

2019 Abstracts  
Poster

**Sam Adeniyi and George Saucedo**

Penetration Testing and Security Scanning for ISO 27001 Compliance Certification

Faculty sponsor: Heidi Berger

The aim of this project is to use vulnerability management software and general penetration testing methods to evaluate the security of IdRamp's software and processes. We have been working with Karl Kneis from IdRamp, an identity provider that uses cross ledger services with conventional technology. IdRamp has very strict security guidelines and protocols. As recipients of the Carver Bridge Program, we are working in conjunction with Karl Kneis to improve the security measures of IdRamp. Making use of SQL Injection, vulnerability scanning software's like Qualys and other network security knowledge, we will write code to attempt to infiltrate and break through the security walls of IdRamp. Secondly, we will use our programming knowledge to add more intuitive features to IdRamp's current systems, hoping to effectively increase customer satisfaction and gain clearer understanding of potential vulnerabilities in a system. We will explore different penetration testing and security scanning methodologies and attempt to use them against IdRamp's security processes.

**Hannah Anderson, Alex Millan, Meara Moore, and Breanna Waugh**

*Motor Unit Recruitment in an Inactive Limb using Mirror Therapy*

Faculty sponsor: Jackie Brittingham

Research has shown that mirror therapy can elicit an involuntary response in inactive muscles in a non-moving limb. Mirror therapy has been used to stimulate motor cortex areas in the brain to improve interlimb coordination in stroke and phantom limb patients. Our current study is measuring the motor unit response in an inactive limb using electromyography (EMG). We will use a mirror box so participants can watch the reflection of their active hand clench. We hypothesize that increasing the force of the dominant hand clench will elicit an increase of involuntary motor unit recruitment of the non-dominant hand using the mirror therapy technique. We will recruit ten healthy subjects between the ages of 18 to 22. We will use BIOPAC Pro system to record results. Participants will be seated with both forearms placed flat on the table in front of them and EMG recording electrodes will be placed on both arms. The mirror box will be placed over the inactive forearm, while the active forearm will be viewed in the mirror while clenching. Participants will be instructed to begin clenching a series of five times with continued increasing force as results are recorded onto the system. We predict these results will show that participants watching their active hand clench in a mirror will elicit an EMG response in their inactive forearm. These results are relevant because they will test the effectiveness of mirror therapy by measuring an increase in motor unit recruitment.

**Jacob Austin and Zach Kreider**

*Measurement of Inelastic Collision Cross-Sections in Rubidium-Argon*

Faculty sponsor: David Olsgaard

The lifetime of excited rubidium states is well known. When in the presence of a perturbing atom, i.e. argon, ethylene, or xenon, these lifetimes are shortened. A method to measure this is through excitation of atomic rubidium by a short ( $< 1$  ns) pulsed laser. Evacuated pyrex cells with rubidium and different

pressures of the perturbing atom were used. The time-resolved fluorescence intensity was used to determine excited state lifetimes in rubidium. A tunable dye laser was built as a means to excite rubidium atoms to various atomic states. Observations were made on the transitions  $6P_{3/2, 1/2} \leftrightarrow 5S_{1/2}$ . Lifetime measurements of the rubidium  $6P_{3/2, 1/2} \leftrightarrow 5S_{1/2}$  transition were obtained as a function of pressure of the perturbing atom. Plotting inverse lifetime versus argon pressure (a Stern-Volmer plot) allowed us to calculate the inelastic collision cross-section of rubidium and various perturbing atoms.

**Jacob Becker, Shelby Hunemiller, Cam Bunting, and Maura Chadwick**

*Effect of Walking Workstations on Memory and Comprehension Compared to Seated Study*

Faculty Sponsor: Katie Smith

Low-intensity aerobic exercise improves memory and comprehension, but little has been studied on benefits of walking workstation use. Walking workstations serve to increase physical activity during tasks like typing or reading. Prolonged sitting bouts increase risk of obesity, heart disease, diabetes, hypertension. College students have increase frequency of seated activities and spend 72% of their day sedentary. Purpose: This study served to determine memory and comprehension effects while on a walking workstation versus seated classroom setting. This study aimed to increase TrekDesk use at Simpson and display potential benefits. Methods: Twenty-five participants age 18-25 completed duplicate protocol in two environments: seated study and a TrekDesk at self-selected speed. Participants viewed a 5-minute video, completed a 17-pair memory card game, and were quizzed over the video. Each location's video, memory game, and quiz were similar with slightly different material. Participants studied memory cards for 90 seconds before cards were turned face-down to complete the game. Quizzes scored out of 10 points each. A physical activity questionnaire assessed patterns of daily activity. Results: Seated environment memory game was completed in  $3.8 \pm 1.5$  minutes and  $37 \pm 1.4$  moves. The same participants took  $2.7 \pm 1.0$  minutes and  $31 \pm 7.6$  moves to complete the game on the TrekDesk. TrekDesk memory game scores improved by 6.4 moves ( $p < 0.001$ ) and 1.1 minutes ( $p < 0.001$ ). Participants averaged 1.8mph pace and  $1,267 \pm 250.1$  steps on TrekDesk. TrekDesk speed had no correlation with test score. Gender played no role in memory game completion time, number of moves, or quiz scores. Daily activity level and test scores had no relationship. Conclusion: This study showed improved memory and comprehension during TrekDesk use compared to similar testing in a seated classroom setting. Regular use of Trekdesks by Simpson students may improve academic performance and content retention, as well as decrease risk for chronic disease.

**Cassie Bergman, Cole Sigler and Harrison Smith**

*Ecosystem Conservation in Warren County*

Faculty Sponsor: Clint Meyer

Land management is crucial in ensuring the providence of ecosystem services such as water quality and biodiversity. Working with the Carver Bridge STEM to Success program, we have started environmentally based work with Doug Gaumer and the Warren County Conservation Board. We are exploring three specific projects to improve habitat in Warren County by focusing erosion, improving biodiversity, and creating a pollinator inclusive environment. We are working on decreasing the erosion of the banks of the South River in Bank Swallow Bend by propagating willow stubs onto the bank to decrease the amount of soil eroding from the river. To quantify the effectiveness of our work, we will conduct water quality tests in the river before and after introducing the willow stubs. To increase biodiversity in timber stands at Otter Creek Park, we will remove invasive species and conduct forest management to enhance

species richness. After removal of specific invasive or elderly trees, we will plant new saplings of native trees. To quantify our impact, we will calculate and compare biodiversity of the area before and after manipulations. We also will be working to enhance habitat for the regal fritillary, a butterfly species of concern in Iowa. The larvae of this species rely on prairie violets so efforts to increase this plant species will hopefully result in increased butterflies. Our specific focus this semester will be to find ways of improving germination of violets. Eventually, they will be transplanted at Blue Flag Marsh into plots which were prepared through burning. We hope our work will enhance the abundance, quality, and diversity of species in the environment of Warren County.

**Genevieve Block and Oleg Nochvay**

*Chicago Crime Analysis for Insurance Risk Assessment*

Faculty sponsor: Heidi Berger

This research study was conducted to analyze crime risk and create a predictive risk score to be applied to the limited geographic area to benefit EMC Insurance. Because we are a part of the Carver Bridge Program, we were paired with EMC Insurance employees and Simpson Alumni, Whitney Lovelace and Teig Loge. Our task was to complete research that could benefit their company and receive their mentorship along the way. Because all data analysis for EMC is done by a third party, our research aims to determine how feasible it may be to produce this data collection and analysis in-house. We have done this by identifying free and/or public sources of data on crime in Chicago, Illinois and cleaned and analyzed the data using Rstudio, which is a statistical computing environment for R. Once we analyzed the data and created a predictive risk score, we prepared a descriptive documentation paper that describes our process and how we completed our research.

**Noeline Boardman**

*Sound Design for FSP 2018*

Faculty sponsor: Jennifer Nostrala

Last spring, I did the sound design for the Festival of Short Plays, Protest and Politics. We did 4 plays - "Existence", "The Cowboy", "Throwing Your Voice", and "Hurt". For the most part, I stuck to the sounds that were listed in the scripts because I didn't want to go too crazy and overpower the shows. "Existence" called for a crazy, earth-shaking thunderstorm at the beginning and end of the show. "Throwing Your Voice" called a screaming voice at the end so we recorded one our actresses screaming so we could cue the screams at the proper times and make sure that it didn't completely deafen the audience. I also had to find gunshots for "Hurt" because it ends with five gunshots when the one of the characters commits, what is implied to be, a mass shooting. "The Cowboy" was where I added my own sounds. When each character met the Cowboy, who was various drugs, they did a dance before taking the drug. The script gave a description of how each drug made the woman feel and I found a drug related song about the drug that each woman likely took to be their "theme song" during the dance. The largest project I undertook was creating a pre-show, intermission, and post-show playlist. I wanted to use protest music, but because the shows were set in the present instead the past I wanted to use current protest music. It was really interesting finding post-2000 protest songs, because many of them are either unknown or are not considered to be protest songs in the way people usually think about them. For example, while I was compiling songs for the playlists "Found/Tonight" came out and all proceeds went to the March For Our Lives Initiative making it a protest song.

**Maslin Boten**

*Silent Sky Stage Management*

Faculty sponsor: Ann Woldt

Silent Sky, written by Lauren Gunderson, is an incredibly important story about some of the first credited women in the astronomy world. Stage managing this show was an empowering experience, especially as the rehearsal process was intimate with the small cast. I learned more about women's contributions to society than I had known before. This process was also a great learning experience for me as there were various technical aspects such as projections and music that were heavily used in our production. As is typical in live theatre, some of the problems I faced challenged both my problem-solving flexibility and leadership skills. I had to deal with light fixes, set and costume problems, as well as the lack of and replacement of my assistant stage managers. The show opened and closed with few problems throughout its run in the fall of 2018.

**Andrew Bowles**

*How does the Federal Open Market Committee meeting effect the S&P 500?*

Faculty Sponsor: Gowun Park

Using the Federal Open Market Committee (FOMC) website for the dates of the meetings ([federalreserve.gov/monetarypolicy/fomc](http://federalreserve.gov/monetarypolicy/fomc)) I will also be using St. Louis Fed website to help chart the Standard and Poor's 500 ([fred.stlouisfed.org](http://fred.stlouisfed.org)). How does the Federal Open Market Committee meeting effect the S&P 500? The FOMC is within the Federal Reserve System and they oversee the United States open market operations. One example of their work is the Federal Reserve buying and selling United States treasury bills. I will be using the past 5 years of data. The markets sometimes change before the actual meetings. I will be looking at data one week before the meetings and one week after the meetings to see if there is any clear indication on whether the FOMC effects the S&P 500. I chose the S&P 500 over Dow Jones Industrial Average is because the S&P 500 is based on the American stock market index and it is based on the market capitalization of the 500 largest companies, whereas the Dow Jones Industrial Average is only showing the values of the 30 large market capitalization and then averages of them out. My hypothesis for this project is a positive correlation between the S&P 500 and the FOMC. When the Federal Reserve uses expansionary monetary policy, they are buying back treasury bills causing money supply to increase and S&P 500 to go up. Whereas contractionary monetary policy the Federal Reserve sells more treasury bills causing less money supply and the S&P 500 to go down.

**Landon Braun**

*Does Mental Toughness Equate to High Performance?*

Faculty sponsor: Don Evans

Coaches and athletes often claim that mental toughness is important to athletic performance (Mental Toughness Quotes, 2017); athletes who persist in times of adversity, lead come-from-behind victories, win when they are not supposed to, or partake in a lengthy win streak are perceived as mentally tough.

Researchers (Goldberg, 1998) define mentally tough individuals as those who rebound quickly from mistakes, enjoy pressure, effectively concentrate on the task at hand, possess confidence in their abilities, and are motivated to succeed.

Outside of the world of sports, important real-world consequences can be predicted by mental toughness. High mental toughness predicted a lower likelihood of engaging in risk-taking behaviors such as drug use, alcohol use, gambling, and sexual activity with a stranger (Crust & Keegan, 2008). Mental toughness can be used as a predictor of scholastic success; Gucciardi et. al (2015) found that mental toughness measured at the beginning of the academic year predicted academic goal progress at the end of the year. To further examine if mental toughness is a predictor of performance, participants engaged in a time sensitive and difficult cup stacking intervention after completing a measure of mental toughness.

### **Katherine Bucklin**

*Rodent Task Switching between Different Sensory Modalities*

Faculty sponsor: Don Evans

The present research is being conducted to determine if rats can switch between two sensory modalities (auditory and visual). The research is answering the question of, are rats able to correctly identify between two different sensory modalities during a task switch procedure? This research provides an analog between rats and humans within the paradigm of voluntary task switching. During training, each rat is being separately trained to switch between visual and auditory stimuli. In the test phase which will be conducted after training is complete, rats will have to distinguish between both visual (lights above left or right lever) and auditory (high or low tone) by pressing the corresponding lever. The hypothesis is that rats will have faster reaction times toward the visual stimuli versus the auditory stimuli. In addition to this, I hypothesize that the rats will choose the task more slowly if it differs from the previous task. If the task is the same, then it will take less time to press the correct lever associated with the stimuli. The proposed results will demonstrate that faster reaction times are associated with visual stimuli. These results are important because they suggest that there is some evidence suggesting an analog between human and rats for voluntary task switching for sensory modalities.

### **Jorge Castelan**

*Analysis of a long equity position in the medium run?*

Faculty Sponsor: Gowun Park

Analyzing stock and having favorable returns is an essential way of becoming able to finance for important things in life such as college, car, or a home. Therefore, in this research, I conduct both fundamental and analytical approaches to analyze stocks in order to reduce risk and maximize earnings. When analyzing stocks fundamentally, it is important to look at their net income, net income to debt ratio, total equity, total inventory and, their payout ratio if applicable. Institutional holding percentage and short interest are also good indicators to examine the general public consensus of stocks. Looking at the stock's dividend history as well as its return on investment are good simple methods to reasoning how well it may perform. Comparing the stock to its sector competitors is also a key because it is a better indicator on how well its performing rather than comparing the stock to an industrial average such as the Dow Jones Industrial Average (DJIA) or the Financial Times Stock Exchange 100 index (FTSE100). For the analytical approach, the best way to analyze a stock is to chart its 200-day Standard Moving Average, 100-day and 30-day Exponential Moving Average, Relative Strength Index and looking for wedges and areas of support and resistance in candle sticks. Candle sticks are an analytical tool that incorporates the

changes of price in stock, if the stock is prone to rapidly changing price it would not follow the candlestick patterns, depending what happens outside the market. Using both the fundamental and technical analysis to analyze a stock is very beneficial as it is a great way to reduce risk and gain capital for goals especially in the medium run.

**Michael Eugene Ciesielski**

*Assistant Director - "Silent Sky"*

Faculty sponsor: Ann Woldt

For the production of "Silent Sky", I assisted the Director, Ann Woldt, in putting together all of the various components that create a play. I helped run lines and scene work with the actors, checked the audience's sight lines, and discussed blocking details with the director. I also helped out the stage manager set up the show and do scene changes. Sound-wise, I checked out the sheet music that was provided during the show and worked out the sound cues. Lastly, I helped set up a dramaturge display in the Lobby.

**Katie Dean**

*Production Stage Manager for FSP 2018*

Faculty sponsor: Jennifer Nostrala

Stage managing Festival of Short Plays 2018: Politics and Protest introduced me to the inner workings within a production team. Managing meetings, rehearsals, cast, crew, and in the end calling the show, was a challenge that I proudly embraced. As the Production Stage Manager, the cast and crew looked to me for direction. One thing I found essential throughout the process was that by remaining patient and calm, everyone else remained patient and calm and the process went so much smoother. Being a part of Theatre Simpson means being a part of a production company that cares about its people on stage and in the audience. To me, theatre is a representation of our world; it challenges ideologies; it is a place where risks are encouraged; it brings the audience into a room of possibilities and leaves them with unanswered questions and a new way to look at the world.

**Mackenzie Finnegan**

*Topological Data Analysis and Persistent Homology to show spacial Sorting in Animal Groups*

Faculty sponsor: Ross Sweet

Homology is a tool used to look at the topological space and find the distinct features in any selected space. Fish move together in unique patterns that are very interesting to study, specifically the topology of the milling pattern fish tend to be in. The milling pattern is when fish swim in a school and the school is swimming in a circle. This can be accomplished by following Couzin's model. This is done by starting with a point cloud of fish and slowly moving the data to finally achieve a CROCKER plot. The simplicial complex tells us what sort of interactions occur so we can create a persistent homology graph. From there the CROCKER plots can be created. CROCKER plots allow the reader to see important topological features, in the group of fish. By examining a group of 100 fish after a period of time, a milling pattern was able to be found. It can be seen in the CROCKER plots. There is a distinct areas of yellow, which shows the fish were in fact milling. This satisfies the goal of the project which was to use topology, homology, and persistent diagrams to look at how schools of fish interact.

**Andre Flatt**

*Role of polyglycylation of tubulin in movement of oral cilia in Tetrahymena thermophila*

Faculty Sponsor: Aswati Subramanian

Tetrahymena are fresh water single-cell eukaryotes that use cilia for movement as well as feeding. Two types of cilia are found on the surface of these cells- somatic and oral. Somatic cilia are involved in movement of the organism in a medium while oral cilia are arranged around an oral groove and are involved in movement of food particles into the cell through phagocytosis. The general structure and movement of cilia are well conserved between oral and somatic cilia. However, certain differences exist with respect to the repertoire of proteins that function in somatic versus oral cilia. Our study focused on the role of oral cilia in Tetrahymena. We specifically study microtubule proteins that maintain the core structure of cilia known as an axoneme. Microtubules are made up of combination of  $\alpha$ - and  $\beta$ - tubulin proteins. Tubulins are post-translationally modified by adding 34 glycine residues onto the COOH- of glutamic acids termini of  $\alpha$ - and  $\beta$ -tubulin. The Tetrahymena AAB2D9-1 mutant lacks functional isoforms of beta-tubulin1, beta-tubulin-2, and shows partial expression of alpha-tubulin-1. In these mutants, polyglycylation sites in  $\beta$ -tubulin are completely blocked and sites in  $\alpha$ -tubulin are partially blocked. This type of modification has been shown to reduce ciliary motility of Tetrahymena demonstrating a role for these tubulin isoforms in regulation of ciliary function. Our study will examine whether these tubulins play a role in movement of oral cilia by performing feeding assay of mutant cells.

**Emma Fleddermann**

*Back Off, Buddy: Increased Courtship Behavior, Mate Guarding, and Deception in the Trinidadian Guppy, Poecilia reticulata*

Faculty Sponsor: Ryan Rehmeier

Mate preferences are a key component of sexual selection in animals. Typically, males maximize their reproductive success by preferring a mate who will ensure the highest possible quantity of offspring with his genes. In many animals, including freshwater fish, female body size is positively correlated with fecundity, or the number of offspring she will produce in a breeding bout. Multiple males in a population are likely to prefer the same female if she displays traits consistent with high fertility, which should lead to competition among rival males for access to her. This competition could manifest as 1) increased efforts by a focal male to court the female, 2) the focal male "attacking" or repelling the rival male to prevent him from interacting with the desirable female, or 3) switching initial preference to a non-preferred "lesser" female while in the presence of a rival. In this lab-based experiment, I used Poecilia reticulata, the Trinidadian guppy, to determine how males modify their preference for a desirable female in the presence of rival males. I tested whether the males were willing to divert attention from females of varying quality to repel rivals or if they showed preference for the lesser female in order to draw the rival male's attention away from the initially preferred subject. Results will be presented in the context of the fitness benefits and costs of preferential mating choice.

**Margaret Flowers**

*Pan Trapping Biases on Abundance and Body Size of Captured Bees*

Faculty sponsor: Deb Smith

Humans rely on pollination services from bee populations, which are currently declining worldwide, causing ecologists to increase bee research. Comparison among studies is essential to the success of bee

conservation, but this is only possible if a standardized sampling method is implemented. Pan trapping is popular among bee scientists because it is simple and inexpensive. Small painted bowls filled with soapy water are placed in the environment; insects are attracted to the bright color (usually yellow, blue or white) and drown in the traps. Size and placement of pan traps varies greatly among studies, making comparative studies difficult. Here, we examine how pan trap diameter, height above ground and floral availability at the sampling site influence abundance and body size of captured bees in Lawrence, Kansas. After using a variety of trap diameters and heights, as well as fields with differing floral densities we found: (1) no difference in abundance of bees captured by traps of different diameters; (2) more bees captured in sites with high floral density than low floral density; (3) a significant difference in abundance between ground-level traps and elevated traps; and (4) no difference in average body size of bees captured in high and low traps. More long-term research should be carried out, as our study was merely 10 weeks long. Our research could be expanded to examine effect of trap design on capture of other pollinators and arthropods. This research will contribute to a standardized sampling method that will allow accurate, unbiased comparative studies.

### **Alayna Geronzin**

*The Effects of State Boredom on Attention*

Faculty sponsor: Don Evans

Attention and boredom although very prevalent in the lives of many has previously been very poorly understood. More recently researchers have realigned their focus on the topic of boredom but it seems as though a lot of research hasn't yet been confirmed. The purpose of our study is to review how a state boredom task affects ones overall attention. A boredom proneness assessment in conjunction with a boredom task and go-no go task allows us to determine baseline boredom proneness and determine how a state boredom task then affects attention. Throughout the semester we expect to see positive correlations between boredom and attention errors.

### **Melanie Gillet and Steve McLean**

*Silent Sky Properties Design*

Faculty sponsor: Mimi Kammer

In the production of Silent Sky by Lauren Gunderson, directed by Ann Woldt, I applied and was chosen to be the properties designer for the show. My concept was to create 1900s technology that would cause the audience to shoot back in time to before we had computers or any fancy technology that allowed us to look deep into space. I had many issues surrounding the many properties I had to create, and the small time I had before the show. The challenges I faced throughout my process was creating these foreign devices to make them look realistic and authentic. To overcome these conflicts, I used research and imagination to help me go the right way. My co-designers and mentor helped me create these properties and I was very satisfied with the results. This experience allowed me to be creative and pushed my concept mindset by allowing me to collaborate with other designers to create an amazing show. The production ran from October 4th, 5th, & 6th at 7:30pm & 1:00pm respectively in Barnum Studio Theatre with no properties broken or stolen during that time.

### **David Goldsmith**

*The Effect of Background Noise Magnitude on Reading Comprehension*

Faculty sponsor: Don Evans



This experiment was conducted in order to help determine if the decibel magnitude of a background auditory stimulus would influence reading comprehension among college students. All test subjects participated in each of the three trials that were randomized in order. In the three trials, every participant was exposed to a trial containing no auditory stimulus, an audio stimulus of 40 dB, or an audio stimulus of 100 dB. During each of these five-minute trials, a reading comprehension assessment was administered where one of three passages was read by the test participants, which was followed by 5 questions that tested for comprehension of the text. Each of these reading comprehension tests are extremely similar in length and in difficulty. The results of the experiment displayed that with decreased decibel magnitude reading comprehension performance increased, whereas in situations of increased decibel magnitude reading comprehension performance declined.

### **Livie Gordon**

*25th Annual Putnam County Spelling Bee Properties*

Faculty sponsor: Rick Goetz

I, Livie Gordon, was the props designer for Theatre Simpson's 2018 production of the musical *The 25th Annual Putnam County Spelling Bee*. Over the course of eleven weeks, I selected, presented, purchased, and handmade props for this show to further the stories of six energetic, middle school spellers and the interesting characteristics each of them holds. In this production, we had props ranging from clipboards to candy, and phones to fidget spinners. It was a joy to have a front row seat to see this show come alive.

### **Kaylee Grabarkewitz**

*Purification of promiscuous cyclic AMP receptor protein for subsequent investigation of single molecule interactions with DNA*

Faculty sponsor: Lindsay Ditzler

The cyclic AMP receptor protein (CAP) is a promiscuous transcriptional activator. Meaning this promiscuous protein has the ability to bind to a number of different DNA sequences. Specifically, CAP functions by binding, in the presence of the allosteric effector cAMP, to specific DNA sites in or near target promoters and enhancing the ability of RNA polymerase holoenzyme to bind and initiate transcription. It participates in the expansion of carbon source utilization, stress response pathways, and virulence. Knowledge of the interactions between CAP and the variety of DNA sequences it binds is limited, however several important DNA sequences have been identified. In this work, *Escherichia coli* underwent cell transformation to overproduce the cyclic AMP receptor protein. The CAP was then purified through process of homogenization, fractionation, and subsequently chromatography. The specific techniques used for the purification process will be determined experimentally. The purified protein will then be imaged using Atomic Force Spectroscopy (AFM). In order to measure individual DNA-CAP interactions, tips were functionalized with relevant DNA sequences and CAP was immobilized on a gold substrate. The magnitude of the interactions will then be measured using force spectroscopy. Due to the fact that CAP can interact with a number of different DNA sequences, each of the varying interactions have a different measured magnitude. The knowledge, techniques, and understanding of the interactions gained from this small system research of the cyclic AMP receptor protein can then be applied to larger, more complex systems.

### **Addison Grant**

### *Dramaturgy for Titus Andronicus*

Faculty sponsor: Mimi Kammer

As dramaturg, my task for this production was providing historical context for the actors by doing pre-production research. My research focused on Roman lifestyles and the fall of the Roman Empire. I was also tasked with providing proper pronunciation during table work. On top of that, I read the play several times in order to be a resource for the cast on plot and character.

William Shakespeare's *Titus Andronicus* is a fascinating tale of revenge and, perhaps surprisingly, love. As director Dr. Mimi Kammer states in her production notes, "each of the protagonists feels so much love for her own children, but not nearly enough for someone else's." This is a key element that our production takes into account.

### **Caleb Grose, Ben Harrison, Alex Henrich, and Hannah Button**

*Effect of Meal Temperature on the Frequency of Gastric Myoelectrical Activity*

Faculty Sponsor: Jackie Brittingham

Prior studies have revealed a relationship between the temperature of ingested liquids and the frequency of gastric motility. Gastric slow waves, which are recorded using surface electrogastrigraphy (EGG), are measures of gastric motility. Our experiment observed the changes in frequency of gastric slow waves with EGG when a subject ingested water at three different temperatures of 4°C, 37°C, and 50°C. We hypothesized that cold and warm water will activate thermoreceptors in the stomach, thus resulting in a higher gastric wave frequency response than at room temperature. We predict that water temperature at both extremes will initiate a parasympathetic response to increase the gastric slow wave frequency. Our experiment will begin with two participants fasting for 6 hours. We assessed their resting gastric frequency for fifteen minutes, then randomly assigned one of three water temperature treatments to be ingested. We then observed the gastric wave frequency for each subsequent treatment in random order. This study consisted of two separate recording sessions. We used the Biopac system for EGG to analyze frequency changes over time for each of the three conditions. We predict that the temperature of ingested liquids will alter the frequency of gastric slow waves. Our experiment will shed light on whether the temperature of the meal will help slow down gastric motility and improve absorption of certain nutrients.

### **Katrina Hartman**

*Evolution of ELISA: Nanoparticle-based Immunoassay for Protein Detection*

Faculty sponsor: Derek Lyons

The ability to detect proteins, which are too small to see with the human eye, is crucial in understanding disease processes and learning about the human body. Immunochemistry assays, such as western blots or ELISAs, detect proteins and antigens within tissue samples. Their methods leading to protein detection vary, but in both procedures, antibodies attach to the desired protein. While using western blot and ELISA procedures at Des Moines University for the detection of TNF $\pm$ , an inflammatory marker, the western blot was not sensitive enough to adequately detect the small amounts of TNF $\pm$  present and the procedures are not able to detect individual proteins. This project explores the use of nanoparticle-based ELISAs to lower the cost and improve the sensitivity of these tests. Nanoparticles are gold, rod-shaped particles that can be coated in polyclonal antibodies. These antibodies bind to a target protein, bringing two nanoparticles close together. The nanoparticles are imaged under a microscope to determine if the target protein is present by quantifying how many nanoparticles are stuck together.

There is no established protocol for a nanoparticle ELISA, so this project worked to develop a protocol to test this nanoparticle method of protein detection. The sensitivity of the nanoparticle assay was compared to an ELISA kit. A limit of detection, which is the minimum quantity needed to detect the protein, was found. The concentration of protein was varied to compare the linear range of detection of the nanoparticle assay to an ELISA kit.

**Hannahlynn Heinen, Ethan Woodruff, Amanda Stadtlander, and Makynze Davies**

*Effect of Dive Reflex on Gastric Motility*

Faculty sponsor: Jackie Brittingham

Past research has shown that the dive reflex is an evolutionarily conserved autonomic reflex that counters normal homeostatic control when a mammal is underwater. In response to anoxia there is a reduction in cardiac output as a parasympathetic response. This will lead to a drop in the arterial blood pressure. The sympathetic nervous system will counteract the decrease in pressure and induce peripheral vasoconstriction which reduces circulation to the viscera. We propose this response leads to a decrease in gastric contractions as blood flow will be redirected to vital organs. To determine how the dive reflex affects gastric motility, our present study measured the frequency of gastric contractions after the dive reflex is induced. We hypothesized that inducing the dive reflex will decrease the frequencies of gastric contractions. Using the BIOPAC's electrogastrogram (EGG) and electrocardiogram (ECG), fasted subject's frequency of gastric contractions and heart rhythms were recorded. After the subject ingested a defined meal, they submerged their face in cool water for twenty-five seconds. Researchers continued to monitor the ECG and EGG for the next twenty minutes. Changes in gastric contraction frequency before, during, and after the dive reflex will be analyzed. The ECG data will be analyzed to confirm the dive reflex was induced. Conclusions will be drawn based on our analyses, and the effect of the dive reflex on gastric motility will be determined. The dive reflex is the most powerful autonomic response in mammals, and we wish to further the knowledge on this complex phenomenon as well as how the autonomic nervous system functions.

**Tanner Jansen, Kenton Thoms, and Parker Schenk**

*The Effects of Exercise on Male and Female Vital Lung Capacity*

Faculty sponsor: Jackie Brittingham

Past research has shown that the vital capacity of the lungs decreases during mild to moderate exercise. However, when the body reaches the level of high to maximal exercise, the vital capacity of the lungs increases due to activation of the sympathetic nervous system. Our study is designed to examine the differences in vital lung capacity mild to moderate exercise. According to prior literature, women have been depicted to show reduced airways diameters and have more mechanical limits to expiratory flow. This would result in a smaller maximal flow. In order to avoid the fight or flight response, we will be asking the test subjects to run 200 meters to avoid the autonomic nervous system from dilating the bronchioles in the lungs. We hypothesize that the vital capacity of the lungs in female subjects will decrease more compared to male subjects. We will record the resting vital capacity of three male and female test subjects using the Biopac computer software. After the baseline is established, each subject will run 200 meters at their max speed. Immediately after completion of running, we will record vital capacity. We expect to observe a significant decrease in the vital capacity of both male and female test

subjects. Conclusions will be drawn based on our analysis of our Biopac data and graphs with considerations of past research studies conducted.

**Audrey Kaus**

*Costumes Hair and Makeup Design for Silent Sky*

Faculty sponsor: Heather Lesieur

Designing Costumes, Hair, and Makeup for Silent Sky by Lauren Gunderson was a process that required a good amount of research into what working women from 1890-1910. The goal of the costumes was to capture the time period realistically, while also adjusting things to the fluctuating time period changes. The challenges that practicality presented included the restricting costume pieces of the time period (i.e. corsets), the budget with which I was working, and the timeline upon which all pieces had to be acquired and built. Because the show was based on real people and real life situations, the design was a way to communicate the position, time period, and views of the characters in the show.

**Collin Lowry and Jake Dotterer**

*The Negative Affects Trade Wars Have on U.S. GDP*

Faculty Sponsor: Gowun Park

If you tune into any news network, then you have probably heard about the current trade war going on between the U.S. and China. President Trump and General Secretary of the Communist Party of China Xi Jinping are constantly going back and forth creating different trade embargo's. This is not ideal for both economies as both countries are heavily reliant on imports and exports to one another. Not only do we in the United States have a lot of use for the goods shipped in from China but also mainly our farmers do send a lot of the crops they grow to China. This not the first we have seen trade wars going on and it probably won't be the last one. The main source used to find this data will be the FRED (Federal Reserve Economic Data). This site lists multiple different charts and graphs that show the fluctuation of a country's economy. This website can easily show us the different changes going on within the markets during the time period of trade wars and how embargo's affect the economy. We think the U.S.'s GDP will not grow as much as expected during the time of a trade war. We want to research and find data to try and find the source of why these trade wars happen and what can be done to prevent more in the future. But mainly the data we want to collect is how trade wars can affect the economies of the countries involved and how they recover from disputes like these.

**Katarina Moore**

*Improving Iowa's Mental Healthcare System*

Faculty sponsor: John Epperson

Over the last several years, mental health related issues have grown throughout our country and at times gained a lot of attention in media. From concerns of growing chronic stress and depression among children to the spike in mass shootings, many people have questioned why mental health is so poor for many Americans. In my study, I am exploring the following question: What policies should be revised or put in place to improve mental health care in the state of Iowa? I'm approaching this project as an opportunity to learn more about an area of policy that I currently do not have a strong background knowledge of. While I do not have a solid hypothesis in place, I plan to form one over the next several

weeks as I learn more about what mental health policies have been effective. That being said, there are a few particular factors I've identified in the early stages of my research that I expect will have an important role in mental health care systems. The first is beds for inpatient care. Having enough of this basic resource is fundamentally crucial to ensuring Iowa has the needed space to treat people struggling with severe mental illnesses. I also anticipate that community-based centers and programs will be an important piece to this puzzle. Making care available throughout the state rather than in just highly populated areas will make seeking out help easier for rural populations. Finally, adequate state funding will be necessary to make the reforms I propose possible.

**Zoe Murphy**

*Costume Design for Festival of Short Plays: Politics and Protest - Hurt and Existence*

Faculty sponsor: Heather Lesieur

This project is supported by AFRI Grant # 2014-06594 from the USDA National Institute of Food and Agriculture.

**Thomas Mussig**

*Nigerian poverty and inequality: A futile economic trap?*

Faculty Sponsor: Gowun Park

Despite a constant growth in population over the last 20 years, Nigeria finds itself diving deeper into economic crisis. Several factors hinder its development including income and inequality of. Not only does inequality segregate the low and high-income class, but it shreds the middle-income class, dissolving access to education and healthcare as well as encouraging government economic and political corruption. Throughout my research, I present an interpretive review of the trends and tendencies found on the relationship between population growth, income inequality and access to education in terms of conceptual approaches, and research methods used. Final implications drawn from the research will be concluded using these techniques.

\*\*Metadata has been collected via worldbank. Economic indicators such as GDP, CPI, HDI, and others will be utilized throughout this study.

**Liz Nimmo**

*Dad's Not Home, Leave a Message: The Argument for Paid Parental Leave in the United States*

Faculty sponsor: John Epperson

The United States is the only developed nation to not have some form of guaranteed paid maternity leave. My paper seeks to prove that the advantages of a U.S. nationwide policy of guaranteed paid parental leave outweigh any foreseeable disadvantages. Paid parental leave benefits employers, employees, and the children involved. Employers are benefitted through higher employee retention rates. As a result, employers save money on training costs. Employees benefit from the alleviated financial burden and stress of taking time off from work. Children also see benefits in brain development because of paid parental leave. In all, paid parental leave is proven to benefit those involved. In order to prove that a policy of paid parental leave should be adopted in the U.S., I utilize data from studies both performed in the U.S. and countries with policies of paid maternity/parental leave. The Pew Research Center has conducted numerous quantitative and qualitative studies on the positive impacts of

paid family leave. This data shows that employers, employees, and children benefit from paid family leave. For these reasons, paid parental leave should be considered a federal legislative priority.

**Brendan Owings, Madie Bacon, Kelli Hanson, and J.W. Brittingham**

*The effects of lavender and peppermint aromatherapy on the stress response*

Faculty Sponsor: Jackie Brittingham

There is an increasing interest in non-pharmacological treatment options as interventions for stress relief. Active chemical components in essential oils demonstrate measurable psychoactive properties. In this study, we investigate peppermint and lavender aromas and their effect on two autonomically regulated systems, the heart and electrodermal activity (EDA). We hypothesize subjects exposed to the aromas will demonstrate a reduced stress response, measured by heart rate and EDA. We will recruit four participants, two males and two females, based on the results of a pre-survey on scent preferences and a perceived stress scale. The subjects will take the Stroop Test, which is universally known to induce an autonomic stress response. Subjects were instructed to respond quickly and accurately possible to two conflicting stimuli, color naming and reading of a word. When subjects see a color, the semantic-level activation is processed faster than the meaning of the word, which results in a measurable stress response. Each participant will be assessed in a resting state and post-test state without the use of oils for a baseline measure. The BIOPAC system will measure participants heart rate as well as their EDA. We will compare data from participants in a resting state, Stroop Test without oils, and Stroop Test with either lavender or peppermint oils. We predict that if we introduce lavender and peppermint aromas in a stressful environment, then we will see a reduction in autonomic stress markers. We also predict lavender will have a weaker response when compared to peppermint. Our study could support the use of essential oils in reducing everyday stress.

**Ling Rudicil**

*INEQUITY OF PUBLIC EDUCATIONAL FUNDING*

Faculty Sponsor: Patti Woodwar-Young

I am expanding on the work of Miranda Schultz who did research on the inequity of public educational funding. My research is focusing on the relationship between school resources and the percentage of free and reduced lunch. My theory being that schools with higher percentages of free and reduced lunch will have less or worse resources compared to schools with lower percentages of free and reduced lunch. I will be going to the top three public high schools with the highest percentage of free and reduced lunch and the top three with the lowest percentage of free and reduced lunch all of which are within a 35-50 radius of Simpson and will evaluate their resources using a survey created by myself, Patti, and students majoring in education.

**Ling Rudicil and Taylor Williams**

*Multicultural Leadership*

Faculty sponsor: Carolyn Dallinger

The American Psychological Association study on ethnic minority leadership provides an overview of the findings of some major studies of differences in the leadership styles of persons of color and European

Americans and relates these findings to the leadership experiences and styles of ethnic minority students and faculty.

Our Project:

We are expanding the work of the American Psychological Association in highlighting the leadership roles of ethnic minorities and reviewing disparities amongst non-white and white leaders/educators. Future research will evaluate the benefits of non-white leadership and develop a plan to increase ethnic minority leadership in a predominately white society.

**Aimee Shrock Dani Marquez and Maddie Glascock**

*The Effect of Stress on Short-Term Memory*

Faculty Sponsor: Jackie Brittingham

The purpose of this study was to investigate the effect of specific stress tests on short term memory. This was examined using three different stress tests and a short-term memory game. We hypothesized that the Cold Pressor test, Stroop test, and heavy resistance exercise stressors would reduce performance on a short-term memory test. The memory test measured spatial short-term memory through recalling tile patterns. The short-term memory game was performed before and after each stress test. Stress levels were raised by the Stroop test, Cold Pressor test, and heavy resistance exercise. The Stroop test is a cognitive overload test that presents words and colors in a confusing pattern. The Cold Pressor test elicits stress by causing a pain response by submerging a hand in ice water. Heavy resistance exercise causes stress on the body through exercise, in the form of ten sets of leg press with a heavy load and low rest time. We predict the short-term memory scores will be lower following the stress tests, however they will be significantly lower with the Stroop and Cold Pressor tests in comparison to the heavy resistance exercise. This may inform us to the effects that stress can have on performance on short-term memory tests.

**Katrina Sieck**

*FSP18: Politics and Protest Set Design*

Faculty sponsor: Jennifer Nostrala

The student-run production of FSP18: Politics and Protest was a collection of four short plays directed by two directors. My concept was to create a set that would bridge the 4 plays and the theme but allow for individuality within the shows. The challenges I faced throughout my process were the confines of the small theatrical space, designing theatre in the "round" (we actually used a triangle), and learning diverse sides to issues. To overcome the confines of the Barnum Black Box Theatre, we pushed the seating to the back wall and put it on a slight angle. Designing in a triangular formation limited the amount of furniture we could use, due to sight lines. We used voms and low furniture to overcome this challenge. Finally, I spent many hours researching posters from diverse sides and working to not be emotional with what I found. The production ran April 13-15 and was highly successful.

**Morgan Taylor, Courtney Clark, Caden Ritter, and Jessica Payne**

*Contraction of Quadricep Muscles on Motor Neuron Recruitment and Electromyography Activity*

Faculty sponsor: Jackie Brittingham

Past research has shown that muscle fiber distribution in the quadriceps leads to differential effects on motor neuron recruitment. A progressive increase in load on a muscle can lead to an increase in the frequency of action potentials and subsequent increase in motor unit recruitment. The

purpose of this study was to characterize the motor unit recruitment patterns in the rectus femoris (RF) and vastus medialis oblique (VMO) in the quadriceps. We hypothesized that electromyography (EMG) activity will be greater in the RF at high loads, as a result of greater depolarization of nerve impulses than the VMO. We recruited four healthy individuals between the ages of 20 and 22. After a light warm up, we recorded the one repetition maximum (1RM) on the leg press machine. Then EMG activity was measured through surface EMG electrodes placed over the RF and VMO muscles at 25%, 50%, and 75% of 1RM load. The average EMG results for each participant at each load for the leg press will be recorded and analyzed. This information may be useful in understanding the muscle fiber activation patterns of muscles in the quadricep and their role in stabilization of the knee joint with possible injury prevention. The overall goal of this work is to develop strategies for recognizing and preventing knee injuries.

**Bailey Timm and Joe Wepler**

*What Socio-Economic factors affect Robbery Rates?*

Faculty sponsor: Ali Madanipour

The purpose of our study is to investigate the social and economic factors that impact areas with high rates of robbery. We are interested in the factors such as income, unemployment, educational attainment rates and others that most commonly impact areas with high rates of violent crime and robbery. We are undertaking this topic of research because of the trends observed in mass incarceration and the high rates of recidivism among people of color. Large numbers of people of color are present in cities that have had historically high rates of violent crime, such as Chicago, New Orleans, and Detroit to name a few. Traditionally, in areas with high crime rates there are also high rates of unemployment, low income, low educational attainment, and high poverty rates. These are trends that have been prominent in research, and in our own learning experiences at Simpson College and are of great interest to us. A pivotal aim of this study would be to link the social and economic factors to high rates of robbery. Do areas that experience frequent burglary/robberies also have historically low-income and high unemployment? Are these criminals given few opportunities because their environment not only works against them socially and financially, but in some cases promotes illegal activity? We hypothesize that a low GDP per capita, low educational attainment, high rates of unemployment, and high rates of poverty are factors that incentivize high rates of robbery.

**Jess Tometich**

*Priming and the Weapon Focus Effect*

Faculty sponsor: April Drumm-Hewitt

The current study investigates how the Weapon Focus Effect is affected by increased emotional arousal and weapon novelty. Participants were either exposed to a video about active shooter training, or a control video unrelated to weapons. After the prime or control video, participants watched surveillance footage of an armed robbery and filled out a multiple choice questionnaire about their memory of the footage. Participants who were primed were more emotionally aroused, which led to worsened memory and a stronger demonstration of the Weapon Focus Effect, despite a low novelty rating.

**Stephanie Twohey, Daniel Goldsmith, Katrina Hartman, and J. W. Brittingham**

*Influence of Meditation on Heart Rate (HR) and Skin Conductance (EDA) in Response to Cold Pressor Test*

Faculty sponsor: Jackie Brittingham



Previous research has indicated that meditation may alter the autonomic nervous system response. Our present study investigated the effects of meditation on the response of the sympathetic nervous system branch of the autonomic nervous system. We measured heart rate (HR) and electrodermal activity (EDA) of subjects before, during, and after administration of the Cold Pressor test, a standard acute stressor. We hypothesized that meditation prior to a stressful event decreases HR, EDA and perceived psychophysiological stress compared to no meditation. Subjects first completed a Warwick-Edinburgh Mental Wellbeing Scale and Freiburg Mindfulness Inventory. Then we recorded baseline measurements of each subject's HR and EDA. Each subject participated in either a period of meditation or no meditation. After meditation, subjects completed the Cold Pressor test while we recorded the time to first pain stimulus, pain threshold, HR, and EDA. Immediately following the test, the amount of pain experienced by the subject was surveyed and recorded. Our results were analyzed by comparing HR and EDA data from resting and cold pressor task periods for both meditation and non-meditation groups as well as the results from the three subjective pain measures. Conclusions will be drawn based on our analyses, and the effect of meditation on the autonomic nervous system will be determined. These results will provide insight on the potential benefits meditation can provide during stressful events.

**Andrea Van Wyk**

*Designing a Quantum Dot General Chemistry Lab*  
Faculty Sponsor: Lindsay Ditzler

Chemical Education is a new and upcoming area of chemistry which focuses on how students learn chemistry. The research in this area gives insight into how to better teach and assess chemistry concepts so that students will be better prepared for life outside the classroom. Current research has shown that there are three main ways that students learn chemistry concepts: symbolically-through the use of equations and symbols, submicroscopically-through the use of models and pictures, and macroscopically-through hands on experiences. In a typical General Chemistry course, there an emphasis on learning symbolically because it is the most convenient way for teaching and assessing student's comprehension. However, research has shown that students need to be able to have a combination between all three ways of learning to fully understand the concepts. The goal of this project was to design a lab for the General Chemistry course that would connect macroscopic learning with symbolic and submicroscopic for a traditionally difficult concept, light. This lab was chosen to center around the idea of quantum dots because they have unique optoelectric properties which will allow the students to connect what they have learned about light to a material of which they have had no prior experience. Along with creating a laboratory procedure, this project sought to create a set of post-lab questions to assess how well students understand the material relating to the lab. The data collected in this project will show how well General Chemistry II students at Simpson College understand optoelectric properties of quantum dots.

**Lauren Villafuerte and Manoj Rai**

*Simulation of DNA nano-cubes through Mathematica*  
Faculty sponsor: Ross Sweet

Modern engineering is progressively integrating nanotechnology into newer fields including the medical field. In the medical field, DNA is used as the biological construction material due to its size and compatibility with human physiology. Unfortunately, nanoscale size structures are still difficult to design and visualize because the actual structures are too small to see and current software for designing nanoscale structures relies on a 2D interpretation of 3D structures. We have successfully integrated DNA

strands on nano-cubes to function as the building block of the structures, however there is no clear way to show the interaction between DNA coated nano-cubes in solution. Using Mathematica, we wrote code that accounts for the forces of two DNA nano-cubes in a solution. We then used this code to create a simulation in Mathematica. We then improve this code to account for numerous DNA nano-cubes instead of just two. In addition to that, we hope to integrate realistic parameters and data to mimic interactions of DNA nano-cubes in solution. Once we have this data, and the code to back it up, we will be able to create an accurate and realistic 3D simulation of DNA nano-cubes in a solution. We had the help of our mentors Deann Nelson from Corteva and Aaron Santos from EMC Insurance and Simpson College. We were able to connect with them through the Carver Bridge to STEM Success program. Dr.Santos aided us with the Mathematica coding and with the overall direction of the project. Nelson was able to give us critical feedback and helpful advice on the progress of the project.

### **Dallas Williams**

*Stage Management for Titus Andronicus*

Faculty sponsor: Mimi Kammer

Stage managing Titus Andronicus by Shakespeare required leadership, communication, and positivity. My goal was to communicate clearly with actors and designers in and out of rehearsals to make sure everyone was working together towards one unified goal. I was very challenged in this position as there were many elements I was responsible for and I was required to have knowledge about every aspect of the production. Because of the time period of the show, Ancient Rome, there were many traditional elements in costumes, lights, and sounds.

### **Val Wilson**

*Mechanistic Elucidation of Cardiometabolic Syndrome*

Faculty sponsor: Lindsay Ditzler

The dietary balance of omega-6 (n6) and omega-3 (n3) polyunsaturated fatty acids (PUFA) has been proposed as an important modulator of cardiometabolic risk and inflammation in humans. *FADS2* encodes for delta-6 desaturase, a rate-limiting enzyme in n6 and n3 PUFA metabolism. The relationship between *FADS2* genotype, diet, and disease risk is yet to be fully understood. We hypothesize that *FADS2* gene expression regulates metabolic responses to “Western” diets, which contain high levels of n6, and the influence of dietary PUFA composition on risk. To test this hypothesis, we utilized mice with heterozygous deletion of *Fads2* (low *Fads2* expression), transgenic *Fads2* overexpression (high *Fads2*) or two wild-type mouse strains (WT, medium *Fads2*). Mice were maintained on high-fat/sugar diets containing PUFA as predominantly n6-PUFA (linoleate), n3-PUFA (linolenate), or balanced mix of each (1:1 n6:n3). To date, studies found that high n6-PUFA intake promotes, while high n3-PUFA attenuates, glucose intolerance and hepatic inflammation in WT mice. When dietary n6:n3 PUFA intake is balanced, high *Fads2* expression promotes, while low *Fads2* attenuates, the same outcomes compared to WT controls. Dietary imbalance of n6:n3 PUFA intake generally diminishes effects of *Fads2* expression on glucose intolerance, with variable effects on hepatic inflammation. We are currently analyzing liver and muscle tissues for signaling proteins linking inflammation with insulin resistance as a plausible mechanism for diet-gene interaction on metabolic risk, which may have clinical implications after more research is performed.

*Presentations*

**Sarah Baker**

*Gerrymandering the Electoral College; Expanding the Nebraska and Maine Model*

Faculty sponsor: John Epperson

**Gerrymandering the Electoral College; Expanding the Nebraska and Maine Model**

The electoral college has widely been known for its ability to promote an equal voice to all states. Even so, it has routinely been criticized for creating a hyper focus on swing states, promoting of a winner-take-all system, and electing illegitimate winners. Following the 2016 election where we saw Donald Trump as the fifth candidate to win the presidential spot without winning the popular vote, many calls have been made for a change to the electoral college. One of the more popular changes being debated is a move towards a Congressional District Method, commonly known to be used in Nebraska and Maine. This method divides the state's electoral votes by giving the overall popular vote winner two of the electoral votes, and then one to the winner of each district. This method is said to give more individualized votes to the districts themselves and allow for a more representative distribution of viewpoints. Allowing districts to dictate which candidate would receive their one vote opens the door for further gerrymandering of an already corrupt system. Politicians would be allowed to further draw district lines to secure elections for their parties, harming the democratic process of electing the President of the United States. My research examines and concludes that adopting a Congressional District Method would pave the way for increased gerrymandering in the future presidential elections.

**Danielle Bates**

*The Political Power of the Vatican in International Affairs*

Faculty sponsor: John Epperson

The Vatican is both a religious power center and a nation state. The Vatican has acted as a state actor in attempts to influence policy and action in international affairs. This study examines the extent to which the Vatican has in fact influenced another state or non-state actor in implementing policy. The Vatican has exclusively soft power, which is not the usual case for nations state that exerts influence on other states. This case study examines four different situations where the Vatican has attempted to affect international affairs. Examples of influence include Pope Francis's role in the US-Cuba détente, Pope John Paul II's part in the break-up of Yugoslavia during the fight against communism, the position of the Catholic Church in the situation in the Middle East, and the permanent observer status of the Holy See at the United Nations. It is clear through these cases that the Vatican does have power through influence. The influence of the Vatican in international affairs has also been criticized due to the religious nature of the state. Other religions do not have a country in the same way that the Catholic Church does and are not granted observer status in the UN, for example. The influence of the Vatican also highlights the possibility for there to be more international actors that are not what many consider traditional countries. However, knowing about the potential power of the Vatican can be beneficial for those studying the world order, international affairs, or trying to implement policy.

**Lewis Cox**

*1st Corinthians 12: Unity in the 21st Century Church*

Faculty sponsor: Jan Everhart

Paul wrote several letters to small communities throughout the Middle East that later became known as the New Testament. In many of these communities, there were stark contrasts of beliefs, cultures, customs, circumcision status, beliefs about Jesus, and many other differences. At this time it was the norm to find and point out the differences separating people. Paul addresses small communities and encourages them to find ways that they can seek unity despite their difference. Throughout the evolution of the modern church, this division within the population of the church has not seemed to have gone away, and that indeed was not the prediction of Paul's writings. Paul knew that it was always going to be easy to point out a difference and let that brood hostility between different groups. Instead of addressing questions of individual morality or even "personal relationship with God" language we so often see in churches Paul instead asks what would be best for a community of people to do. One of those particular letters was 1st Corinthians where Paul addresses a whole host of behaviors that people should do for the betterment of the community. Near the end of this letter in chapter 12, Paul discusses some of the intentions of creating unity within the church. 1st Corinthians 12 holds practical insight that may help guide discussions of division within the 21st-century church.

### **Kylie Doupnik**

*Living an Incredible Life: A presentation and discussion on invisible and chronic illness*

Faculty sponsor: Deano Pape

In this presentation, I plan to first present my competition speech piece, a speech written by Claire Wineland, who loved her life with cystic fibrosis. After this presentation, I hope to lead a discussion on how to make Simpson campus more inclusive for invisible and chronic illness.

### **Molly Fisher Dr. Thomas Rosburg**

*South-central Iowa seed banks: A comparison between recently restored, low diversity restored and remnant prairies*

Faculty sponsor: Clint Meyer

Tallgrass prairies once dominated the Iowa landscape prior to European settlement. These prairies were an incredibly diverse ecosystem filled with flowers and grasses allowing for hundreds of species to thrive. Now, 99.9% of Iowa prairies no longer exist, but there is a great effort to restore land into prairie once again. Seed banks, comprised of dormant, viable seeds, can offer numerous insights into restored and remnant prairies. These insights can include a prairie's vegetation history as well as the composition of future vegetation. Through the Carver Bridge Program and in collaboration with Drake University professor Dr. Thomas Rosburg, we conducted a seed bank study on three different prairies located in south-central Iowa. Samples from the top 5 cm of soil were collected from two different sites in a recently restored prairie, and one site in a low diversity restored prairie as well as a remnant prairie. Following identification of the seedlings observed in a seedling assay, we will determine seed density for seedbank species and compare and contrast the seedbank composition of these three sites. In the first eight days of the seedling assay, a minimum of 469 seedlings had so far germinated in the seedbank samples under study.

**Margaret Flowers, Nanci Ross, Deserre Johnson, Patrick Wilson, and Mirabai Moseley**

*Floral Morphology and Sex Expression in the food of the gods Diospyros virginiana, American persimmon*  
Faculty sponsor: Nanci Ross

As part of the Carver Bridge STEM scholarship program, I am studying floral morphology, which is key to understanding plant reproductive biology and pollination systems. My mentor is Dr. Nanci Ross at Drake University and other members of the team include Deserre Johnson, Patrick Wilson, and Mirabai Moseley. We are investigating floral morphology in American persimmon, *Diospyros virginiana*. Specifically, we want to know if we will see greater morphological variation in cultivars or wild types of the American persimmon. We hypothesize that the cultivars will have the greatest variability since in the wild, pollinators are exerting stabilizing selection pressures on the plant to limit changes in floral form for their reproductive success. Thus, it would not be beneficial to significantly alter reproductive structures that are already favored by pollinators. Alternatively, gene transfer and survival in cultivars are less dependent on pollinators which is why we hypothesize that their flowers will display less morphological variation. Additionally, we want to know if there are correlations between suites of floral characteristics. We hypothesize that there will be strong correlations in the wild types, but not necessarily the cultivars because in the wild, some floral characteristics may have evolved to be genetically linked due to their developmental history. We will be measuring dimensions of floral structures and pollen viability from specimens collected in Missouri. This is key in addressing the significance of integrated characters in animal-pollinated flowers. This research investigates plant reproductive evolution within an historical ecology framework. It also provides insight on the evolutionary lability of dioecious systems and the potential for adaptive flexibility in reproduction of long-lived perennials. This will be valuable for conservation of this rare, native species as well as baseline data for agricultural development of American persimmons.

### **Cayce Good**

*What has Trump done? The Future of the GOP*

Faculty sponsor: John Epperson

The Republican Party has changed drastically since the election of Barack Obama in 2008. Our American political parties have become more polarized than we have ever seen in the modern era. Political issues and social issues such as racism, LGBTQ rights, and immigration have become the hot-button issues in 2019, and they have split a wedge between the Republican and Democratic parties. Particularly, the introduction of Donald Trump as our president and leader of the Republican Party has altered American political life because of his unconventional style of governing. Trump has displayed irrational behavior on social media, spoken with tones of racial slurs, and attempts to exert powers beyond the authority of the president granted to him by the Constitution. I will be examining Trump's impact on the Republican party moving forward to the 2020 election and beyond. Will Trump's unique "ideology" rub off and stick with the GOP after he is finished as our president? Has the GOP always had these political stances rooted deep within and Trump is the first figure to bring them out? Will the GOP return to its less extreme, traditional ideology that is consistent with conservative ideas and values? I will be examining a few ways the Trump presidency could end (a second term, impeachment, peaceful transition of power) and what each says about the Republican Party once Trump's time as president is up.

### **Addison Grant**

*Madness of Mathematics*

Faculty sponsor: Katherine Vance

Three plays I read all featured mathematicians who were told they were crazy, insane, mad. Mathematics, portrayed in these scripts, was like a monkey at a typewriter. How does the outside world view mathematics and mathematicians? So many of my non-mathematics friends tell me the mathematics I'm doing is just a bunch of gibberish. While the work we do is incredibly important, anyone not in the world of mathematics has a difficult time understanding it. The mathematicians featured in *Proof*, *Arcadia*, and *The Curious Incident of the Dog in the Nighttime* surrender to the stereotype of mad mathematicians while providing the distinct notion that mathematics is more than nonsensical numbers.

### **Kathryn Joelle Hays**

*Affects of Disinformation Campaigns on Varying Electoral Systems*

Faculty sponsor: John Epperson

I plan to explore the question: how disinformation campaigns by foreign actors affect varying democratic electoral systems and what factors make those systems more or less susceptible to interference. This is an extremely important question to investigate in order to better deter disinformation campaigns in the future. We are seeing foreign influences in elections in both first world and third world countries, elections and referendums, authoritarian and democratic electoral systems. At this moment in time, no government is safe from these attacks and the transgressors are improving their tactics with each coming day. The effects of information manipulation in the United States 2016 presidential election were far more influential than in the French Election due to several factors such as cultural views towards the media, preparation (already aware of possible influences due to the interference in the United States election in 2016), a prompt and effective response by the En Marche campaign, structure of the electoral system (direct election with two rounds, and the purdah period which is a time of media blackout before election days) and governmental agencies (National Commission for the Control of the Electoral Campaign for the Presidential Election CNCCEP and the National Cyber Security Agency ANSSI).

### **Michael Jacob Hite**

*Asymmetry of the Universe through Leptogenesis*

Faculty sponsor: Nicolas Rey-le Lorier

Right after the big bang, the universe consisted of massless particles, but as expansion and cooling occurred, they began to slow and collide to form the particles we know as matter and antimatter. Current observations show the observable universe has a preference for matter, so these early processes must have generated this asymmetry. A current theory, known as leptogenesis, postulates that the decay of a heavy right-handed neutrino (HRH neutrino) into leptons and Higgs bosons, or their antiparticle counterparts, favored the lepton over antilepton, producing the lepton asymmetry; and later on, the proton-neutron asymmetry. The evolution of particle densities is guided by their respective Boltzmann equation, a differential equation relating the expansion and cooling of the universe, to the rate of particle formation. We have solved these coupled Boltzmann equations of an approximate leptogenesis scenario in order to find what properties of the HRH neutrinos were necessary to produce the lepton

asymmetry. Our model predicts that the mass of the HRH neutrino will lie within  $10^7-10^{11}$  GeV. To explain the proton-neutron asymmetry, we will improve the model by accounting for certain interactions the HRH neutrinos and leptons have with other particles within the gas of the primordial universe. Limits of current particle accelerators keep us from directly testing leptogenesis, but the success of a complementary model, Big Bang Nucleosynthesis, that explains the abundances of Helium-4 and deuterium of the universe, leads us to believe leptogenesis is a viable scenario.

**Jacob Irwin**

*Rubik's Magic: The Mathematical Wonders of the Magic Cube*

Faculty sponsor: Katherine Vance

Rubik's Cubes are one of the most sold toys in all of history, and yet only about 5.8% of the world's population can actually solve them. What makes this toy so hard to solve? We explored this question in this paper, and the astounding mathematics behind the Rubik's Cube. We discussed the historical background of the Rubik's Cube, and how it came to be invented, as well as diving into how a Rubik's Cube works. We then walked through the how to solve a regular 3x3 Rubik's Cube. After that, we proved that the amount of permutations for a 2x2 Rubik's Cube is 3,674,160 permutations. Lastly, we discussed what the configuration groups of the Rubik's Cube are, and if the group is isomorphic to any known or named subgroups  $S(24)$ .

**Malia Jansen**

*Classifying Diagonal Knots*

Faculty sponsor: Katherine Vance

Within the field of knot theory, grid diagrams are an alternative way to represent knots and links. Diagonal grid diagrams are of special interest in my research, specifically what kinds of knots can be represented on a diagonal grid diagram. I focus on the braid word whose closure is one knot in particular in an effort to understand what makes a knot diagonal. This knot is the first known diagonal knot that is not a torus knot, and as such I define a new classification of knot for it.

**Morgan Johnson**

*Mother and Daughters' How Did We End Up Here?*

Faculty sponsor: Jan Everhart

"Mother and Daughters' How Did We End Up Here?" is an analytical and creative piece that explores the bonds between women as well as the power dynamics found in the New Testament story of John the Baptist's death. At first glance, most readers will only view the story as a tragic death scene of a beloved prophet. Using a feminist lens, the essay concludes that Herodias and Salome, mother and daughter, are manipulated for men's benefit and are nothing more than scapegoats. The creative aspect of the piece is an interpretive monologue between a mother and daughter that explores the circumstances Herodias and Salome were possibly subject to but with a modern twist.

**Sara Lawson and Ben Christensen**

*Minimizing the Risk of Stock-Out at Koppers, Inc.*

Faculty sponsor: Ross Sweet

A stock-out can cost a company in back-order costs, lost sales, and lost customers. Hoping to minimize this threat, many companies choose to carry safety stock, a reserve quantity of extra inventory. We use the safety stock formula and historical sales data to calculate the ideal quantity of safety stock for six products for the railroad tie block of business at chemical company Koppers, Inc. We weigh the costs and benefits of varying service level, a measure of the risk of stock-out and a factor in the safety stock formula. A higher service level means a decreased risk of stock-out, but also a decreased cash balance available for other business ventures. The result is a proposal that gives Koppers financial flexibility and protection against potential stock-out. This project is part of the Carver Bridge to STEM Success program at Simpson College and is mentored by Melissa Hadley, Business Planning Manager, Koppers, Inc.

**Faithyna A Leonard**

*A Story Through Poetry*

Faculty sponsor: David Wolf

As a person who came from a childhood that was much more difficult than any child should ever have to experience, my only way to compensate with what was happening was to write poetry. These poems are the stepping stones in my life journey that have worked towards creating the person I am today and continue to be. These pieces show the many life events and struggles I went through as a child, the same experiences many people within our society have faced within their lives as well. As a writer, I want to use my experiences through my poems to show others that no matter what they go through their is always hope and a way to overcome.

**Lydia Magalhaes**

*Teaching Proof Writing Through Crochet*

Faculty sponsor: Katherine Vance

For many high school students, the geometry classroom is the first place they are asked to engage in mathematical writing. The dreaded proof becomes the bane of many high schoolers' math education. However, that does not need to be the case. One of the primary reasons that students struggle with proof writing is because it is totally foreign to them. If they had prior or similar experience with this type of writing, they could be more successful. This research examines how crocheting can be used to teach students the mechanics of proof writing. By asking students to create a crochet square and then write their pattern as a proof, they gain experience with mathematical writing. This happens in a concrete and physical way making the learning more salient for students. This provides students with a framework to build on when learning about proof writing. Additionally, fiber arts are often used in mathematics and math classrooms. This research will explore those foundations as well as examine the effect of using crochet to teach proof writing.

**Bailey Creed McMillan**

*A Critique of Fundamental Beliefs*

Faculty sponsor: John Pauley



In my paper, I will be critiquing a certain set of ideals that are held by some throughout the Christian Faith. First, there will be a discussion on the particular types of Christian beliefs that are being discussed. Second, the issue of inherited guilt and the contradictions to which it leads. Third, the issue of repentance being the necessary requirements for entrance into heaven. Fourth, retributive justice and how its uses can allow use to imagine some criteria an all-just God might use when deciding individuals' eternal fate. Fifth, the issue eternal punishment poses for the Omni-properties of God. Sixth, how a reevaluation of standard Christian thought is necessary in order to form a more cogent argument between a God with Omni-properties and these Christian beliefs. Seventh, the inherent contradiction that stems from assuming a God with equal Omni-properties compared to the assumed Christian ideals and biblical practices. While not all individuals who fall under the Christian doctrine have these beliefs, many of them do. The specific type of Christian I will be referring to throughout the text will be individuals who would fall into a category of having these beliefs.

**Elizabeth Mixon**

*Britain and the Armenian Genocide*

Faculty sponsor: Rebecca Livingstone

During WWI, the Ottoman Empire massacred nearly a million of its own Armenian citizens, with most killings happening between 1915-1916. Despite the murder of the Armenians serving as inspiration for creating the word genocide, the Turkish government, the successor government to the Ottoman Empire, has refused to acknowledge that these massacres occurred and that they constituted a genocide, defined as a deliberate attempt to destroy an entire people and their culture. Additionally, the Turkish government has restricted governmental archive access only to those who also support the ahistorical assertion that the Armenian genocide did not happen. Because of the challenges presented by Turkish denial and a paucity of sources, most scholars have focused on demonstrating that the Armenian experience constituted a genocide and determining why these murders occurred.

My paper focuses on the British role in the Armenian genocide, specifically their awareness of the mass killings of the Armenians and subsequent inaction. With primary source documents, such as British eye witness accounts, articles, and parliamentary proceedings from 1914-1922, I argue that the British public and government were sympathetic to the Armenians due to a variety of commonalities, such as historical British support for the Armenians, a shared religion, and opposition to the Ottoman Empire. However, Britain neither intervened in the genocide nor successfully prosecuted the perpetrators due to the preoccupation with war aims during and after WWI. Studying the international response to genocide is relevant today because of many ongoing genocides and the lack of a solution to this perennial calamity.

**Rhett Murphy**

*Economic Development for the City of Mount Ayr*

Faculty sponsor: Gowun Park

Throughout rural America and the state of Iowa there has been a decrease in population in small towns. From the downturn in population it creates a waterfall of negative effects on small towns and what happens to their future. With no reason to move into these small towns or any benefits there causes a shortage of people for these areas to try to stay stable. With fewer people in the town or the surrounding area, less people enroll in the public school, taxes gained for community upkeep goes down, families don't spend money in the town or generate new businesses and the town goes stagnate. There

is a huge problem that is lurking on small towns. There are some key ways in which some towns around America have prepped for this case and have tried to bring people in and make sure the town that they grew up in, is still there for the younger generation to enjoy. The ways towns go about attracting people is unique to their own town and the things that do or can offer in the future. For some town across the country it's a huge problem, while for others, it's the matter of when is it going to happen to us? By comparing the different communities throughout the country and the state, you can correlate some of the things that worked and the big failures. By comparing past and present relationships, you can assume these movement of people. Though there is no-exact formula to figure out, but only the most logical ways to develop an area. How can a town of roughly 1100 people, within a 30-minute driving distance from interstate I-35, create a new version of their town?

### **Liz Nimmo**

*A Call for an Intersectional Theory of Metrocentrism*

Faculty sponsor: John Pauley

Feminism is concerned with identifying and resisting oppression. In order to do so, it is necessary for feminists to recognize which social groups are oppressors and which are oppressed. Lisa Heldke, author of *Farming Made Her Stupid*, makes the claim that metrocentrism enforces the marginalization of rural people and therefore should be recognized within the feminist movement. Heldke, however, does not account for a marginalized group that is predominantly found in cities: racial minorities. The epistemic experience of racial minorities is absent from Heldke's analysis which makes her theory of metrocentrism epistemically violent. Epistemic violence occurs when the experience of a marginalized group is neglected (intentionally or not)--an aspect central to Heldke's theory of metrocentrism. Using both Kristie Dotson's *Tracking Epistemic Violence, Tracking Practices of Silencing* and Josi Medina's *Epistemology of Resistance*, I will prove racial minorities are not granted epistemic authority and that Heldke's lack of acknowledgment of this reality within her theory of metrocentrism is epistemically vicious and violent. I do not disagree with Heldke in claiming metrocentrism exists; however, she needs to acknowledge how the experience of racial minorities fits into her theory.

### **Jaycie Owens**

*Tariffs & Twitter: The Federal Open Market Committee, Trump, and the Stock Market*

Faculty sponsor: Gowun Park

This presentation examines the effect of the Federal Open Market Committee (FOMC) meetings on stock market performance aired with President Trump's social media usage and their accuracy. The FOMC holds eight regularly scheduled meetings during the year where members discuss the economic outlook and make policy decisions following through a policy statement released following each meeting. By law, the FOMC decides the monetary policy to achieve set objective to maximize employment and stabilize the level of prices by setting short-term interest rates to respond to the economic outlook. Therefore, when the FOMC does not change the interest rate it implies the prediction of a stable or increasing economic outlook. When the FOMC opts to change the interest rate, it may cause changes in the economic condition. The question proposed is how the outcome of the FOMC meetings impact our economic conditions such as the stock market performance as well as how President Trump's reaction to the policy statements via twitter alter the major stock market index. The presentation will combine data points of dates of significant announcements released that impact the economy and align policy statements of recent FOMC meetings. Furthermore, extract President Trump's tweets as well as media reactions to determine if it results in a larger impact in the Standard & Poor's 500 stock index, which will

be the indicator for the stock market reaction. The relationship between FOMC meetings and stock market performance has been investigated before, presenting a positive correlation. However, adding the additional elements of analyzing President Trump's Twitter presence are to the current economy.

### **Tim Palese**

*Desolation on the Wind: How Rural Peasants Understood Great Leap Forward*

Faculty Sponsor: Judy Walden

The Great Leap Forward, launched 1958, was Mao Zedong's attempt to radically industrialize and collectivize China. It was, however, a failure on a cataclysmic scale. Vast stretches of China became a wasteland, violence against rural peasants proliferated, and the most devastating famine in human history gripped China until 1962. It is estimated that between 35 and 45 million people died as a direct result of the Great Leap Forward. Despite its massive scale this is an event that has been largely overshadowed by the Cultural Revolution in the history of Communist China. Recently, historians and scholars have begun to assert the importance of the Great Leap Forward to the history of modern China, some even claiming it as the pivotal event for 20th century China. In order to understand the true scope and the impact of this event, it is thus necessary to examine it at all aspects and all societal levels. This study focuses on rural peasants, the group most immediately affected by the Great Leap Forward and its subsequent famine, to analyze how they understood and made sense of the world around them and the narratives they have constructed surrounding the Great Leap Forward. Rural peasants witnessed, were victims of, and survived a near apocalyptic event, yet the Great Leap Forward is still a taboo topic in China today the stories of rural peasant's experience are virtually unknown outside of the villages that dot the countryside. There are no memorials and for most of the victims there are no tombstones. As those who survived the Leap begin to age and die it is not more vital than ever to preserve, analyze, and understand their stories and the stories of those who perished, before it is completely buried in the past and lost to history.

### **Ashley Partee**

*Depression: An Alternative Approach*

Faculty sponsor: April Drumm-Hewitt

Depression affects millions of Americans per year, and is known to cause a negative impact on people's ability to engage in the activities of daily life (Brody, Pratt, & Hughes, 2018; NIMH, 2017). The ultimate negative impact caused by depression is suicide. To avoid this tragedy, depression should be treated early on, or prevented altogether. Traditional treatments like psychotherapy and pharmaceutical interventions have varying degrees of success. Unfortunately, there are barriers to psychotherapy, such as lack of insurance or access to care, and pharmaceuticals can have harmful side effects.

An alternative approach is the Therapeutic Lifestyle Change (TLC) program (Ilardi, 2009). This program addresses modern depression triggers such as malnutrition, sedentary lifestyle, spending time indoors, sleep deprivation, social isolation, and the fast pace of life. There is evidence that these triggers can be counteracted by lifestyle changes addressing six components: engaging activity (Ciesla & Roberts, 2007), omega-3 fatty acids (McNamara et al., 2016), physical exercise (Balchin, 2016), sleep (Dworak et al., 2008), social support (Teo et al., 2018), and sunlight exposure (Goel & Etwaroo, 2006).

Mindfulness Based Programs (MBP) are another alternative approach for treating depression that have been gaining popularity. Studies have found Mindfulness Based Cognitive Therapy (MBCT) and Mindfulness Based Stress Reduction (MBSR) significantly decreased depression (Eisendrath et al., 2016;

Song & Lindquist, 2015). In my talk I will propose adding MBP's to the TLC program. The combination of these programs may be more beneficial than the TLC program alone.

**Amelia Richards**

*Kavanaugh and Thomas: a comparison of two hearings*

Faculty sponsor: John Epperson

There has been significant evolution to society since the confirmation hearings of Clarence Thomas, however, very similar issues seem to be reoccurring. The confirmation hearings of Brett Kavanaugh had some seemingly eerie similarities & some of the rhetoric caused feelings of déjà vu for those who were familiar with the confirmation hearings of Clarence Thomas. There were, however several substantive differences in the nature of the accusations brought against the nominees to the Supreme Court of the United States. These differences, while broadly overlooked by society at large, were sufficiently substantive to warrant discussion, however the more interesting differences occurred in the nature of the hearings. The tone was decisively different in the more recent hearing and reveals the change in our political climate.

The qualifications of neither candidate were ever in contention & both were rated favorably by the American Bar Association and had judicial experience. Despite their qualifications, both hearings were extremely drawn out after accusations of sexual misconduct came out. This is a case study considering the comparing and contrasting aspects of these two hearings. Both hearings were veritable media circuses. The key parallels focused on will be the rhetoric surrounding the accusations and hearing, the social climate of the hearings, the Justice's positions on issues, and the similarities of the accusers. The differences most highlighted will be the differences in power, timeline, previous experiences, and race. Consideration will also be given to the political climate of each hearings and the difference of majority party between the two hearings.

**Rachel Riley**

*Being Anthropocentric, Becoming Naturalistic: Ontological Implications for Climate Change*

Faculty sponsor: John Pauley

Despite overwhelming evidence from the scientific community that global climate change is mounting rapidly, humanity has failed so far to take collective action to mitigate this environmental catastrophe. In the past this has been attributed to a motivational problem; however, my work examines this behavior as a broader phenomenon, one that is a product of the current human world view in relation to the natural environment. Our anthropocentric ontology, which I characterize as being individualistic and microscopic, is the obstacle which prevents us from permanently and effectively combating climate change. To do so, our ontology must evolve. I illustrate the reimagining of nature as a pathway to adopting a naturalistic ontology, which is instead holistic, integrated, and macroscopic. When we understand ourselves a part of the natural world, affecting and being affected by it, we will then feel the emotional connection necessary to commit to battling the global threat of climate change.

**Michael Roets**

*The Worlds We Inhabit: A Collection*

Faculty sponsor: David Wolf

The poems in this collection were created using a spontaneous composition method which attempts to highlight the process and conditions of their creation as an integral part of their meaning. Borrowing

themes from the theoretical literary work of both beat poet Jack Kerouac and University of Arizona Professor Marissa M. Juarez, as well as the philosophical writings of Maria Lugones and Michel Foucault, my work is primarily interested in exploring how direct acknowledgement of the worlds and positions inhabited by the creator of a composition can be used to enrich the power of the work. These poems were each written initially in a single sitting, with the writer jumping back-and-forth between first-person details of the poet while he considers or composes the piece, and third-person observations on the other subjects of the writing. Careful attention is given within the collection to precision of language and imagery, as well as tightness of phrasing.

### **Sydney Samples**

*byePhone: Environmental, Political, and Social Ramifications of Exporting our E-Waste to China*

Faculty sponsor: Ryan Rehmeier

Almost everyone uses some type of electronic in their day to day life. However, not many people know where these electronics go when they are no longer being used and become e-waste. Until 2015, Guiyu, China, was the e-waste center of the world, taking large portions of US e-waste and recycling parts that could be utilized in the future. This presentation will use an interdisciplinary approach to look at e-waste recycling in Guiyu to demonstrate how the actions of the United States- government, laws, and daily actions of its residents- are affecting another country. The main topics to be discussed will be the past and present practices of e-waste recycling in Guiyu, China; the environmental harms that were created because of these practices; the Chinese bans and regulations that changed how e-waste is recycled in Guiyu; a look into ethically why US waste is being shipped and recycled in China; and possible solutions for the US to better manage their electronic waste will be proposed.

### **Zoe Seiler**

*What's the Point: Do the Des Moines Register's Presidential Endorsements Impact Voters?*

Faculty sponsor: Brian Steffen

This research paper analyzes the impact the Des Moines Register's presidential endorsements have historically had on Iowa voters from 1988 to 2016. The Register has endorsed a candidate for president since 1988, when it was purchased by Gannett and even before that. Presidential endorsements are a long-standing tradition of the Register but do not aim to sway elections. The endorsements are meant to offer the perspective of the editorial board and whom they think will best represent the values of Iowans and is the most capable to lead the nation.

### **Amelia Schafer**

*Made of Money: How Advertisers Use Money to Control the Media*

Faculty sponsor: Brian Steffen

This research paper analyses the history of advertisers using their monetary power to censor the media and connects this concept to Edward R. Murrow's anti-McCarthy broadcasts as well as how this concept still applies today. Looking at this topic reveals just how prevalent monetary manipulation is in censoring the media. Advertisers using their profits to try and control what Edward R. Murrow covered on his See It Now broadcasts is a definitive example of this pressing issue. When advertisers use their money to try and control what the media can say, they affect the American public. Manipulation of the media by

advertisers continues to this day, as evidenced by YouTube's demonetization of controversial or sensitive topics such as hurricanes, wars, or catastrophes, even if no imagery is shown. This paper will cover the idea that advertisers are more concerned with their public image than they are with the public itself.

**Kristina Smith**

*Quantum Chromodynamics on the Lattice*

Faculty sponsor: Nicolas Rey-le Lorier

Quantum chromodynamics (QCD) describes the internal structure of subatomic particles like protons and neutrons. An interesting and challenging property of QCD is that because of the strength of the interactions within this theory, conventional perturbative methods provide a limited view of the scope of the theory. One method that bypasses this difficulty is to produce numerical simulations of QCD by using a discretized version of 4-dimensional spacetime called the lattice. In this project, I implement a version of the Metropolis-Hastings algorithm to measure the energy of two QCD-interacting particles. My results reproduce a known fact which is unique to QCD: that the energy between two particles grows linearly with the distance. This result explains one of the most striking observed features of QCD: color confinement, which is the fact that all QCD-interacting particles are confined within bound states like the protons and neutrons.

**Amir Suljic**

*Al Fatiha: The Significance of Islam on Indian Muslim Soldiers During the First World War*

Faculty sponsor: Judy Walden

As the centenary of the end of the First World War has just passed us by, understanding the stories of Indian Muslim soldiers who fought as part of the British Empire is beneficial to our understanding of the legacy of such a catastrophic and global war. These soldiers, who fought for a foreign nation, showed immense bravery and sacrifice in the face of devastating war conditions. These Indian Muslim soldiers valued the comfort Islam gave them and used it to understand the war and their place in it. The use of Islam as a method to justify their opinion of the war is a compelling idea seen with countless soldiers. The ability to practice Islam, whether it be through prayer at makeshift mosques, reading a Quran in the muddy trenches, or fasting an entire day during the month of Ramadan, was a vital part of these soldiers' lives. The concern over the loyalty of these soldiers was a constant issue during the war, however, it provides a necessary glimpse into the totality of the First World War and how pivotal this period was for humanity. Using primary sources to uncover these sentiments, as well secondary sources to uncover religious traditions practiced at the war front, the stories of these soldiers can be fully appreciated and analyzed. The story of the Indian Muslim soldier during the First World War comes at a crucial period and deserves to be shared with the world.

**Amir Suljic**

*Nema Mira: Yearning for Prosperity Within a Democratic Bosnia and Herzegovina*

Faculty sponsor: John Epperson

The region of Bosnia and Herzegovina has seen tumultuous political and economic change in the past century. Most recently, after the death of Yugoslav leader Josip Broz Tito, a civil war erupted leaving human rights violations in its destruction. The creation of the Dayton Peace Accords, which formally ended the war in Bosnia and Herzegovina, also framed the government binding the region to this day. This agreement has largely been split along religious lines and has caused the current system of democracy in Bosnia and Herzegovina to be on the brink of disaster. Bosnia and Herzegovina's politics is present in the minds of internationalists, as the recent civil war still invokes concern. To determine how successful democracy has been, this research incorporates election data and current scholarly analysis, articulating whether or not democracy is the ideal form of government that is best suited for the people of Bosnia and Herzegovina. Analyzing recent political events, the situation in Bosnia and Herzegovina showcases how fragile democracies are in the twenty-first century. It is with this specific case that the success of other democracies can be analyzed as well.

**Elise Tauer, Katrina Sieck, and Guadalupe Valladares**

*Enough is Enough*

Faculty sponsor: Mimi Kammer

For the Theatre and Social Change class, we wrote two slam-style poems. The poems discuss topics in the Women and Gender Studies area. Our goal for these pieces is to represent unheard voices and show the emotion attached to the situations represented. Our first poem focuses on the trials of a Latina woman who is fighting against society to find her confidence. This piece is meant to challenge understanding by crossing culture and language. The second poem discusses women's body issues. We wanted to challenge the way women look at their bodies. The second poem is meant to challenge people to look at the issues surrounding the way women's bodies are presented. It challenges the perceptions and how people discuss women's appearance. A professional visual presentation was created to accompany and enhance the second poem. The pieces are meant to be performed by three people in any space that is available.

**Trey Thompson**

*Bellringers and their effectiveness in student learning*

Faculty sponsor: Heidi Berger

In a classroom setting, bellringers are an effective method to prepare students for learning. It is a short problem to begin class where students implement content they have already learned that will be helpful in the lesson for the day. This study will investigate how effective bellringers are. During my time of student teaching, I will have 2 classes of high school geometry have a bellringer to begin class followed with an "exit ticket" question at the end of class. My other two sections of high school geometry will not have the bellringer provided to them, but they will have the same exit ticket question. My hypothesis is the sections with the bellringers provided will have a higher success rate at answering the exit ticket questions compared to the two sections without the bellringer.

**Devon Veach**

*Consumers: Their Own Best Friend or Worst Nightmare?*

Faculty sponsor: Gowun Park

The consumer confidence index (CCI) and consumer sentiment index (CSI) measure what their names imply. Both the CCI and CSI gauge consumers' attitudes towards our nation's markets and overall economy. Confidence is a very fragile yet important piece of our economic system. Banks rely on confidence to stay afloat, and consumers rely on a similar sense of trust between themselves and corporations in daily business transactions. Because of its importance, significant research has been conducted on these indexes (i.e., measuring consumer attitudes towards our economy). However, little research has been done on exactly how much this confidence can affect American markets. The goal of this study is to research and analyze what type of an impact consumer attitudes have on our markets. Because of the high level of importance consumers have in our economy, the expected result is that there is a direct correlation between their attitudes and our market's performance. An optimistic consumer can improve our markets, but a cynical consumer can have detrimental effects. Data from the Federal Reserve on the CSI and CCI, as well as major news announcements, will be used to understand the attitude of the American consumer at any given point in time. To gauge the market effect of these indexes, the Standard and Poor's 500 Index (S&P 500) will be used as our market performance indicator. The S&P 500 consists of a large sample of corporations from all sectors of the economy. This provides a broader idea of how our markets are doing as a whole. Descriptive data analytics will be used to analyze correlation and trends that show the impact that consumers' attitudes play in the stock market.

**Nicole Ward**

*Comparative Analysis of School-Wide Programming in Des Moines*

Faculty sponsor: Ross Sweet

Through the Carver Bridge Program, we were given the opportunity to work with Jeffrey Panek, assessment manager for Des Moines Public School (DMPS), on a data analysis project. DMPS has sixty-four schools and thirty-three thousand students. Within these schools exists a wide range of demographics based on race, gender, and additional programming. The goal of this project was to gather standardized test scores from the Des Moines schools and through analysis, determine whether the impact of the Learning Services International (LSI) programs has improved test scores since being implemented. By using R, the data was formatted and analyzed based on demographics, such as ethnicity, gender, school location, and grade level. The results gathered will be beneficial to our mentor and the school system itself as there will be a determination if the LSI program produced increased test scores over the years of implementation.

**Val Wilson**

*Reclaiming the Serpent*

Faculty sponsor: Meave Callan

Archaeological stone figures, drawings and etchings, and written myths point to an ancient and well-established bond between women and serpents. Religious texts and modern cultural symbolism use this relationship to criticize and suppress feminine wisdom and power. However, women can still find the serpent empowering if they choose to reclaim the symbol. In my paper, I will first discuss the positive bond between serpent symbolism and feminine power proposed by archaeomythological theories, how creation and combat myths turned that relationship against women, and how a culture that grew out of those myths now treat women and serpents. Then, I will argue that women can use the symbolism present in archaeomythology to reclaim the serpent as a symbol of their own wisdom and power.



Ultimately, the serpent can provide an empowering symbol for women as they tell their stories and resist modern misogyny.

### **Mary Wood**

*The Social Media Race: How Social Media has impacted the Presidential Election*

Faculty sponsor: John Epperson

Throughout American political history, Presidential campaigns have been used to understand how mass media contribute to political communication and engagement. As media has shifted from traditional mediums such as newspapers and television to social media platforms, the way the American public interacts with politics in Presidential elections has changed significantly. Election night in 2012 was the most live-tweeted event in U.S. history, which shows the amount of influence the individual now holds in political engagement in Presidential elections. This research paper will seek to identify how social media has changed recent presidential elections from 2008 to 2016. First, this paper will look into how the candidates shifted their campaign messages to social media in order to reach the public in the 2008 election, which is arguably the first presidential election that used social media as a campaigning platform. Second, the research seeks to identify how the 2012 election used social media to play a major role in the perception, both negative and positive, of the Presidential candidates, primarily with memes and the ability for real-time interaction during and after debates on Facebook and Twitter. Finally, this paper will examine the 2016 election, which dealt primarily with the development of a campaign narrative on social media as well as the amount of debate and number of times a candidate's name was used. For example, Twitter was a major platform during the 2016 election and heavily used by Donald Trump during his campaign.

### **Mary Wood**

*"Redefining the Female Bildungsroman: Cultural Differences Between Jane Eyre and Wide Sargasso Sea"*

Faculty sponsor: J.J. Butts

Charlotte Bronte's novel, *Jane Eyre*, is widely considered a great example of a strong female character, leading to many adaptations of the novel. However, Jane is not the only character of interest to critics and writers alike. Bertha Antoinette, Rochester's mentally unstable wife whom he locked away in the attic, has been a character of interest, her most notable adaptation being *Wide Sargasso Sea* written by Jean Rhys in 1966. This article delves into the differences between Jean Rhys's book *Wide Sargasso Sea* and Charlotte Bronte's original work *Jane Eyre*. Though the books are about the same woman, *Wide Sargasso Sea* has shifted how women are depicted culturally, women's studies in literature, and styles of writing the portrayal of women compared to the original Bronte novel. By looking at some of the momentous scenes in Jane and Antoinette's personal lives and studying their interiority, we can see how their bildungsroman stories differ from each other in structure and tradition by highlighting the differences discussed in this article: location, race, patriarchy, and sexuality. Foremost, the scenery and different locations depicted in these novels reflect the interiority of the two women, which shows not only their physical differences, but also their socio-economic and cultural standings in society. Additionally, sexuality and power are an important part of both books, as this paper argues while Antoinette may seem like a character who has more sexual freedom, it is really Jane who has more sexual power because she is able to choose who she will marry. Lastly, one of the most critical topics of this paper is how identity and race play a role in both Antoinette and Jane.

**Samantha Wuebker and Miriam McDonough**

*Effect of Alcohol on Ocular Development in Danio rerio*

Faculty sponsor: Jackie Brittingham

Fetal alcohol syndrome, a subset of Fetal Alcohol Spectrum Disorders (FASD), affects 6-9 children per 1000 births in the United States (May et. al, 2014). Exposure to alcohol during critical periods of embryonic development can cause a range of physical and functional defects. One of the distinguishing features of FASD includes microphthalmia, defined as abnormally small eyes. These studies are designed to use *Danio rerio* as a model organism for characterizing the effect of alcohol on the morphological and functional development of the ocular system. We focus on the difference between alcohol-induced morphological defects in wild type versus the Dalmation mutant strain of *Danio rerio*. Zebrafish were exposed to 0.10% - 1% ethanol for the first 72 hours of development to determine the teratogenic dose response. At 4-6 days post fertilization, morphological measures such as interpupillary distance, intercanthal distance, and axial eye length were obtained. Microphthalmia measurements were computed using the axial length and width of the eye. We predict that as the alcohol concentration increases, the ocular distance will increase and ocular size will decrease. Compared to our control group we predict that 1% ethanol will have the greatest teratogenic effect, specifically with respect to microphthalmia. Additional teratogenic effects expected include a reduction in the size of the swim bladder, edema in both the gut and heart and spinal dysmorphogenesis. These studies will also identify the teratogenic potential of ethanol in different genetic backgrounds, illuminating the complex genetic components that lead to the variable susceptibility in FASD.

Panel Discussions

*The Case for Interfaith*

Panelists: Lauren Hastie, Val Wilson, Vincent Lloyd, Bailey Peterson, and Tyler Jacobs

Faculty sponsor: Meave Callen

Students in Introduction to Interfaith Studies, along with their professor, will present on the case study method, which uses incidents in which conflicts arose relating to religious diversity and explores how such conflicts might be productively resolved and what steps might be taken to reduce the likelihood similar conflicts might arise in the future. A succinct case study will also be read and discussed, considering how it relates to other conflicts and how we might productively respond to similar situations that could arise in our community.

*George Washington Carver Fellows Research*

Panelists: Heidi Ekborg-Ott, Maxie Saceda-Hurt, and Kathryn Velasquez

Faculty sponsor: Carolyn Dallinger

We will explain the George Washington Carver Fellows program and the research requirements for first year students within the program. Each student will detail the findings of their research which will include: the influences of mentorship on George Washington Carver's life and legacy; how Carver's scientific research findings helped Southern farmers; and how a select few of Carver's inventions have

potential for use locally and internationally to better lives including soybean plastic, peanut milk and sweet potato rubber.

*Building Capacity for HSL capstone internships*

Panelists: Anna Herrmann, Tyler Unruh, Pierce Carey, Reagan Sesker, Annyka Morris, Madi Paulson, Ryan Morgan, and Sarah Skladzien

Faculty sponsor: Jacy Downey

This panel discussion will feature HSL students who have previously or are currently engaged in a HSL internships. I will invite HSL students who have yet to register for internships to participate in the discussion so that they will be better armed to be an advocate for starting conversations with potential host sites about developing high-quality, rigorous internship experiences. Currently, I have been developing internships for students, one-at-a-time, using a project-based model. This process is not sustainable nor does it empower students to engage with the professional community.

*Choking on Plastic: Looking for Solutions*

Panelists: Reza Dad Mohammadi, Sydney Alt, Michael Roets, Michael McGee, Triniti Kraus, Heidi Ekborg-Ott, Mackenzie Ritscher, Natasha Shipp, and Carter Fricke

Faculty sponsor: Jan Everhart

This panel is composed of students from the SC Honors class, Choking on Plastic. Participants in this interdisciplinary leadership-driven course came together in an attempt to quantify and mitigate Simpson College's contribution to the single-use plastic crisis. Plastic discarded by millions of Americans kills wildlife, contributes to ocean and air toxicity, adds to harmful greenhouse gases, and even enters the bodies of humans as it degrades in the form of micro-plastic. This honors course first considered policy change on Simpson's campus to minimize the college's output of single-use plastics. Based on survey results, the class is working to add several eco-friendly products to the campus bookstore. The class is also conducting a new audit of the SGA-funded "hydration stations" on campus. Finally, the class is working to set the groundwork for significant future change in policy. Identifying Kent Campus Center as one of the biggest producers of single-use plastic on campus, this group continues to work to bolster support for plastic-reducing efforts in the facility. To do this, the Choking on Plastic class combined a variety of persuasive techniques with an artistic display sculpted from three-weeks' worth of plastic collected from this panel's participants. This panel's presenters will explain the research, activism, and results behind our various plastic-reducing research and efforts.

*Globalization and Social Justice in BRICS*

Panelists: Brenna Yeutsy, Katie Mitchell, Lauren Mahlberg, Abby Loecke, Helena Laster, Alex Hawthorne, Edward Halbur, and Kate Derrick

Faculty sponsor: Ali Madanipour

Students in the department of social sciences are conducting comparative study of various aspects of globalization (political, economic, and socio-cultural) and social justice among BRICS (Brazil, Russia, India, China, and South Africa) as well as the United States. They will apply various quantitative and qualitative

methods such as descriptive comparative methods, case studies... to respond to their research questions about social justice in the era of globalization.

### *Advanced Research in Psychology*

Panelists: Ethan Woodruff, Kaitlyn Klommhaus, Katarina Moore, Mariah Clark, Melissa Ward, Paige Bendt, and Paige Rader

Faculty sponsor: Sal Mayers

7 students will present the empirical research projects they are conducting.

Ethan Woodruff: How Body Dissatisfaction Relates to Stress for Males and Females

Kaitlyn Klommhaus: Memory for Trustworthy versus Untrustworthy Faces

Katarina Moore: Perceptions of Politicians' Morality: Effects on Political Efficacy and Cynicism

Mariah Clark: Attachment Styles and the Perceived Risks of Seeking Support from Close Relationships

Melissa Ward: Listening to Music When Sad: Do Implicit Theories of Emotions Predict Music Choices?

Paige Bendt: Imposter Phenomenon: Effects on Belongingness and Academic Motivation

Paige Rader: Applying the Elaboration Likelihood Model of Persuasion to Improve the Environment

Note: Ethan Woodruff is part of 2 other classes which are doing symposium presentations. Katarina Moore also needs to present for her political science Senior Seminar course; however, she might be doing a poster.

### *Maple Tree Marketplace*

Panelists: Luke Sarver, Madi Paulsen, Miranda Plowman, Jonathan Steinkruger, Madison Rasmussen, Madison Koonce, Megan Waldbillig, Rhett Murphy, Vaughn Brasseaux, and Mackenzie James

Faculty sponsor: Marilyn Mueller

The senior management capstone students will present the results of their work on Maple Tree Marketplace (MTM). An e-commerce site designed to promote and grow an entrepreneurial ecosystem at Simpson College and with the Indianola community, students, faculty and staff are starting businesses and establishing them on MTM. The goals of MTM are that members are learning new skills, developing their networks and making money in the process to help with expenses. Attend the presentation and learn about the journey of founding MTM.

### *Speech Performances*

Panelists: Kylie Burmeister, Eimear Fanthorpe, Melanie Gillet, Lydia Magalhaes, and Belle Ward

Faculty sponsor: Deano Pape

Several students from the speech program will perform their events during the symposium. Events may include an after dinner speech, humorous monologue, and duo interpretation of literature. Thank you for your consideration!

*What is the future of the hundreds of Iowa small towns?*

Panelists: Austin Hronich, Randy Paulson, Zoe Seiler, Taylor Bates, Dustin Teays, and Emily Carey  
Faculty sponsor: Mark Seibert

The Multimedia Journalism Senior Seminar class is again teaming up with Iowa Watch, a nonprofit journalism organization at the University of Iowa, to do a journalism project of statewide impact. This year's class will be examining what the state is doing to help small communities grow and increase business/economic activity. They are trying to answer the question: Is there anything being done to save small-town Iowa? Much investment is made in the state's urban areas where cities are using state money to attract tech giants such as Google and Facebook or huge manufacturers like a \$3 billion fertilizer plant in southeast Iowa. One particular focus of this project will be Humeston, a town in Wayne County, south of Indianola. The students will be gathering stories from the townspeople and also talking with rural development experts and state officials. They we also will look at the declining population. In Humeston, for example, the population was 1,200 in 1920 and is now down to just 500 - a decline of 58 percent.

*Senior Capstones for Sport Science & Health Education Majors*

Panelists: Ashley Allen, Logan Egeland, Chase Erickson, Gable Johnson, Prince Krah, Kelsa Berkland, Jacob Becker, and Shelby Hunemiller  
Faculty sponsor: Katie Smith

Students from the Department of Sport Science and Health Education will present their senior capstone in Exercise Science or Sport Administration. Capstone presentations will be a report of independent research or a comprehensive academic experience embedded in a senior internship. Students from all realms of the department are encouraged to attend to foster ideas for future capstones, research projects, and internships.

*The Human Figure, Art, and You*

Panelists: Sydney Alt, Jacob Becker, Paula Carlson, Olivia Curtis, Bailey Earls, Olivia Erickson, Carter Fricke, Kelli Hanson, Taylor Hoffman, Blake Kakacek, Gizzy Keeler, Meara Moore, Laura Nielsen, Benjamin Rupe, Elise Sturgeon, and Isabelle Ward  
Faculty sponsor: Katie Smith

This panel will consist of a compilation of art projects from students in the Honors 190-B Health at Every Size course from the spring semester. A significant aspect of the course was exploring how every body is a form of art, despite shape, size, length, color, etc. We have spent the semester exploring scientific reasonings behind clinical parameters of health as well as the role of bodies in art on stage, in performance, and historical and current day works of art.

*STEM Competition Showcase*

Panelists: Emily King, Mason Remington; Eli Marriott, Michael Roets, Max Folkers; Mackenzie Finnegan, Andrea Van Wyk, Leslie Decker; Jacob Austin; Scott Odeiro; Blake Dalmas; Kaylee Grabarkewitz; Kade Tatkenhorst, Denver Hargrove, Cole Jacobsen; Hannah Anderson, Benjamin Harrison, Emilie Hulse, Samantha Wuebker; Daniel Goldsmith, Hannahlynn Heinen, Amanda Stadlander, Ethan Woodruff; and Andre Flatt, Galen Gist, Carley Irlmeier, Ellen Willhoit  
Faculty sponsor: Ross Sweet

In the Division of Natural Sciences, Simpson students participate in a wide range of STEM-related competitions, from biology to mathematics and computer science. This panel is a showcase of those competitions, student work, and results. Come see how Simpson students are applying their knowledge in interesting and interdisciplinary ways to solve real-world problems.

#### *Simpson College During the First World War*

Panelists: Abby Anctil, Jordan Baldwin, Jimmy Camp, Karrecia Crawley, Kenyon Draper, Emmy Farrell, Wade Gibson, Melanie Gillet, Collin Lowry, Eli Marriott, Questen McFarland, Elliott Meyer, Madeline Schulenberg, Josiah Sutton, Geoffrey VanDeusen, Jordan Yawn, and Joe Meyer

Faculty sponsor: Judy Walden

Students from HIST 285 will be using the Simpson College Archives to research what life was like at the College from 1914-1919, during the years of the First World War and the 1918-19 Influenza pandemic. This panel discussion will present the results of their research projects. Possible topics include views of the war and the U.S. involvement, attitudes towards Germans and German Americans, impact of the war on students and student life, gender roles during the First World War, and the impact of the influenza pandemic on the College.

#### *Business Model Canvas: Using innovative entrepreneurial experiments to discover ideas and solve problems.*

Panelists: Andrew Bowles, Vaughn Brasseaux, Trey Byers, Mackenzie Clayton, Reid Cobb, Tom Hol, Todd Kale, Jessie McElderry, and Katrina Sieck.

Faculty sponsor: John Walker

Business models and ideas are innovating at an ever-increasing rate. In order to maintain pace in this environment business people are utilizing a flexible strategy to identify the right business ideas. The Business Model Canvas (BMC) is a tool that can be used to capture innovative ideas in real time and increase the probability of successful business venture creation. BMC allows you to visualize your business model, detect weaknesses and test whether it can work.

For this research project, students will apply the BMC to observations in their surrounding environment and discover both business ideas and potentially solvable problems. Students will utilize scientific methodology to make these observations and create specific hypotheses, develop experiments, and measure results. Failure and feedback will create an iterative process culminating in a documentable timeline of idea creation and re-creation.

Student poster presentations will provide a visual explanation of their research and process flow.

#### *Acting for Change*

Panelists: Caitlyn Berkey, Casey Dorhout, Tyler Dredge, Tonya Greve, Claire Johnson, Kelsey Keenan, Melissa Miller, David Moissonnier, Ben Sebastian, Taylor Sudmann, Nicole Ward, Cody Bell, Tatum Clayburn, Spencer Davis, Kate Derrick, Chastain Evans, Lisa-Marie Fricke, Alexa Kinkade, Brennen Lemke, Kyle Makar, Dev Patel, Jade Thompson, and Guadalupe Valladares

Faculty sponsor: Patti Woodward-Young

And Social Justice Studies (not given as a choice).

Over the course of this semester we have collectively read, viewed, discussed and explored in many

manners a myriad of social injustices. Some of these are housed in the attitudes and biases of individuals while others are embodied in systematic inequality in our institutions. Each student has found one inequality about which they are passionate and designed and carried out an act of activism to bring about positive change.

This may be in the form of one larger (more complex and time consuming - minimum of 6 hours devoted to doing this project) act such as creating, filming and posting a YouTube raising awareness of the inequality in a powerful and moving way. Or perhaps, if they were in a practicum or internship setting, they may have facilitated a training or two that raises awareness of others and then facilitated their writing of letters to congress or to a corporation (like McDonald's), media service, publishing company, etc. Perhaps they decided to run for office on a city council, school board, legislature, etc. or work in a campaign of another. If they chose to do a smaller (less complex and time consuming) act, I asked that they do two of these smaller acts of activism. (minimum of 6 hours devoted to doing these projects). Some examples might be writing a letter to the editor, a letter to legislators, speaking to a group, etc. These will be will all shared collectively in panel presentation. There will be a brief 5 minute introduction and then silent gallery style presentation (each person will have one half table for visual display).