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Illinois' first public university



2020 Online UNIVERSITY RESEARCH SYMPOSIUM PROGRAM BOOK

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Welcome to the 2020 Online University Research Symposium

At Illinois State University, we understand that research is central to our core values of learning and scholarship. We define research to include many forms of inquiry, scholarly creativity, and innovation. Our faculty regularly serve as mentors, guiding students in systematic inquiry and investigation so that they have the opportunity to experience the thrill of discovery, insight, and invention. We encourage all students to participate in such endeavors. Student research occurs across the campus in the context of specific courses, independent studies, and theses and dissertation projects. Faculty and staff mentorship helps Illinois State University students make valuable intellectual or creative contributions to their disciplines. Remarkably, over one-third of Illinois State University faculty publications, conference papers, and other creative works typically include student contributions and recognition.

Our offices and campus partners are proud to support student research with grants and travel funds, workshops, technical resources, research competitions, and exhibitions. We regularly facilitate student participation in off-campus professional and academic conferences at the regional, national, and international level. On campus, The University Research Symposium is the premiere showcase for student scholarship, featuring close to 400 individual or group oral and poster presentations. This marks the 29th year of the University Research Symposium, indicating its importance to student achievements.

The 2020 Spring semester presented unprecedented challenges that impacted our ability to host the Symposium on campus, but this does not diminish the recognition and accolades deserved for our student researchers and faculty mentors. You have persevered through difficult times and we applaud you. Congratulations on your achievements!

Dr. John Baur, AVP for Research and Graduate Studies

Dr. Gina Hunter, Director, Office of Student Research

Dr. Noelle Selkow, Interim Director, Graduate School

Abstracts By Department

Agriculture

Presenter: Frederick Adomako, Graduate

Mentor: Aslihan D Spaulding

Co-mentor: Iuliia Tetteh

Title: BIG DATA ON THE MIDWEST FARMS: AN ASSESSMENT OF THE USE, CONCERNS, AND CHALLENGES

Farming is undergoing a digital revolution (Bronson and Knezevic, 2016). The advent of plant genetics, chemical inputs and more recently guidance systems have transformed the industry into one that is increasingly technology-intense and data-rich (Stubbs, Big Data in U.S. Agriculture, Congressional Research Service, 2016). In 2015, investors poured \$661 million into 84 agricultural startups to help farmers transform agriculture into the next big data industry (Pham and Stack, 2018, Burwood-Taylor, Leclerc, & Tilney, 2016). Farm machines in today's agriculture are equipped with sensors and cameras that capture field-level data like soil moisture, leaf greenness, temperature, seeding, fertilizer and pesticide spraying rate, yield, fuel usage and machine performance (Pham & Stack, 2018). Approximately 70 percent of tractors in the U.S. have GPS with auto steering technologies and 40 percent of all corn farms can potentially use yield monitors (Schimmelpfennig, 2016).

Though big data is seen as having a lot of prospects for the agricultural sector, certain issues including who has access to the data generated and to whom the data generated belongs to is of concern. Many producers are skeptical of data storage companies allowing their data to end up in the wrong hands which has prompted discussions by a number of articles (Castle et al. 2016). Singh and Kaskey (2014) state that "big agricultural companies could now control a data trove that presents privacy and business risks to farmers who don't want to share the secrets of their trade with rivals or the government." An overwhelming majority of producers believe farm data belongs to them and them alone (Banham, 2014). This belief of ownership has resulted in much discussion of developing a farm data exchange, in which producers could be compensated for sharing of their data (Shickler, 2015; Banham, 2014; Singh & Kaskey, 2014).

The purpose of this study is to identify factors that influence Midwestern U.S. agricultural producers' adoption of big data technologies and some challenges these farmers encounter in the acquisition, use and control of these technologies for production management and agricultural decision-making purposes. Both online and paper survey were used in this study. Surveys were mailed and emailed to 620 and 11,556 farmers respectively within Illinois, Indiana and Iowa. Results of this study will add to the existing knowledge of literature and may assist stakeholders and policymakers to better understand rates of adoption of big data technologies and the concerns of farmers.

Presenter: Garrett Conaty, Undergraduate

Mentor: Maria Boerngen

Title: THE DECISIONS MADE BY FARM MANAGERS

Farm managers typically work for farmland owners who are not actively involved in farming operations. For example, most farm managers are involved in farm income tax paperwork; fertilizer, seed, and chemical recommendations; and conservation practice decisions. I am researching the processes farm managers go through to make these decisions for individual farms. I am specifically interested in the process that goes into deciding what farms to rent to what tenants, how much to rent it out for, and the different terms of contracts (i.e., upkeep practices for each farm). To complete my research, I will be job shadowing multiple accredited farm managers through the Illinois Society of Professional Farm Managers and Rural Appraisers (ISPFMRA).

Presenter: Rebecca Dwyer, Graduate

Mentor: Nicholas Heller

Title: AGRONOMIC AND DEMOGRAPHIC DISCOVERY OF ILLINOIS INDUSTRIAL HEMP PRODUCTION

Farms and farm families across the country, especially in Illinois, are struggling financially to produce corn and soybeans. Industrial hemp (*Cannabis sativa* L.) is a new option for an economically viable crop with over 25,000 recognized end uses. Industrial hemp was legalized for production and processing in Illinois in 2019. Numerous media articles have referenced industrial hemp production as a “gateway into farming” for young adults, women, and minority groups, but there are not yet studies to support this assertion. As of 2017, only 8% of Illinois agricultural producers were under the age of 34, 29% were women, and 99% identified as white. One purpose of this study is to identify the general demographics of Illinois industrial hemp farmers. This will help us to better understand the role of industrial hemp production in increasing diversity in agriculture. For the 2019 growing season 631 individuals applied for and received a license to produce industrial hemp. This number does not include industrial hemp processors or certified labs for testing industrial hemp plants. Industrial hemp promises to be an environmentally and economically sustainable crop which is new again to Illinois - prior to the 2014 Farm Bill, industrial hemp production had been banned for over 70 years. Thus, there have been no local agronomic research trials and no published best production practices for Central Illinois. For other crops produced in Illinois, there are decades of advanced agronomic research to support farmers in making decisions such as seeding rate and depth, weed control, and insect and disease management. This lack of research in industrial hemp farming makes producer decisions difficult and is one of the many challenges faced by industrial hemp farmers in Illinois. We will conduct an industrial hemp fiber production trial over the 2020 growing season to begin reducing this problem and will focus primarily on seeding rates of fiber varieties for various end uses.

Presenter: Blake Hartman, Undergraduate

Mentor: Maria Boerngen

Title: YOUNG FARMERS ADVICE 101

The majority of farmland in Illinois is operated by farmers who rent the land from landowners. Landowners are often represented by accredited farm managers in the process of selecting farm operators and determining the terms of farmland leases. Through this process, landowners and farm operators establish a business relationship, and a farmer who wishes to rent must indicate to the landowner and/or farm manager that he or she is a good candidate to farm the owner’s land. Farmers who are more established and experienced have connections with landowners and farm managers, in addition to proven production and financial records, and may therefore be more likely to be chosen as an operator. Therefore, it is often a struggle for young farmers today to rent farmland for the first time due to their relatively limited resources and experience. The objective of this case study was to identify steps a young farmer can take to best prepare to be chosen to rent farmland by a landowner. Through telephone interviews in Fall 2019, ten accredited farm managers from throughout the state of Illinois provided valuable information that young farmers can utilize they seek to advance their farming careers. Interview participants were members of the Illinois Society of Professional Farm Managers and Rural Appraisers (ISPFMRA), representing a wide range of experience levels (from nine to fifty-nine years). Questions addressed the farm managers’ background and experience, and specific steps young farmers can take to best represent themselves to landowners. Results of this study indicate that young farmers should establish good reputations and strong connections in their communities, and document the capital they have available to their operations. They should also stay informed about trends in the industry, be prepared to offer a fair cash rent, and avoid what accredited farm managers refer to as “rent chasing.” The results of this study can inform the efforts of young farmers as they seek to build and grow their farming careers.

Presenter: Bailey Hoerbert, Undergraduate

Mentor: Maria Boerngen

Title: THE PERCEPTIONS OF MEDIA PORTRAYALS OF AGRICULTURE

With less than 2 % of the population being directly involved in agriculture production, the general public has lost touch with where their food comes from and have a lack of trust towards agriculture producers. Studies have shown that Americans tend to fear food production and production agriculture. This fear stems from not understanding what farmers are doing and why they are doing it. A recent report found that younger adults have more trust in technological sources such as bloggers, fitness apps, and TV personalities than information from farmers and scientists. While information is becoming more available at faster rates than in years past, not all media information is accurate. It has been reported that fake news stories increased exponentially in the months leading up to the 2016 presidential election. While “fake news” is a term typically used when discussing politics, it also has negatively affected the agriculture industry. False media portrayals about the agriculture industry can easily push consumers to have doubts about the overall production of food. To address the disconnect between farmers and the non-farming public, we paired agriculture students (who grew up on farms) and non-agriculture students (who did not grow up on farms) together to discuss their varying perspectives on the agriculture industry, one-on-one. These paired student experiences took place in Fall 2018, Spring 2019, and Fall 2019 semesters (n=32). We sought to measure any changes in the participants’ perspectives as a result of this experience. The media portrayal of agriculture was one of the issues we studied. Through questionnaires administered prior to this experience, we determined that the agriculture students perceived a more negative media bias toward the industry than the non-agriculture students ($p < 0.001$). Follow-up questionnaires evaluated how these perceptions and beliefs

Presenter: Raeann Huffman, Graduate

Mentor: Nicholas Heller

Title: CORN AND SOYBEAN CROPPING SYSTEMS: PROFITABILITY OF DIFFERENT AGRONOMIC MANAGEMENT TECHNIQUES

The environmental impact of current production agriculture operations in Illinois and across the corn belt have attracted attention in many studies. These studies point out the nutrient over application that then leaches off the farm and the negative impact monocultures have on biodiversity. The modern agriculture industry focuses largely on efficiencies on a large scale and on yield - not on farm profitability. Operations are dependent on costly inputs such as seed, fertilizers, herbicides, fungicides, insecticides, and machinery costs. Despite rising yields, the current system is not sustainable and has resulted in a concomitant continued rise in farm bankruptcies. We propose alternative practices including intercropping which is a sustainable practice that can improve resource-use efficiency, such as nutrients and water, allowing low input agricultural systems. A system that reduces inputs and those associated costs may help increase operational profitability. The current study will evaluate cropping system specifics including row spacing, row orientation, seeding population, and intercropping and their impact on profitability which may offer producers a sustainable alternative to monocultures.

Presenter: Brianna Messman, Graduate

Mentor: Michel Barrowclough

Title: MENTAL HEALTH SERVICE PREFERENCES AMONG ILLINOIS DAIRY FARMERS: A BEST-WORST SCALING APPROACH

Mental health has gained significant awareness across the United States (U.S.) in the past decade. Some communities in the U.S. however, have only recently begun to address this topic. Importance of mental health is expanding within the agriculture community. One reason for this could be low levels of mental health within this community. For instance, males in the U.S. agriculture sector had a suicide rate of over one and half times the national average in 2015. Mental health concerns have been increasing in a particular sector in agriculture more recently, the dairy industry. Some of the main reasons for decreasing mental health in the dairy sector include low milk prices, excess supply, economic hardships, and retaliatory tariffs imposed by Mexico and Canada. With the ongoing trend of negative economic returns for dairy farmers projected to continue through 2020, there is no better time to address mental health concerns for dairy farmers. This study will focus specifically on dairy producers in the Midwest state of Illinois. 2018 brought about the lowest net returns per cow since 2012 at a negative \$747. Combining negative returns with increasing feed costs and continued low milk prices and the importance of this topic is realized. The five objectives that this study is focused on are: identifying mental health service options preferred by Illinois dairy farmers willing to seek help, quantifying tradeoffs that Illinois dairy producers are willing to make when choosing between service options, determine factors that affect the tradeoff decisions that will be made, examine anxiety and depression levels and the impact that has on decision making, and identifying subgroups, if any, that may influence any tradeoff decisions that will be made. A questionnaire will be administered using the best-worst scaling approach to collect qualitative data in regards to the mental health of dairy farmers in order to achieve this goal. This data will be examined in order to acquire a greater understanding of this topic such as service preferences, possible mental health disorders, and various demographics. The findings from this study have the potential to assist policy makers at the local, state, and federal levels, as well as agricultural organizations in creating and implementing programs towards the preferences of mental health services among agricultural producers. The use of such programs, if implemented, could lead to a decline in mental health illnesses and incidents, such as suicide.

Presenter: Jacob Styan, Graduate

Mentor: Maria Boerngen

Title: INCREASED USAGE OF CASH RENT: FACTORS INFLUENCING ILLINOIS FARMLAND LEASES OVER THE PAST TWO DECADES

In recent years, cash rent leases have become increasingly popular amongst farm landowners in Illinois. Since 1995, Illinois has seen a 44% rise in cash rent lease usage in Northern Illinois, a 105% increase in Southern Illinois, and a 117% increase in Central Illinois for acres enrolled in the Illinois Farm Business Farm Management Association, which helps operators make farm management decisions. The rise in cash rent lease usage has been attributed to many factors such as crop yields, commodity prices, crop revenue, commodity payments, and crop insurance. This study aims to determine which factors are the most pivotal in driving the shift toward the use of cash rent leases in Illinois. Using data from the USDA National Agricultural Statistics Service (USDA-NASS), the Environmental Working Group (EWG), and University of Illinois farmdoc, the determinants mentioned above were examined to explore the effects they have on the increasing use of cash rent leases. Data from each variable was collected from all 102 counties in Illinois over a 21-year period and then moved into the correct region. Comparisons were made across the three regions in Illinois (Northern, Central, and Southern) from 1995-2015 using four different fixed effects regression models. Results indicate that crop insurance payments ($p < .001$), corn price ($p < .05$), soybean price ($p < .05$), corn revenue ($p < .05$), soybean revenue ($p < .05$), and commodity payments ($p < .05$) have all influenced the increasing use of cash rent leases in Illinois. However, corn and soybean yield did not influence increasing cash rent usage in Illinois. Although there were only 5,500 Illinois farms examined in this study, the findings can be viewed as a starting point for why the usage of cash rent leases are increasing in Illinois. With agriculture consistently changing, any variations that occur to the variables examined in this study could potentially have major ramifications on the leasing market in the years to come.

Presenter: Kaiti Zbinden, Undergraduate

Mentor: Iuliia Tetteh

Title: THE ROLE OF SHARED VISION IN SURVIVAL OF MULTIGENERATIONAL FAMILY BUSINESSES

Succession planning plays a vital role in the survival of a family business from one generation to the next. However, if succession planning is so critical, why do only 30 percent of family businesses survive from the first generation to the second, only 12 percent from the second generation to the third, and only 4 percent from the third generation to the fourth (Poza 2013). Previous studies have revealed that having a shared vision for the future of the multigenerational family business increases the likelihood of a smooth and effective leadership transition. If a shared vision is so important to the multi-generation survival, why are there gaps in having one? The purpose of this study is three-fold: first, to conduct an in-depth literature review on various aspects/factors that impact the creation and use of shared vision for the future of the firm by the younger and older generations, second; to develop a survey instrument that will be used to identify if multigenerational family farm businesses indeed have a shared vision for the future of the farm; and third, to draw on the existing evidence from agriculture and non-agriculture fields to identify practical strategies to create a shared vision and increase the probability of survival of a family farm business.

Art

Presenter: Spencer Molnar, Graduate

Mentor: Daniel Breyer

Co-mentor: Tyler Lotz

Author: Spencer Molnar

Title: THE ARTISTIC AND PHILOSOPHICAL SEARCH

Whether it be looking at something from above or below. Or attempting to understand different political opinions, it is hard to refute the fact that in daily life we are constantly confronted by different perspectives. My artistic research and exposure to different philosophies, as well as visual psychology, have fostered the notion that attempting to understand the world through multiple perspectives is common to our human behavior and psyche. It seems as though humankind has endlessly strived to reconcile seemingly opposing views. In a sense, you might say that collectively (and individually) we have attempted to make “wholes” out of a fragmented world. One of the most widely accepted forms of visual psychology to describe this phenomenon would be the gestalt principal of closure. Closure attempts to explain how human perception is inclined to see forms in a complete state, despite the absence of one or more of their parts. A seemingly opposing perspective to gestalt’s principle of closure might be observed in the philosophical idea of anattā, which is a Buddhist doctrine that identifies a person’s “self” as constantly undergoing change. Therefore making a “self” imperceptible. My claim however, is that principals such as closure explain how individuals can distinguish a “self” through phenomenal experience – an idea that would not be dissimilar to constructing meaning through experience. Systematic investigations within my painting practice have allowed me to come to this conclusion. And, unlike more conventional forms of research, visual art opens up new ways to understand conceptual ideas that are not strictly data-driven. Instead, visual art (as well as philosophy) provide a space to nurture and understand ideas in a way that is as fluid as our ever-changing world.

Biological Sciences

Presenter: Jessica Edmondson, Undergraduate

Mentor: Victoria Borowicz

Title: PARASITE PACKS A PUNCH: IMPACT OF SCARLET INDIAN PAINTBRUSH ON THE GROWTH OF ITS HOST

Castilleja coccinea, commonly known as Scarlet Indian Paintbrush, is a root hemiparasitic plant native to Illinois and other areas of the central and eastern United States. As a hemiparasite, *C. coccinea* is green and photosynthetic, but grows haustoria that penetrate neighboring plants' roots to steal various types of nutrients. *Castilleja coccinea* can survive alone, however, it is not known to fully mature without having penetrated roots of a host plant. *Castilleja coccinea* is known to parasitize many vascular plant species, and scant literature suggests *Lobelia spicata*, commonly known as Pale Spiked Lobelia, is a viable host. *Lobelia spicata* is also native to Illinois prairies and other surrounding areas of the United States. We tested the hypothesis that by taking minerals, water and other nutrients from the host's xylem stream, *C. coccinea* reduces host growth and alters the host's allocation to shoot and root growth, and that *L. spicata* would be a suitable host for this particular hemiparasite. *Castilleja coccinea* seeds were added to young *L. spicata* plantlets and fertilized with either high or low concentration of fertilizer. Plants were harvested, cleaned, dried and weighed approximately 31 weeks after the addition of *C. coccinea* seeds, and the masses of roots and shoots were recorded and compared. Parasitism by *C. coccinea* significantly reduced root and especially shoot growth of the host, but the impact was dependent on the level of fertilizer. Shoot mass of *L. spicata* was depressed regardless of fertilizer level, but root mass was significantly reduced only in *L. spicata* treated with [high] fertilizer. We conclude that: (1) *Lobelia spicata* is a viable host for *Castilleja coccinea*, (2) this hemiparasite strongly reduces growth of the host, but (3) the impact of the hemiparasite on host growth depends on nutrient supply. Currently, little information about *C. coccinea*'s preferred hosts and their dynamic relationships is available, so these results add to the understanding of hemiparasite-host interactions.

Presenter: Iresha Jayasinghe, Graduate

Mentor: Rebekka Darner

Title: WHAT FACTORS INFLUENCE OUR SCIENTIFIC ARGUMENTATION ABOUT BIODIVERSITY CONSERVATION?

Examining the human-nature relationship and individual reasoning about biodiversity conservation is important to understanding human treatment towards nature because this provides direction to mitigate human induced environmental issues. This study determines whether individuals' relationships with nature (NR) and emotions experienced during evidence evaluation drive evaluation of evidence and claims about biodiversity conservation. It is hypothesized that participants exhibit motivated reasoning during argument evaluation, in which their NR and emotions experienced during argument evaluation will influence their evaluation of the evidence-based argument. The predictions are: 1. Participants with a strong NR exhibit higher quality argument-evaluation skill as they evaluate an anti-conservation argument, compared with their pro-conservation argument evaluation. 2. Participants who experience positive emotions during evidence evaluation will demonstrate higher quality argument evaluation skills, compared to participants who experience negative emotions during evidence evaluation. The participants were approximately 250 undergraduate students from a large, Midwestern institution recruited via the university mass email listserv that included a link to the Qualtrics questionnaire. Relationship to nature was measured using the short version of the NR scale. Scientific argumentation was assessed by the Uncertainty-Infused Scientific Argumentation Test (USAT) modified to focus on biodiversity conservation argumentation. Although we predicted that participants with strong NR would exhibit motivated reasoning, resulting in strong argument-evaluation skills as they evaluate an anti-conservation argument, we found that participants' emotions during evidence evaluation were more predictive of their argument-evaluation skills. Further, participants with either low or high conservation concern demonstrated better argumentation skills. These findings suggest that while fostering strong relationships with nature may be important, of greater importance is to address emotions experienced when evaluating evidence. Furthermore, this study indicates a possibility that one's reasoning about arguments made about biodiversity conservation may be motivated by how important one deems conservation to be.

Presenter: Elliot Lusk, Graduate

Mentor: Joseph Casto

Title: EFFECTS OF IN OVO TREATMENT WITH ETIOCHOLANOLONE ON NESTLING DEVELOPMENT

When transferred to egg yolks during oogenesis, maternally derived testosterone can alter offspring phenotypes. However, avian embryos readily metabolize testosterone to etiocholanolone early in incubation. Thus, it remains unclear whether testosterone or etiocholanolone mediates the phenotypic effects of maternal yolk testosterone, or whether this metabolism serves to inactivate the maternal steroid signal. Previously, injection of artificially incubated European starling (*Sturnus vulgaris*) eggs with etiocholanolone resulted in no detectable changes in embryonic phenotype after five days of incubation; however, few phenotypic traits were readily assessed at that embryonic age. Here, we examine the effects of in ovo etiocholanolone treatment on starling nestling phenotypes throughout nestling development. On the day they were laid, eggs were marked, injected with 5 ng of etiocholanolone in sesame oil, oil alone, or left uninjected, and returned to nests to complete incubation. The fates of eggs and their resulting nestlings were followed through fledging. At five, ten, and fifteen days of age, structural growth was assessed, and blood was collected to assess hematological development, blood glucose, and corticosterone titers. Pre- and post-hatching nesting success was similar among treatments and the percent of eggs hatched was affected by complications associated with injection, but not the addition of etiocholanolone. Structural growth, plasma concentrations of the metabolic hormone corticosterone, and hematological development were also largely unaffected by experimental treatment with early hematocrit levels being affected by oil itself and not etiocholanolone. Our analyses support the idea that embryonic metabolism of testosterone to etiocholanolone serves to inactivate a maternal signal that influences offspring development rather than mediate the maternal effects of that signal.

Presenter: Teagan Sudbrook, Undergraduate

Mentor: Ryan Paitz

Title: DYNAMIC CHANGES IN YOLK STEROID LEVELS IN EGGS DURING DEVELOPMENT

The early endocrine environment is important to embryonic development because steroid exposure can induce permanent effects on offspring. In birds, maternal steroids are present in the yolk, which is thought to occur because steroids are lipophilic and the yolk has a high lipid content. Numerous steroids can be detected in bird yolks, with progestogens such as progesterone, pregnenolone, 17 α -hydroxypregnenolone, pregnanedione, and pregnanolone being more abundant than the androgens. Once incubation begins, many of these steroids are subject to metabolism by the embryo in ovo, but very little is known about the specific routes of metabolism or what happens to steroids in the yolk during the later stages of development. To examine how steroid levels in the yolk change throughout development, chicken eggs were incubated and frozen at days 3, 6, 9, 12, and 15 of development and steroid levels in the yolk were quantified using LC/MS/MS. We found that some steroids, such as pregnenolone, etiocholanolone, progesterone, pregnanedione, and pregnanolone, showed a drop in concentration early in development but levels then transiently rose during the middle stages of development before dropping again after day 12. Our current interpretation of these findings is that maternally derived steroids that are present at the onset of development are metabolized before the embryo starts producing steroids that can be detected in the yolk. Towards the end of development, the embryonic steroids in the yolk are metabolized. Overall, these data suggest that steroid levels in the yolk of bird eggs are dynamic over the course of development, going through several periods of being elevated and then subsequently metabolized. The specific mechanisms regulating these changes in yolk steroid levels are currently being investigated.

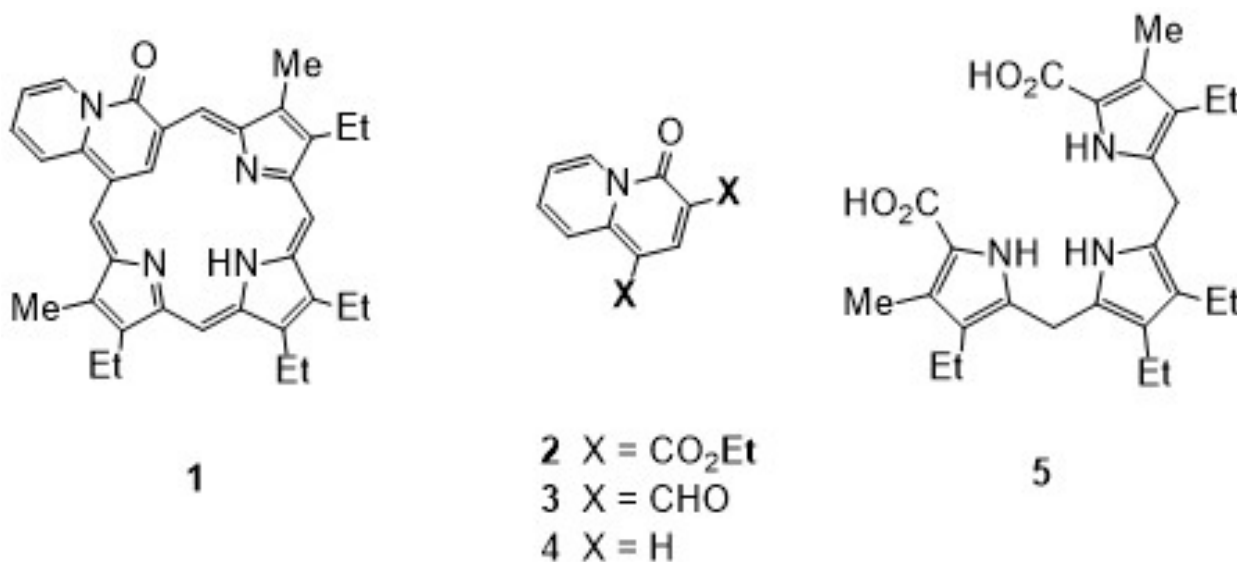
Chemistry

Presenter: Emma Cramer, Graduate

Mentor: Timothy Lash

Title: SYNTHESIS OF OXYQUINOLIZINIPORPHYRIN

Carbaporphyrinoids are porphyrin analogues where one or more of the internal nitrogen atoms have been replaced by carbons. Many examples of these systems have been reported and these show diverse reactivity and modified spectroscopic properties. In order to further extend this field, the formation of carbaporphyrinoid systems incorporating heterocyclic subunits is being investigated. Specifically, porphyrinoid **1** incorporating a 4*H*-quinolinizin-4-one unit was targeted for synthesis. A quinolizone diester **2** was synthesized from ethyl 2-pyridylacetate and diethyl ethoxymethylenemalonate. Refluxing **2** with conc. hydrochloric acid afforded quinolizone **3** and subsequent Vilsmeier-Haack formylation gave the related dialdehyde **4**. Condensation of **4** with tripyrrane **5** using the MacDonald-type "3 + 1" approach gave the targeted oxyquinoliziniporphyrin **1**. Proton NMR spectroscopy indicated that this novel porphyrinoid has intermediary aromatic character. Ongoing studies are being directed towards the metalation, structural and spectroscopic characterization of **1**.



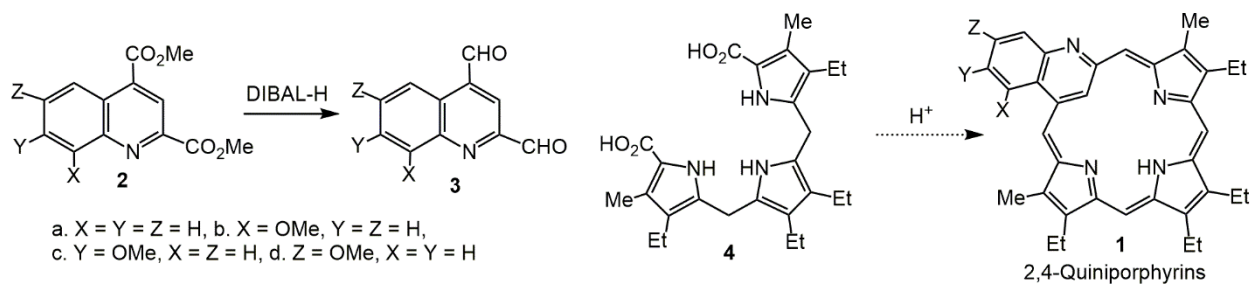
Presenter: Alexis Graybeal, Undergraduate

Mentor: Timothy Lash

Authors: Alexis Graybeal; Timothy Lash

Title: INVESTIGATIONS INTO THE SYNTHESIS OF 2,4-QUINIPORPHYRINS

Carbaporphyrins and related systems replace one or more of the nitrogens of the porphyrin cavity with carbon atoms. Many examples of these systems are known, including benziporphyrins and naphthiporphyrins that incorporate benzene or naphthalene subunits, respectively. In this project, carbaporphyrinoids incorporating quinoline subunits (**1**) have been targeted for investigation. In these structures, a nitrogen has been reintroduced but placed at the periphery of the structure. A series of quinoline diesters **2** have been prepared and reduction with diisobutylaluminum hydride at -70 °C afforded the related dialdehydes **3**. In addition, a tripyrrolic intermediate **4** (tripyrane) has been synthesized so that the new porphyrin analogues can be generated using a "3+1" methodology. Preliminary investigations into the formation of quiniporphyrin derivatives **1** are currently in progress.



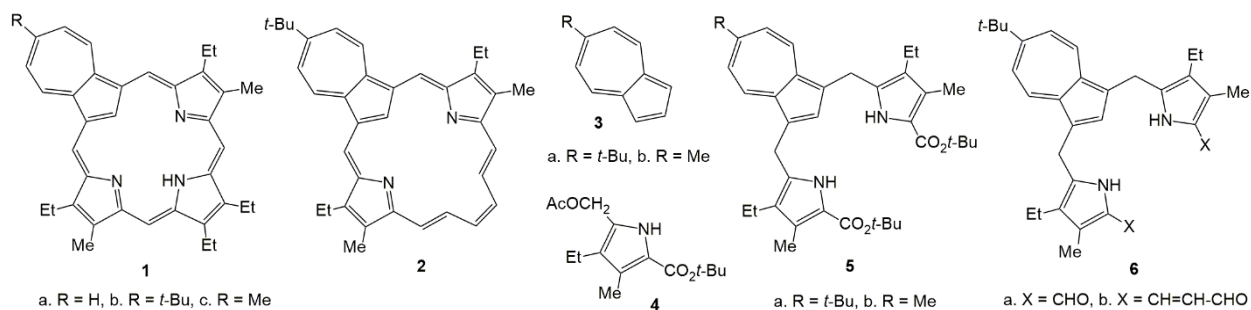
Presenter: Rachel Johnston, Undergraduate

Mentor: Timothy Lash

Authors: Rachel Johnston; Timothy Lash

Title: INVESTIGATION INTO THE SYNTHESIS OF PORPHYRIN ANALOGUES FROM AZULITRIPYRRANES

Due in part to their importance in nature, porphyrins have been synthetically investigated to determine their properties and potential applications. Azuliporphyrins 1, porphyrin analogues that possess a bicyclic azulene subunit, have intriguing properties that include the ability to form organometallic derivatives under mild conditions. In order to further investigate this unusual porphyrinoid system, the synthesis of methyl-substituted azuliporphyrin 1c and deazaazuliporphyrin 2 have been chosen as synthetic targets. 6-tert-Butyl- and 6-methylazulene, 3a and 3b, were reacted with two equivalents of an acetoxymethylpyrrole 4 in the presence of an acidic clay catalyst to give azulitripyrranes 5. Good yields were obtained for 5a but the methylsubstituted azulitripyrrane 5b was isolated in comparatively low yields. Although 5a reacts with pyrrole dialdehydes to give good yields of azuliporphyrins, this reaction failed for 5b, possibly due to the acidic nature of the methyl substituent. tert-Butylazulitripyrrane was also converted into the corresponding dialdehyde 6a by sequential treatment with trifluoroacetic acid and trimethyl orthoformate. Currently, the conversion of this species into a stretched dialdehyde 6b is under investigation. It is anticipated that McMurry condensation will convert 6b into deazaazuliporphyrin 2. This novel macrocycle will allow us to probe how the missing nitrogen atom affects the aromatic properties of these compounds.



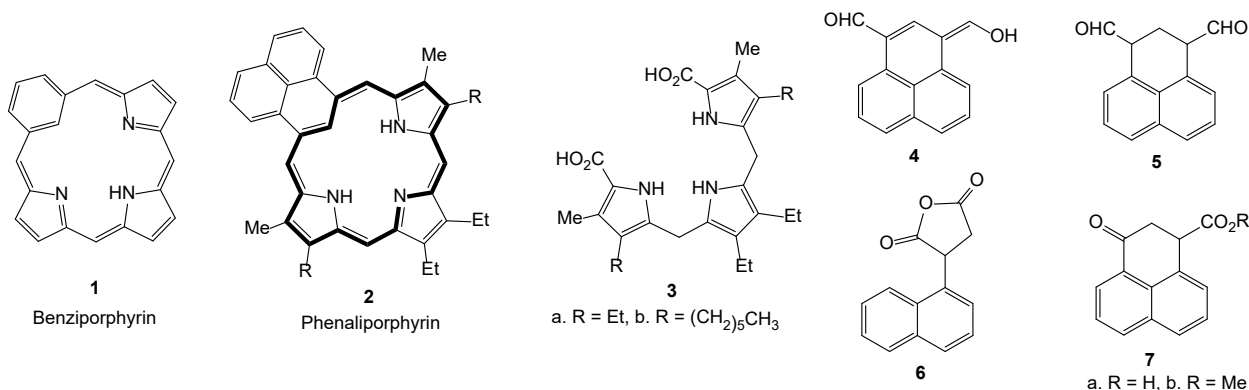
Presenter: Melissa Mathius, Undergraduate

Mentor: Timothy Lash

Authors: Melissa Mathius; Timothy Lash

Title: INVESTIGATIONS INTO THE SYNTHESIS OF PHENALIPORPHYRINS

Benziporphyrins **1** are nonaromatic porphyrinoids with a cross-conjugated 6π electron arene subunit. However, modification of this system can result in the formation of aromatic macrocycles. In this project, a benziporphyrin-like system **2** incorporating a phenalene subunit has been targeted for investigation. It is anticipated that this porphyrinoid will take on fully aromatic characteristics while retaining a fused naphthalene moiety. The required precursors to **2** are tripyrranes such as **3a** and **3b**, and tricyclic dialdehydes **4** or **5**. Initial attempts to prepare **4** by performing a Wittig condensation with perinaphthenone, followed by a Vilsmeier formylation, were unsuccessful. Currently, an alternative synthetic route to **5** is being developed beginning with 1-tetralone. Naphthylsuccinic anhydride **6** has been prepared and cyclized to produce keto acid **7a**. It is anticipated that esterification to produce **7b**, followed by a Wittig condensation and reduction with DIBAL-H, will afford the required dialdehyde **5**. Subsequent '3+1' condensation with tripyrranes **3** will afford phenaliporphyrins **2**.



Communication

Presenter: Alyssa Green, Graduate

Group Member: Hillary Campos

Mentor: John Baldwin

Title: STUDENTS PERCEPTIONS OF SOCIAL MEDIA INTEGRATION INTO ACADEMIA

In today's world, nearly every app, tool, and website has a social media component to it. From sharing Youtube videos to communicating through platforms, educators could benefit from exploring the functionality of bringing technology into the classroom. Social media allow people to collaborate, communicate, and share information online in a social environment as creators of their own content through a virtual community. This study utilized focus groups in order to determine the perceptions that college students have about bringing social media into an educational setting. Focus groups allow participants to have a group conversation about a particular topic, while also identifying key ideas and challenging their thought processes with a group of their peers. This study examined responses from two focus groups, with a total number of nine participants. Results revealed three major themes to help identify if and to what extent social media should be incorporated into academia: Content of media, perceived strengths of social media, and perceived cons of social media.

Presenter: Tamanna Tasmin, Graduate

Mentor: John Baldwin

Title: YOU ONLY HAVE TO BE BRAVE ENOUGH TO SEE IT: EVALUATION OF GENDER ROLE PORTRAYAL IN DISNEY PRINCESS MOVIES IN VIEW OF WAVES OF FEMINISM

This paper rhetorically analyzes gender role portrayal in Disney princess movies. Disney princess movies have a significant impact on how society defines gender roles as it is a prominent voice of the entertainment world. Disney has successfully commercialized the concept of being a princess feeding on a century-old fantasy. Each of their movies' centers around a female lead. Although they vary in the storyline, the gender role portrayal in these movies remains similar. From dependent, delicate and domesticated to independent, bold and adventurous features of their heroines, Disney princess movies have shifted their concentration briskly. At an initial stage, Disney portrayed stereotypical notions of women in their movies. Gradually, accepting the changes in society, Disney adapted their storylines. In this paper, I will identify whether the recent uprising and previous waves of feminism, have any influence on these movies and to what extent the characteristics of princesses changed from past to new princess movies. To do this, I have categorized the most popular Disney princess movies in three generations – the conventional princess (1939 – 1959), the transitional princess (1980s and 1990s) and the modern princess (2000 till now). After introductory discussion, this paper discusses gender roles in media followed by three generations of Disney princesses and concludes with a discussion of this shift in the storyline, in line with the waves of feminism.

Communication Sciences and Disorders

Presenter: Savannah Cornejo, Undergraduate

Mentor: Taeok Park

Title: TEMPORAL CHARACTERISTICS OF OROPHARYNGEAL SWALLOWING IN MULTIPLE SYSTEM ATROPHY: A LONGITUDINAL STUDY

Multiple System Atrophy (MSA) can be defined as a sporadic neurodegenerative disorder. Muscular weakness is a major clinical feature of myotonic dystrophy. Bradykinesia and rigidity affect the motor function of the tongue which can cause dysphagia. Oral-related symptoms such as drooling, sensory changes in the oral cavity, difficulty in chewing, and dry mouth are characteristics of MSA. Also, delayed pharyngeal swallow, penetration, and aspiration can also be symptoms of this disorder.

The purpose of this longitudinal study was to determine temporal characteristics changes of swallowing in a patient with MSA in order to better understand how the swallowing mechanism is directly affected from this neurogenic disease. The participant included a 60-year-old male who was diagnosed with MSA in 2009. Over the course of six evaluations, 1/21/2013-6/16/2014, a videofluoroscopic swallow examination (VFSE) procedure was performed for 5 different boluses. The types of bolus and volumes included 2mL thin liquid, 5mL thin liquid, thick liquid, puree, and pudding.

To measure temporal characteristics, each swallow was analyzed for the following points: onset of posterior movement of bolus, bolus head passing the ramus of mandible, initial opening of UES, tail of bolus passing the UES, initiation of maximal excursion of hyoid, first contact of arytenoid and epiglottis, and the final contact of arytenoids and epiglottis. The temporal measurements included Oral Transit Time (OTT), Pharyngeal Transit Time (PTT), Duration of UES Opening (DUESO), Stage Transition Duration (STD), Initiation of Laryngeal Closure (ILC), and Laryngeal Closure Duration (LCD). The average time in seconds per each kind of bolus were compared to normative data.

Overall the temporal characteristics of the swallow were different in comparison with the normative data. Evaluations showed prolonged bolus transition in the oral and pharyngeal stage across all consistencies due to rigid and stiff musculature of the oral and pharyngeal structures and also delayed initiation of laryngeal closure (ILC) which is related to risk of aspiration. Utilizing these measurements helped to determine how MSA was affecting the swallowing mechanisms individually. Since MSA is a progressive disease there must be follow-up evaluations to look at long-term proponents. Dysphagia management will help maintain function of swallow.

Criminal Justice Sciences

Presenter: Jacqueline Privett, Undergraduate

Mentor: Jacqueline Schneider

Authors: Jacqueline Privett; Jacqueline Schneider

Title: EVALUATING MIKE & PIKE: THE RELATIONSHIP TREND BETWEEN ELEPHANT CARCASSES & THE ILLEGAL TRADE IN ENDANGERED ELEPHANTS

African and Asian elephants face many threats to their population numbers, including habitat loss, climate change, and interactions with humans. However, poaching and the illegal wildlife trade are the largest threats to these species. The first step in the illegal trade is taking or poaching of the elephant – typically the bulls with the largest tusks. Tusk ivory, whether African or Asian, is then exported to transit hubs in Asian countries. Final exported products, either carved or raw, enter the illegal markets located in many Asian countries and cities. Monitoring the Illegal Killing of Elephants (MIKE) and Proportion of Illegally Killed Elephants (PIKE) calculated that more elephant carcasses were found in 2011 than any other year, which resulted in more shipments of ivory leaving Africa and the price of ivory tripling in China. MIKE and PIKE data are analyzed in order to evaluate the crime of elephant poaching and its role in the illegal trade in endangered species.

Presenter: Davey Rivers, Undergraduate

Mentor: Michael Gizzi

Title: OFFICIAL MISCONDUCT IN EXONERATION CASES PRIOR TO 1989

No system is without its shortcomings, and the legal system is no different. In the instance of a wrongful conviction, appeals may be filed for further examination of the case. When an individual who was wrongly convicted is released because of an error made within the Criminal Justice System, this is called an exoneration. My research examines trends within exoneration cases containing official misconduct prior to 1989, when DNA evidence became commonly used in courts. Through data collected from the National Registry of Exonerations, I have outlined the common causes of wrongful conviction from both police officers and prosecutors. Results showed that the most common form of police misconduct leading to wrongful conviction was coercing a false confession. That factor was followed closely by violence or the threat of it and framing the suspect. These three forms of police misconduct frequently occurred together in the narrative of police beat a false confession out of their suspect and then used that as evidence in court. Prosecutorial misconduct was largely centered around mishandling or withholding evidence in order to obtain the conviction, frequently by suppressing exculpatory evidence. There were many cases that featured both police and prosecutor misconduct.

Economics

Presenter: Sirazum Munira Haque, Graduate

Mentor: David Cleeton

Co-mentor: Dimitrios Nikolaou

Title: FIRM'S COMMITMENT TO RELATIONAL CONTRACTING AND CAPITAL STRUCTURE DECISIONS

Permission was not given to place abstract in this book.

Presenter: Kosiso Madu, Graduate

Mentor: Dimitrios Nikolaou

Title: FERTILITY RATES AND PAID FAMILY LEAVE AMONG OECD COUNTRIES

For the past decades, fertility rates in Europe and North America have been on the decline and have fallen below replacement levels owing to increase in female labor force participation rate, changing gender roles, and lack of social protection for children. In France for instance – the country with the highest fertility rate among OECD countries – the fertility rate is 1.9 which is still below the United Nations replacement rate of 2.1. This has raised concerns for population sustainability and the possible role of family-friendly policies in countering this decline. Family policies encompass policies targeted at family creation, economic support for families, childrearing, and care-giving. In this paper, I investigate a type of family policy with an almost complete coverage among OECD countries: paid family leave policies. Paid family leave is used here because it facilitates work-family balance and appears to have a decisive impact on child bearing. Also, apart from the United States, it has a complete coverage among OECD countries. If we subscribe to the demand for children following the demand of a normal good, then paid family leave could affect fertility through positive income effects by increasing income since they are paid, and secondly, through negative substitution effects by reducing the opportunity cost of birthing and raising children. Using country-level annual data on fertility rates and maternity leaves from 1990 – 2018, I examine if this policy has any effect on fertility rates among 30 OECD countries. I employ the difference-in-difference technique to identify a causal impact of this policy on fertility rates.

Presenter: Md Zahidur Rahman, Graduate

Mentor: Rati Ram

Title: INCOME ELASTICITY OF POVERTY: RECENT ESTIMATES FOR SOUTH ASIAN COUNTRIES

Measuring the magnitude of the effect of economic growth on poverty rate is relevant both for academic and policy purposes. This paper estimates the income elasticity of poverty in six South Asian countries – where world's majority of the poor people live – for the most recent period since 2005 to 2015. Based on the findings, five notable points can be identified. First, there has been substantial improvement in poverty situation during the period reflected by high rates of decline in \$1.90 poverty rate. Second, compared to 1990-2005 period, observed effect of growth on poverty reduction during the last decade has increased across all the countries under the study by a factor of three and higher. Third, income elasticity of poverty declines substantially as the cut-off point of poverty measure is increased from \$1.90 to \$3.20 and \$5.50 poverty line. Fourth, huge variability is observed in elasticity estimates for this small group of countries and the pattern of variation is almost similar to what is reported by Ram (2015). Finally, this implies that cross-country factors other than income might explain a larger part of the reduction of poverty for the South Asian countries.

Key words: Income elasticity of poverty; economic growth; South Asia.

Presenter: Shabnam Shahrezaei, Graduate

Mentor: Hassan Mohammadi

Title: CONTRIBUTION OF PUBLIC AND PRIVATE INVESTMENT IN THE GROWTH PROCESS: A CROSS-SECTIONAL INVESTIGATION USING OECD DATA

This paper examines the relative contribution of public and private investment to per capita GDP growth in 36 OECD countries. It extends the basic neoclassical model of growth by separating investment into its public and private components following Khan and Kumar (1997) and estimates this model for a sample of 36 OECD countries using single equa-

tion estimation techniques for four time periods: 1980-1989, 1990-1999, 2000-2009, 2010-2017. This empirical analysis provides a framework to test several interesting hypotheses: (1) Does private investment have a larger impact on growth than public investment, and is the differential impact statistically significant? (2) Does public investment expenditure substitute or complement private investment in the economic growth process? (3) Does evidence support convergence in per capita real income across the 36 OECD countries? The findings from this study are relevant from a theoretical, empirical, and policy point of view. All data are derived from IMF's World Economic Outlook (WEO) database, World Bank's World Development Indicators and OECD National Accounts.

JEL Codes: E22, O47

Reference

Mohsin S. Khan and Manmohan S. Kumar (1997). 'Public and Private Investment and the Growth Process in Developing Countries', *Oxford Bulletin of Economics and Statistics*, 59, 1 (1997) 0305-9049.

Presenter: Sara Vaez, Graduate

Mentor: Oguzhan Dincer

Title: FINANCIAL DEVELOPMENT AND INEQUALITY IN MIDDLE EAST COUNTRIES: A PANEL DATA APPROACH

The relationship between financial development and economic growth rate is well established in the economics literature. However, the impact of financial development, in public and private sectors, on income inequalities, still requires more investigation. Income inequality is one of the most economic challenges facing most countries. In this research project, we replicate the study of the financial development's impact on income inequality in India (Ang, 2010) in order to shed light on the same phenomenon in other middle eastern countries (e.g., Iran). We will aim to curate and analyze an annual time series data for a period of time and compare our results with those reported in the original study. The project will share details of the empirical framework proposed in the original research projects and our modification thereof. The findings of this project will provide insights on the role of financial development plays in determining income inequality and distribution in the countries included in the sample data set.

Family and Consumer Sciences

Presenter: I Chun Lin, Graduate

Mentor: Yoon Ma

Title: IS FAIR TRADE BRINGING SATISFYING IMPACTS OR CHANGES TO THE UNITED STATES?

With the increasing consciousness of ethical (Goworek, 2011) and various environmental issues (Mollenkropf, Stolze, Tate, & Ueltschy, 2010), people started paying more attention to the manufacturers who have produced products to satisfy basic human needs but haven't acquired enough benefits for the minimum level of their quality life including a promised wage, healthy working condition and the bonus they deserved to maintain the quality of their products. The purpose of this content-based research was to explore both possible positive and negative impacts of fair trade, the attitudes from the U.S. government and the retailer side, the viewpoints of manufacturers and workers, and the thoughts from consumers, comprehensively. The researcher reviewed scholarly articles and organization websites from the University library and Google Scholar by mainly using the keywords of fair trade, America, the consciousness of fair trade, and manufacturers in developing countries. The positive impacts of fair trade include that workers are able to gain a more favorable working environment, a promised fair wage, and additional compensations. In the environmental aspect, executing the Fairtrade Standard, which harmful chemicals and pesticides are not allowed, results in a better and sustainable environment (Fairtrade Foundation, n.d.). However, a stronger competition within small producers and different certified processes of the fair trade system became the concerns (Jaffee & Howard, 2016). For the U.S. government and

the retail side, fair trade gives them opportunities to strengthen the relationships between workers and retailers (Cater, Beal, & Collins, 2016). The research studies demonstrated that consumers' willingness pays more to promote fair trade products and how consumers these days still lack consciousness of fair trade comparing to the population of fair trade supporters (Konuk, 2019). The biggest concern for the manufacturing companies which are executing fair trade is how to pursue the aspiration of fair trade but still achieve the expecting profits for their companies at the same time. By reviewing previous studies, this research provides a better understanding of fair trade nowadays and complications of it as well.

Geography, Geology, and the Environment

Presenter: Olivia Bachtold, Undergraduate

Mentor: Michaelene Cox

Title: SPATIAL ANALYSIS OF MEDITERRANEAN MIGRANT ROUTES TO EUROPE

How has the flow of Mediterranean migrant routes fluctuated before, during and after the European migrant crisis?

Successfully integrating migrants into the European Union system has been one of the most difficult and controversial challenges within the Union. Since the migrant crisis peak in 2015, there has been a universal spotlight on the abundant migrant activity through the Mediterranean. A visual analysis of migrant route patterns within the Western, Central and Eastern Mediterranean Sea regions will allow one to see how the flow of migrants has fluctuated overtime due to policy changes in Europe. My research will focus on the spatial understanding of migrant demographic data through a cartographic lens.

Presenter: Seth Hardin, Undergraduate

Mentor: Alec Foster

Title: DOCUMENTING GREENSPACES IN PHILADELPHIA

Studies have shown that having access to green space areas are important to overall well-being and can reduce health inequalities. We documented and mapped existing greenspaces in the Olde Kensington neighborhood of Central Philadelphia near Temple University. With the gentrification and recent development boom in this area of Philadelphia, there have been many greenspaces that have been destroyed and built upon to make room for new residences. By utilizing Google Earth and recent satellite imagery, we digitized greenspaces within the study area parcel by parcel and applied their existing parcel and address data. We also included whether the greenspaces were on commercial, resident, or vacant lots, as there is a significant amount of vacant lots in the neighborhood. In August of 2019, we visited the study site in Philadelphia to conduct field work by ground truthing our results and observing if any greenspaces had been added or lost from the date of our satellite imagery. Using ArcMAP, Google Earth, and Adobe illustrator, we created a map with the current existing greenspaces found from our research as well as the amount of schools, community centers, and churches within the study area. We found 531 greenspaces in our study area, totaling 16.98 acres, or 7.9% of the total study area. The average area per greenspace was 0.032 acres, while the largest greenspace had an area of 1.33 acres. This study represents the first phase of a long-term research project in Philadelphia, by documenting the current greenspaces in this rapidly changing neighborhood, residents and policymakers can work to ensure that they are preserved as new development occurs. Future research will examine how changes in greenspaces over time relate to shifting neighborhood demographics. The methodology developed for this study can be replicated in other locations to study rapid urban socioecological change.

Health Sciences

Presenter: Hannah Birchfield, Undergraduate

Group Member: April Post

Mentor: Jennifer Peterson

Title: HOSPITAL ACQUIRED COMPLICATIONS

This audit compares the data on hospital acquired complications for four hospitals in Illinois (listed below). The research team selected five hospital acquired conditions that were reported by the Leapfrog Hospital Safety Grade website and compared the data between those hospitals. The categories that were selected are surgical wounds split open, C. Diff infections, dangerous bed sores, infections in the urinary tract, and collapsed lungs. The team then gathered information from the worst hospital scores and the best hospital scores in the United States and averaged them to determine the standard rate for the audited hospitals. It was found that two hospitals fell below the standard rate in at least one category. The team then researched ways to improve the scores for all audited areas to ensure that proper safety and precautions were in place to protect patients.

Presenter: Angela Brown, Undergraduate

**Group Member: Hannah Swanson, Valerie Wozniak, Ewurabena Okai, Erin Brown,
Liseth Bustamante, Jane Bartlett, Holli Winter**

Mentor: Beverly Barham

Co-mentor: Deborah Johnson

Title: INFUSING A CURE INTO THE MEDICAL LABORATORY SCIENCE PROGRAM

All students in the Medical Laboratory Science (MLS) cohort of 2021 (n=22) participated in a course based undergraduate research experience (CURE) in the fall semester 2019. The 5 basic components for a CURE include: 1) use of multiple scientific practices, 2) the outcome is unknown, 3) there is a broader relevance or importance beyond this classroom experience, 4) collaboration is essential among students and instructors, and 5) iteration is built into the process.

Members of this MLS cohort took on the role of primary researcher in an applied research protocol by collecting, analyzing, and reporting data from specimens they collected from residential plumbing determining the incidence of opportunistic mycobacteria present. MLS students assembled the collection kits and then collected specimens from residential plumbing faucets (bathroom sink, bathtub, showerhead, kitchen sink, or laundry room sinks). Each student analyzed the specimens they collected for the presence of opportunistic mycobacteria. Opportunistic mycobacteria are included as one of five different opportunistic plumbing pathogens that can be found in residential plumbing. An Auramine O fluorescent antibody stain, specific for opportunistic mycobacteria, was performed on each specimen. The data for the applied research portion indicated that 7% (n=44) of the specimens collected were positive for opportunistic mycobacteria in the residential plumbing specimens. City water was the water source for all faucets tested and specimens originated from 6 different zip code areas.

These same MLS students then reflected on the overall CURE experience as the human subjects involved in this research. Students were asked to complete 4 short anonymous surveys regarding the areas of the IRB process, the collection protocol, the fluorescent staining process, and meeting the objectives of a CURE. The data generated from these reflections indicated students felt they had a better understanding of the IRB process, the collection protocol was efficient, there was agreement that the staining and interpretation of the modified Auramine O fluorescent staining was a positive experience, and that the overall CURE experience met the parameters of a true CURE. This CURE model included all students and provided equal access and an equitable experience as a part of their class participation.

Presenter: Trevor Moran, Undergraduate

Mentor: Liangcheng Yang

Title: COMPARISON OF BIOGAS PRODUCTION USING DIFFERENT DIGESTER OPERATIONAL STRATEGIES

There has been growing interest in using anaerobic digestion to treat lignocellulosic biomass, and in the meantime, generate biogas for energy production. However, current design of either liquid or solid anaerobic digestion has met with considerable challenges and usually requires pretreatment of feedstock. This study worked on a new cartridge design anaerobic digestion system to treat lignocellulosic biomass. In this 13-month test, corn stover was employed as the feedstock, and the system was operated in three conditions: 1. three cartridges in the digester and each cartridge was rotated every seven days; 2. four cartridges in the digester and each cartridge was rotated every seven days, and 3. four cartridges in the digester and each cartridge was rotated every 9-10 days. The biogas production was stable in all three conditions and the average methane yield was 7.57, 7.11, and 6.90 L/day/kg-VS from conditions 1, 2, and 3, respectively, which was comparable to other digester designs. However, no floating problem, only minimal liquid waste was generated from this system, and the daily biogas/methane yield was stable. Also, due to the microaeration effect, the H₂S concentration in the biogas was kept at a relatively low level, with averages of 60.48, 110.31, and 52.79 ppm from the conditions 1, 2, and 3 respectively. The study demonstrated the feasibility of using this new design for biogas production from lignocellulosic biomass and also provided a baseline for system optimization.⁴

Presenter: Nolan Simmons, Undergraduate

Mentor: Guang Jin

Co-mentor: Tom Bierma

Authors: Nolan Simmons, Guang Jin, Tom Bierma

Title: USING RECYCLED GLASS IN ALKALI-ACTIVATED MATERIALS

Portland cement-based products, primarily concretes, are the world's most commonly used building materials. However, Portland cement production is characterized by high energy demands, consumption of non-renewable prime materials and the emission of greenhouse gases. Alkali-activated materials (AAMs) constitute a possible alternative to Portland cement due to lower energy demands, lower polluting gas emissions and the absence of durability-related technical problems. AAMs is prepared by an alkaline activator and industrial by products such as slag, fly ash and silica fume. The purpose of this study is to examine the use of recycled glass in AAMs production through forming sodium silicate hydrate (waterglass) – a common alkali activator. A series of bench-scale glass dissolution reactions were performed using sodium hydroxide solutions with commercially cleaned and characterized recycled glass. Reactions were performed at 80°C and continuously stirred where all glass particles are suspended. Concentration of dissolved silicon were monitored for every 48 hours for 3 weeks and analyzed using ICP (Inductively Coupled Plasma). Impact of glass particle size and concentration of sodium hydroxide were examined. Highest dissolved silicon concentration was found to be at 70,000 ppm with the finest glass particle size of around 70 μm using 1M sodium hydroxide.

Information Technology

Presenter: Liza Fernandes, Graduate

Mentor: Qi Zhang

Authors: Liza Fernandes, Qi Zhang,

Title: INTERNET-BASED MEDICAL DATA RENDERING AND IMAGE ENHANCEMENT USING WEBGL AND APACHE SERVER

Internet-based medical data visualization has wide applications in distributed medical collaborations and treatment. It can be achieved through volume rendering technique, which is a key method for medical image exploration and has been applied to the clinical medical fields such as disease diagnosis and image-guided interaction.

In this project, we implement some medical data processing and optical mapping methods for web-based medical data visualization and image enhancement. The Web Graphics Library (WebGL) is used with JavaScript for rendering 3D graphics in a web browser. WebGL supports GPU based volume rendering which is an efficient tool for visual analysis of medical data, which involves vertex shaders and fragment shaders. The vertex shader provides space coordinates, and the fragment shader provides color.

Network-based volume rendering is used to visualize data in a 3D form. An image processing method is implemented to transfer the 3D dataset into multiple slices of 2D image data and WebGL is employed to render 3D medical data in web browsers. Volume rendering is accomplished using the volume ray casting algorithm implemented with WebGL2. We collect new medical data and process them to fit the web-based rendering environment. The submitted work will explain the process of preparing and loading medical data suitable to be rendered. All the visualized data can be enhanced with the developed methods to emphasize the image feature of interest. We also add new control points for optical mapping and rendering medical data in a web browser in real-time. The software platform is running on Apache Web Server for network-based data visualization. The developed image enhancements and property control methods can improve medical data visualization on web browsers, which will be helpful for internet-based medical data analysis and exploration, as well as medical diagnosis and treatment.

Presenter: Amrita Shalini, Graduate

Mentor: James Wolf

Title: USING MACHINE LEARNING & DATA SCIENCE TO FIGHT CYBER CRIME

In the modern world the technology is rising quite rapidly. In order to operate our industries, government, national defense and other vital functions, society is becoming more dependent on data and networks. Nearly every person with computer knowledge has entered into the use of this fast-growing industry. Cyber crime is a criminal act committed via internet and technology. Most cyber crime is an attack on personal, corporate, or government information. Though the attacks do not occur on a physical body, they do occur on the virtual personal or corporate body, which is the set of information attributes that define people and institutions on the Internet. Today, cyber crime has drawn a great deal of attention around the globe because of the recorded dramatic increase rate of case reported. As a matter of fact, a new form of cyber crime case is being recorded every single day. In reality, cyber crime is the most brutal computer crime in the modern world that has caused a great deal of many people to lose their most confidential information. In other words, our virtual identities are essential elements in the digital age. Machine learning & Data Science is one of the defense mechanisms to protect our virtual identities. This not only helps to react to cyber crimes by enhancing the cyber protection systems but also is instrumental in formulating defense strategies proactively by predictive analysis.

Kinesiology and Recreation

Presenter: Hannah Harris, Graduate

Mentor: Noelle Selkow

Co-mentor: Justin Stanek

Author: Hannah Harris

Title: HEMODYNAMIC EFFECTS OF GRASTON TECHNIQUE ON TRIGGER POINTS IN THE UPPER TRAPEZIUS IN PATIENTS WITH NECK PAIN

Context: Non-specific neck pain lacks a specific diagnosis with varying causes such as poor posture and muscular trigger points. Commonly, poor posture causes tightness in the upper trapezius (UT) muscle due to sustained activity. This leads to decreased oxygen to the muscle and trigger point formation. Graston Technique® (GT) is a form of manual therapy that uses stainless steel instruments to break down tissue adhesions. GT on trigger points has been presumed to increase local blood flow leading to tissue healing and decreased pain, however, the physiological effects on subcutaneous hemodynamics have yet to be proven.

Objective: To measure active cervical range of motion (ROM), neck pain, and subcutaneous hemodynamics of the UT following a single intervention of GT in patients with neck pain stemming from trigger points.

Study Design: Single-blinded randomized controlled laboratory study.

Participants: Sixty participants (18-40 yo) experiencing neck pain and trigger point(s) present in the UT muscle volunteered. Participants were excluded if they had manual therapy within the past 3 months to the neck/shoulder, history of diagnosed neck injury, spinal, or shoulder surgery, cancer, kidney dysfunction, pregnancy, anticoagulant medication, varicose veins, polyneuropathies, diabetes, heart failure, contagious skin conditions, open wounds, thrombophlebitis, and hypertension.

Interventions: Participants randomly assigned to: GT, sham instrument assisted soft tissue mobilization (IASTM), or control. All participants completed the GT protocol: a 10-minute arm bike warm-up, 5-minute treatment based on group, passive lateral flexion stretch, and 3 therapeutic exercises. Treatment area was determined by bilateral palpation of the UT muscle for the most prominent trigger point.

Main Outcome Measure(s): Subcutaneous hemodynamics, neck lateral flexion ROM, and pain pressure threshold.

Results: Increased levels of oxygenated hemoglobin (superficial and deep) in GT and sham groups ($p < 0.008$) compared to control group. However, there were no differences found between GT and sham ($p > .555$). For right ($p = .025$) and left ($p = .002$) lateral flexion, there was a treatment main effect. GT showed increased ROM compared to the sham ($p = .019$) and control ($p = .017$) on the right. GT ($p = .001$) and sham ($p = .017$) increased ROM compared to control on the left. No differences found among groups for PPT ($p = .201$).

Conclusion: Overall, a single treatment of GT proved to be an effective treatment technique for the UT regarding subcutaneous hemodynamics and ROM in patients with neck pain. Further research is needed to establish if GT as a superior treatment to other forms of IASTM.

Presenter: Mike Kianicka, Graduate

Mentor: Mike Mulvaney

Title: THE EFFECTS OF SUPERVISOR TRUST ON EMPLOYEES' REACTIONS TO THE PERFORMANCE APPRAISAL SYSTEM IN PARK AND RECREATION AGENCIES

Well-designed employee performance appraisals assume great importance by providing park and recreation agencies with information that can guide administrative and developmental decision-making about their most important asset - their human resources. Despite their importance, an agency's performance appraisal system can often be viewed by em-

employees and management as a frustrating and unfair process. Previous research has suggested that performance appraisals do not happen in isolation, but within a social context. Guided by the existing appraisal research, the purpose of this study is to examine the effects of supervisor trust on employees' reactions to the performance appraisal system. Strategic Human Resource Management (SHRM) theory will serve as the framework for the study. More specifically, SHRM and the existing management literature will guide the development and testing of this hypothesis. Public park and recreation professionals within the Illinois Park and Recreation Association's membership were invited to participate in the study. An online survey was developed to measure the variables of interest including satisfaction with their performance appraisal, satisfaction with the system used during the appraisal, and perceptions of procedural and distributive justice with the appraisal system. Preliminary and substantive statistical analyses were performed to test the study's hypothesis. A discussion of the findings, their implications for management, and recommendations for future research are also provided.

Presenter: Darby McCauley, Graduate

Mentor: Nicole Hoffman

Authors: Darby McCauley; Chelsea Kuehner; Nicole Hoffman

Title: PERCEIVED SOCIAL SUPPORT GIVEN TO INJURED COLLEGIATE ATHLETES BY THEIR HEAD COACHES, ASSISTANT COACHES, TEAMMATES, AND ATHLETIC TRAINERS

Injuries sustained during an athlete's career can be detrimental and may not only cause physical harm, but may cause psychological distress and resulting questions of identity, roles, and purpose. Social support is commonly defined as individuals whom are readily available, reliable, and let us (the recipient of social support) know that they care about, value, and love us. Social support is one way that clinicians and others who are close to the athlete can focus on helping the whole patient and meeting both their physical and mental needs more effectively throughout the course of an injury. Unfortunately, social support is often overlooked and evidence is minimal. **Purpose:** The purpose of this study was to determine the satisfaction of social support given by head coaches, assistant coaches, teammates, and Athletic Trainers to their student-athletes throughout an injury, as perceived by the student-athlete. **Methods:** Athletic Trainers distributed anonymous online surveys to eligible student-athletes at NCAA Division 3 and NAIA universities in the central Illinois area. Sixty complete surveys (60.6% response rate) were available for analysis (males = 18(30%), females = 41(68.3%), prefer not to answer = 1(1.7%) with an average age of 20.1±1.2). The survey was distributed and completed through a secure Qualtrics website. **Results:** The survey analyzed 8 different types of social support and how much the student-athletes were satisfied with the social support that they received from their head coaches, assistant coaches, teammates, and Athletic Trainers. A one-way repeated measures MANOVA revealed a significant multivariate effect for combined aspects of social support between the 4 supporters with Athletic Trainers giving overall more satisfying social support (Wilks $\Lambda = 0.76$, $F(3, 59) = 2.09$, $p = 0.002$, $\eta^2 = 0.89$). Furthermore, Athletic Trainers were shown to provide significantly more satisfying social support in regards to reality confirmation, task appreciation, task challenge, and tangible assistance support. **Conclusion:** This study identified important differences between the types of social support given to the injured student-athlete from these different individuals. This research can help guide Athletic Trainers and other healthcare professionals with understanding the importance of social support and bring light to a subject that has been overlooked.

Presenter: Emily Schultz, Graduate

Mentor: Noelle Selkow

Authors: Emily Schultz; Noelle Selkow

Title: EXPLORING THE HEMODYNAMIC BENEFITS OF CUPPING THERAPY AT THE UPPER TRAPEZIUS

Context: Musculoskeletal neck and shoulder pain is a prevalent condition with nearly two-thirds of the population experiencing it sometime in their lifespan. The treatment for musculoskeletal pain conditions varies, but recent focus is on complementary and alternative medicine, such as cupping therapy. Cupping therapy is an ancient treatment method that involves the use of a cup to produce sub-atmospheric pressure on the skin. There is much speculation around its true

mechanisms on the human body; theories indicate that cupping therapy has an effect on blood flow, inflammation, and pain. Additionally, there has not been pre-defined parameters for the treatment of musculoskeletal pain conditions. **Objective:** To examine if different dry cupping treatment times altered changes in superficial and deep subcutaneous tissue hemodynamics. **Design:** Single-blinded, randomized crossover study **Setting:** Athletic Training Laboratory **Participants:** 32 participants volunteered for this study. Participants were included if they were healthy individuals with non-specific neck pain. Participants were excluded if they had cupping therapy or any treatment performed within the past three months to the neck or shoulder area; history of head, neck, or shoulder injury within the past six months resulting in medical care; known blood clotting disorder; allergy to lubricant; or the following medical conditions: hypertension, diabetes, cancer, pregnancy, cardiac failure, renal failure, allergic purpura, hernia, psoriasis, eczema, rosacea, varicose veins, phlebitis, hepatocirrhosis, allergic dermatitis, sunburn, open wound, fever, or were taking anticoagulants. **Interventions:** Dry cupping therapy for 5, 7.5, and 10 minutes in a randomized order repeated once per week. One stationary cup was placed directly over the midpoint of the upper trapezius muscle for each participant for the allotted time. **Outcome Measures:** Subcutaneous hemodynamics (superficial and deep oxygenated, deoxygenated, and total hemoglobin) were collected and exported for data analyses using the NIRS Portamon. Change scores were calculated between baseline and immediate postintervention, immediate and 10 minute post-intervention, and baseline and 10 minute postintervention measurements. Statistical analyses were completed using repeated measures ANOVAs to compare changes in subcutaneous hemodynamics following different treatment times (5, 7.5, and 10 minutes). **Results:** There was a main effect for superficial and deep oxygenated, deoxygenated, and total hemoglobin ($p \leq 0.001$). Post hoc analyses revealed that all treatment times increased hemoglobin levels immediately after intervention and maintained this increase over the 10 minute period for oxygenated and total hemoglobin levels. **Conclusions:** The results demonstrated that dry cupping therapy increases deep and superficial oxygenated, deoxygenated, and total hemoglobin levels at treatment times of 5, 7.5, and 10 minutes. This indicates that clinicians can apply cupping therapy for a shorter period of time and maintain a significant effect on blood flow. Dry cupping therapy is an effective treatment for non-specific neck pain, and may help decrease pain and inflammation in patients as well.

Presenter: Cara Zinn, Undergraduate

Group Members: Alex DiSerio, Graduate; Ayla Kibler, Graduate

Mentor: Karen Dennis

Co-mentor: Alex Wolfe

Authors: Cara Zinn; Alex DiSerio; Ayla Kibler

Title: HEART RATE VARIABILITY: A 16-WEEK EXAMINATION OF STRESS MANAGEMENT EDUCATION AND PHYSICAL ACTIVITY ON HRV

Heart rate variability (HRV) had been described as the time interval between heartbeats and has been shown to be an important aspect of overall health. Stress is a phenomenon that influences heart rate variability. During stressful events, the sympathetic nervous system is aroused. Physiologically, stress appears in the form of lowered HRV, with decreased parasympathetic activity, increased sympathetic activity, and increased levels of cortisol. This can be altered through a system of exercises and stress management education referred to here as HRV training. Previous research (Dennis and Wolfe, 2016; Dennis and Wolfe, 2017) has shown that physical activity and exercise intensity has a positive effect on Heart Rate Variability. Further, achievement of moderate intensity physical activity recommendations may have a greater influence on stress than total steps per day (Dennis and Wolfe, 2018).

Purpose: The purpose of this study was to continue to investigate the effects of physical activity and other biometric variables on HRV over the course of a semester-long (16-week) course designed around lifestyle education and stress management HRV training.

Methods: The subjects for this research were 23 students enrolled in the KNR 113 "Personal Fitness" course. The duration of this study lasted one academic semester (16-weeks). All participating students were assigned a pedometer (New Lifestyles) that was used to track their steps each day. Each student had physical fitness and biometric data collected at the beginning and end of each semester, in addition to having HRV measurements taken at the beginning and end of each semester. HRV measurements were taken using the HeartMath emWave pro software using an infrared pulse plethysmograph (ppg) ear sensor. Physical activity data was collected each week of the course through self-reported pedometer logs. Lifestyle education and exercise were the primary focus of the curriculum for the class. Weekly assign-

ments given through the HeartMath website were used to educate students on stress management techniques.

Results: To Be Determined

Mathematics

Presenter: Emily Gutzler, Undergraduate

Group Member: Lia Kaminsky, Undergraduate

Mentor: Songling Shan

Authors: Emily Gutzler; Lia Kaminsky

Title: GRACEFULLY LABELING SPIDERS WITH ALL BUT AT MOST 2 LEG LENGTHS BEING AT MOST 2

Let G be a graph with m edges. A graceful labeling of G is a function $f : V(G) \rightarrow \{0, 1, \dots, m\}$ such that distinct vertices receive distinct numbers and $\{|f(u) - f(v)| : uv \in E(G)\} = \{1, 2, \dots, m\}$. We call G graceful if G has a graceful labeling. Rosa in 1966 firstly conjectured that every tree is graceful. This conjecture was only confirmed for certain classes of trees including caterpillar trees, lobster trees with a perfect matching. A spider is a tree with exactly one vertex of degree at least 3. Panpa and Poomsa-ard in 2016 proved that all spiders with all but at most four leg length being 1 are graceful. In this work, we show that every spider with all but at most two leg lengths being at most 2 is graceful.

Our proof consists of finding a nice pattern in gracefully labeling two subgroups of spiders: every spider with all legs being length at most two, every spider with all but one leg being length at most two. In all these labelings, the value assigned to the center vertex is always zero. Finally, applying an approach introduced in [Gracefulness of families of spiders, P. Bahl, S. Lake, and A. Wertheim, *G, Involve*, 3 (2010) 241-247], we are able to find a graceful labeling for spiders with all but at most two leg lengths being at most 2.

Presenter: Kazi Tanvir Hasan, Graduate

Mentor: Olcay Akman

Title: INFECTIOUS DISEASE MORTALITY PREDICTION

When mortality statistics are reported for infectious diseases, they commonly reflect the ratio for the entire population impacted from it. This causes an underestimation since the frail members of the population are impacted at a higher rate. With the remaining healthy members, the mortality rate becomes skewed. With this project, we study predicting mortality under varying frailty conditions to account for the hidden heterogeneity's impact on the parameter estimates.

Presenter: Jesse Hayes-Carver, Undergraduate

Group Member: Walter J. Witt, Undergraduate

Mentor: Songling Shan

Authors: Jesse Hayes-Carver; Walter J. Witt

Title: SMALL QUASI-KERNELS IN HAIRY TOURNAMENTS

Let $D = (V, E)$ be a digraph. A vertex set $K \subseteq V$ is a quasi-kernel of D if K is an independent set in D and for every vertex $v \in V \setminus K$, v is at most a distance of 2 from K . It is a well-known result of Chvátal and Lovász that every digraph has a quasi-kernel. In 1976, P. L. Erdős and L. A. Székely conjectured that if every vertex of D has a positive in-degree, then D has a quasi-kernel of at most $|V|/2$. A tournament is obtained from a complete graph by assigning a direction to each edge, and a hairy tournament is a digraph whose deletion of all sink vertices yields a tournament, where a sink vertex is a vertex of zero out-degree. A core is the largest tournament of a hairy tournament. In this work, we study the size of a quasi-kernel in a hairy tournament and support the Erdős-Székely conjecture for hairy tournaments such that each vertex of its core is joined to at most two sink vertices.

Theorem

Let G be a n -vertex hairy tournament and $T \subseteq G$ be the core of G . If $|N_G^+(v) \cap (V(G) \setminus V(T))| \leq 2$ for every $v \in V(T)$, then G has a quasi-kernel of size at most $n/2$.

This Theorem implies that given an n -vertex hairy tournament in which the core is connected to no more than two sink vertices, one can find an independent set K of G satisfying two properties: for any $a \in V(G) \setminus K$ it holds that $\text{dist}_G(K, a) \leq 2$, and the number of vertices in K will be at most $n/2$.

Methods

In essence, our proof is an application of induction on the number of edges of G , or equivalently, by taking a counter example G with the smallest number of edges to the statement, and then finding a way to reduce the graph to one G^* with a smaller number of edges. As G^* is no longer a counterexample to the statement, a desired quasi-kernel K^* of G^* can be found. We then modify K^* to get a desired quasi-kernel for G . In order to accomplish this, we begin by investigating the structures of a counterexample with the smallest number of edges to the statement. We prove two essential properties regarding the in-degree values of sink vertices and how those sink vertices relate to the tournament part of the graph.

Keywords: Quasi-Kernel, Erdős-Székely Conjecture, Hairy Tournament

Presenter: Samuel Kirk, Undergraduate

Mentor: Songling Shan

Title: GRACEFUL LABELINGS OF ORDER SIX GRAPHS

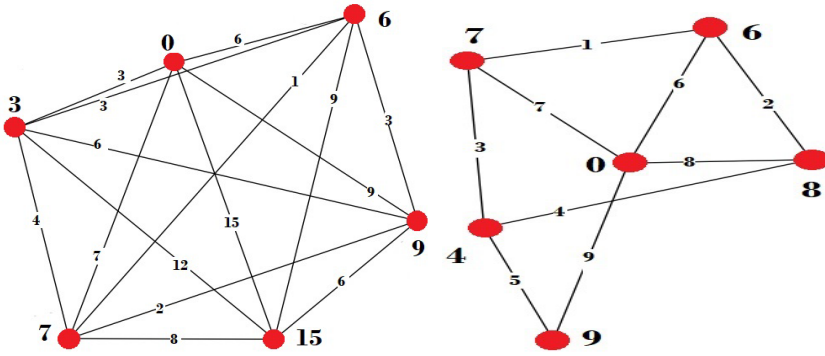
Given a graph G with m edges, we can describe this graph as graceful or not. A graph that is graceful has a function $f: V(G) \rightarrow \{0, 1, 2, \dots, m\}$ so that distinct vertices receive distinct numbers and the set defined by $\{|f(u) - f(v)| : uv \in V(G)\}$ is equivalent to the set $\{1, 2, 3, \dots, m\}$. Put simply, we want to be able to label the vertices of the graph in such a way where the absolute difference between the end vertices of an edge is unique. If there is a way to label the graph following these stipulations then we say that the graph is graceful, and if there is no such way that graph is not graceful.

In this project we look at all order six graphs and categorize them as graceful or not. Using a compiled list of order six graphs, we are able to take all non-isomorphic graphs with their respective adjacency matrices and find if they are graceful or not. To do this we created a program in Java which takes the adjacency matrix as an input, and outputs all ways to gracefully label the graph if any.

The program uses several steps to try and minimize the total number of cases we need to check, and does so in a few different ways. In order for a graph with n vertices to be graceful, it must have at least $n-1$ edges, else there would not be enough elements in the set $\{0, 1, 2, \dots, m\}$ to distinctly label the vertices. So we check this first, then move on to the sets of possible numbers themselves, as not every set of numbers has all possible differences we need.

The program works with all graphs no matter the order, however for larger graphs the program may take some time to execute, as the time function is one that grows exponentially with the order of the graph.

Below are two examples of order six graphs. The larger numbers are the vertex labels, and the smaller ones are the edge labels. To the left is a labeling of the Complete Graph that is not graceful. As you can see there are repeated edge numbers, so this labeling is not graceful. In fact, there are no ways to gracefully label the complete graph using numbers from the set $\{0, 1, 2, \dots, 15\}$, so we say that the graph itself is not graceful. On the right is a graceful graph, with one way to label it gracefully.



On the left is the complete graph on six vertices, which is not graceful. On the right is an order six graph that was found to be graceful.

Presenter: Sara Liesman, Graduate

Mentor: Olcay Akman

Title: IMPACTS OF A CROSS-INSTITUTIONAL RESEARCH EXPERIENCE WORKSHOP ON STUDENT UNDERSTANDING OF AND SELF-EFFICACY FOR RESEARCH

Sara Liesman, Department of Mathematics, Illinois State University, Normal, IL, 61761 Angela Antonou, Department of Mathematics and Computer Science, University of St. Francis, Joliet, IL, 60435 Megan Powell, Department of Mathematics, University of North Carolina Asheville, Asheville, NC, 28804

There are many perceived benefits to undergraduate student research; however, students may not have a full understanding of the research process prior to engaging in a project. To help students gain an understanding of the research process, the Intercollegiate Biomathematics Alliance organizes a Cross-Institutional Research Experience (IBA-CURE) that brings students together to work on research skills and problems. In this presentation, we analyze the impact of an undergraduate research workshop on students' understanding of academic research as well as the impact on their self-efficacy for conducting research through an analysis of the 2018 and 2019 IBA-CURE workshops. Students completed before and after surveys addressing their understanding of research and effective collaboration in conducting research, their perceived role in conducting research, and their perception of their own skills specific to biomathematics research. Here we discuss improvements in self-efficacy and shifts in perception of research.

Presenter: Jacob Nottoli, Undergraduate

Group Members: Eva Yang, Undergraduate; Anna Janaszak, Undergraduate

Mentor: Songling Shan

Authors: Anna Janaszak; Jacob Nottoli; Eva Yang

Title: GRACEFULNESS OF SPIDERS WITH LEG LENGTH AT MOST THREE WITH AN ADDITIONAL LEG OF ARBITRARY LENGTH

Let G be a graph with m edges. A *graceful labeling* of G injectively assigns integers from the set $\{0, 1, \dots, m\}$ to the vertices of G so that the absolute difference between each vertex includes every number in the set $\{1, 2, \dots, m\}$. We say that G is *graceful* if there exists a graceful labeling of G . Rosa in 1966 firstly proposed the following conjecture: every tree is graceful. This conjecture was only confirmed for certain classes of trees and is still wide open. A *spider* is a tree that has exactly one vertex of degree at least three. Bahls, Lake, and Wertheim in 2010 proved that every spider with its leg lengths being in two consecutive values is graceful. In this work, we show that every spider with each leg length being at most 3 and one leg being an arbitrary length can be gracefully labeled.

Bahls, Lake, and Wertheim [Gracefulness of families of spiders, P. Bahl, S. Lake, and A. Wertheim, *G, Involve*, 3 (2010) 241-247] introduced a method of adding a leg of arbitrary length to a gracefully labeled spiders such that the central ver-

tex is labeled by zero. The paper explains a method to gracefully label spiders with an odd number of legs and then uses the arbitrary leg method to add on another leg to gracefully label spiders with an even number of legs with consecutive leg lengths. The issue with the arbitrary leg method is that it requires that the central vertex to be previously labeled by zero, and the actual method will change the central vertex to go from 0 to 1 to 2 and onward. Therefore, you cannot use the arbitrary leg length method more than once. So in order to gracefully label spiders with an even amount of legs of length at most 3 with an additional leg of arbitrary length, we had to find a new approach.

We solve this issue from two aspects. One strategy involves attempting to find a way to gracefully label spiders with an even number of legs of length at most 3 while keeping the central vertex labeled zero. This is being explored by the first author. The second strategy involves being able to add an arbitrary length leg while the central vertex is not 0. A method has been found and proven for this.

Keywords: graceful labeling, spider tree,

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Presenter: Ian Samsami, Undergraduate

Group Members: Joie Green, Undergraduate; Brett Klepitch, Undergraduate

Mentor: Songling Shan

Authors: Joie Green; Brett Klepitch; Ian Samsami

Title: ON ANTIMAGIC LABELING OF LOBSTERS

An antimagic labeling of a graph G with p edges is a function $f: E(G) \rightarrow \{1, \dots, p\}$ such that distinct edges receive distinct numbers and any two vertex sums are distinct, where a vertex sum is the sum of the labels of all edges incident to that vertex. A graph is antimagic if it has an antimagic labeling. In 1990, Hartsfield and Ringel conjectured every connected graph with at least three vertices is antimagic. The conjecture was confirmed for trees with at most one vertex of degree 2 and other classes of graphs including caterpillars and spiders. However, the conjecture is open for lobsters, where a lobster is a tree with a central path such that all vertices are within distance two from the central path. We study the antimagic labeling of lobsters and show that three classes of lobsters are antimagic.

The first class of lobsters that we studied was one with an arbitrary amount of edges along the central path, and legs extending from each inner vertex on the path. The legs consist of arms, which are edges connecting the arbitrary number of claws to the central path. This is the basic type of lobster, with variations on uniformity of claws, as well as adding arbitrary amounts of degree two vertices to the central path (see Figure 1).

The second class we review allowed for m vertices along a central path, then off each central path vertex there is at least one leg and then as many more legs and leaves as possible (See Figure 2). There are $x + y + \dots + z = q$ stumps, where $x, y, \dots, z \geq 0$. Additionally, there are $a + b + \dots + c = n$ legs, where $a, b, \dots, c \geq 1$.

The third class of lobster that we study is a patterned-based graph (see Figure 3). It sets constants as follows:

- With a clearly defined central path, the two endpoints of that path are vertices of degree 1
- Every packet of legs consists of exactly twice as many edges as there are legs, that is; each leg is comprised of two edges
- Every packet of legs is the same for the entire span of the graph, and each are separated by buffer vertices of degree 2

With each of these graphs, we define a class of lobster graphs and work through examples of each class to learn more. Our research is not limited to these classes of graphs, and we will continue to add to our report to reflect all that we have

learned.

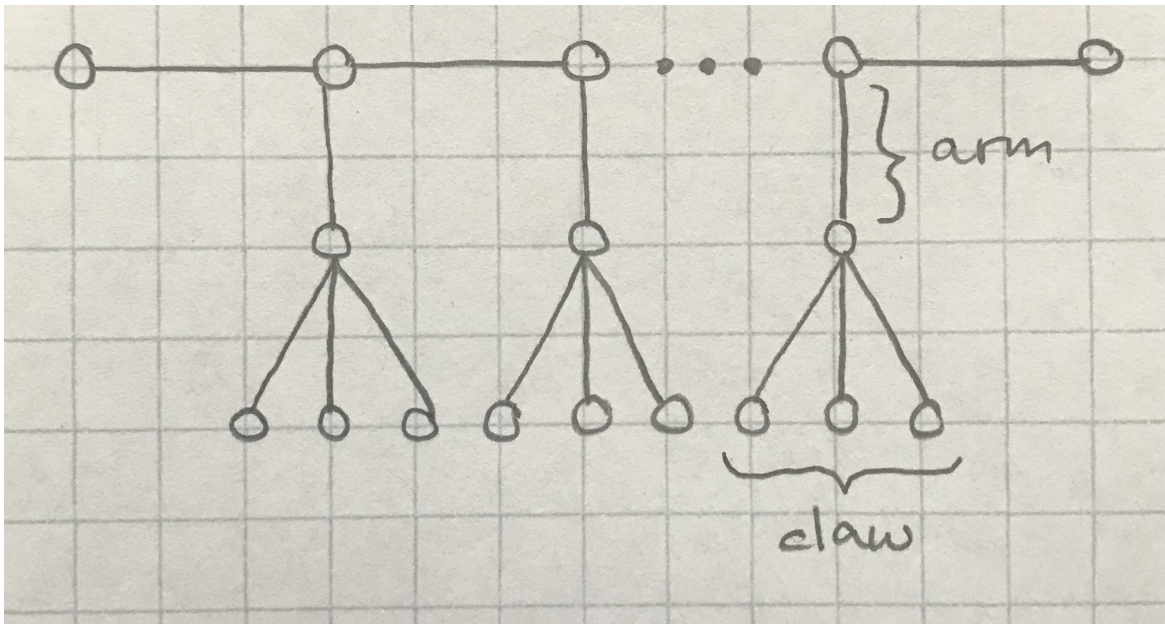


Figure 1: lobsters with arms and claws

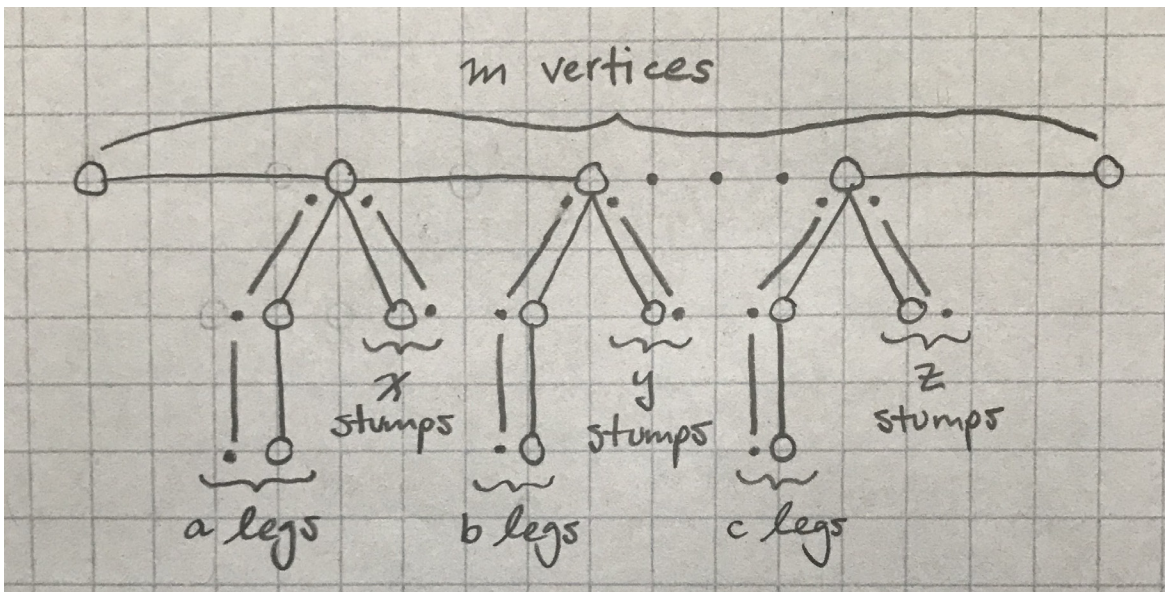


Figure 2: arbitrarily large lobsters

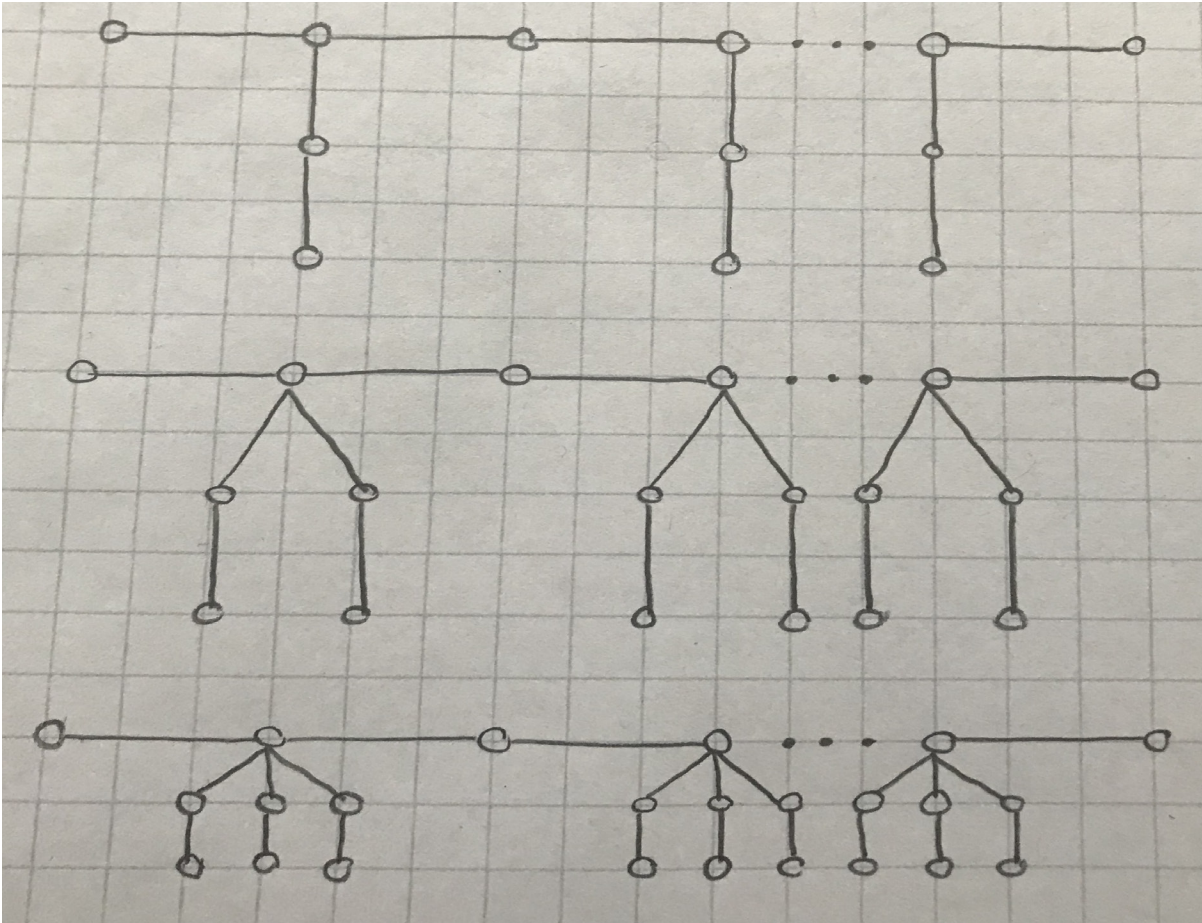
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Our research is not limited to these classes of graphs, and we will continue to add to our report to reflect all that we have learned.



2 Figure 3: Patterned lobsters

Philosophy

Presenter: Megan Kalafut, Undergraduate

Mentor: David Sanson

Title: THE PRINCIPLE OF THE IDENTITY OF INDISCERNIBLES

The Identity of Indiscernibles is the principle that states, roughly, that if two things have all properties in common, then they are the same thing. It is an attractive principle because it gives us a criterion for identity and as such a criterion for counting. But, in "The Identity of Indiscernibles," Max Black argues the principle is false because there could be two distinct but indiscernible spheres. In this poster, I explore the point and declare method of discerning, the implications of accepting the principle of the Identity of Indiscernibles is false, and the implications of accepting the point and declare method to support the Identity of Indiscernibles

Physics

Presenter: Nathan Bennett, Undergraduate

Mentor: Justin Bergfield

Authors: Nathan Bennett; Justin Bergfield

Title: QUANTUM INTERFERENCE ENHANCEMENT OF THE SPIN-THERMOPOWER

Heat can be directly converted into electricity via the thermoelectric effect in a device which has no moving parts and no operational carbon footprint. More efficient thermoelectric materials are highly sought after as energy harvesting materials and as way to understand how charge and heat interact with one another. In addition to charge, electrons carry a purely quantum property known as spin. Under the influence of an applied temperature difference, certain “spintronic” materials generate spin-dependent potentials useful for a host of applications. The interplay between spin and heat is described by the spinthermopower, a quantity we calculate and analyze for a few interesting systems.

Presenter: Cal Forsman, Undergraduate

Mentor: Matt Caplan

Title: THERMAL FLUCTUATIONS IN NUCLEAR PASTA

All stars maintain an equilibrium between the pressure in their cores and gravity compressing them. When massive stars exhaust their fuel nuclear fusion in the core ceases and can no longer support the core against gravitational compression. A core-collapse supernova occurs, and the collapsed core remains as a neutron star. Neutron stars are significantly more compact and thus much denser. At these high densities protons and neutrons rearrange into structures known as ‘nuclear pasta’ which are theorized to generate gravitational waves on rotating neutron stars. We study thermal fluctuations in nuclear pasta at finite temperatures using molecular dynamics simulations. We render these simulations in 3D using Paraview to study the evolution of nuclear pasta with increasing temperature. We resolve a melting transition above which the structure breaks down. At high temperatures below the melting transition various defects such as holes and filaments spontaneously form and dissolve, and we observe high surface roughness. At low temperatures defects exist but are infrequent and short lived. We characterize the surface of the pasta structures with the Minkowski functionals and find powerlaw deviations in surface curvature which may impact observable properties of neutron stars.

Presenter: Ian Freeman, Undergraduate

Mentor: Matt Caplan

Authors: Ian Freeman; Brighton Coe

Title: MODELING NUCLEI FOR SIMULATED NUCLEAR COLLISIONS

Traditional methods of simulating nuclear fragmentations require considerable of computational resources. To combat this, we have utilized a new classical nuclear model to both reduce computational load and maintain a high level of accuracy. This model treats both protons and neutrons as point particles that only interact in two particle interactions. We have validated the model for select light nuclei, comparing nuclear binding energies we obtained from simulations and analytical calculations to experimental values. We model heavy nuclei with a body centered cubic lattice, and automatically generate stable configurations of very large nuclei to simulate collisions.

Presenter: Daniel Mueller, Undergraduate

Mentor: Justin Bergfield

Authors: Daniel Mueller; Justin Bergfield

Title: THERMOELECTRIC MICROSCOPE THEORY

Scanning tunneling microscopes (STMs) image the nanoworld by measuring the current flowing through a sample. In response to an applied temperature difference, current flows until a voltage is built up to oppose the flow. The ratio of the voltage to the temperature difference is a measurable quantity known as the thermopower. Although thermoelectric devices are important for a variety of heating and cooling applications, we propose that the thermopower is also of interest as a microscopic observable because it is a probe of the second moment of the transport. In this work, we derive the theory necessary to describe this new microscopic technique. We also simulate several images produced by a scanning thermopower probe (SThM) and discuss the implications of the technique.

Presenter: Alex Plumadore, Undergraduate

Mentor: Allison Harris

Authors: Alex Plumadore; Allison Harris

Title: TWISTED IDENTITIES

Humanity has been striving to understand the universe for thousands of years. Today, this understanding has taken a leap forward as a new advancement called electron vortex beams are being used to probe deeper into the unknown. These new beams have a unique twisting that leads to potential applications in communications, microscopy, astronomy, and identification of atomic structures. In order to access these applications, a fundamental understanding of these twisted beams, and their interactions with matter, is required. To gain deeper insight into twisted beam interactions with matter, we calculate ionization cross sections for electron vortex beam collisions with hydrogen. These cross sections show signatures of the target structure and provide more information than nonvortex collisions.

Politics and Government

Presenter: Jacky Luu, Undergraduate

Mentor: Michaelene Cox

Co-mentor: Nargiza Yusupova

Title: SECURITY OF FREEDOM FOR THE PEOPLE OF HONG KONG

This topic will explore how the Hong Kong people are trying to fight for their sovereignty from China. Hong Kong was a British colony for 156 years and was given back to China. Hong Kong was only a part of China for about 23 years. The Chinese Community Party (CCP) and Hong Kong existed side by side for many years under two different governments. After Hong Kong's transition, the CCP refers to the arrangement as "one state, two systems." But the CCP has a history of making its land homogenous which can be seen in areas such as Tibet and Xinjiang. My research question is: How can we assess the value Hong Kong people place on their independence and sovereignty from the CCP? Recent Hong Kong protests are one of the most recorded and photographed protests in modern media. This art-based research project will show the chronology and escalation of the unrest. The presentation will have visuals drawn from news media sources and/or image databases that cover the struggles of the Hong Kong people's fight against police and the CCP, which will give insight on how much the people are willing to struggle for their sovereignty.

Presenter: Michael McCarthy, Graduate

Mentor: Noha Shawki

Title: UNMASKING DISPOSSESSION: PHILANTHROCAPITALISM, THE GLOBAL JUSTICE DEBATE, AND STATIST COSMOPOLITAN AGENCY

The historical emergence of philanthrocapitalism, the development of market relations through philanthropic giving, as a theory and praxis of attaining global justice is called into question by the relationship that philanthrocapitalists have with state actors and international governance organizations that facilitate regulatory capture and increased economic inequality. This paper is an attempt to revise the philosophical underpinnings of the philanthrocapitalist movement by applying Lea Ypi's statist cosmopolitan model of political agency to the institutions that foster philanthrocapitalist institutions.

Psychology

Presenter: Ashley Adams, Graduate

Group Members: Victoria Powers, Jake Solka

Authors: Ashley R. Adams, Victoria Powers, Yessenia Chavez, Jake Solka, Laura J. Finan, and Christine M. Ohannessian

Mentor: Laura Finan

Title: LONGITUDINAL ASSOCIATIONS BETWEEN SCHOOL CONNECTEDNESS AND ADJUSTMENT PROBLEMS DURING ADOLESCENCE

Given that adolescents spend majority of their lives in school, nearly seven hours every day, it is crucial to investigate how their relationship with their school impacts developmental outcomes. Key features of school connectedness, such as support and acceptance from the community, serve as protective factors against development of depression and anxiety symptoms during adolescence (Waters et al., 2009; Joyce & Early, 2014). Further, longitudinal research suggests that school connectedness is negatively correlated with behavioral problems and psychopathology during the adolescent period (Lester et al., 2013; Loukas et al., 2009). Although these relationships have been established, extant research has yet to investigate potential developmental pathways among these constructs. Therefore, the current study sought to examine depressive and anxiety symptoms as mediators of the relationship between school connectedness and later problem behavior. Data were drawn from the Predictors of Anxiety and Depression During Adolescence (PANDA) Project (Ohannessian & Vannucci, 2018), which surveyed adolescents from five Northeastern State middle schools in fall 2016 (T1; Mage=12.75; SD=.71; 51% female), spring 2017 (T2), and fall 2017 (T3). Adolescents reported on depressive and social anxiety symptoms, feeling of school connectedness, and problem behaviors. The Center for Epidemiological Studies Depression Scale for Children (Weissman et al., 1980) was used to measure adolescent depressive symptoms ($\alpha T1=.91$); the Screen for Child Anxiety Related Emotional Disorders (Birmaher et al., 1999) was used to assess social anxiety ($\alpha T1=.87$); and a school connectedness scale measured school connectedness ($\alpha T1=.71$). Adolescent also reported on the frequency in which they engaged in a variety of risk behaviors (e.g., start physical fights; $\alpha T1=.95$) (American Psychiatric Association, 2013). Structural equation modeling was used to examine whether depressive and anxiety symptoms (T2) mediated the relationship between school connectedness (T1) and later problem behavior (T3). Age, gender, and previous time points of all endogenous variables were controlled (Figure 1). Model results indicated that school connectedness negatively predicted later depressive and anxiety symptoms. However, only depressive symptoms in turn positively predicted later problem behavior. The direct effect of school connectedness to problem behavior 1.5 years later remained significant after accounting for the mediated pathways, suggesting that depressive symptoms partially mediated this effect. These findings highlight a developmental pathway from school connectedness to later problem behavior through adolescents' depressive symptoms. Findings may aid schools in identifying at-risk youth for developing later emotional and behavioral problems and point to the importance of promoting school connectedness among young adolescents.

Presenter: Ashley Adams, Graduate

Group Members: Sara Kurbyun

Mentor: Laura Finan

Title: PARENTAL PROBLEM DRINKING AND ADOLESCENT SUBSTANCE USE: THE MODERATING ROLE OF SIBLING RELATIONSHIPS

Families are complex systems with each member influencing all others (Cox & Paley, 1997). Family factors like parental problem drinking have been consistently shown to predict a range of adverse adolescent adjustment outcomes, including alcohol and other substance use (Caspi et al., 2018; Park & Schepp, 2014). However, other family factors, such as sibling relationships, may serve as protective or additive risk factors in influencing adolescent behavior. Limited extant research has investigated the role of sibling relationship characteristics in the context of parental problem drinking (Rueter et al., 2015). Therefore, the current study examined if hostility and warmth in sibling relationships served as risk or protective factors in the relationship between maternal and paternal problem drinking and adolescents' alcohol and drug use.

Data were drawn from the Adolescent Adjustment Project (Ohannessian, 2009), which surveyed adolescents from seven Mid-Atlantic State public high schools in Spring 2007 (M_{age}=16.08; SD=.69; 55% female). Only adolescents who reported having a single sibling were included (N=373). Adolescents were asked how often in the last 6 months they (a) used marijuana, sedatives, stimulants, inhalants, hallucinogens, cocaine or crack, and opiates (drug use frequency) and (b) how much and how often they drank beer, wine, and liquor (alcohol use quantity and frequency). The Short Michigan Alcoholism Screening Test (Crews & Sher, 1992) measured adolescents' perceptions of their mother's and father's alcohol use problems. Scale items were summed such that greater scores represented greater maternal (MPD; $\alpha=.60$) and paternal (PPD; $\alpha=.84$) problem drinking. Finally, the Sibling Relationship Questionnaire (Slomkowski et al., 2001) was used to assess adolescents' perceptions of warmth ($\alpha=.89$) and hostility ($\alpha=.87$) with their sibling.

Regression analyses were used to examine associations between sibling relationship characteristics, parental problem drinking, and adolescents' substance use. Separate models were conducted for MPD and PPD, and structural elements of sibling relationships were controlled (Table 1). Only PPD was positively associated with adolescents' alcohol use (Model-2). However, sibling hostility and MPD (Model-3) and sibling hostility and PPD (Model-4) were positively associated with drug use. Further, sibling hostility and PPD interacted to predict drug use ($B=.14$, $p<.05$). Probing this interaction with simple slope analyses indicated that adolescents in families with high PPD and high sibling hostility reported the greatest drug use. Results may help identify youth that are at the greatest risk for engaging in health risk behaviors and can support substance use treatment efforts for adolescents by addressing family functioning and relationships.

Presenter: Merissa Berens, Undergraduate

Group Member: Keeley Hynes

Mentor: Daniel Lannin

Co-mentor: Luke Russell

Authors: Keeley Hynes, Merissa Berens, Jeremy Kanter, Daniel Lannin, Luke Russell

Title: LONELINESS: EXPLAINING THE LINK BETWEEN SOCIAL MEDIA RUMINATION AND PSYCHOLOGICAL DISTRESS

The present study found that among at-risk youth in a relationship education program, the relationship between social media rumination and psychological distress is mediated by loneliness. This suggests that more social media rumination affects psychological distress because of its link to loneliness. Implications for educational interventions for at-risk youth will be discussed.

Presenter: Rebecca Bove, Graduate

**Group Members: Jazmin Lozada, Taiz Garcia, Michaela Pierson, Abbey Warwick,
Jessica Rothman, Lucy Okrasinski**

Mentor: Alycia Hund

**Authors: Rebecca Bove, Jazmin Lozada, Taiz Garcia, Michaela Pierson, Abbey Warwick, Jessica Rothman,
Lucy Okrasinski, Jackie Diaz, Caroline Signa**

**Title: THE DEVELOPMENT OF CARDINAL, ORDINAL, AND SPATIAL LANGUAGE IN YOUNG
CHILDREN**

Language is an important aspect of child development. When it comes to numbers, children first learn lists of numbers then give those words meaning (Slusser, Ditta, & Sarnecka, 2013). The more numbers children know, the greater their comprehension of ordinal orders (Brannon & Van de Walle, 2001). When a child is more familiar with ordinal labels, it helps with problem solving skills (Miller, Marcovitch, Boseovski, & Lewowicz, 2015). As for spatial language, it improves from 3- to 5-years (Hund, Bianchi, Winner, & Hesson-Mcinnis, 2017). Our objective was to specify the developmental trajectory of cardinal, ordinal, and spatial language comprehension and production for 3- to 5-year old children. Children were randomly assigned to either the Tell Me or Give Me condition, and all the children in either condition completed cardinal, spatial, and ordinal trials. The cardinal order can be defined as a numeric, such as one or three. The spatial order can be defined as the location of a person or object, such as front, middle, or back. The ordinal order can be defined as sequential numerical, such as first or third. In the Tell Me condition, the children were asked to tell the researcher where a randomly assigned labelled car was located (testing language production); whereas, in the Give Me condition, the children were asked to put a labelled car(s) in the garage (testing language comprehension). To date, 33 children have participated. As predicted, preliminary analyses revealed that there were significant improvements across development in cardinal, ordinal, and spatial language. In addition, the Give Me group performed higher than the Tell Me group for 4-year-olds, suggesting comprehension may be easier than production. Children were more successful with cardinal labels than with ordinal labels, with spatial labels being intermediate. Once completed, the results of this study may be helpful in academic and home settings, perhaps to increase exposure to complex language to facilitate developmental success.

Presenter: Shaunta Caffey, Undergraduate

Mentor: Julie Campbell

Authors: Shaunta Caffey, Bailey Schejbel, Emily Marcinowski

Title: MOTHERS' HAND PREFERENCE DURING DYADIC PLAY EXPERIENCE WITH INFANTS

Research shows an infant's hand preference is related to the mother's handedness (Michel, & Harkins 1988). During simple unimanual actions, Michel and Harkins (1988) found that mothers who had a strong left-hand preference had infants who had more left-hand use during reaching and unimanual actions than infants who had two right-handed parents or an infant who had a left-handed father. The purpose of this study is to examine the relation between mother and infant hand preference during complex play experience, extending beyond simple unimanual actions. Hand preference was observed for thirty-one mother-infant dyads during play experiences, across a one-year period. While video-recorded, mothers were asked to play with their infants for five minutes using a standard set of toys. Mothers' hand actions were coded as right, left or both, for each action depending on which hand was used in an interaction with the four objects. Actions were coded if mothers engaged in the following: object play, (mother interacted with the infant using an object), construction/deconstruction (mother connected or separated the chain link toy), nonconstruction (mother utilized an object as a tool). The number of actions performed with each hand were then put into the equation $(R-L)/\sqrt{(R+L)}$ in order to create a z-score of continuous hand preference. Infants' hand preference was recorded during a play situation in which the infant was presented with several different toys that could be constructed or combined. Results showed that across all play types and visits mothers preferred to use their right hand twice as often as they used their left hand and four times more than they used hands bimanually. More mothers are right hand dominant during play, which may result in

asymmetrical play experience for infants with a burgeoning hand preference. A Pearson Correlation showed no significant relation between mother and infant handedness ($p = .08$). Our results do not agree with previous research; this disagreement may be due to an insufficient assessment of mother handedness, which does not require the use of the dominant hand, while the infant assessment was difficult and required the skill of a dominant hand.

Presenter: Heather Calkins, Graduate

Mentor: Gregory Braswell

Title: PARENT AND TEACHER PERCEPTIONS OF SEL IN THE SCHOOLS

This thesis presents a research project that examined the differences between parent and teacher perceptions of social-emotional learning (SEL) in the schools. This project also examined how parents and teachers rank social-emotional goals with respect to academic goals for their children. Results indicate that teachers rate the importance of SEL more highly compared to parents; however, there was no difference in how parents and teachers ranked the items overall. Qualitative analyses revealed differences in the reasoning for parent and teacher support for SEL in the schools as well as concerns for the inclusion of SEL. Future research should further investigate these differences between parent and teacher perceptions of SEL, as this could influence how SEL is presented to stakeholders and how it is implemented.

Presenter: Yonca Cam, Graduate

Group Member: MaKayla Smullin

Mentor: Scott Jordan

Authors: Yonca Cam, MaKayla Smullin, Scott Jordan

Title: LEARNING CONTINUOUS ACTION-EFFECT CONTINGENCIES THROUGH OBSERVATION

The effects of our movements become associated with the motor commands that generate those movements (Hommel et al., 2001), and later exposure to (i.e., perception of) those effects (e.g., being a passenger in a car) primes us to make those same types of movements. To date, these experiments have used discrete stimuli and discrete responses. The present experiment investigated whether or not response-effect pairings could be acquired during a continuous control task, and whether one can learn such pairings, simply by observing another person do the control task. One of the participants used the A and L key on a keyboard to keep a circle stimulus inside a rectangle for three minutes, while the other participant (i.e., Observers) observed them. Each key press produced a clearly discernible tone as long as the key was pressed. Half of the observers sat next to the controller and were able to observe the key-presses (i.e., actions) and dot movements (i.e. effects) the controller made—Full Observers. The other half had their view of the controller's hand obstructed, in the attempt to deny them access to the controller's actions—Partial Observers. All participants completed stimulus-compatibility reaction-time tasks to test whether dot movements or tones primed their actions, both before and after the control phase. Reaction times for Target-Prime pairings that were congruent with those in the control task were subtracted from those that were incongruent. These priming scores underwent a Session (i.e., pre and post—within) by Prime Type (i.e., dot motion or tones—within) by Condition (i.e., Controllers, Full Observers, and Partial Observers—between) mixed factors ANOVA, which revealed a marginally significant Session X Condition interaction in which priming scores became larger for Controllers across sessions while the opposite occurred for both types of Observers. Contrary to Jordan and Hunsinger (2008), the finding that Full Observers performed more like Partial Observers than Controllers challenges the idea that one can learn the action effect contingencies produced by another, simply through observation. References Hommel, B., Müsseler, J., Aschersleben, G., & Prinz, W. (2001). The theory of event coding (TEC): A framework for perception and action planning. *Behavioral and brain sciences*, 24(5), 849-878. Jordan, J. S., & Hunsinger, M. (2008). Learned patterns of action-effect anticipation contribute to the spatial displacement of continuously moving stimuli. *Journal of Experimental Psychology: Human Perception and Performance*, 34(1), 113.

Presenter: Samantha Croney, Graduate

Group Member: Riley Cronin

Mentor: Alycia Hund

Authors: Samantha Croney, Riley Cronin, Alycia Hund

Title: TEMPERAMENT AND AGGRESSION IN EARLY CHILDHOOD

Temperament has been associated with aggressive behaviors (Rothbart, Ahadi, & Evans, 2000); however, the nature of this relationship would benefit from more specificity. This project focused on the temperament dimensions of shyness and inhibitory control. Shyness is marked by slow, avoidant, or inhibited approaches to novel social situations or uncertainty, whereas inhibitory control is the ability to “suppress inappropriate approach responses under instructions or in novel or uncertain situations” (Rothbard, Ahadi, & Hershey, 1994, p. 29). We tested two types of aggression evident in early childhood. Proactive aggression is characterized by expecting positive outcomes from aggression and involves many aspects of social interaction, whereas reactive aggression is more automatic and less verbal. We focused on age 4 years when children are beginning to prepare for the transition to kindergarten, which could present challenges for children who are shy or who have low inhibitory control, especially if these aspects are linked to aggression. We predicted that inhibitory control would be negatively correlated with aggression, whereas shyness might be positively correlated with aggression. To date, 72 parents of 4-year-old children reported their child’s temperament using the Short Version of the Children’s Behavior Questionnaire Shyness and Inhibitory Control subscales (Rothbart, Ahadi, Hershey, & Fisher, 2001). Additionally, parents completed the Proactive Reactive Aggression Questionnaire (Dodge & Coie, 1987). Participants were recruited from area preschools and organizations serving children and families. As predicted, Pearson correlations indicated that there was a significant negative correlation between inhibitory control and proactive aggression, $r(70) = -.47, p < .001$. Similarly, there was a significant negative correlation between inhibitory control and reactive aggression, $r(70) = -.49, p < .001$. These findings suggest that lower inhibitory control is related to higher proactive and reactive aggression. There was not a significant correlation between shyness and proactive aggression, $r(70) = -.01, p = .963$, or between shyness and reactive aggression, $r(70) = -.01, p = .914$. Differences in temperament affect how children regulate their mood and behavior. This study provides further evidence that low inhibitory control is associated with higher levels of both proactive and reactive aggression. In contrast, no significant associations were evident for shyness and aggression. These findings help clarify the nature of relations between temperament and aggression in early childhood.

Presenter: Megan Donnelly, Graduate

Mentor: Steven Landau

Co-mentor: Daniel Lannin

Authors: Megan Donnelly, Daniel Lannin, Jeremy Kanter, Steven Landau

Title: THE DEMEANING SOCIOCOGNITIVE ATTITUDES OF BULLIES

Current divisive political discourse evokes concern, as hostile and bullying exchanges at school have recently (and dramatically) increased. While bullying has been widely studied, less is known about sociocognitive functioning of bullies, especially concerning different types of bullies. To inform screening and intervention efforts, this study will examine sociocognitive differences in high-school-aged bullies versus bully-victims regarding their moral disengagement, normative beliefs about aggression, and social dominance orientation.

Presenter: Hailie Halverson, Undergraduate

Group Member: Kailey Greene

Mentor: Daniel Lannin

Co-mentor: Luke Russell

**Authors: Hailie Halverson, Kailey Greene, Daniel Lannin, Jeremy Kanter, Luke Russell,
Ani Yazedjian**

Title: DO INTRINSIC AND EXTRINSIC MOTIVATION ENCOURAGE DIFFERENT FACETS OF HOPE?

The present study examined the association among intrinsic and extrinsic life goals and different aspects of hope. Results indicated that the type of motivation that adolescents are oriented toward influences the type of hope they experience. Bolstering intrinsic motivation may be an important consideration for practitioners who work with youth.

Presenter: Kate Hart, Graduate

Mentor: Suejung Han

Co-mentor: Scott Jordan

Author: Marjorie Kate Hart

**Title: WHAT'S ON YOUR MIND? APPLYING A NEUROCOGNITIVE MODEL OF EMOTION
REGULATION TO ATTACHMENT**

Attachment theory has often been studied as a trait-like variable which has reliably predicted outcomes in numerous domains. The underlying mechanism to attachment is its role in affect regulation, and theories about the systems involved outline two separate processes depending on attachment security: primary attachment strategies and secondary attachment strategies. This paper focuses on the secondary attachment strategies, outlining the behavioral and neurocognitive evidence in support of Mikulincer, Pereg, and Shaver's (2003) models of hyperactivation and deactivation affect regulation systems. Attachment anxiety's hyperactivation system is well-supported in both behavioral and neural domains, but the attachment avoidance deactivation system is only consistently supported in behavioral domains. As an important step forward in understanding the affect regulation system in humans, this paper attempts to fit the model of attachment affect regulation into an emotion regulation model proposed by Etkin, Büchel, & Gross (2015). It is concluded that because attachment systems are already understood as internal working models, and because Etkin, Büchel, & Gross' (2015) model delineates a system that relies on internal working models, attachment and general emotion regulation research can be successfully integrated. Additionally, studies across the domains of attachment and emotion regulation show relatively consistent neural patterns of affect regulation, with the secondary attachment strategies coinciding with worry and suppression strategies outlined in general emotion regulation research. The adaptation of Etkin, Büchel & Gross' (2015) model in attachment research will allow for meaningful differentiations between attachment affect regulation systems, however, more research connecting the attachment affect regulation and emotion regulation subfields is necessary to understand the cognitive systems behind emotion regulation.

Presenter: Paige Hemming, Undergraduate

Group Member: Dante Caruso

Mentor: Adena Myers

Authors: Paige Hemming, Dante Caruso, Adena Myers

Title: STUDENT ENGAGEMENT IN A HYBRID UNDERGRADUATE STATISTICS COURSE

This project examines the application and evaluation of a variety of instructional technologies in teaching a hybrid version of an intermediate undergraduate statistics class. Specifically, we examine what happened when activities formerly delivered in person (such as lectures) or completed in analog paper-and-pencil format (such as homework) were moved to online platforms, and we discuss strategies for fostering engagement, scaffolding skill development, and assessing learning through a combination of in-person and online efforts.

We use two measures of student engagement to evaluate our instructional methods. The first is a measure of students' use of online resources (such as visiting our site, checking the gradebook, and watching video lessons) developed by the instructor specifically for this class. The second is an index of engagement provided by the online textbook publisher. It is based on the time spent reading the textbook as well as activities performed while reading such as highlighting and searching within the text. Efforts to increase engagement were implemented in Spring 2020 with the expectation for improvements from fall to the current spring semester.

Analyses of 58 students from the current and previous semesters indicate that engagement with our online site was a significant predictor of performance on course assignments and assessments, rather than spending time on the online textbook. For example, analyses showed that the visits to the Reggie Net site was significantly correlated with the total amount of homework points earned through mid-semester, $r(58) = .29$, $p = .03$ and the scores on Assessment II, $r(58) = .40$, $p = .00$. Excitingly, students from the current semester showcased significantly higher scores on total homework points than those from the Fall 2019 course, $t(58) = -2.55$, $p = .01$. Although assessment scores were not statistically different between semesters, there were trends in the expected direction with Spring 2020 scores being higher than Fall 2019 scores.

Presenter: Alexandra Horton, Graduate

Group Member: Tyler Pederson

Mentor: Daniel Lannin

Authors: Alexandra Horton, Tyler Pederson, Daniel Lannin, Luke Russell, Ani Yazedjian, Jeremy Kanter

Title: DOES DISCRIMINATION EVOKE AN ORIENTATION TOWARD MATERIALISTIC VALUES

The present study explored the relationship between race, discrimination, and a materialistic values orientation (MVO). MVO corresponds to an orientation wherein an individual prioritizes a cluster of goals centered around consumerism that include achieving financial success, cultivating an attractive appearance, and having a high social status (Kasser, Ryan, Couchman & Sheldon, 2004). One pathway by which MVO develops is as a compensatory response to feelings of insecurity; that is when individuals feel threatened they are more likely to compensate for this distress by pursuing goals related to MVO, as opposed to pursuing goals that meet deeper psychological needs of affiliation, autonomy, and competence (Kasser, 2016). Given perceived discrimination is inherently threatening for minoritized populations (Seaton, Caldwell, & Sellers, 2010), it stands to reason that greater rates of discrimination may be one means by which minoritized populations are urged toward greater MVO. Therefore, the present study predicted discrimination would mediate the relationships between racial minority status and MVO.

Presenter: Keeley Hynes, Graduate

Mentor: Daniel Lannin

Co-mentor: Luke Russell

Authors: Keeley Hynes, Daniel Lannin, Jeremy Kanter, Leandra Paris, Luke Russell, Ani Yazedjian

Title: SOCIAL MEDIA RUMINATION: THE IMPACT OF MATERIALISTIC VALUE ORIENTATION

Previous research demonstrates that ruminating on social media content is associated with greater mental distress. However, it is unclear what factors are associated with rumination. Using Self-Determination Theory, this study examined how orientation toward intrinsic and extrinsic life-goals differentially predicted social media rumination in a sample of racially and socioeconomically diverse high school students at two time points.

Presenter: Keeley Hynes, Graduate

Mentor: Luke Russell

Co-mentor: Daniel Lannin

Authors: Keeley Hynes, Luke Russell, Leandra Paris, Jeremy Kanter, Daniel Lannin, Ani Yazedjian

Title: STRATEGIES FOR AT-RISK YOUTH ACHIEVING AND AVOIDING DISTAL GOALS

Background

Long-term planning may be beneficial for vulnerable youth, as goal-setting in therapy has been shown to be effective in helping prevent psychological distress and improve retention in therapy (Cairns., Kavanagh, Dark, & McPhail, 2019). In adolescence, the prefrontal cortex is not fully developed, and adolescents' decision-making capabilities are more susceptible to stress than adults (Tottenham, & Galván, 2016). This finding may be particularly important for low income youth who may experience more stressful life events than adolescents from higher income homes (Reynolds, O'Koon, Papademetriou, Szczygiel, & Grant, 2001). Therefore, in an effort to better inform intervention services and supports, the current study sought to evaluate the long-term goals of at-risk youth and the current strategies they are engaging in to achieve those goals.

Methods

Data were collected from 187 high school students from predominantly low-income households in Champaign County participating in a school-based relationship education and job readiness training program. Students reported their goals for the next year and the current strategies they were utilizing to achieve them by completing the "possible selves task". Goals were categorized using codes developed by the original authors of the "possible selves task" (Oyserman, 2004). Subsequently, following guidelines from Corbin and Strauss (2015), an inductive constant comparative method was used to categorize adolescents' strategies.

Preliminary Results

Goals were categorized as relating to achievement, personality traits, health, and lifestyle. Strategies to reach these goals were categorized as relating to self-improvement, work and finance, school, staying out of trouble, and relationships. Goals and strategies reported by students demonstrated the diversity of experiences at-risk youth have in their schools, families, and neighborhoods. For example, many students reported goals related to improving their school performance through studying more, increasing school attendance, and completing their homework. Other students, however, reported goals and strategies strongly influenced by other stressors in their environments such as avoiding violence, gang membership, or jail time which they hoped to achieve by cutting off toxic relationships and avoiding the police.

Conclusion

Understanding how youth plan for their future and hope to achieve their goals can assist mental health and school professionals in targeting interventions to best support them. Some adolescents' goals and strategies to achieve them may be unrealistic or maladaptive, suggesting a need for additional services or intervention.

Presenter: Raina Isaacs, Graduate

Mentor: Dawn McBride

Author: Raina Isaacs

Title: CAN SUBJECTIVE TIME COST EXPLAIN COGNITIVE TASK CHOICES?

Previous research (Potts et al., 2018; Rosenbaum & Bui, 2019) suggests that participants' time estimates for completing the tasks is the primary predictive factor of task choice. However, these past studies have only compared a perceptual-motor task with a cognitive task. The current study compares cognitive to cognitive tasks. The purpose of the current study is to investigate the factors that contribute to task choices for cognitive factors. Participants will be given instructions on the three tasks (box-moving, item generation, and addition/subtraction problems). After receiving the instructions, participants will then make an estimate of how long each task will take them. They will then be given a series of trials where they choose between two of the three tasks. Difficulty levels of the tasks will vary across trials. Participants will complete whichever task they choose within each pair of tasks presented. Based on results from past studies, we predict that participants' subjective time estimates will predict which cognitive task they will choose to complete in each pair of tasks given.

Presenter: Stephanie Ivanoff, Undergraduate

Group Member: Taylor Ullrich

Mentor: Daniel Lannin

Co-Mentor: Jeremy Kanter

**Authors: Taylor Ullrich, Stephanie Ivanoff, Daniel Lannin, Jeremy Kanter, Luke Russell,
Ani Yazedjian**

Title: HOPEFULNESS: EXPLAINING THE LINK BETWEEN SELF-AFFIRMATION AND SELF-ESTEEM

The present study examined the association among self-affirmation, hope, and self-esteem. Results indicated more frequent self-affirmations were linked to greater hope, which in turn was linked to increased self-esteem. Helping students identify and draw on self-affirmations may assist in positively impacting their evaluations of their current situation and themselves.

Presenter: Caitlyn Jezowit, Graduate

Group Members: Lucy Okrasinski, Norah Bufford, Jessica Foley

Mentor: Adena Myers

Authors: Jessica Foley, Caitlyn Jezowit, Lucy Okrasinski, Norah Bufford

**Title: EVALUATING THE TRAUMA-INFORMED PROGRAM FOR PROMOTING SUCCESS USING A
MIXED METHOD APPROACH**

This research project is part of the evaluation of the Trauma Informed Program for Promoting Success group intervention (TIPPS). The intervention consists of nine lessons designed to help students navigate friendships, family issues, and

identifying stressors. Children were identified for the intervention using a screener test and teacher referrals. Lessons were given weekly to local middle school students. The program is being evaluated with a mixed method approach that includes comparisons of the students' scores on pre and post-test measures of peer relationships and emotional regulation, weekly evaluation questionnaire, as well as qualitative interviews. This presentation focuses on the qualitative and quantitative aspects. This poster will present analyses to examine perceptions of intervention acceptability for each lesson. Students from this group intervention were also invited for one-on-one interviews led by group leaders. Individual interviews were conducted to gain insight into the perceptions of the program, as well as help identify common themes regarding children's perceptions of the intervention. During the interviews children are asked about their experiences in the TIPPS program, including questions about what they liked or disliked, and what components they may have found helpful.

Presenter: Morgan Johnson, Graduate

Mentor: Alycia Hund

Co-mentor: Adena Myers

Authors: Morgan Johnson, Alycia Hund, Adena Myers

Title: ELEMENTARY GENERAL AND SPECIAL EDUCATORS' EFFICACY TEACHING STUDENTS WITH DISABILITIES

With the rise of inclusive education, more students with disabilities are receiving instruction in the general education classroom. We will present the results of a research study analyzing elementary teachers' efficacy for teaching students with disabilities. Practitioners will learn the ways in which efficacy differs between general and special educators as well as between general teaching efficacy and efficacy specific to teaching students with disabilities.

Presenter: Han Jung, Graduate

Mentor: Eros DeSouza

Title: CULTURAL DIFFERENCES OR POLITICAL DIFFERENCES? FLIPPING OVER THE HOFSTEDÉ'S 6-D MODEL OF CULTURE IN TERMS OF CONSERVATISM AND POLITICAL VIEWS

Hofstede's 6-D model of culture is one of the most widespread taxonomies regarding the cultural differences across the countries, but it has also faced many fierce antagonists. Most criticisms of the Hofstede model include identification of nations and cultures, superficial and narrow theoretical backgrounds, and suggestions of rival hypotheses. Especially, there is some evidence that suggests that the allegedly cultural differences may actually stem from political backgrounds or people's traits related to their political circumstances; Therefore, I expect that most of Hofstede's dimensions are associated with political traits of people and most national differences in Hofstede's dimensions will disappear if the influence of political traits are controlled. The political differences across nations may rather indicate the global commonality, not the differences dichotomously divided without consideration of the dynamic natures of culture.

Presenter: Han Jung, Graduate

Mentor: Eros DeSouza

Co-mentor: Suejung Han

Title: CAN THREAT ONLY MAKE PEOPLE CONSERVATIVE? THE EFFECT OF THREAT SALIENCE ON THE DEFENSIVE REACTIONS OF LIBERALS AND CONSERVATIVES AND ITS LONG-TERM CONTINUITY

The development of the theories of threat and defense has revealed that conservative prejudice is a type of defensive reactions in which people attempt to protect egos and status quo from social threats, which stem from the interactive mechanism between the various situational backgrounds related to threat and the dispositional factors that make individuals more sensitive to threat. However, some studies have shown that dispositional liberals or people with dispositional traits known to be relatively insensitive to threats are rather more likely to be affected by threat priming; Therefore, I will propose the successive three studies to further analyze the theoretical points of this study. Study 1 will check whether the same result can be replicated when the threat stimuli are matched with a goal as the ingroup favoritism, and Study 2 will attempt to induce a different aspect of the defensive reaction to the threat stimuli. Finally, Study 3 will test whether these priming effects can be significant even in the long term and will allow participants to respond identically to equivalent stimuli over time.

Presenter: Madison Maciejewski, Undergraduate

Mentor: Daniel Lannin

Authors: Madison Maciejewski; Daniel Lannin

Title: AVOIDANT, BUT READY TO CHANGE? FACILITATING HELP-SEEKING FOR AVOIDANT HELP-SEEKERS

The present study found that autonomous and avoidant help-seeking styles demonstrate opposing relations with positive help-seeking beliefs. Readiness to change may buffer the negative effect of an avoidant help-seeking style on beliefs about professional help. Bolstering readiness to change may facilitate help-seeking for resistant individuals.

Presenter: Elizabeth Marsh, Undergraduate

Mentor: Suejung Han

Author: Elizabeth Marsh

Title: IS CAMPUS INVOLVEMENT BENEFICIAL FOR COLLEGE STUDENTS? GPA, PERCEIVED ACADEMIC ADJUSTMENT, SOCIAL SUPPORT, AND PSYCHOLOGICAL WELL-BEING

Students who are involved on campus have better mental health and academic performance (Bergen-Cico & Bylander, 2011; Bergen-Cico & Viscomi, 2013). However, why and how campus involvement promotes mental health and academic achievement has not been examined sufficiently. I hypothesized that campus involvement would be associated with overall better mental health via perceived social support, and higher GPA with perceived college adjustment. A sample of 353 college students participated in an online survey. The survey included demographic questions, Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet, & Farley, 1988), College Adjustment Scale (Rice & Dellwo, 2002) with GPA, and the Depression Anxiety Stress Scale (Lovibond, & Lovibond, 1995). A path analysis with AMOS 22.0 revealed an adequate fit to the data, $\chi^2_{(4)}=7.91, p=.10, CFI = .97, RMSEA = .05, 90\% CI = .00, .11$. Campus involvement was associated with perceived academic adjustment ($\beta = .33, p = .002$), which was associated with GPA ($\beta = .50, p < .001$), as predicted. However, campus involvement was not associated with perceived social support ($\beta = .07, p = .18$), although perceived social support was associated with distress ($\beta = -.27, p < .001$). Students who are involved on campus perceive themselves to be well adjusted to college and higher levels of social support reduces distress, which is why they perform better academically. Therefore, to help college students adjust to college and have better mental health students should get involved on campus and participate in programs that increase their levels of social support. Universities should provide ways for students to gain social support throughout their years on campus. Future research could find strategies to improve college adjustment, while reducing distress among college students.

Keywords: college adjustment, campus involvement, social support, psychological distress

Presenter: Elizabeth McPherson, Undergraduate

**Group Members: Sabrina Kelbe, Undergraduate; Julia Wenig, Undergraduate;
Jessica Foley, Graduate**

Mentor: Adena Meyers

Authors: Elizabeth McPherson; Sabrina Kelbe; Julia Wenig; Jessica Foley; Adena Meyers

Title: TRAUMA INFORMED PROGRAM FOR PROMOTING SUCCESS (TIPPS)

The Trauma Informed Program for Promoting Success (TIPPS) is a 9-week ongoing program for middle school students. It is aimed at improving students' perceptions of school climate, emotion regulation, conflict management, and learning behaviors. Students were selected to participate in TIPPS based on elevated scores on a screening measure that was administered in the early fall. Students selected for TIPPS were then assigned to participate in the program in fall 2019 (fall program group) or spring 2020 (comparison group). Both groups were administered measures of outcomes (school climate perceptions, emotion regulation, learning behaviors, and conflict management skills) before the fall groups began and again at the end of the fall semester. This poster will present results of analyses focusing on differences between the two groups on outcomes following the fall semester, as well as the role of demographic factors (age, gender, and socioeconomic status) in influencing the effectiveness of the program.

Presenter: Christopher Melecio, Undergraduate

Group Member: Tyler Pederson, Undergraduate

Mentor: Daniel Lannin

Title: DIFFERENTIAL PREDICTORS OF YOUTHS' INTENTIONAL AND SPONTANEOUS HELP-SEEKING DECISIONS

The present study examined how individual, romantic, and family characteristics differentiated diverse youth's desire to seek out relationship help currently and prospectively. Results highlighted various characteristics that contributed to youth's current and future intentions to seek relational help. These findings are useful for clinicians to promote help-seeking behaviors in youth.

Presenter: Rachael Namboodiri, Undergraduate

Mentor: Daniel Lannin

Authors: Rachael Namboodiri; Daniel Lannin; Patrick Heath

Title: HOW STRESSFUL WILL COUNSELING BE? APPRAISALS OF CONTROL AND CHALLENGE PREDICT HELP-SEEKING INTENTIONS

Purpose

Mental health counseling is an effective treatment for mental health concerns (APA, 2012), though psychological barriers prevent people from seeking out counseling when distressed (Corrigan, 2004). Self-stigma, or an individual's fear that seeking help would lead to diminished self-worth, is one commonly cited psychological barrier leading to lower help-seeking intent (Lannin et. al. 2015). One untested barrier is whether individuals believe they would be able to cope with potential stress created by attending and participating in counseling (cf. stress appraisal theory; Peacock & Wong, 1990). Therefore, this study attempts to address this gap in the literature by testing whether stress appraisals predict help-seeking intentions above and beyond the previously identified barrier of self-stigma.

Methods

Participants completed in-person assessments of previous counseling experience, distress (Kessler et al., 2002), self-stigma of seeking psychological help (Vogel et al., 2006), and an adapted stress appraisal measure (SAM; Peacock & Wong, 1990) that assessed how stressful the prospect of utilizing counseling would be via 5 four-item appraisal subscales (perceptions of self-controllability, centrality, threat, stress, and challenge).

Results

A multiple regression predicting intentions to seek counseling was conducted with previous counseling experience entered in step one, self-stigma entered in step two, and the five subscales of the stress appraisal measure entered in step three. Whereas distress and previous counseling accounted for 16% of the variance in intent to seek counseling, including self-stigma in step two significantly increased the amount of variance explained by 18% ($R^2 = 0.34$, $p < .001$), and including counseling stress-appraisals in step three significantly increased the amount of variance explained by 21% ($R^2 = 0.55$, $p < .001$), with stress-appraisals of challenge ($\beta = .30$, $p < .001$) and self-control ($\beta = .21$, $p = .004$) being significant predictors.

Conclusions

While beliefs about stigma are salient in the help-seeking process, the present study suggests that regarding counseling as a manageable challenge rather than a stressor is a predictor of help-seeking intentions as well. Additionally, believing that one appraises counseling as an environment where they can be successful may bolster help-seeking intentions, suggesting that this could be an important area to focus on in outreach programming in the future.

Presenter: Jessica Quast, Undergraduate

Mentor: Daniel Lannin

Authors: Jessica Quast; Meredith Spraggon; Jeremy Kanter; Daniel Lannin; Luke Russell; Ani Yazedjian

Title: DO DEMOGRAPHIC CHARACTERISTICS MODERATE THE ASSOCIATION BETWEEN LONELINESS AND DISTRESS?

The present study examined associations among loneliness, psychological distress, age, and gender in youth. Results indicated older youth demonstrated difficulty coping with feelings of loneliness and experienced more symptoms of distress. Gender did not moderate the effects of well-being. The present research highlights avenues to increase perceptions of belongingness.

Presenter: Krystal Remijas, Graduate

Mentor: Mark Swerdlik

Authors: Krystal Remijas; Mark Swerdlik

Title: A FORMATIVE EVALUATION OF MTSS IN A MIDWESTERN ELEMENTARY SCHOOL

A program evaluation was conducted of the implementation of MTSS at a midwestern elementary school. Assessment data included an online parent and staff survey and an analysis of student outcome data. The focus was on parent and staff perceptions and analysis of student outcome data related to intervention effectiveness.

Presenter: Darin Roberts, Undergraduate

Mentor: Alycia Hund

Author: Darin Roberts

Title: THE ROLE OF WORKING MEMORY IN DIRECTION GIVING AND WAYFINDING

An important task in our everyday lives is finding our way around and helping others find their way. To do these tasks, we must rely on working memory, which is necessary when holding onto information while performing other tasks. We used Baddeley and Hitch's model to conceptualize four aspects of working memory. The first aspect is the central executive, which is the main processing unit of working memory. Second, the visuospatial sketch stores visual semantics like visual and spatial details, and third, the phonological loop stores verbal information such as language. The last aspect is the episodic buffer, which is responsible for holding onto multidimensional chunks of information (Baddeley, 2009). Past research has linked working memory and wayfinding. For example, indoor wayfinding directions were less accurate when visuospatial working memory was being taxed by a secondary task. Indoor wayfinding times were also found to be slower when visuospatial memory was being taxed (Hund, 2016). The present study investigated the role of working memory in direction giving and wayfinding in an outdoor environment. The sample consisted of 257 participants recruited from Illinois State University. We tested the role of working memory in direction giving and wayfinding through a dual-task paradigm. The dual tasks included being able to tell if a word was a real English word or not (taxing verbal working memory) or making decisions about times on an analog clock (taxing visuospatial working memory) while simultaneously giving directions or finding the best route to a specific destination on the university quad, compared to simply giving directions or wayfinding. Preliminary analyses supported our hypotheses. That is, participants made more errors in direction giving when working memory was being taxed during dual-tasks. They also were slower during wayfinding. These findings provide important details about the role of verbal and visuospatial working memory in wayfinding and direction giving.

Presenter: Alexa Snodgrass, Undergraduate

Mentor: Dan Lannin

Authors: Alexa Snodgrass; Daniel Lannin

Title: A CLEAR AND AFFIRMED IDENTITY; SELF-CONCEPT CLARITY, SELF-AFFIRMATION, AND STIGMA

The present study found that as the tendency to utilize self-affirmation increases, help-seeking self-stigma decreases, but only when self-concept clarity is also high. This suggests that affirming the self may lead to two different paths—depending on the clarity and stability of a person's self-concept.

Presenter: Meredith Spraggon, Undergraduate

Mentor: Dan Lannin

Authors: Meredith Spraggon; Jessica Quast; Luke Russell; Jeremy Kanter; Daniel Lannin; Leandra Parris; Ani Yazedjian

Title: HOW DEVELOPMENTAL PROGRAMMING INFLUENCES YOUTHS' AWARENESS OF THEIR ONLINE AUDIENCES

A. Problem or Major Purpose: The current study sought to evaluate how youth described the impact of participating in a relationship and job readiness curriculum on their behaviors in online environments. Social media usage is prevalent among U.S. youth with more than 81% of students reporting the use of social media at least once a week (Agosto & Abbas, 2017). Youth identify the most salient risks associated with online environments as the prevalence of strangers, the tendency for others to misrepresent themselves, and concerns about privacy (Hundley & Shyles, 2010). Increasingly, professionals have advocated for additional educational interventions to help youth navigate online challenges (Moreno et al., 2013); suggesting it may be beneficial to examine how preexisting interventions influence youths' online experiences. Therefore, the present qualitative study examined the influence of a program that combines relationship education and job-readiness training on youths' online behaviors.

B. Procedure: During Fall 2018 and Spring 2019, youth aged 14-21 in mid-central Illinois participated in focus groups

conducted following a relationship education curriculum (14 focus groups, n = 205) and a job readiness curriculum (15 focus groups, n = 184). Youth responded to questions regarding their social media usage, attitudes, and how curricula influenced online behaviors. Following transcription, inductive analyses of responses were conducted following Corbin and Strauss's (2015) constant comparative method to identify core themes within the responses.

C. Results: Preliminary themes identified across focus groups center around increased awareness of variable audiences who may view youths' social media posts, images, and comments. Youth reported becoming more conscious that photos they post could be accessed by individuals with ill intentions, as well as by potential employers who may view and evaluate their online behavior. One student stated that her awareness of these dynamics increased due to the curricula, noting, "they be looking up your stuff on social media." Preliminary themes and exemplar quotes can be found in Table 1.

D. Conclusions and Implications: Our findings provide preliminary evidence that relationship and job-readiness programming may assist students in becoming more aware of digital audiences and the potential relational or employment-related consequences of social media posts. Increased awareness of these implications may assist youth in more safely navigating online environments and ensuring they do not jeopardize relational and employment opportunities.

Presenter: Taylor Ullrich, Undergraduate

Group Member: Stephanie Ivanoff, Undergraduate

Mentor: Dan Lannin

Co-mentor: Jeremy Kanter

**Authors: Taylor Ullrich; Stephanie Ivanoff; Daniel Lannin; Jeremy Kanter; Luke Russell;
Ani Yazedjian**

Title: HOPEFULNESS: EXPLAINING THE LINK BETWEEN SELF-AFFIRMATION AND SELF-ESTEEM

Problem or Major Purpose: The present study examines the association among self-affirmation, hope, and self-esteem. Self-affirmation is a process that involves compensating for threatened domains of one's self-worth (e.g., feeling unintelligent after failing a test) by being reminded of positive aspects of one's identity that are not threatened (e.g., feeling positive about being a loving sister); the tendency to self-affirm has been linked to decreased perceptions of threat, and thus may increase faith in one's ability to achieve positive outcomes (i.e., hope) and ultimately bolster self-esteem (Sherman & Cohen, 2006; Tesser, 2000). Given that hope has been linked to accomplishing goals (Snyder, 1995) and self-esteem (Frieson & Frieson, 1997), it is possible that hope may be a critical determinant of self-esteem maintenance. The present study examined whether the link between self-affirmation and self-esteem was due to associations with greater hope. Specifically, we predicted a mediation effect wherein selfaffirmation would predict greater hope, which in turn would predict greater self-esteem.

Presenter: Mary Wallace, Undergraduate

Mentor: Suejung Han

Authors: Mary Wallace; Suejung Han

Title: ACADEMIC SELF-EFFICACY, LEARNED HELPLESSNESS, AND GPA AMONG WHITE AND RACIALLY MINORITIZED STUDENTS

Purpose: Racial disparity in academic performance has been well-documented (e.g., Oyserman & Lewis, 2017), but reasons that explain such disparity need more scholarly attention as they could be intervention targets. Among other psychological mechanisms, this study examined two socio-cognitive barriers of low self-efficacy and negative outcome expectations (Bandura, 1986). They were operationalized as low academic self-efficacy (one's conception of their ability to perform academic achievement; Gerardi, 2005) and learned helplessness (a sense of lack of control over one's actions

due to perceived repeated negative outcomes; Smallheer, 2011). I hypothesized that racial membership (i.e., White vs. students of color) would be associated with GPA via differences in academic self-efficacy and learned helplessness.

Procedure: A sample of 165 college students (122 Whites, 33 students of color) participated in the online survey of this study. The mean age was 19.04 (SD=1.47). The sample included 142 females, 20 males, 1 non-binary, and 2 not reporting gender. The survey consisted of Learned Helplessness Scale (Smallheer, 2011), College Academic Self-Efficacy Scale (Owen & Froman, 1988), and GPA/demographic questions.

Results: Data collection is in progress and complete results will be reported at the conference if accepted. A preliminary one-way ANOVA using SPSS showed White students scored higher on academic self-efficacy, $F(1, 119) = 7.16, p = .008$, and GPA, $F(1, 160) = 6.42, p = .01$, than students of color, but there was no significant mean difference on learned helplessness, $F(1, 153) = .49, p = .49$. A path analysis with AMOS 22.0 revealed a marginal to adequate fit to the data, $\chi^2(1) = 2.34, p = .13, CFI = .97, RMSEA = .09, 90\% CI = .00, .25$. Racial membership was associated with GPA via academic self-efficacy (racial membership-academic self-efficacy path $\beta = .21, p = .013$, academic self-efficacy-GPA path $\beta = .41, p < .001$), but not via learned helplessness (racial membership-learned helplessness path $\beta = .06, p = .47$, learned helplessness-GPA path $\beta = -.09, p = .28$). Correlation coefficients between learned helplessness and GPA were $r = -.29 (p = .03)$ among Whites and $r = -.33 (p = .06)$ among students of color, but they were not significantly different from each other ($z = -.7, p = .24$).

Conclusions and Implications: Acknowledging and educating that racial disparities in academic performance is due to differences in confidence rather than actual competence, may help racially minoritized students boost their academic self-efficacy. Further analyses with a larger sample of racial minority students will re-examine the role of learned helplessness, particularly among different subgroups of racially minoritized students.

Sociology/Anthropology

Presenter: Radiance Campbell, Undergraduate

Mentor: Thomas Gerschick

Title: PERFORMING COLOR: PARTICIPATORY PHOTO AND COMMUNITY BASED RESEARCH IN A MODERN U.S. CIRCUS

This study asks “what is the experience of people of color in a modern U.S. circus?” and is primarily concerned with granting performers of color control over telling their own story. Given that the circus is a visual art, this study produces visual research that centers participants’ perspectives through photo voice, or participatory photo, which is a visual research methodology that uses participant-generated photos as data. Participants were given disposable cameras and encouraged to photograph their own worlds, identifying the assets and challenges of their circus community. Through qualitative photo-elicitation interviews and a focus group, together we created a space for deep discussion and collaboration as we developed a collective message to share.

Because of the impact of spectatorship on performers of color, the research results were displayed in a research exhibit as opposed to a traditional research report. The culminating exhibit along with participants’ increased consciousness is part of the empowerment process at the core of this project. The goal of the exhibit was to create space for the wider community to engage with research results while simultaneously asserting the performers’ right to a self-determined public narrative. Visual research methodologies and the culminating exhibit were chosen for this project because they constitute an empowering form of research while producing results that are more accessible to the non-academic audiences that often directly influence the lives of performers of color.

The final exhibit features select participant-generated photos, artistic statements made up of quotes from participant interviews, historical images courtesy of Milner Library Special Collections, studio photography courtesy of Nathan Masciola, and audio tracks set to music courtesy of Brandon Campbell of The Clinic. The exhibit was displayed in Illinois State University’s Rachel Cooper Gallery from February 25, 2020 through summer 2020 and Schroeder Hall Gallery for the academic year 2020-2021. An optional “exit survey” was available at the gallery’s original opening reception on Febru-

ary 25th and was analyzed to help gauge audience's interaction, understanding, and learning from the exhibition. The research publication consists of a digitized version of the research exhibit as well as a discussion of research methods, results, and implications.

Presenter: Christian Maynard, Undergraduate

Mentor: Winfred Avogo

Authors: Christian Maynard; Winfred Avogo

Title: FROM SMOKE CLOUDS TO VAPE CLOUDS: A STUDY OF SUBSTANCE USE AND DELINQUENCY

The 'vaping epidemic' has incurred at least 12 deaths and 805 injuries so far. Overall, research on vaping has been substantially limited, primarily in the context of vaping and delinquency. The purpose of this study is to investigate the correlations between vaping and smoking and the various kinds of delinquent acts. Using secondary data from Monitoring the Future: A Continuing Study of the Lifestyles and Values of Youth conducted in 2017, with a sample size of 21,188 participants, we find that youth 'vapors' were associated with less delinquency than youth smokers(cigarettes); however, youth 'vapors' were associated with more delinquency than alcohol users. Finally, young people who vape were more likely to report smoking and drinking alcohol. We interpret these results in the context of social bonding and social learning theory and policies to create awareness on the potential dangers of vaping.

Teaching and Learning

Presenter: Abby Basler, Undergraduate

Mentor: Miranda Lin

Title: USING AFRICAN AMERICAN LANGUAGE IN THE CLASSROOM TO AFFIRM LANGUAGE DIVERSITY

The purpose of this study was to see how teachers can naturally integrate African American Language (AAL) into their classrooms without creating the cultural barrier that normally follows with AAL. Research shows that correcting AAL speakers can negatively impact their learning abilities (Lee, 31). Students will begin to shut down and not participate during class time. When AAL speakers are corrected, they also lose the confidence to speak in a social setting, which is crucial for language development. According to the National Council of Teachers of English, there are several goals for AAL students. For example, to value students' cultural-linguistic heritage, maintain black identity, enhance their command of Language of Wider Communication, and master critical reading, writing, and speaking skills. Many teachers have tried to incorporate the strategy of Code-Switching into the classroom. Still, research shows the Code-Switching approach implies a racist and segregationist response to the language habits of African Americans. However, the newer strategy of Code-Meshing is seen as being more effective in the classroom. Code-Meshing attempts to embrace the globalized and diverse world we live in by combining local dialects of English with Standard World English on assignments and activities inside the classroom (Lee, 166). After analyzing the literature, the implications of the study include teachers implementing code-meshing to their lesson planning by using CodeMeshing to remix a text. Further, a positive and inclusive environment in the classroom requires more than just integrating different dialects into lesson plans. Some ideas to include AAL in the classroom are providing AAL books in the classroom library and having posters and decorations that include the African American dialect. Nevertheless, the first step to integrate AAL into a classroom is to make the students feel comfortable enough to express themselves freely, the other factors will then naturally follow. Integrating other dialects into a classroom is never easy. However, it is necessary for the success of our students.

Presenter: Kaytlin Halperin, Undergraduate

Mentor: Miranda Lin

Title: CONSTRUCTIVISM AND PIAGET'S STAGES OF COGNITIVE DEVELOPMENT: EFFECTIVE OR NOT

In the study, I will present an analysis of the movie "Brave" (2012) using Piaget's constructivism and stages of cognitive development (Follari, 2019). This theory touches on the role of a child's environment in the education process. Each stage describes how a child uses his/her intuition and prior knowledge to advance his/her understanding of the world around him/her. Moreover, Constructivism is the teaching style that enhances this learning process, allowing the students to formulate their own strategies and concepts, using their contact with their environment, through minimal direct instruction from the educator.

I have used this theory to analyze the movie because the main character, Merida, learns through her personal experience, working with her environment and reflecting on her actions to reach an understanding of the spell cast on her mother and come up with the antidote. In the movie, there are a few facilitators to this learning, just as teachers would facilitate learning in the constructivist classroom. However, for the most part, Merida uses her own previous knowledge of her country and the legends told to her as a child, as well as her own intuition to solve the witch's riddle. Additionally, one witnesses Merida working through the stages of development, proposed by Piaget, throughout the movie. She works with her senses at first obtaining a very simple understanding of her situation, then she starts to use concrete objects, in trying to reverse the spell. Finally, she accumulates all of the knowledge she built throughout the movie to end up with a very post-operational thought process in her final attempt to save her mother, a form of self-reflection and abstract comprehension of the witches' spell and riddle.

A brief description of Merida's experience in each stage of cognitive development accompanied by a summary of the movie will be addressed. Further, examples of how teachers may use this education style and theory in the classroom, along with a testament to its success rate among students will be provided.

Technology

Presenter: Sara Schelinski, Undergraduate

**Group Members: Megan Glynn, Graduate; Allison Morgan, Undergraduate;
Raquel Zvirbulis, Undergraduate**

Mentor: Pranshoo Solanki

Authors: Sara Schelinski; Meghan Glynn; Allison Morgan; Raquel Zvirbulis

Title: BENEFICIAL USE OF DREDGED MATERIAL: ADDRESSING THE US ARMY CORPS OF ENGINEERS' SURPLUS PROBLEM

In an attempt of the US Army Corps of Engineers' (USACE) continuous clearing waterways for improved aquatic navigation, a surplus of more than 2,000,000 cubic yards of dredged material between three locations of Sangamon River - Decatur, IL, Mackinaw River - Pekin, IL, and Bull's Island - Ottawa, IL require sustainable repurposing. To resolve this, the beneficial use of this material has been investigated by assessing reports given by the USACE as well as conducting independent research to highlight the best, most feasible use based upon composition, location of the surplus sites, and cost associated with use and transportation of the dredged material. Upon request of the USACE, sustainability and environmental conscientiousness, defined by preserving the use of renewable resources in the future as well as repurposing nonrenewable waste, have also been taken into account. Determinants for the material use and market have been drawn from cold call surveys of potential markets within the state of Illinois with the following focus: landfill covering and lining, university research, green infrastructure/construction, and remediation of soil/habitats. Because this is an ongoing study, preliminary survey results will lead to an established marketability plan that will define the measures for the most suitable project to ensue.

Theatre and Dance

Presenter: Shahrzad Hamzeh, Graduate

Mentor: Bruce Burningham

Title: BELLY DANCING AND THE FORGOTTEN HISTORY OF PERSIAN DANCE

This paper will discuss the differences between Belly dancing and Persian dancing while focusing on the particular history of Persian dance. Not only has Persian dance not gotten the same attention as belly dancing, but in some cases the entire style has been mistaken for belly dancing. The paper will begin with a short history of what might have caused the confusion of considering the two dance forms to be the same. It will also examine visual differences such as those related to costuming and technique. Ultimately, the paper will argue that Persian dance is fundamentally different and independent from Belly dancing, and that the absence of available histories of Persian dance has left a vacuum in the documentations on dances of the Middle East, which has led to the belief that Belly dancing is all there is.

Presenter: Shahrzad Hamzeh, Graduate

Mentor: Lauren Lowell

Title: THE SHALWAR KAMEEZ: PAKISTAN'S PERSIAN-INFLUENCED NATIONAL GARMENT

This paper will begin by going through the reasons why *Shalwar Kameez*, which means "trousers and tunic," is Pakistan's national garment. The paper will investigate the religious reasons why this outfit is preferred amongst Muslims of the subcontinent of India. It focuses on the history of *Shalwar Kameez* in Pakistan. The garment started as a fashion during the Moghul era when the Moghuls were ruling over the Persian Empire which included the Indian subcontinent and modern-day Pakistan. Ultimately this paper will argue that the national garment of Pakistan is a Persian influenced item of clothing, and it continues to be popular among people of the subcontinent of India.

Oral Presentations

DEPARTMENT OF PHYSICS

April 25

Zoom Undergraduate Oral Sessions (meeting ID # 650-402-442)

Faculty mentors: Dr. Matthew Caplan, Dr. Xing Fang, Dr. Rainer Grobe,
Dr. Daniel L. Holland, Dr. Uttam Manna, Dr. Epaminondas Rosa Jr.,
Dr. George H. Rutherford, and Dr. Q. Charles Su

Session 1

8:00-8:15

Jack Yost (Fang, Grobe, Su)

MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE APPLIED TO ACOUSTICS

8:15-8:30

Chi Gong (Grobe, Su)

DIRAC VACUUM CAN RESOLVE RAPIDLY CHIRPED EXTERNAL FIELDS

8:30-8:45

Cassie N. McGinnis (Holland, Grobe, Su)

UNIVERSAL SCALING LAWS FOR OPTIMALLY EXCITED NONLINEAR OSCILLATORS

8:45-9:00

Austin Penwell (Grobe, Su)

TRANSITION BETWEEN COHERENT AND INCOHERENT CHIRPING MECHANISMS IN ELECTRON-POSITRON PAIR
CREATION

9:00-9:15

Bailey Wilkinson (Manna)

MULTIPOLAR DECOMPOSITION OF OPTICAL SPECTRA OF HIGH-INDEX DIELECTRIC NANOPARTICLES

9:15-9:30

Brighton Coe (Manna)

EXCITATION OF ELECTRODYNAMIC ANAPOLE MODES IN DIELECTRIC NANOSPHERES

9:30-9:45

Jonathan Sullivan-Wood (Holland)

EFFECTS OF DIAMAGNETISM ON MAGNETOTAIL CURRENT SHEET EQUILIBRIUM

break 9:45am-10:00 am

Session 2:

10:00-10:15

Julian Jovanovich (Caplan)

STUDYING "NUCLEAR PASTA" IN NEUTRON STARS THROUGH 3-D PRINTING

10:15-10:30

Brighton Coe (Caplan)

SIMULATED MULTIFRAGMENTATION OF NUCLEAR COLLISIONS

10:30-10:45

John Miles (Caplan)

SIMULATING THE ORBITAL PRECESSION OF COMETS

10:45-11:00

James Brokaw (Caplan)

NATURE OF NEUTRON STAR CRUSTS

11:00-11:15

Cal Forsman (Caplan)

THERMAL FLUCTUATIONS IN NUCLEAR PASTA

11:15-11:30

Ian Freeman (Caplan)

MODELING NUCLEI FOR SIMULATED NUCLEAR COLLISIONS

break 11:30-11:45 pm

Session 3:

11:45-12:00

Sean Comben (Grobe, Su)

EXTERNAL FIELD APPROXIMATION FOR THE BREIT-WHEELER PROCESS?

12:00-12:15

Luis Rizo (Fang, Grobe, Su)

THE EXACT PREDICTABLE FUNCTIONS BY A SINGLE NEURON

12:15-12:30

Jordan Bryan (Grobe, Su)

SYMBIOTIC VS. NON-SYMBIOTIC OPTIMIZATION FOR SPATIAL AND TEMPORAL DEGREES OF FREEDOM IN PAIR CREATION

12:30-12:45

Ian Freeman (Rosa)

TEMPERATURE EFFECTS ON NEURONAL ACTIVITIES

12:45-01:00

Jordan Brandt-Trainer (Rutherford, Rosa)

EXPLORING THE HODGKIN-HUXLEY NEURON MODEL WITH CIRCUIT BOARDS

1:00 The End of the Physics Zoom Oral Sessions

SCHOOL OF THEATRE & DANCE

Oral Presentations

Organized by Drs. Ann Haugo and Kee-Yoon Nahm

April 28, 2020

Zoom session link: <https://illinoisstate.zoom.us/j/715201371>

1:00 - 3:45 p.m.

Panel 1

1:00 - 2:15 p.m.

Cheyenne Flores, “Virgin Whore, or Neutered: Applying Chicana Feminist Thought to the Women of El Teatro Campesino”

Shahrazad Hamzeh, “Shalwar Kameez: Pakistan’s Persian-influenced National Garment”

Samuel Langellier, “Lost Plays and the Issue of Primary Text in Theatre”

Break

2:15 - 2:30 p.m.

Panel 2

2:30 - 3:45 p.m.

Demitri Corbin, “The Lost Art Generation: The Effects of the 2008 Financial Crisis on Arts Education”

Shahrazad Hamzeh, “Belly Dancing and the Forgotten History of Persian Dance”

Hope Morris, “Bewitching the Blame: The Crucible’s Legacy of Sexual Shame and Cultural Othering in Popular Culture”

A

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Adams	Ashley	34	Psychology	Laura Finan
Adomako	Frederick	4	Agriculture	Aslihan D Spaulding

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Bachtold	Olivia	18	Geography, Geology, and the Environment	Michaelene Cox
Basler	Abby	49	Teaching and Learning	Miranda Lin
Bennett	Nathan	31	Physics	Justin Bergfield
Berens	Marissa	34	Psychology	Daniel Lannin
Birchfield	Hannah	19	Health Sciences	Jennifer Peterson
Bove	Rebecca	35	Psychology	Alycia Hund
Brown	Angela	19	Health Sciences	Beverly Barham

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<i>Presenter Last Name</i>	<i>Presenter First Name</i>	<i>Page Number</i>	<i>Department</i>	<i>Faculty Mentor</i>
Caffey	Shaunta	35	Psychology	Julie Campbell
Calkins	Heather	36	Psychology	Gregory Braswell
Cam	Yonca	36	Psychology	Scott Jordan
Campbell	Radiance	48	Sociology/Anthropology	Thomas Gerschick
Campos	Hillary	13	Communication	John Baldwin
Conaty	Garrett	4	Agriculture	Maria Boerngen
Cornejo	Savanah	14	Communication Sciences and Disorders	Taeok Park
Cramer	Emma	11	Chemistry	Timothy Lash
Croney	Samantha	37	Psychology	Alycia Hund

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<i>Presenter Last Name</i>	<i>Presenter First Name</i>	<i>Page Number</i>	<i>Department</i>	<i>Faculty Mentor</i>
Donnelly	Megan	37	Psychology	Steven Landau

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Edmonson	Jessica	9	Biological Sciences	Victoria Borowicz

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Fernandes	Liza	21	Information Technology	Qi Zhang
Forsman	Cal	31	Physics	Matt Caplan
Freeman	Ian	31	Physics	Matt Caplan

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Graybeal	Alexis	11	Chemistry	Timothy Lash
Green	Alyssa	13	Communication	John Baldwin
Gutzler	Emily	25	Mathematics	Songling Shan

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Halperin	Kaytlin	50	Teaching and Learning	Miranda Lin
Halverson	Hailie	38	Psychology	Daniel Lannin
Hamzeh	Shahrzad	51	Theatre and Dance	Bruce Burningham, Laurel Lowell
Haque	Sirazum Munira	15	Economics	David Cleeton
Hardin	Seth	18	Geography, Geology, and the Environment	Alec Foster
Harris	Hannah	22	Kinesiology & Recreation	Noelle Selkow
Hart	Kate	38	Psychology	Suejung Han
Hartman	Blake	5	Agriculture	Maria Boerngen
Hasan	Kazi Tanvir	25	Mathematics	Olcay Akman
Hayes-Carver	Jesse	25-26	Mathematics	Songling Shan
Hemming	Paige	38-39	Psychology	Adena Meyers
Hoerbert	Bailey	6	Agriculture	Maria Boerngen

Horton	Alexandra	39	Psychology	Daniel Lannin
Huffman	Raeann	6	Agriculture	Nicholas Heller
Hynes	Keeley	39-40	Psychology	Daniel Lannin, Luke Russell
<u>J</u>				
<i>Presenter Last Name</i>	<i>Presenter First Name</i>	<i>Page Number</i>	<i>Department</i>	<i>Faculty Mentor</i>
Isaacs	Raina	41	Psychology	Dawn McBride
Ivanoff	Stephanie	41	Psychology	Daniel Lannin
<u>J</u>				
<i>Presenter Last Name</i>	<i>Presenter First Name</i>	<i>Page Number</i>	<i>Department</i>	<i>Faculty Mentor</i>
Jayasinghe	Iresha	9	Biological Sciences	Rebekah Darner
Jezowit	Caitlyn	41-42	Psychology	Adena Meyers
Johnson	Morgan	42	Psychology	Alycia Hund
Johnston	Rachel	12	Chemistry	Timothy Lash
Jung	Han	42-43	Psychology	Eros DeSouza
<u>K</u>				
<i>Presenter Last Name</i>	<i>Presenter First Name</i>	<i>Page Number</i>	<i>Department</i>	<i>Faculty Mentor</i>
Kalafut	Megan	30	Philosophy	David Sanson
Kianicka	Mike	22-23	Kinesiology & Recreation	Mike Mulvaney
Kirk	Samuel	26-27	Mathematics	Songling Shan
<u>L</u>				
<i>Presenter Last Name</i>	<i>Presenter First Name</i>	<i>Page Number</i>	<i>Department</i>	<i>Faculty Mentor</i>
Liesman	Sara	27	Mathematics	Olcay Akman
Lin	I Chun	17-18	Family and Consumer Sciences	Yoon Ma
Lusk	Elliot	10	Biological Sciences	Joseph Casto
Luu	Jacky	32	Politics and Government	Michaelene Cox
<u>M</u>				
<i>Presenter Last Name</i>	<i>Presenter First Name</i>	<i>Page Number</i>	<i>Department</i>	<i>Faculty Mentor</i>
Maciejewski	Madison	43	Psychology	Daniel Lannin
Madu	Kosiso	16	Economics	Dimitrios Nikolaou

Marsh	Elizabeth	43	Psychology	Suejung Han
Mathius	Melissa	13	Chemistry	Timothy Lash
Maynard	Christian	49	Sociology/Anthropology	Winfred Avogo
McCarthy	Michael	33	Politics and Government	Noha Shawki
McCauley	Darby	23	Kinesiology & Recreation	Nicole Hoffman
McPherson	Elizabeth	44	Psychology	Adena Meyers
Melecio	Christopher	44	Psychology	Daniel Lannin
Messman	Brianna	7	Agriculture	Michael Barrowclough
Molnar	Spencer	8	Art	Daniel Breyer
Moran	Trevar	20	Health Sciences	Liangcheng Yang
Mueller	Daniel	32	Physics	Justin Bergfield

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Nottoli	Jacob	27-28	Mathematics	Songling Shan

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Privett	Jacqueline	15	Criminal Justice Sciences	Jacqueline Schneider

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Quast	Jessica	45	Psychology	Daniel Lannin

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Schelinski	Sara	50	Technology	Pranshoo Solanki
Schultz	Emily	23-24	Kinesiology & Recreation	Noelle Selkow
Shahrezaei	Shabnam	16-17	Economics	Hassan Mohammadi
Shalini	Amrita	21-22	Information Technology	James Wolf
Simmons	Nolan	20	Health Sciences	Guan Jin
Snodgrass	Alexa	46	Psychology	Daniel Lannin
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Wallace	Mary	47-48	Psychology	Suejung Han

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Zinn	Cara	24-25	Kinesiology & Recreation	Karen Dennis