiss**

### **Lightning Talk**

My project is to create and develop an application that helps people taking many pills and different medications on a daily basis. It is aimed more predominantly towards older people who easily lose track of their prescriptions and medications and what they have and have not taken. It is a way to organize and better track pills, dosages, types of pills, and times/alarms to take specific pills daily. This application will feature a calendar which includes all medications and necessary medical notifications from a monthly overview down to the hour. The user will be able to input details and information on their medications including drug name, pill count, dosage amount, dosage per day/times, and any other relevant information. The application will notify users when a specific medication is running low or the pill count is down and have a pop-up option to call their pharmacist for a reload.

### **TYLER SHIMCHAK**

#### ***iOS app for Alumni Reunion Weekend***

**Mentor: Scott Weiss**

### **Lightning Talk**

The Director of Alumni Engagement, Emily Myers, had expressed the need for an app for Alumni Reunion weekend that could be used to notify users of the events and their details that take place and could be reused for future weekends. When the idea was first proposed, she employed a peer for the creation of the app only on Android OS. As things progressed Director Myers expressed further that she would like the app on both of the two popular mobile OS's, Android and Apple iOS. Apple iOS development can only be done on macOS device, which my partner did not have access to. I was then recruited to work on the iOS app as I have a macOS device. The app itself that is being created is a calendar and schedule for the event-filled week that occurs in every June. The app will have a home page that will have several different links to social media outlets, the

Mount bookstore and Grotto, and then a link to an event page. The event page will display all the events (with all their details of time, date, location, description) happening throughout the week. When an event is tapped on the event tab will expand and display the extend event information. Each event will have the ability to be added to a user's personal agenda, what they plan on going to and view separately from all the event, and will have the ability to set notifications to remind the user of the event. The events will be pushed to the app through a backend online database, where Alumni Engagement will enter the events and their information to be published to the app

### **GILLES TAMUKONG**

#### ***Wifi Channel Planner***

**Mentor: Scott Weiss**

#### **Lightning Talk**

One way of improving the Wifi quality in a high capacity environment is to reduce the amount of Interference and Channel Noise caused by Access point configurations. I have developed an application that will recommend a proper configuration to reduce these events.

## **CONFLICT, PEACE, AND SOCIAL JUSTICE**

### **GRACE KING**

#### ***Speaking Out Against Oppression: Comparing the Voices of George Lamming and Meek Mill***

**Mentor: Indrani Mitra**

#### **Lightning Talk**

George Lamming's *In the Castle of My Skin* is an autobiographical narrative in which a boy named G navigates life in 1930's Barbados, as he attempts to find himself and his place in the world. G's village on the island is a place of great racial and class divide. In this society slavery has been abolished, but a person's worth is based on the shade of his skin. Through G's experiences Lamming argues that the structural oppression of poor black people continues to manifest itself in the form of feudalism and later capitalism. I agree with Lamming and want to take his point a step further by showing how it is relevant to modern U.S. To do this I will compare *In the Castle of My Skin* with Meek Mill's rap "Trauma." The striking similarities between the two works highlight the fact that G and Mill experience similar oppression despite the fact that their pieces are separated by more than half a century. Both note the insidious nature of the black "overseer" model in preserving systems of oppression, whether it be a village inspector or an unjust judge. In many ways our nation has come far in addressing racism. However, the fact that a Philadelphia rapper in 2019 shares so many experiences with a boy growing up in 1930's Barbados demonstrates that so much has remained unchanged. I will emphasize both literature and rap as means of speaking out against oppression and how this fits into our Catholic mission. I will reference the recent USCCB document addressing racism, which says that remaining silent in the presence of racial injustice is a sin of omission.

# CRIMINAL JUSTICE

## **BRET W. HOLLANDSWORTH**

### *Growing Tensions*

**Mentor: Layton Field**

### **Poster Presentation**

#### Growing Tensions

The world we live in is currently facing an intense divide when it comes to the relationship between law enforcement and those who reside within our country. Three main components to look at when it comes to this tension is miscommunication, the lack of knowledge between both parties, as well as the negative outcomes in the news with police interactions. These three components offer the question as to whether interaction courses between officers and those they protect would yield any positive outcomes. The overall goal is to aid the relationship and establish a new trust between the parties being examined. The method being used to data collect has been interviewing 5 officers as well as 5 citizens that reside within Maryland. These interviews focused on the 3 components to my problem stated above. The officers all had very similar problems and solutions yet all 5 of the citizens had different opinions on police. The results found that both parties wished to find solutions to the tensions and the evidence was clear that interaction courses sparked interest. The media tends to focus on the negative side of law enforcement, yet they do not show how vastly different both point of views are between the police and citizens. Miscommunication is a very important component to examine and understand within this research. Police interaction courses may be the answer to the growing problem.

## **STEPHANIE KENNEDY**

### *The Impact of Extreme Risk Protection Orders on Domestic Violence*

**Mentor: Layton Field**

### **Poster Presentation**

Domestic violence is a pressing issue across the nation. Two of the largest issues concerning domestic violence are offender recidivism and the use of firearms by offenders. Legislatures and organizations across the nation are searching for a solution to these problems. One possible solution that has been introduced is Extreme Risk Protection Orders. Currently, there are thirteen states who have enacted these laws, with eight of these states recently passing legislation in 2018. These laws are relatively new, and it is unclear how effective they are at preventing domestic violence and protecting victims. This project analyzes California's Extreme Risk Protection Order that was implemented in 2014. By analyzing the state of California, who implemented Extreme Risk Protection Orders multiple years before most states, I will be able to compare the annual domestic violence rates, use of weapons, and other variables, including total population, median income, race, unemployment rate, and educational attainment before and after the implementation of the law. This comparison allows me to determine if Extreme Risk Protection Orders have had any impact in preventing domestic violence incidents or whether other factors are impacting domestic violence. Preliminary observations of the data suggest that the implementation of Extreme Risk Protection Orders does not provide statistically significant impacts on domestic violence and the use of firearms during these incidents. By computing additional descriptive statistics and utiliz-

ing t-tests, I will be able to find trends in the data and analyze all the variables that impact the occurrence of domestic violence and determine which have the most influence.

### **TRISHA NEE**

*Should pharmaceutical companies and their management along with conspirators be held liable, criminally and civilly, for the current opioid epidemic in the United States?*

**Mentor: Joseph Vince**

#### **Lightning Talk**

Our nation has been plagued with what is known as the opiate epidemic. Everyday 130 people in the United States die from an opiate overdose . Opiate overdose rates continue to raise in the country . The Abuse of and the addiction to opiates like OxyContin, is a major national crisis. The affect that the opiate epidemic has and will continue to have on public health, in addition to social and economic welfare is exponentially growing . Society as a whole is calling for there to be answers behind why our country has been plagued with such an epidemic. In addition to demanding answers from the creators of Oxycontin, society is pointing fingers at Purdue Pharma, Inc. and conspirators for manipulating and misrepresenting OxyContin as non-addictive and having very little chance for abuse, to increase profits.

## **DATA SCIENCE**

### **PATRICK AQUINO**

*Image Processing on Cancer Detection*

**Mentor: Rebecca Portier**

#### **Poster Presentation**

Cancer treatment has baffled regular people for a long time. With little knowledge of cell mutation and cancer development, people have always asked silly questions such as, “why is there still no cure for such and such cancer?” and “is the government hiding the cure for [any kind of] cancer from us?!” The first recorded cancer research dates back centuries ago, 1775, when Percivall Pott identifies a relationship between chimney soot and squamous cell carcinoma. I am not a scientist but, I would like to contribute on cancer research using my knowledge on data science and mathematics.

While browsing on Kaggle.com, I stumbled upon a dataset which contains 10,000 dermatoscopic images of pigmented lesions, which was provided by the Harvard Dataverse project. For my research project, I will identify various types of skin cancer and conditions and use the concept of image processing to translate images into numerical values. Ultimately, I will develop a variety of classification models with the use of k-nearest neighbors, k-means, and principal component analysis in hopes of accurately associating each image with its corresponding cancer type and condition from derived clusters of pixels. Detection and diagnoses of cancer could be different depending on the specific kind of cancer. The proposed modeling approaches are focused on skin cancers, and would not necessarily be usable for abnormalities inside the human body. My goal is to advance detection with simple snapshot and using a computer to quickly determine its condition while also being accurate.

# ECONOMICS

## **NATHANIEL F. BALD**

*Designer Society: How the Perfect Combination of Ideas and Conditions Led to Eugenic Economic and Social Policies*

**Mentor: John Larrivee**

### **Lightning Talk**

The view of the human condition tremendously determines how society views people and human action. Perhaps the best illustration of a society grounded in eugenics principles – a society committed to controlling and engineering the best genes and conditions for its citizens – is that of Aldous Huxley’s *Brave New World* or Andrew Niccol’s *Gattaca*. The scientific movement of the late 19th century acted as a looming backdrop as Darwinism shattered many notions about human equality and fortified scientific determinism. This, in addition to the rise of social utopian movements, coincided with long-debated metaphysical philosophies that reject transcendence and freewill. This junction of ideas, as well as the prevalent impact of economic conditions in the context of the Industrial Era, generated the perfect breeding ground for eugenic thought which poured into economic and social policies that endured past the brutality and barbarism of Nazism. This paper explores the various ideas and economic conditions of the late 19th and early 20th centuries that led to prevalent eugenic policies. Moreover, it will highlight how the change in the view of the human condition empowered eugenic principles. Finally, it will briefly touch upon more recent pushes in the eugenics movement as well as hypothesized societies built on the idea that society can and ought to control and engineer its citizens.

## **WAYNE CARROLL III**

*Banking in america*

**Mentor: John Larrivee**

### **Lightning Talk**

Today many in America and around the world depend on the banking systems that we operate in. Should they suddenly fail or cease to function as they should the effects would be disastrous, but it’s the banking system that allows much of the progress that society has made and people acknowledge this and talk about it. We consider if the way things are now is how they ought to be but most don’t understand how this system has come to be. this paper will help fill some of that gap. The goal of this research is to find out how banks and economic conditions have impacted each other over the course of American history. To arrive at the answer to this question I will be analyzing documents that take account of large changes in American banking, and I will also analyze documents that take account of major economic conditions of the same time. The constant economic conditions that will be studied include measurements of physical wellbeing such as average height and weight and time cost for common items as well as more general economic markers. Elements of banking that will be studied throughout the document is how loans are conducted and how interest is applied and understood as well as general banking tactics.

## **CAROLYN CICCOCIOPPO**

*Hostility to the Family in the Thought of Marx and Engels and its Influence on Communist Policy*

**Mentor: John Larrivee**

**Lightning Talk**

Communism has looked different in the many countries that have attempted this economic and political system. Not all communism is the same, but most are rooted in the theories of Karl Marx and Frederick Engels, materialists in the nineteenth century. Marx and Engels reduce every societal structure down to economic principles of production and property rights, including the family unit. According to Marx and Engels, the family is a social construct and consequence of the desire for property rights. While many think property rights give men the incentive to work hard in order to leave an inheritance for their family, Marx and Engels claim that property rights encourage men to focus more on work and earning wealth, giving them the upper hand over women who take care of the household and raise the children. Furthermore, they state that it leads to oppression, causing inequality among the sexes, especially in monogamous marriages. Even though women think they are choosing to serve their family, this is just a mask of a stronger force. Since the men were the breadwinners, the women were subject to the men. Marx and Engels's solution is to eliminate property rights, impacting both economic production and the family. They want to make everything a public affair; from household cleaning to raising and educating children, so that everyone's needs will be met by the greater community. On one hand, this allows them to be freer; on the other, it is likely to limit the possibilities of love. This drastic shift in ideology leaves a lasting impression on how the modern world views family life and the rapid deterioration of the family over the past one hundred years.

**ETHAN FIERY**

*Nazis and Their Economics*

**Mentor: John Larrivee**

**Lightning Talk**

The Nazis had a peculiar economic system, besides socialism, they handled economic problems in interesting ways. They tackled major economic problems by intuitively solving them in relation to the needs and ability of the state and race. In short, they didn't really have an economic policy. This led to interesting responses and even more interesting results in that it actually worked. Many believe though it is only due to the war economy at the time. This is combined with the assumptions made by the Nazis about the human person and the state. They believe that the state and individuals are subordinate to the race and state of the Germanic peoples, although the importance of race and state are ambiguous in their order. Some of the practices that were revolutionary in Germany were large deficits, regulation of foreign trade, prices, wages, and investment. Many of practices had not been seen on such a large scale at this point in history making them very interesting. Even more interestingly, it is inconclusive as to how the Nazi economy was centrally planned and, according to some literature, if it was centrally planned at all. Some sources suggest it was renewed fervor stoked by Hitler or just people excited about the rebounding economy and they saw the Nazi party as the bringer of this prosperity and wanted more of that. Whatever the causes and methods were will be discussed.

**HANNA HOUCK**

*Oppression in Communist Regimes: The Cuban Experience*

**Mentor: John Larrivee**

**Lightning Talk**

This project will explore the conditions that Cubans faced under the Batista and then Castro regimes

and how it starkly contrasted the initial expectations of how a Communist government would interact with its constituents. Through use of the Dirección General de Contra-Inteligencia, the State Security Department or the DGCI (also referred to as the Red Gestapo), the Dirección Special de Ministerio del Interior, and other entities, the Cuban Communist party punished those who did not comply with their standards. This could include critics of the regime, homosexuals, Catholics, Protestants, pimps, prostitutes, and other “socially deviant people” (Courtois et al., 1999). These punishments were extremely harsh and inhumane at times. Physical and psychological torture were used, along with forced labor and forced military service. In addition to the punishment of these individuals, their families would also be punished by loss of employment, banning from higher education, and other social exclusionary measures.

### **ANTHONY KORTISSES**

#### ***The Flawed Nature of Fractional Reserve Banking***

**Mentor: John Larrivee**

#### **Poster Presentation**

The purpose of my proposal is to explore the origination and history of fractional reserve banking, especially its roots in the Bank of England, and to analyze its flawed structure and the economic instability it creates. It is a banking system that has put handcuffs on our economy as it essentially created a massive stockpile of debt that gets passed around while the issuing institutions profit. The whole idea behind fractional reserve banking is that the bank is able to loan money without actually having physical guaranteed assets to back it up. When a loan is issued, the bank gives out notes of receipt (currency) that is generated on a ledger, created completely out of nothing, rather than giving out their physical deposits. This results in the creation of more money than can be possibly backed, and is the central problematic issues in the whole system. When there is more debt than money in circulation in an economy, made possible by fractional reserve banking, there is a great deal of risk involved. By introducing this new system, it insures that the vast majority of people will end up in debt while a small percentage profit greatly. In the case of a situation in which the majority of loans are called due at the same time, like an economic crisis or war times, it is guaranteed that some people will default on their loans through no fault of their own, simply because there is not enough physical wealth in existence to pay back all the debt that has been issued. The zero-sum nature of money in conjunction with the over-leveraged lending practice created an economic mess that allowed for powerful bankers and banking institutions to maintain an unjust stranglehold on the real wealth of an economy while lending out fiat money and charging interest on it to those in need of capital to survive, start and grow businesses, and to further expand the economy in general.

### **ALEXANDER LANGAN**

#### ***The Impact of Colonial Practices on Institutional and Economic Development***

**Mentor: John Larrivee**

#### **Lightning Talk**

The European discoveries of a sea route around Africa’s southern coast in 1488 and of the Americas in 1492 forever changed the course of human history. With these two events, the emerging nation-states of Portugal, Spain, the Dutch Republic, France, and England were able to establish sea power across the Atlantic, and the era of Western colonialism began. For the next five centuries, the major European powers explored, conquered, settled, and exploited large areas of the world, spreading European institutions and culture throughout the process. Once, the era of Western colonialism came to an end during the mid to late 1900s, the immediate political consequences of rapid

decolonization became apparent as many young nations were unable to establish sovereignty or solvency over their populations. During this talk, I will explore the long-term economic, political, and humanitarian consequences of Western colonialism, and the role that differing colonial practices by major European powers played in the long-term development of the nations that were once under European control. To do so, I will divide the talk into two sections. In the first section, I will summarize the theory Daron Acemoglu and Simon Johnson present in their book, *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. In the second part of the talk, I will present my findings after applying Acemoglu and Johnson's theory and comparing colonial practices that nations endured with their current Human Development Index (HDI).

### **NICHOLAS LAVENBERG**

#### ***The Historical Roll of Civil Society in Shaping Human Culture***

**Mentor: John Larrivee**

#### **Poster Presentation**

Civil Society refers to families, communities, organizations, churches, civic groups, and other voluntary associations which all work together to develop necessary human character and a firm grasp of morality. Today the world is faced with poverty, hunger, and the tragic repercussions of a steady breakdown in cultures and family. Author Michael Joyce writes about how the freedom granted in the United States, initiated by our founding fathers, relies on the human capacity of self-government. The creation of a free society is grounded in objective truths about what it means to be human. These truths, as John Paul indicates, are self-evident and discerned in human nature. If human beings are more than just matter, then the institutions who build character, morals, and values are exceedingly significant. Poverty, homelessness, and the other misfortunes alluded to above can be resolved if society reverts to the vision of compassion held a century ago. The breakdown of family and culture will not be resolved by government checks or subsidies, but rather by people helping people on a personal, individual level, which can only be achieved through civil society. The purpose of this research is to determine what civil society is and how it was effective historically in order to clarify which efforts would be most beneficial for the economy today.

### **REBECCA E. LEE**

#### ***Material Well-Being Trends in the 20th Century***

**Mentor: John Larrivee**

#### **Lightning Talk**

By the end of the 19th century, the United States had made its way to center stage as a world power. In American Society, the 20th century brought about a vast amount of opportunities and improvements. New inventions had introduced mass production, and people flocked to the cities for opportunities of a better life. One of the major improvements was material well-being. With new jobs came better income and increasing purchasing power. Income inequality fell drastically until the 1960s, and then slowly started to rise. The poverty rate has shrunk significantly, yet the quality of the material well-being of those in poverty still come into question. In this paper, I analyze the trends of material well-being during the 20th century. Furthermore, I discuss what influenced these trends using sources from well-known economists such as Robert Fogel, Peter Lindert, and Jeffery Williamson. Although income is an effective way to measure material well-being, it does have its flaws. Income does not take into account of life-time well-being, or the many factors that affect it, such as inflation. Thus, I consider material well-being using many measures such as consumption, non-material, and bio-medical measures. These measures help provide an effective representation

of what accurately happens in these trends.

### **SCOTT OWENS**

#### ***Moral Corrosion of Communism***

**Mentor: John Larrivee**

#### **Lightning Talk**

In most societies, people tend to see capitalism as an institution that supports evil characteristics such as greed, dishonesty, and a lack of ethical values. It is a popular belief that communism supports the idea that it will support the common good of society and do more to benefit those of the community. People often miss the big picture that when analyzing communism, these standards appear less than they do under this sort of institution. Both capitalism and communism have historically had their cons of lower characteristic values in greed, character and charity, however, communism was an inefficient institution with corruption of character in firms and public abuse of authority. The question at hand here is what system makes other people care about others? John Clark and Aaron Wildavsky write on how the control of the communist party in the Soviet Union led to moral corrosion in the form of a society completely controlled by government. This form of governing crippled virtue in every citizens character and eradicated any form of religion in the country. The two biggest implications to note in both capitalism and communism is which systems offers the most morally fit for society in terms of the character of human beings.

### **SAM STEPHAN**

#### ***The Impact of Reductionist Views of Human Nature on Economic and Social Theory of the Late 1800s and Early 1900s***

**Mentor: John Larrivee**

#### **Poster Presentation**

This paper explores how ideas such as Thomas Huxley's claim that people are "conscious automata," or the drive for social control of Edward Ross, impacted economists of the late 1800s and 1900s. As a result, this presentation will work to understand the impact and implications that the actions of animals, namely humans, can be analyzed as predictable. Ultimately, if humans are simply automata then they are forced to stay within the bounds of their conditions and genes. Every action that is taken is not subject to the soul and consciousness of the individual who takes said action. Rather, each action that is taken always has a physical cause at its root. If this is to be taken as true, then it is apparent that intellectuals should work to understand which conditions create different results. On the one hand, accurate assessment of how circumstances affect people is essential for improving society, for appropriate policies to solve social problems. On the other hand, it can go too far. As the intellectual class adopted an increasingly reductionist view in the late 1800s it became an easy step from exploring how people were affected or determined by conditions, to considering how to engineer the conditions in the first place, an outcome portrayed well in Aldous Huxley's Brave New World.

### **MARY STRATTON**

#### ***Eugenics and its effects on economic structure***

**Mentor: John Larrivee**

#### **Poster Presentation**

In this presentation I will briefly explain eugenics, the eugenics movement, and how it affects economics. Two of the main eugenic movements were promoted through positive and negative

eugenics. Positive eugenics is the idea that encouraging of the “genetically fit” to reproduce. Negative eugenics is much more cynical. It deals with the encouragement of the sterilization of the genetically unfit. This includes people with mental health problems, physical ailments, and the economically disadvantaged. Those who encouraged the eugenics movement were typically members of the upper class who had rejected religious beliefs. As these groups of people released their religious beliefs and tendencies, they began to adopt a philosophical materialist point of view. I will talk about how those world views impacted the way the economic structure of the early progressive era changed throughout the 20th century.

### **JOHN M. WILSON**

#### ***The Influences of Economics on Social Crises***

**Mentor: John Larrivee**

#### **Poster Presentation**

The famous economist Robert Fogel states in his research, “The theory...embraced by modernism generally, held that cultural crises could be resolved by raising incomes” (Fogel, 172). This project takes the similar process of Robert Fogel in reviewing modern socioeconomics. The goal of this project is to observe the levels of the standard of living which the West has obtained throughout the 20th century and how these levels compare to certain sociological statistics. The project will start out by observing different ways in which the standard of living is measured such as prices, working hours, and purchasing power and illustrate how these levels have progressed throughout the past one-hundred years. It will then proceed to show data in the same time period on sociological circumstances such as biological measurements and similar data to what Fogel researches, “drug addiction, alcoholism, births to unmarried teenage girls, rape, the battery of women and children, broken families, violent teenage death, and crime” (Fogel, 172). The last part of the paper will compare these two forms of data to understand to what degree economic standards affect human action and happiness to avert crises.

### **JACKSON WOOD**

#### ***The Expectations of a Socialist Utopia***

**Mentor: John Larrivee**

#### **Poster Presentation**

For my presentation, I will be discussing the Utopian expectations of socialism. I will discuss the ideas people had about socialism and why it would be better than a capitalist or any other society. Sub-topics will be was it more efficient, more just, there would be better relations between people of society, no self-interest, and less materialistic. I will go through the years of 1800-1900. Authors or economists discussed in my presentation will be Wilde, Hollander, Bebel, and Bellamy. With these people I will delve into what people were thinking at the time and what they thought socialism would bring. How has socialism affected countries and how did it turn out looking at it now in hindsight.

### **SEAN P. ZALESKI**

#### ***The Miracle of the Cistercians***

**Mentor: John Larrivee**

#### **Lightning Talk**

The Miracle of the Cistercians This project will explore the economic and technological contributions of the Cistercians during the Middle Ages (800-1200). This time in history is unfairly seen as

a time of technological and economic stagnation. In reality, at this time extensive innovations in transportation, agriculture, and trade were founded and spread throughout Europe. Many of these advances were developed by Catholic monks called the Cistercians. Their work contributed to the economic, cultural, and political growth of early feudal Europe. The innovations made by the monks include inventions like the water wheel, the blast furnace, and fertilizer. They also advanced in the practices of farming, husbandry, market based economics, trade, education textiles, architecture, engineering, construction, and theology. These improvements were diffused through their practice of incorporating lay brothers. This order of early monastics through their implementation of philosophy, education, theology, economics, and technology helped jump start the early growth of Europe well into the Renaissance.

Sources Cameron, Rondo E. *A Concise Economic History of the World: from Paleolithic Times to the Present*. Oxford University Press, 1989. Novak, Michael. "How Christianity Created Capitalism." Acton Institute, [acton.org/pub/religion-liberty/volume-10-number-3/how-christianity-created-capitalism](http://acton.org/pub/religion-liberty/volume-10-number-3/how-christianity-created-capitalism).

## ENGLISH

### ANNISHA MONTGOMERY

#### *The Power of Poetry*

**Mentor: Sarah Scott**

#### **Lightning Talk**

I want to present the accessibility of poetry, the authenticity it entails, and the connections that are created through sharing your story. I will begin my presentation with a poem, then move into my experience with writing i.e. how I started, why I do it, and how it has changed. I will then discuss free verse and spoken word poetry – how it demands to be heard and allows for more immediate connection because the piece is physically coming to life off the page – and the romantic tendencies of memory on poetry. I will conclude my presentation by presenting a final poem.

## ENVIRONMENTAL SCIENCE

### SEAN KAZMIERSKI

#### *Training and Preparing to Become a Seasonal Park Ranger at Cunningham Falls State Park*

**Mentor: Abigail Kula**

#### **Poster Presentation**

For the SPARC festival, I would like to do a poster presentation presenting the work that I have and am doing for Cunningham Falls State Park. I have interned at the park for when completed 5 credits or 200 hours. My work at the park was various and general and I tried to learn as much as I could about as many things as I could while at the park. I believe some of the most important

things that I have learned was; understanding park and state work maintenance schedules, learn the protocols of doing certain jobs and experienced when these protocols can be disregarded, how to act when working as a ranger at the park and how to deal with various confrontations, the training and knowledge that will help me obtain this job and other jobs like this one, and lastly first hand training and knowledge on the jobs and duties that a ranger is required to do while on duty as a Ranger or as Duty Ranger. I think that this project is worthy of being at the SPARC festival because I know from personal experience that there are many misconceptions about being a Ranger or how to become one. Many people seem to think that it is as simple as just walking/driving around the park with a Ranger hat on, but there is so much more knowledge and work that is done to keep an area that is used by almost a million people yearly look unused to those people. I also see this as important because it will help people who may have learned about Cunningham Falls through visiting themselves or from the career fair about what the workers actually do at the park or what they would be expected to do if they tried to work at the park. To conclude I believe that this SPARC poster presentation would be very interesting to many because of the knowledge and experience that I could share with others that will help both people in the environmental science/biology field like myself and those who are not.

### **ERIK MENJIVAR**

*Photocatalytic Degradation of Furosemide and Identification of Carboxylic Acid based Derivatives using GC/MS/HSTrap*

**Mentor: Kathryn Dye**

**Lightning Talk**

One of the most significant problems involving water pollution is contamination by micropollutants from pharmaceuticals. Their inability to be filtered out by wastewater treatment plants has led them to go into bodies of water, affecting the ecosystem. One common pharmaceutical is furosemide, a diuretic that has been linked to affecting population growth of crustaceans. Photocatalysis has been shown to degrade several micropollutants in the past and was used to determine its effect on an aqueous solution of furosemide. Photocatalytic degradations were done at Université Claude Bernard Lyon 1 followed by the analysis of the products of the reaction. High performance liquid chromatography was used to determine the remaining concentration of furosemide. After 30 minutes, little to no furosemide remained. A system of a gas chromatograph with a headspace trap and a mass spectrometer was used to identify the products under a set of parameters. Furfural, the main product was identified at the moment of full degradation. However, organic acids were not found in the chromatogram despite being identified earlier with a stock solution. Future replications will need modifications to the parameters of the mass spectrometer and gas chromatograph in order to identify both furfural and the organic acids.

## **FINE ARTS - MUSIC**

### **JASMINE PATRICK**

*Representation and Racism in Opera*

**Mentor: Andrew Rosenfeld**

**Lightning Talk**

There are multiple styles of music, each with their own accomplishments and setbacks. Opera is one of those styles that has positively impacted the world but also is acquainted with racism, prejudice, and a lack of representation for people of color in the field. In the modern day world, jobs and careers should be equal in terms of representation. People of color should not only be encouraged to pursue white dominated careers such as opera, but should also be celebrated for their accomplishments. It is important to understand the positive and negative aspects of a material that impacts humans in everyday life.

## HISTORY

### KELLEY NORTHAM

*The First Blast Against the Writings of John Knox: An Investigation of Knox's Forms of Argumentation Against Female Monarchy*

**Mentor: Jamie Gianoutsos**

**Lightning Talk**

## MATHEMATICS

### PATRICK AQUINO & TREY MCGOUGH

*Ticket to Using Graph Theory on a Board Game*

**Mentor: Jonelle Hook**

**Poster Presentation**

Ticket to Ride, a board game, is a rendition of the North American map. The board game consists of major American and Canadian cities that are connected with a color-coded railroad system. One could argue that the ultimate goal of the game is to accumulate as much points by connecting the cities. However, another subtle way to gain points is by having the longest connected railroad throughout the map. We present the problem of finding the longest yet safest connected railroad on the map. Our methods would apply of graph theory such as degree sequences and spanning trees, in addition to methods of game theory.

### REBECCA BREINER & HANNA LORENZEN

*Vertex Coloring*

**Mentor: Jonelle Hook**

**Poster Presentation**

Vertex coloring is the process of coloring vertices of a graph such that no two adjacent vertices are the same color. Often we desire to minimize the number of colors used; this process is often used to solve problems in real world scenarios. We will investigate several graph coloring heuristics including the greedy algorithm, and we will show that the order of vertices is important for the

greedy algorithm and proper coloring of graphs. We will model applications as vertex coloring problems.

### **NATALIE BRUNNER & ABIGAIL SPENCER**

#### ***Check-ing Out the Shortest Path***

**Mentor: Jonelle Hook**

#### **Poster Presentation**

Chinese Checkers is a game created in Germany in 1892. The goal of the game is to move all of one's pieces from their current position in one of six corners of the star to the opposite corner the fastest. We will apply Graph Theory and Game Theory to the game of Chinese Checkers. A shortest path algorithm will be used to analyze all paths in order to determine which path is optimal for a player to move their pieces in order to win. Some shortest path algorithms include breadth-first search (BFS), depth-first search (DFS), and Dijkstra's Algorithm, which will be used to aid us in finding the optimal path for each of the pieces.

### **JOSEPH CONTRERAS & MARK PLAVETIC**

#### ***Instant Insanity***

**Mentor: Jonelle Hook**

#### **Poster Presentation**

The game Instant Insanity consists of four distinctively colored cubes that must be stacked one on top of the other. The objective is to make sure that each side of the vertically stacked cubes does not share a color. We will investigate a variation of this game by changing the configuration in which they are stacked. To gain a deeper understanding of this problem we will use graph theory and vertex coloring. Considering the variation to the game we are imposing we will use graph theory to pose a efficient solution.

### **JOSEPH CONTRERAS & PATRICK AQUINO**

#### ***Pickomino***

**Mentor: Brian Heinold**

#### **Lightning Talk**

We will be taking a look at the dice game Pickomino. It is a game that can be played by up to seven people. Each player has a turn and in their turn they must initially roll 8 dice. The player will store certain dice and then re roll the dice. The goal is to accumulate a score large enough to acquire certain dominoes and the player with the highest total value of their perspective dominoes wins. We will be using probability theory and programmed simulations to examine certain scenarios of the game. One important decision a player will have to make is whether to keep rolling the dice or to stop because if a player chooses to roll they sometimes are more likely to lose during their turn.

### **CATHERINE LYNCH, SAMANTHA VANDERLIPP & MEGAN ZUVICH**

#### ***Minimal Coprime Labelings of Nonisomorphic Graphs***

**Mentor: Jonelle Hook**

#### **Poster Presentation**

# POLITICAL SCIENCE

## KATHERINE CORR

### *Does One's Race Impact their Level of Confidence in Congress?*

**Mentor: Maureen Oakley**

#### **Poster Presentation**

Many may think that their votes do not count and politics are not important. Both of those statements are very untrue, especially in today's current events and political climate. In fact, Americans are the core of democracy because they elect the officials into office. This project will look into the levels of confidence of voters in relation to their race. I will look into the demographics of the country and see how proportionate the numbers are compared to the demographics for the members of the Senate and the House of Representatives. After looking at these numbers my theory is that minorities will have a lower level of confidence in Congress than those of whites. My findings show that both whites and those who identify as "black" and then "other" have varying levels of confidence in Congress; in conclusion, minorities have the lowest level of confidence in Congress. After testing this, there are other factors and events to consider and what it means for our democracy and country.

## JAMIE KARPENCY

### *Heritage or Hate?: The Symbolism of the Confederate Flag and Racially-Charged Politics*

**Mentor: Maureen Oakley**

#### **Lightning Talk**

Debate has raged for decades over the appropriateness of the display of Confederate symbols. Defenders of the display of these icons claim that their use is nothing more than a show of pride in Southern culture and heritage. Detractors argue that the heritage they so proudly uphold is one of slavery, Jim Crow-era segregation, and oppression. This research seeks to show that, despite protestations that the Southern heritage symbolized by the Confederate flag holds no racial component, there are links between claims that the flag symbolizes Southern heritage, conservative cultural thought, and public policies considered to be racially-motivated. Using survey data from the Public Religion Research Institute, a policy and perceptions scale was constructed using variables chosen to reflect a wide range of cultural beliefs and policy positions that ranged from very obviously racially-based to more nuanced ones involving some possible "racial code" language. A difference of means test was then performed against respondents who described the Confederate flag as a symbol of southern heritage and those who described it as a symbol of racism. This revealed that there is a large and significant difference between the two groups, with the Southern heritage group taking what could be considered the more racist side of these issues. Additional contingency table examinations between perceptions of the flag and each individual variable included in the scale helped confirm this finding.

## CHACHIE TCHUENKAM

### *A Quantitative Analysis of the Relationship of Abortion Restrictions 2010 and Abortion Rates (Rate of Occurrence) 2013*

**Mentor: Maureen Oakley**

#### **Lightning Talk**

In the United States, there are numerous social issues which influence political ideologies and the lives of Americans. One of which is abortion, a medical procedure of terminating, or ending, a pregnancy. In 1973 in the Case of Roe vs. Wade, the Supreme Court ruled that abortion is protected under the constitution and shall be legal in all states. However, states retained the right to uphold restrictions according to what they best feel fit for them (Rolnick, Joshua 2012). My research analyses the relationship between abortion restrictions and abortion rates in the United States. Since States may have difference rates of abortion occurrences, my study is on the variables which influences abortion rates in the United States to either increase or decrease. My hypothesis is that abortion restriction is the variable with the most influence on the rate of occurrence, however, I also included a separated analysis of other political and demographic variables which are the percentage of the population who identify democratic, per capita income, and religion observance, to see the significance on the rate of occurrence without the restrictions involve. I found that, at a bivariate level, abortion restrictions and occurrence rates are highly correlated with an inverse relationship, however, the study only explained 18 percent of the variation in the occurrence rates. The second analysis with the political and demographic variables explained more than half of the variation in abortions/occurrence rates and, therefore, suggests that abortion restrictions do not have a greater influence on the rate of occurrence compared to other political and demographic variables.

## PSYCHOLOGY

**LIZ BULLARD, MARIA MACK, RACHEL FINN & KAYLA HUGHES**

*C. elegans, nicotine, and locomotion*

**Mentor: Angy Kallarackal**

**Poster Presentation**

The purpose of this study was twofold: to build off prior research on the effects of varying concentrations of nicotine on the locomotion of *C. elegans*, and to assess how tolerance to the drug affects the organism's locomotion. This organism in particular is beneficial to study as its entire genome has been sequenced, thus this research can be beneficial in better understanding the effects of a drug on larger organisms like humans. Fifteen worms were studied under three concentrations of nicotine: 0mM (saline), 0.1mM, and 10mM. Locomotion was measured by counting the number of thrashes a worm made in one minute. An ANOVA was conducted in order to determine if the number of thrashes between different concentrations of nicotine was statistically significant. According to the data, the results were statistically significant between the 0.1mM nicotine group and the 0mM (saline) group, thus supporting the findings of prior research that a small amount of nicotine does increase locomotion. For the second part of this experiment, the locomotion of ten worms was measured in 0.1mM of nicotine solution, with five of these worms in the control group having had no prior exposure to nicotine, and the other group of five worms having been exposed to the drug prior. A t-test was conducted to determine if the previously-exposed worms with tolerance to nicotine exhibited a lower number of thrashes in the nicotine solution than the control group. According to the data, the results were not statistically significant, thus our study did not support the idea that tolerance to nicotine decreases locomotive hyperactivity.

## TAYLOR CARHART & KRISTEN AKERS

### *Information About Epilepsy*

**Mentor: Caitlin Faas**

#### **Lightning Talk**

Epilepsy is a group of neurological disorders defined by the occurrence of seizures and it also can be referred to as seizure disorders (Burnham, 2017). There are three different types of epilepsy (e.g., generalized, focal, and idiopathic epilepsy). In our talk, we will outline the types of seizures (e.g., generalized and partial seizures) and their treatments caused by epilepsy. The most common treatment for epilepsy is drug therapy. Drug therapy can be seen as antiepileptic drugs, anticonvulsant drugs, or antiseizure drugs. One main cause of epilepsy is abnormalities in the brain (e.g., a vitamin B deficiency, a scar, a tumor). We will also discuss how children with epilepsy lives are affected. Normally occurs in young children from the ages of 6 to 13 years of age. About 4% of the population will have epilepsy sometime during their lifetime. About 1% of the population will have epilepsy at any point in time. This talk will provide educational information on epilepsy on its causes and treatments.

## EMELY CRUZ, IVY MCGLAUGHLIN, KATE MCCANN & CAROLINE COLSON

### *Locomotor Behavior in C. elegans After Exposure to Nicotine*

**Mentor: Angy Kallarackal**

#### **Poster Presentation**

*Caenorhabditis elegans* can be used as a model to test the behavioral effects of nicotine, such as locomotion. An analysis of locomotor activity was conducted among *C. elegans* lacking *acr-16* acetylcholine receptor and those with *acr-16* in saline and a nicotine solution of 0.1 μM. The purpose of this study is to determine if thrashing behavior increases in *C. elegans* when exposed to the nicotine solution and how nicotine affects *acr-16* mutants. It was hypothesized that locomotor behavior will increase among *C. elegans* as well as the mutants when exposed to the nicotine solution of 0.1 μM rather than the saline solution. A total of 10 *C. elegans* were analyzed first comparing thrashing responses in nicotine. Next, 10 mutants and 10 controls were tested in both saline and nicotine solutions. The number of thrashes were counted for each *C. elegans* in each of the two solutions. Based on the results, the *C. elegans* and the mutants in the 0.1 μM solution of nicotine did not have higher locomotor activity compared to those in the saline solution, which rejected our hypotheses.

## BREANNA DESIMONE

### *The Effect of Food as a Reinforcer in a Conditioned Place Preference Task*

**Mentor: Jon Slezak**

#### **Poster Presentation**

This study was conducted to observe the effectiveness of two types of Pavlovian conditioning by testing the reinforcing potential of food in a conditioned place preference task. Four groups assessed food as a reinforcer when placed in the home cage before the rat was put in a Conditioned Place Preference (CPP) box. The other four groups assessed effectiveness of food as a reinforcer when placed in the CPP box with the rat. Data was taken on total and average time spent in each section of a CPP box before and after conditioning was completed. Experimenters used 9 male Sprague Dawley rats at approximately 5 months of age. The rats weighed between 320 to 350 grams. The subjects were fed 22 hours before experimental sessions and consumed 15 grams of food at each feeding with continuous access to water. A 12-hour light/dark cycle was maintained

in a temperature-controlled room where the rats were kept. When the food was placed in the CPP box with the rat, conditioning was found to be more effective. Little to no change was found when the food was placed in the home cage before conditioning sessions in the CPP box. Therefore, simultaneous conditioning is proven to be more effective than delayed conditioning when testing reinforcing potential of a stimulus.

## **GIANNA DUCA & SANDRA GRANADOS**

### ***Treacher Collins Syndrome***

**Mentor: Caitlin Faas**

#### **Poster Presentation**

Our poster presentation for SPARC will be on Treacher Collins Syndrome. Treacher Collins syndrome is a condition that affects the development of bones and other tissues of the face (Treacher Collins syndrome - Genetics Home Reference – NIH). The condition affects an estimated 1 in 50,000 people, it is a very rare disease (Treacher Collins syndrome - Genetics Home Reference – NIH). Making a diagnosis for this disease is very challenging because of how rare the disease is, a genetic testing registry is a testing resource, physical exam, and a laboratory test help in diagnosis (Treacher Collins NIH). Individuals affected by this condition can also present with intellectual disabilities. In our Neurodiversity class, we have learned about various disabilities and how the individuals are affected by society while having a disability and how their overall daily life is affected. We saw many of these experiences in the movie “Wonder”, where a little boy experiences grade school while having Treacher Collins syndrome. By watching the movie we were inspired to expand on Treacher Collins syndrome to bring awareness to the world on the condition. It is a very rare disease and the movie was able to be that first step in bringing awareness and we will continue to bring more awareness through this presentation. A main theme that the movie aims to portray is the idea that in society overall, we need to be more educated on how people with physical or intellectual differences are just like everyone else. In our presentation we hope to educate others by, discussing how Treacher Collins affects the person externally, internally and emotionally, explaining characteristics, treatment, and diagnosis. In the movie “Wonder”, it focuses heavily on how the little boy, August Pullman deals with how society and fitting in affects how he feels about himself. This poster will help give information about Treacher Collins and bring awareness.

## **MITCHEL GERAGHTY & IVY MCGLAUGHLIN**

### ***Chromosome Deletion Syndrome***

**Mentor: Caitlin Faas**

#### **Poster Presentation**

Deletion Syndrome is a genetic disorder affecting roughly one in four thousand people. (Genetics Home Reference) It is a syndrome marked by a partial deletion of some of the genetic material of the 22nd chromosome. The portions of the chromosome deleted vary from person to person, which also means the effects vary likewise. The symptoms vary enough to show individuals from low to high functioning. When deleted, the individuals who are impacted by this genetic neurodiversity face significant obstacles within the developmental and cognitive aspects of their lives such as heart defects, immune system deficiencies, and delayed development in speech. (Children’s hospital of Philadelphia) People affected by deletion syndrome are also more likely to develop mental illness later on in life than people without. Although the direct causes and influence of this neurodiversity are still undetermined, it is vital to pursue further knowledge due to the syndrome’s adverse effects. Within our SPARC presentation poster we will present an in depth introduction into deletion

syndrome, its effects, outcomes, and how it adds to an increasingly neurodiverse world.

**MORGANNE HENDRICKSON, BRIANNA RIZZO, GEMMA O'KEEFE & ALYSSA GALLAGHER**

***Comparing Simultaneous and Backward Conditioning of Short-Term Pavlovian Conditioning in Male Sprague Dawley Rats***

**Mentor: Jon Slezak**

**Poster Presentation**

This research was conducted to determine if the Pavlovian conditioning procedure (backward vs. simultaneous) affects conditioned place preference. In this experiment, ten grams of food were paired with either the home cage (when subjected to backwards conditioning), or the rat's non-preferred side of the conditioned place preference box (when subjected to simultaneous conditioning) to have the rats associate the food with the non-preferred environment. After conditioning sessions were run, post tests were conducted to determine if there was a change in the rat's approach behavior. Results of this study show that these types Pavlovian conditioning will increase the total time spent in the non-preferred environment. However, this trend is not statistically significant.

**KRISTINE HODGSON-TORRES & JOSE M. LUCERO**

***Neurodiversity: Cerebral Palsy***

**Mentor: Caitlin Faas**

**Poster Presentation**

Cerebral palsy is defined as a motor disorder caused by injury to the persons developing brain (Wehmeyer et al., 2017). In more descriptive terms cerebral palsy is defined as a grouping of permanent disorders of the development of movement and posture causing difficulties and inabilities in the participation in activities. These developmental delays are attributed to non-progressive disturbances that occur inside the developing or developed brain of that person (Wehmeyer et al., 2017). Within the term cerebral palsy there are many different types of cerebral palsy that a person can develop. There is the "spasticity" type, "dyskinetic" type, "ataxia" type, and lastly the "mixed" type. Cerebral palsy is known as the most common cause of childhood physical disability. In developing countries, like the United States the prevalence of cerebral palsy is estimated to be two out of every 1,000 children (Anderson et al., 2008). Unfortunately, the rate of prevalence of cerebral palsy has remained stable over the years, despite the advancements that has been had in obstetrical care. As part of this research we are going to interview a family, who has a 22-year-old son who has cerebral palsy. The aim of this research is to allow in better understanding of the disability, and also understanding ways in which we as a society can aid in making the lives of people with cerebral palsy easier.

**KRISTINE HODGSON-TORRES**

***Effects of Cortisol on Associative Memory in C. Elegans***

**Mentor: Angy Kallarackal**

**Poster Presentation**

Previous studies have shown that stress, which activates the release of cortisol, can play a role in associative memory. Although preliminary research has shown that there is a correlation between stress and associative memory in humans, the relationship is complex. Using a model organism such as *Caenorhabditis elegans* (*C. elegans*) researchers can provide insight into the evolutionarily conserved mechanisms that cause cortisol to impact memory. *Caenorhabditis elegans* are

self-reproducing organisms which are inexpensive, easy to manipulate, and has a variety of genetic tools available. Additionally, *C. elegans* are capable of exhibiting associative learning and memory through salt chemotaxis. In the current study, three different levels of cortisol (.5mg/L, 5mg/L, and 50mg/L) were tested using *C. elegans* with salt chemotaxis learning. For each condition the worms experienced starvation in NaCl (Sodium Chloride) or regular chemotaxis buffer. The worms were then tested on the salt chemotaxis assay. This research will hopefully help to create a model of cortisol-sensitive associative memory, and can lead to future studies that explore genes and conditions that contribute to it.

### **KAYLA HUGHES & DREW WERTZ**

#### ***What does it mean to have Down syndrome?***

**Mentor: Caitlin Faas**

#### **Poster Presentation**

Down Syndrome, also called Trisomy 21 (Center for Disease Control, 2019), is a chromosomal disorder that most times gets looked over and not many people understand. Down syndrome is caused by an extra chromosome 21 which may modify a person's facial appearance and impair their cognitive abilities. There are three types of Down syndrome that include Nondisjunction, Mosaicism, and Translocation (National Down Syndrome Society, 2019). In many situations, a person with down syndrome experiences a lack of social acceptance as well as an increased risk of heart disease and other deficiencies. Due to the fact that Down syndrome is a lifelong disorder, there are not necessarily treatments, but a lot of researchers suggest physical, occupational and speech therapy (CDC, 2019). Children with this disorder at times may need extra help at school and or more attention due to their cognitive impairment. Separate special education is usually necessary and can occasionally need to be continued throughout their life. The best way that you can find out if your child may have this disorder is through screening (CDC, 2019). What this test does is take your blood as well as give you a prenatal ultrasound in order to figure out if you have the genetic components needed and or the risk your child has for this disorder. For this poster, we intend to give the reader information about this disorder as well as allow them to understand it further. Giving a better idea of what this disorder is may allow people with Down syndrome to be more understood. Some recommendations if you would like to learn more are to research more about the topic as well as contacting someone who may have Down syndrome to tell you more about their disease.

### **MATENYEH KABA & THOMAS PITTS**

#### ***Dementia of the Alzheimer's Type: What Today's Technology has Brought to Light.***

**Mentor: Caitlin Faas**

#### **Poster Presentation**

Within the end of the 20th and much of the 21st centuries, there have been various reports linking Alzheimer's disease and Down Syndrome, this condition has now been labeled as Dementia of the Alzheimer's type (DAT). Due to advancements in health care, nutrition, and housing conditions, the frequency of dementia has become much more prevalent in individuals with Down Syndrome. This increase in average life expectancy means that not only are people with Down Syndrome living longer but, also that their chances of developing Alzheimer's have increased (Wehmeyer, et. al., 2017). Furthermore, individuals with Down Syndrome are at risk of developing dementia 2-3 decades earlier than someone without Down Syndrome due to the high amount of amyloid-? gene found in people with Down Syndrome over the age of 40 (Wehmeyer, et. al., 2017). Due to the similarity of symptoms, there are many conditions that tend to mask DAT and thus, make

it difficult to accurately diagnose (Wehmeyer, et. al., 2017). As previously discussed, the various advancements being made have increased the prevalence of DAT in the United States and throughout the world, therefore, this poster sought to identify contributing factors of DAT, its symptoms, and possible treatments that exist with the overall purpose of educating the general public about a condition affecting many people today.

### **JESSICA LEE, REBECCA CERMAK & VICTORIA DOING**

#### ***Prader-Willi's Syndrome***

**Mentor: Caitlin Faas**

#### **Poster Presentation**

Prader Willi's Syndrome is a genetic disorder that effects all aspects of life. The main symptoms include hypogonadism, hyperphagia, and behavioral problems (Cassidy, 1997, pg. 917-918). Hyperphagia, the larger proportion of fat bodily mass compared to lean body mass, is the most recognizable symptom in people with Prader Willi's Syndrome (Cassidy, 1997, pg. 918). This translates to obesity, a common symptom of Prader Willi's Syndrome. Cassidy writes, "Food seeking behaviour, with hoarding of or foraging for food, eating of unappealing substances such as garbage, pet food, and frozen food, and stealing of food or money to buy food, are common" (1997, pg. 918). People with Prader Willi's Syndrome have been known to have behavioral issues concerning eating due to their large appetites. Other symptoms include, developmental delays, cognitive delays, hypotonia, behavior disturbances, sleep abnormalities, short stature, etc. (Cassidy & Driscoll, 2009). Essentially, those with this disorder have difficulty growing all the way around. Some common treatments for people with Prader Willi's Syndrome are nutrition counseling, early infant stimulation programs, growth hormone therapy, cryptorchidism, physical therapy, occupational therapy, speech therapy, parental training, and genetic counseling (Cassidy & Driscoll, 2009, pg. 9-11). To characterize people with Prader Willi's Syndrome, we will include personal stories from parents of and people with the syndrome.

### **MEGAN MCCASKEY, JESSICA LEE, KHALIL REID & ALLISON WADE**

#### ***Does Pavlovian Conditioning Procedure Influence Condition Place Preference in Rats?***

**Mentor: Jon Slezak**

#### **Poster Presentation**

Rats were conditioned either using backwards or simultaneous pavlovian conditioning methods. Using a conditioned place preference (CPP) box, researchers determined rats' preferences before and after conditioning. The CPP box consisted of two different compartments, a light side and dark side. Preferences were determined based on the time spent on each side of the CPP box. In the backwards conditioning group, rats were given food in their home cage before being placed in the non-preferred compartment of the CPP box. In the simultaneous conditioning group, rats were given food while they were in the non-preferred compartment. Both conditions were tested after four conditioning sessions. Although there were trends towards an increased time spent in the non-preferred side of the CPP box in the simultaneous conditioning group, there was no significantly statistical differences.

### **ZENA MOHAMMED, MADISON COLLINS, SHAUN MILLER & WILL ALMOZARD**

#### ***The Effect of Psychoactive Drug (Ethanol) on C.elegan Behavior***

**Mentor: Angy Kallarackal**

#### **Poster Presentation**

The purpose of this was to test EtOH tolerance within the *C. Elegans*. *C. Elegans* are a wild type worm, that are a model organism with similar genes and neurons to humans. Within this study, we analyzed how *C. Elegans* reacted to exposure of ethanol (EtOH). In our first experiment we conducted, we created a control group containing *C. Elegans* only exposed to saline, and an experiment group containing *C. Elegans* exposed to 300mM of EtOH. As observed, we saw that thrashing within the experimental group slowed down compared to the control group. The purpose of this was to show that EtOH has an inhibiting effect on the motor system. Within the second study, we looked at tolerance in the *C. Elegans* pre-treated with to EtOH. Our experimental group had previously been exposed to 300 mM for their entire life. The control group was naive. After exposing both groups to EtOH, the control group had a hindered locomotive; in other words, their body movements (thrashing) decreased. While the experimental group maintained rapid thrashing. There was a large significance indicating that EtOH inhibits thrashing within *C. Elegans*.

### **JAMES MORRIS, NATALIE BERRY & ALLISON KOONTZ**

#### ***Short-Term Pavlovian Conditioning Using Place Preference of Rats***

**Mentor: Jon Slezak**

#### **Poster Presentation**

The purpose of this study is to determine the effectiveness of different types of Pavlovian conditioning procedures on place preference. This was determined by studying eight male Sprague Dawley rats and collecting data using a conditioned place preference (CPP) box. The CPP box had two sides, one light and one dark. For backward conditioning rats were given food in their home cages and then exposed to their non-preferred side, while for simultaneous conditioning rats were presented with food while in the non-preferred side of the CPP box. The results indicated a disparity between conditioning styles that presents simultaneous conditioning as the effective conditioning type as the time spent in the non-preferred side ( $M = 20.75s$ ,  $SD = 8.57s$ ) was higher compared to its baseline ( $M = 17.2s$ ,  $SD = 11.48s$ ), rather than backward conditioning ( $M = 21.99s$ ,  $SD = 6.67s$ ) in comparison with its baseline ( $M = 26.54s$ ,  $SD = 6.88s$ ). The differences in average duration was not statistically significant among groups,  $f(1,6) = 1.32$ ,  $p = 0.29$ .

### **AURORA MOSER-REED, AJANI ROBERTS, CASEY SMIAL & KELLY VANDYKE**

#### ***Long Term Learning: Is Backward or Simultaneous Conditioning more Impactful***

**Mentor: Jon Slezak**

#### **Poster Presentation**

The purpose of this study was to compare the effects of backward and simultaneous conditioning modeled after Pavlovian conditioning on eight rats when placed in a non-preferred side of a conditioned place preference box. Eight male Sprague Dawley rats were used weighing in at approximately 320 grams to 350 grams. Backward conditioning consisted of pairing 10 grams of sucrose pellets in the home cage. Simultaneous conditioning consisted of pairing 10 grams of the pellets in CPP box on the non-preferred side. These rats were placed in their home cage for ten minutes after being weighed then placed in the CPP on alternating sides for 10 minutes over four days to determine a preference. Pellets were given in alternating days and were placed in either the home cage with the rats or in the non-preferred side in the CPP. Compared to baseline preference total time in the non-preferred side and the post-test two there was a significant increase after four days of food conditioning regardless of conditioning type ( $f(1,6)=7.51$ ,  $.03$ ) demonstrating that the conditioning had worked.

**NICOLE PINTO & DONNA SZAJDEK*****Fragile X Syndrome: What Is It?*****Mentor: Caitlin Faas****Poster Presentation**

The presentation topic that we have selected is Fragile X Syndrome, the most common known inherited intellectual disability (Wehmeyer et al., 2017). It is a disability that mainly affects males because they only have one X chromosome to show the syndrome. However, females are more likely to be the carriers because they have two X chromosomes and the symptoms can be inhibited on one of them. It is not a well known disability and has little public awareness, but it is important that it is being studied because there is yet to be a cure. Males affected will usually have some degree of cognitive impairment, and behavioral problems that likely include aggression, anxiety, and autistic behaviors. Physically, it can usually be associated with a long face, prominent ears, loose joints that all become more prominent with age. As for females, the symptoms are usually, with some learning disabilities, shyness, and anxiety. They also may have some of the same physical features as the males. Fragile X syndrome occurs when the individual has a mutated FMR1 gene and this can be determined through genetic testing. In conclusion, our poster will include general facts and symptoms, why it occurs, how to get tested, and why certain people are more likely to become affected.

**THOMAS PITTS, MARYANN GRACE, EMILY BIESECKER & VICTORIA DOING*****Withdrawal Effects of Ethanol on C. elegans' Thrashing Behavior*****Mentor: Angy Kallarackal****Poster Presentation**

It has been shown that 100-500 mM ethanol decreased the amplitude of body bends, speed of locomotion, and frequency of egg laying in *C. elegans* (Mitchell, et al., 2007). One type of body bend is thrashing. This involves showing a rhythmic flexing motion centered on the midpoint of the body. The present study observed thrashing behavior of 10 young adult *C. elegans* when exposed to saline at one time, and ethanol at another time at a concentration of 400 mM. The hypothesis that ethanol will cause *C. elegans* to thrash less than the worms who received saline was supported; worms treated with ethanol ( $M = 61.00$ ,  $SD = 8.75$ ) produced fewer thrashes per minute than the saline ( $M = 84.40$ ,  $SD = 14.29$ ). There was a significant difference between groups ( $t(8) = 3.12$ ,  $p < .001$ ). The hypothesis that when *C. elegans* experience withdrawal after being exposed to 400 mM of ethanol, the number of thrashes will decrease was not supported; worms treated with ethanol ( $M = 78.60$ ,  $SD = 21.62$ ) produced a varied number of thrashes per minute compared to the saline ( $M = 82.00$ ,  $SD = 8.80$ ). There was no significant difference between groups ( $t(8) = 0.33$ ,  $p > 0.05$ ). To understand these worms as a relevant model for human ethanol intoxication, it is crucial to define the concentration dependence of behavioral responses in the worm.

**BAILEY RAYMOND & MAKAYLA SUTPHIN*****Tourette's Syndrome: An Inside Look Into A Misunderstood World*****Mentor: Caitlin Faas****Poster Presentation**

We will be presenting a poster on Tourette's Syndrome, a neurodevelopmental disorder that is characterized by involuntary movements and vocalizations (Albin et al, 2006). The research that we plan to present will include signs and symptoms include motor tics, such as head bobbing and arm jerking, and vocal tics, such as grunting and shouting. As there is no official diagnostic battery

of tests for Tourette's, the objective diagnostic methods of determining motor and verbal tics will also be explored. Once diagnosed, treatment regimens such as psychotherapy, speech therapy, medication, and even botox is used to diminish symptoms. Various clinical trials on using dental implants, mindfulness, and even brain surgery are available for individuals who demonstrate more severe symptoms. Symptoms are presented in a more severe manner in childhood and adolescence. There is currently no cure, but symptoms tend to become less severe in adulthood. Individuals with Tourette's have difficulty with social and emotional skills because of their tics, and it has a high comorbidity rate with other developmental disorders and mental illnesses. The goal of the poster is to educate the Mount community on a disorder that is often overlooked and ostracized by society.

### **AURORA REED & ERIN GAMBLE**

#### ***Klinefelter and You***

**Mentor: Caitlin Faas**

#### **Poster Presentation**

Klinefelter Syndrome is one that not many experience, only 1 in every 500 baby boys have this disorder, totaling 3,000 males every year (Wehmeyer, Brown, Percy, Shogren, & Fung, 2017). There are a few identifying symptoms of this disorder, small testes, enlarged breast tissue, and lower levels of testosterone. Klinefelter occurs when there is an extra X chromosome attached to the already present XY make up. This occurs sporadically through generations of males, they might be a carrier for the disorder and never know until years later when a relative develops it. There is also another form of Klinefelter Syndrome called Mosaic Klinefelter Syndrome. Mosaic Klinefelter is a less severe form of Klinefelter Syndrome. The symptoms will be less pronounced and harder to detect in males with this abnormality. There are a few risk factors that go with Klinefelter other than the mutation of an extra X chromosome (Genetics Home Reference, 2018). One risk factor is that the male may experience depression and anxiety. Another is the presence of osteoporosis, breast cancer due to the extra breast tissue, diabetes and hypothyroidism. A few recommendations for parents is that this can be treated or managed by having testosterone replacement therapy to help increase the amount of testosterone in the body to what is considered normal levels. Breast tissue removal is also done to help with the enlargement, so they retain a normal chest size (Wehmeyer, Brown, Percy, Shogren, & Fung, 2017).

### **BRIDGET SHEPHERD & EMILY WOOD**

#### ***Effects of Fetal Alcohol Syndrome on Executive Functioning and Mental Health***

**Mentor: Caitlin Faas**

#### **Poster Presentation**

The purpose of this poster will be to educate its audience about fetal alcohol syndrome from the perspectives of diagnostic criteria; neural, cognitive, and behavioral effects; and interventions and support; in addition to the effect that fetal alcohol syndrome has on an individual's life span. Prenatal alcohol exposure is the leading preventable cause of intellectual disabilities and birth defects (McClain, Kodituwakku, & Kodituwakku, 2017). For this reason, it is incredibly important to educate the general public on the dangers of fetal alcohol exposure. The diagnosis of fetal alcohol syndrome was first completed through the triad of growth deficiency, facial anomalies, and central nervous system dysfunction (Jones, Smith, Ulleland, & Streissguth, 1973). Now, there are four sets of diagnostic guidelines that will be further explained in this poster. Neuroimaging studies show a variety of structural differences in people who were exposed to alcohol as fetuses including the reduction of several regions such as the corpus callosum, the caudate nucleus, and the cerebellum

(Chen, Coles, Lynch, & Hu, 2012). Cognitive-behavioral studies suggest that those with fetal alcohol syndrome show deficits in eye movement, intellectual ability, attention, executive functioning, language, memory and learning, among other issues. Due to all of the adverse conditions children with fetal alcohol syndrome face, a successful intervention program will involve a structured and loving environment, guided experiences, and management of comorbid experiences (Paley & O'Connor, 2011). We will then provide recommendations for future research.

### **SYDNI SUROWIEC & MADISON NORRIS**

#### ***ADHD Myths and Truths***

**Mentor: Caitlin Faas**

#### **Poster Presentation**

For our poster presentation, we will be discussing ADHD (attention-deficit/hyperactivity disorder), which is provided to us by DSM. We will dive into what actually goes on in the brain when one has ADHD. Also, we will go over diagnosis and how doctors come to a final decision that one has this disorder. The majority of the presentation will be how this disorder affects one's everyday life, such as school, work, extra curricular activities, family life etc. A main aspect will include the signs and symptoms of the disorder and how the different levels of severity of the disorder can affect these. We are also looking to see who it affects (if it can affect anyone or if it depends on gender and age). There are also many misconceptions and myths that come along with this disorder, so we plan to touch upon these. We will go into the variety of treatment plans, which all depend on the individual and severity. Finally, we will go over the difference between ADHD and ADD and why it is no longer considered under ADD. Then how the school systems approach helping students with this disorder excel in school. One of our main sources of information will be from the national institute of mental health and then other credible sources that we find online. To make our poster more lively and easier to understand, we plan on adding charts to visibly show the data and information we are already explaining.

## **SOCIOLOGY**

### **JAZZMINE ALSTON**

***Does living in a violent urban neighborhood make individuals more susceptible to experiencing PTSD symptoms?***

**Mentor: Layton Field & Denise Obinna**

#### **Poster Presentation**

Untreated Posttraumatic Stress Disorder (PTSD) has very severe and life-threatening consequences for anyone living with it. Many times we only associate PTSD with soldiers who were in high combat areas, policemen in violent neighborhoods, and other service fellows who have experienced traumatic situations. In the discussion of this specific mental health disorder, we tend to not look at how many people in America's highly crime-ridden areas are affected by the crimes that are being committed in their neighborhoods and the situations they may have experienced or seen. This paper will analyze existing information on PTSD in urban environments, its effects, policy, and lack of policy, and what ways we can continue the conversation.

**CRISTAL ALVAREZ-HERNANDEZ*****What Does Culture Have To Do With It?*****Mentor: Layton Field****Poster Presentation**

The dissolution of a marriage affects couples worldwide. While there are several factors that drive a marriage to a divorce, we focused on how culture affects each person individually and leads them to decide if getting a divorce is right for them. To do this, we focused on the Latin culture. We compared how the cultural experiences of a Latino born and raised in a Latin American country differed to the cultural experiences of a Latin-American who was born and raised in America. We will conduct qualitative research by interviewing a sample frame of ten subjects of which were gathered through a snowball effect sampling method. They will be asked several questions regarding their cultural experiences targeting what norms, gender roles, and religious beliefs they grew up with. All interviews will be recorded and transcribed for further analysis to either reject or fail to reject is a Latin-American who was born and raised in America is more likely to get a divorce than a Latino born and raised in a Latin American country.

**ALLYSON BAHR*****Violence Against Native Women Compared to Non-Native Women*****Mentor: Denise Obinna****Poster Presentation**

For my research I will examine violence against Indigenous women here in the United States compared to non-indigenous women. For my research I will also examine the different acts of violence against women whether it be physical or emotional abuse. For my research I will also examine the different Native American Reservations and how many native women are victims of violence. There is also an epidemic of Native women going missing or being murdered. Women on reservations are being easily taken for human and sex trafficking. This research will examine the number of Native women being trafficked compared to non-native women. This topic is most prevalent on Native American reservations due to the justice system that lacks the resources to find and help these women. According to the Missing and Murdered Indigenous Women database, “two-spirited” or homosexual women are also at a high risk of being victims of violence. Also, on most reservations there is a feeling of hopelessness. This feeling may cause women to think that it is ok to be treated bad, or may think that they can tough it out, some may just be used to that lifestyle, and that is not ok. For my research I will also examine the resources that Native women have on reservations when it comes to being a victim of violence and abuse compared to non-native women off reservations. Lastly, I will examine the side effects of women being victims of violence and what kind of steps can be taken to prevent any more violence and abuse on Native American reservations.

**LE-ROY BATTLE III*****Do Mount Students Understand Race: The Racial Identity Development of Mount Students*****Mentor: Layton Field****Lightning Talk**

Very recently, Mount St. Mary's University has put forth extensive efforts to make the school a more inclusive and equitable community. Some of these efforts include trainings for staff and faculty, adjustments to the core-curriculum and new positions dedicated to the oversight of these efforts. The goal of these efforts is to increase the overall cultural competence of the community and push student and staff along the racial identity development scale. In light of this, I am conducting

a qualitative study that will examine how students at Mount St. Mary's University understand and engage with discussions on race. My research stems from the work of Robin DiAngelo and specifically her concept of white fragility, as well as, Janet Helms research on black and white racial identity. The project includes two qualitative components including individual interviews and small focus groups. Both collection techniques allow me to explore the various stages of racial identity development among students. My results to date suggest that it is difficult for many white students to discuss race without feeling a large amount of discomfort, resulting in the students exhibiting defensive behaviors. This research is important because it can assist in understanding what steps need to be taken to develop undergraduate student's concept of race.

### **BRITTANY BRIER**

#### ***What school type is better: Graduation and Retention rates of Black students at PWI's and HBCU'S***

**Mentor: Layton Field**

#### **Poster Presentation**

Over the past twenty-four years, the graduation rates of black students have steadily risen but remain significantly lower than white students. This project is focused on looking at the difference between retention and graduation rates of black students in Predominantly White Institutions (PWI) and Historically Black Colleges/Universities (HBCU). From 1996 to 2010 the four-year graduation rate for black students has risen only by two percent and is still twenty percent lower than the graduation rate of white students. The graduation rate for black students is forty-seven percent lower than white students in the twenty-four-year span. Using nationally collected data from the National Center for Education Statistics I explore the average graduation and retention rate differences in black and white students. I have used a t.test to compare the averages of black and white retention and graduation rates at HBCU and PWI. Graduation rates at PWI for students of color are about half as high as at HBCU's. These rates are changing and different due to the multiple factors discussed in this research.

### **YVELLY CABRAL**

#### ***Socioeconomic Status Impact on High School Graduation Rates***

**Mentor: Layton Field**

#### **Poster Presentation**

In our society today, obtaining a high school diploma is a crucial milestone that influences life chances. This period in learning is the time where an individual can pursue opportunities to move up the social ladder or, in many cases, remain stagnant in socioeconomic status. My research project will examine how socioeconomic status can have a crucial effect on whether a student graduates high school or not. I use quantitative research in looking at high school attainment indicators from the Education Longitudinal Study (ELS) from 2002-2012. In doing so, I will utilize the variables: socioeconomic status, race, ethnicity, and high school graduation rates. I am paying close attention to recipients who were coded as "non-completers", which serves to further analyze what factors and characteristics caused students not to finish high school. Existing literature suggests that race and ethnicity can have an effect on non-completers. For example, there are significant racial gaps in students who attend high school in high poverty, racially secluded, and urban districts. Moreover, we know racial and ethnic minority groups tend to have a significantly lower graduation rate. My hypothesis specifically focuses on the role of socioeconomic status. I expect to find that low socioeconomic status students would be less likely to graduate high school.

**ZACK COSTELLO*****Gun Regulations vs. Violent Crime Rate*****Mentor: Layton Field****Poster Presentation**

In this research paper I am seeking to provide evidence that the strictness level of gun regulations has no effect on the homicide rate. Instead, I aim to prove that the real factor that effects homicide rate is urban culture. Two significant parts of urban culture that I am focusing on are the high population density and poverty rates within urban environments. I will be using statistics found on the UCR and US census along with creating graphs and charts in order to create a better visual that makes it easier for the reader to compare statistics. I will use analysis of variance for my methods section so that I may include numerous variables into my comparisons in order to reach the most accurate, well-backed conclusion.

**JESSICA ENCINAS*****Examining Aggression in Children's Cartoons*****Mentor: Layton Field****Poster Presentation**

This project serves to study aggressive behaviors within animated children cartoons and to examine the progression of displayed violent actions and behaviors from different time periods. As technology and media continues to rapidly advance, research on the relationship between the media and human behavior has increased. Media psychologists have researched the effects of violence in television and found evidence that media violence does effect and increases the likelihood of aggressive and violent behavior in both immediate and long term contexts. The media's promotion of such violent acts could possibly be leading young viewers to accepting aggression and violence as part of society's norm. With this being public knowledge, I question whether television outlets have taken action to reduce the amount of displayed violence within their shows. With that, I use qualitative research in the form of watching 30-minute television shows to gather data on the amount of aggressive behavior depicted in popular cartoons. I examine the top shows from the popular children's network; Cartoon Network between the years of 1995 to 2015. I watched the top three shows that earned the highest rating and highest viewers from each decade and randomly select fives episodes through each series. During each episode, I mark any aggressive action that has taken place. These actions include yelling, growling, hitting, kicking, causing harm to others, and so on. Through this research, I expect to see an increase in aggression among the various cartoons I observe. This will inevitably lead to an increase in desensitization towards aggression and violence in our society. Future generations will then become far more violent all for the sake of numbers and ratings.

**CHRIS GOODEN*****Education's Effect on Colored Students*****Mentor: Layton Field****Poster Presentation**

A common belief is that if one goes to college, they will be able to obtain a good paying job. In fact, the existing literature has identified a positive correlation between educational attainment and overall lifetime earnings such that more school ordinarily leads to higher income. However, I want to know if this benefit to a college education holds true across various racial and ethnic categories. More specifically, the main goal of my research project is to determine if higher education has a

significant impact on African American students' future employment, family status, and income. In other words, does the cost of a higher education and the potential debt incurred lead to significant outcomes among African Americans. I explore this relationship using data from the General Social Survey (GSS) collected between 2010 and 2016, limited to respondents who are 30 years old or older. The independent variables being used in this project are race, age, and education. The dependent variables are employment, family status, and income. I will compute several Chi Square and ANOVA models to test for correlation between education level and future outcomes by race. I expect to find the results to show a significant relationship between higher education and African American students. If the results are not significant, that is also important news, as it tells me that there is no need for higher education.

### **SARAH R GOUIN**

#### ***Outlooks on abortion based on gender, race and religion***

**Mentor: Layton Field**

#### **Poster Presentation**

The increasingly open debate of abortion in the United States has shifted into a political issue that is causing the population to divide. The U.S. population is divided by different opposing views held by the pro-life and pro-choice activists. My study is important because it highlights women's sexual reproductive rights. In today's society, women's rights are often overlooked because it is associated with politics. In this research, I will focus on the relationship between gender, race, religiosity and the outlooks on abortion. The purpose of my research is to examine which variables affect positive or negative outlooks on abortion. I plan to use the General Social Survey (GSS) to collect data on all of the variables listed above. I will then Run Chi-Square through R Studio to find whether we can support or reject the Null hypothesis. These findings will give us a better understanding of women's right and how many people in society perceive abortion.

### **BRIDGET KIMBERLY LEONARD**

#### ***The Struggle of Motherhood With The Burden of Mistreatment***

**Mentor: Layton Field**

#### **Poster Presentation**

The United States has been classified as the most expensive and the worst quality healthcare in the developed world. The administration of healthcare facilities often overcharge every little part of the treatment or procedure a patient receives, and the lack of proper insurance coverage cannot take care of the hefty bill. The healthcare is also unequal in personal treatment for patients, especially when it comes to maternity care. The United States also has the worst maternal mortality rates in the modern age, and the race of the mother seeking treatment for pregnancy or childbirth contributes heavily to this. Several decades of racism and oppression in U.S. history have lingered in the healthcare, meaning people of color are treated with less respect when given treatment, if they are even treated at all. Women of color are more vulnerable to mistreatment, misdiagnosis and complications with their pregnancies and childbirth than white women because of this prejudice. Innocent women and their babies are suffering because they are valued less due to their racial identity, and there is no excuse for this in a first world country. This study examines the emotional and physical mistreatment women of various races have experienced in the time of their pregnancies, the quality of care they were given, the relationship with the medical staff, and the complications faced when their babies were born. This project uses data from a variety of health and sociology journals and computes several ANOVA tests to determine how treatment varies based on race and ethnicity of

the patient.

### **KELLY MARJARUM**

#### ***Impact of Cochlear Implants on the Deaf Community***

**Mentor: Layton Field**

#### **Poster Presentation**

This project researches the ethicacy and efficacy of Cochlear Implants, and the impact Cochlear Implants have on Deaf Culture. I believe that Cochlear Implants have a negative impact on the Deaf Community and on Deaf Culture. To support this opinion, I will use a mixture of interview and existing data. Those interviewed will be Deaf adults with Cochlear Implants, deaf adults without Cochlear Implants, children of Deaf adults with and without Cochlear Implants, hearing sign language students, and sign language interpreters. The existing data will be used primarily to understand the working and effectiveness of Cochlear Implants on Deaf individuals. Through the project, I will refer to Deaf and deaf individuals. A Deaf individual is someone who was born into the Deaf community, fluent and/or their first language is sign language, and usually comes from a Deaf family. A deaf individual is “medically deaf.” Their deafness is something to fix and those individuals are usually the candidates for Cochlear Implants. This distinction is important because the actions of deaf individuals are negatively impacting the Deaf Community, by reinforcing stereotypes and the idea the Deaf individuals are “broken.” This project serves to decipher the Deaf Community, Deaf Culture, and ableist repercussions of Cochlear Implants.

### **RACHAEL MATTIO**

#### ***The Presence of Substance Abuse in Relationships with Intimate Partner Violence***

**Mentor: Layton Field**

#### **Poster Presentation**

Intimate partner violence is present in many relationships today. The presence of this violence can be devastating for those involved. Because of its effect on the lives of the individuals involved, research needs to be done to find out more about it. This project serves to examine the relationship between intimate partner violence and substance abuse. The main focus of this project is the abuse of substances such as alcohol, marijuana, and other illegal substances and how it correlates with the instances of intimate partner violence. I use data from Wave IV of the National Longitudinal Study of Adolescent to Adult Health to investigate the relationship between the two variables to discover if the use of substances is an indicator to the prevalence of intimate partner violence. I expect to find that there is a relationship between the two variables, meaning that intimate partner violence is more likely in relationships where the abuser has been relying on the use of substances.

### **ROBERT PETRIZZO**

#### ***Relation between Tattoos and Delinquent Behavior***

**Mentor: Layton Field**

#### **Poster Presentation**

This project’s purpose is to examine the relationship between delinquent actions committed by juveniles and permanent tattoos. In other words, this project is looking at whether the presence of permanent tattoos correlates with delinquency. Tattoos are utilized in different capacities across cultures. However, the existing literature on adolescent tattoos in the US points toward tattoos representing the potential deviation from acceptable norms of behavior. Yet, it still is not clear if having a tattoo directly correlates to delinquent behavior. I hope to explore that relationship more

concretely in this project. I also expect to find that tattoos correlate with various types of delinquent behavior. The role of symbolic interactionism plays an important role in this research through trying to understand the actual reasons for someone underage to receive a tattoo and what the tattoo may represent. I am using quantitative data from Wave II of the National Longitudinal Study of Adolescent to Adult Health collected in 1996. The Add Health survey contains information answered by adolescents having to do with everything from school years completed to the number of crimes a person has committed. I intend to test this relationship using chi square comparing the relationship between the presence of a tattoo and delinquent behavior.

### **THOMAS REILLY**

#### ***Saudi Arabia: A Human Rights Debacle***

**Mentor: Layton Field**

#### **Poster Presentation**

Saudi Arabia: A Human Rights Debacle

In our ever changing society, human rights and in particular women's right have become the talk of the day. Saudi Arabia is also in the news, but not as a champion of change but as an example of abuses. This project looks to highlight the extent of the women's rights abuses that are current in Saudi Arabia and compare them to the like of western countries, namely the Unites States. Through quantitative analysis procured from the world bank and the cultural context of said data through scholarly journals. The project should to hope to find definitive numerical evidence, of and provide the extent, of the abuses. As well as the sociological outcome of the abuses upon the populace long term with policy solutions for the abuses. This report should bring to light the many disparities in the world both at home and abroad to the public and Mount community.

## **TAYLOR REMSBURG & MARIE DICKSON**

### ***The Head Tutor Program***

**Mentor: Kristin Sites**

#### **Lightning Talk**

Learning Services has contributed to the academic well-being of the student body in unmeasurable ways. The department fosters the Peer Tutor program which provides free tutoring for students and allows students to build relationships based in academic friendship and trust. Recently, a Head Tutor program has been implemented for the Fall 2018 and Spring 2019 and will continue to be instated for the next academic year. This presentation serves to demonstrate what the Head Tutor program entails and what it has accomplished in the beginning stages of its development and implementation. The Head Tutor of Social Science and the Head Tutor of Math/Science will detail time spent maintaining contact with the tutors they are assigned to and will describe various tasks they are responsible for as part of this position. Additionally, they will provide information regarding the qualifications for becoming a Head Tutor. The goal of this presentation is to provide information for the newly hired Head Tutors who will share these responsibilities in the Fall of 2019 and Spring of 2020 and to spread awareness of the new position as to accumulate interest among the current Peer Tutors. So far this year, the Head Tutors have provided tutor training sessions on topics that include: tutoring students with Autism and related disabilities, tutoring ESL or ELL students, study strategies, Brain Dominance Learning Theory, and Socratic Methods.

## **TAYLOR REMSBURG**

### ***“I’m not a Feminist, I’m something else”***

**Mentor: Layton Field**

#### **Poster Presentation**

My research serves to examine which variables affect how college-aged women form perceptions of feminism. Primarily, it focuses on how women of various racial, ethnic, religious, socio-economic, and educational backgrounds form negative perceptions of feminism. I use qualitative research in the form of detailed interviews to gather this data, as well as a snowball sampling method of recruitment. Female students at Mount Saint Mary’s University were asked, in twenty-minute increments, a series of questions regarding their familiarity with the concept of feminism, how they became familiar with the concept, which symbols most accurately represent the feminist movement, and whether these symbols have positive or negative connotations for them. Subsequently, the women were asked which race/ethnicity, religion, social class, and level of education they identify with. Some of my major findings include the hesitance in women of strong religious backgrounds in labeling themselves as feminists due to feminism’s perceived affiliation with contraception and pro-choice politics. Additionally, nearly all of the respondents noted that anger, aggression, and polarization are negative symbols that are representative of a modern feminist movement.

## **LYNDSEY SAUNDERS**

### ***A District of Discrimination; The educational effects of historical redlining in Baltimore***

**Mentor: Layton Field**

#### **Poster Presentation**

Baltimore, Maryland is a victim of redlining. Its city-centered construction allows spatial segregation to inhibit the success of area residents, causing greater disparities between Baltimore City and Baltimore County. The history of redlining has systematically kept neighborhoods this way for generations. The effects of redlining have not only impacted who lives in certain neighborhoods,

but their overall quality of life as well. Unfortunately, literature has not sufficiently addressed how redlining affects the quality of education in these communities. My research seeks to contribute to that conversation by exploring the correlation between attending school in a historically redlined district and its implications on educational outcomes for K-12 students in Baltimore, Maryland. I specifically test if trends in dropout rates, graduation rates, school grade averages, school types, and free/reduced lunch eligibility align with district lines from the 1935 Baltimore Redlining Map. Data from this project comes primarily from the Common Core of Data (CCD) dataset distributed by the National Center for Education Statistics. I expect schools from redlined districts to have poorer educational outcomes, including higher dropout rates, lower graduation rates, and more free/reduced lunch eligibility.

### **KAITLIN SIMMONS**

#### ***Poster of the Seton Center***

**Mentor: Layton Field**

#### **Poster Presentation**

For my project, I was hired at my internship with the Seton Center Inc. in Emmitsburg MD, to help answer their main question of what are the characteristics of the clients that access Seton Center's help? To answer this question, I have gone into Service Point, and taken data from the years 2014-2018 (current) and put them into an excel spreadsheet. From here I will recode everything in the spreadsheet and I will be using detailed descriptive analysis, identifying the most utilized services and services that are underutilized that the Seton Center offers to their clients. For the Seton Center, I am looking at and putting together monthly reports of the cliental that comes in, and what services they really need. A limitation that has come across in the research is that we don't have access to all the data that is available like financial amounts and highest level of education received from the client. I am also doing secondary reports which will show what are the most common services the clients require from the Seton Center and what are the not so common services that the clients don't really use.

### **CAMILA VACA-PEREIRA**

#### ***Is college attainable for all***

**Mentor: Layton Field**

#### **Poster Presentation**

In today's economy a college degree is necessary to succeed. Some members of society are not able to obtain this necessity. Particularly, lower socioeconomic status students have more obstacles to overcome in order to graduate from high school and enroll in college. I will be using data from the Education Longitudinal Study of 2002(ELS) collected by the national center for educational statistics (NCES). The objective of my study is to explore the relationship between lower socioeconomic students and college enrollment, specifically from the follow up 3 of 2002. I will be using chi square to compare socioeconomic status to the decision of enrolling in college. I expect to find that the two variables are related and that students from lower social economic status are less likely to report they enrolled in college, even after controlling variables like race, ethnicity, and gender.

### **TERRELL WASHINGTON**

#### ***Intimate Partner Violence Statistics: Heterosexual Communities v. LGBTQ Communities***

**Mentor: Layton Field**

#### **Poster Presentation**

My research involves a comparison of Intimate Partner Violence in the LGBTQIA community to the heterosexual community. This study explores the statistics of any “physical” or “verbal” intimate partner violence by analyzing heterosexual relationships and LGBTQ relationships in the United States. The statistical analysis was conducted using a Chi-Square Analysis to explore the validity of this research. Participants of this study ranged from ages 18-80. This research comes from police arrest records and the determination of crime committed in both communities. The frequency of the crime was also studied to provide an accurate analysis of physical violence at hand in both communities. The results aim to provide an idea of what factors truly influence violence in relationships. Factors include race, age, and sexual preference. Results are discussed from information given by various Cross-Sectional Studies and sociological theories.

## SPORT MANAGEMENT

### IVAN KORPICS

*Youth Sport: Does It Really Help the Development of a Child?*

**Mentor: Timothy Wolfe**

**Lightning Talk**

In this research study, I asked the question about the impact youth sport had on the development of young athletes and their experiences. Other researchers have studied the effects youth sports have had on the development of young athletes and have found both positive and negative effects. Using a web survey I was able to ask current student-athletes and non-athletes the effects that youth sports had on them as a child, the lessons they learned by participating in youth sports, and how their development was affected by participating in youth sports. My findings were consistent with the other research studies I have found that youth sports had both positive and negative effects on the development of youth athletes. Detailed findings and their implications will be discussed.

## THEOLOGY

### GLORIA MARIE DEMOURA

*The Personalistic Psychology of St. John Paul II*

**Mentor: Paige Hochschild**

**Lightning Talk**

There are many views of what the human person is and what motivates them. In fact, there is not merely one umbrella of thought to which all psychological disciplines subscribe, which leads to varying views of the human person as well on what motivates the person. Some of these views is subjectivity, which has causes people to turn inwards and Freud’s view that we are only guided by our instincts. In this lightning talk, I will argue for Karol Wojtyla’s personalistic psychology and for his view of the human person in contrast to complete subjectivity and Freud’s view of motivation. Wotjyla’s view goes beyond subjectivity and include aspects of Personalism, Phenomenol-

ogy, and Objectivity. My primary sources will be from lectures in the course PSYC 415 Personalist Psychology of Karol Wojtyła/John Paul II completed this past summer and will directly and indirectly reference Karol Wojtyła's works of Love and Responsibility, Person and Act, Personalism, Thomistic Personalism, The Person in Development, Personal Structure of Self-determination, and On the Meaning of Spousal Love.

## **WORLD LANGUAGES & CULTURES**

**GABRIELLE BENEDICTIS, BRENDA BRODBECK, ALEXANDRA ROBIERO & ALBA SARRIA**

*Las Lavenderas*

**Mentor: Andrea Solis**

**Lightning Talk**