

# 2024 University Research Symposium



# Illinois State University

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Welcome to the 2024 University Research Symposium

Research is fueled by curiosity, the desire to innovate, and the need to find solutions to the world's pressing problems. Illinois State University recognizes that research encompasses diverse forms of inquiry, creativity, and innovation and we invite all students to participate in our community of scholars. Student research occurs across the campus in the context of specific courses, independent studies, summer research experiences, and thesis and dissertation projects. Faculty and staff mentors work with our students to make valuable intellectual or creative contributions to their disciplines. In fact, many faculty publications, conference papers, and creative works include student co-authors and student contributions.

Our offices and campus partners are proud to support student research with grants and travel funds, workshops, technical resources, research competitions, and exhibitions. We encourage and enable students to take part in off-campus professional and academic conferences at the regional, national, and international level. On campus, the University Research Symposium is the premier showcase for student scholarship, featuring more than 300 individual, group, oral or poster presentations this year. In addition, there is an e-poster session with 41 participants aimed at including students who may not otherwise be able to present on-campus, and a showcase of the 2024 Image of Research Competition winners. New this year, there will be opportunities to connect with some of ISU's interdisciplinary centers and Advancing Research and Creative Scholarship (ARCS) projects, which are collaborative teams with internal and external stakeholders across disciplines.

Congratulations on your achievements. We look forward to celebrating with you!

Dr. Craig C. McLauchlan, AVP for Research and Graduate Studies  
Dr. Robyn Seglem, Acting Director, Office of Student Research  
Dr. Noelle Selkow, Director, Graduate School

Morning Session Abstracts

AGRICULTURE

**PENNYCRESS UTILIZATION IN CHICKEN FEED**

Presenter(s): Knowles, Marley, Graduate, Agriculture

Mentor: Dr. Nicholas Heller

Pennycress (*Thlaspi arvense*) is a winter cover crop grown in the Midwest that is rising in popularity as a cash crop used for biofuel production. After oil is pressed out of the seeds, a meal remains, which may be discarded. Incorporation of this meal into feedstuffs for livestock would be an efficient way to make the biofuel process more sustainable. Wild pennycress contains anti-nutritional factors, including glucosinolates which are sulfur-containing compounds resulting in a bitter flavor. A previous study has shown that gene-edited whole pennycress seed can be incorporated into chicken feed at certain inclusion rates with no significant changes to the health of the chickens. Building from this prior study, the present research will focus on the incorporation of domesticated pennycress meal at differing inclusion rates from hatch to market in eight weeks. Effectiveness of the diet and performance of the chickens will be assessed through metrics such as feed intake, body weight gain, feed conversion, minor blood chemistries, and organ weights. Successful integration of domesticated pennycress meal into chicken diets would utilize a waste product in a productive manner.

## **METHANE YIELD OF PENNYCRESS BIOMASS IS INFLUENCED BY HARVEST DATE AND CONCURRENT ALKALI PRETREATMENT AND ENSILING**

Presenter(s): Lubna, Tuba Yasmin, Graduate, Agriculture

Mentor: Dr. Liangcheng Yang, Health Sciences

Co-Mentor: Dr. Rob Rhykerd

Pennycress (*Thlaspi arvense* L.) is an annual cover crop, known for its exceptional cold tolerance and high oil and protein yields. Pennycress can be integrated into a corn-soybean rotation in the U.S. However, utilization of pennycress biomass remains largely unexplored, including assessing compositional changes through its growth and organic matter digestibility. This study harvested pennycress at three growth stages, characterized the biomass for anaerobic digestion (AD), and tested the effects of concurrent alkali pretreatment and ensiling on the biomass methane yield. Results showed that the biomass harvested when the plants were undergoing senescence (“third-harvest”) had higher contents of acid detergent fiber, neutral detergent fiber, and lignin, while biomass harvested when 80–90% of pods were fully- sized (“second-harvest”) had the highest protein content. The AD experiments showed that the first-harvest biomass (90% of flowers opened) failed to produce biogas due to a drop in pH and alkalinity, the second-harvest biomass was inhibited for biogas production, and the third- harvest biomass had a methane yield of  $171.80 \pm 4.82$  L/kg-VS. After alkali pretreatment and ensiling, a methane yield of  $270.4 \pm 3.10$  L/kg-VS was obtained from the second-harvest biomass, representing a significant 4.5-fold increase (adjusted for the organic matter loss) relative to untreated second-harvest biomass.

## TRENDS IN ILLINOIS HORTICULTURAL SALES AND OPERATIONS HAVE AFFECTED THE LOCAL SHOP OWNER

Presenter(s): Petry, Nora, Undergraduate, Agriculture

Mentor: Dr. Michelle Kibler

Retail garden centers provide products including bedding flowers, potted flowers, flowers sold in flats, seeds, sprouting plants to start a garden, accessories, and decorations to customers. Sales of bedding flowers increased in popularity from 1985 to 1998 where, “... *bedding/garden plant sales were over half of the finished floriculture sales for the first time*” (Miller). Horticultural sales began to decline in 2005. Smaller retailers are often less financially equipped to navigate large trends in decreased sales across the horticulture industry.

This study aims to investigate national and state-level trends in horticulture since 2009. Data was collected from the United States Department of Agriculture, National Agricultural Statistics Service from 2009 to 2019 for flats, baskets, and potted plants. Data included the number of sales measured in the dollar amount, how many units sold, and number of operations.

Results indicate both national and Illinois retail sales, number of retail stores, and units sold are declining. Nationally, the number of stores decreased by 18% while sales decreased by 44% between the study timeframes. In Illinois the number of stores selling flats, baskets, and pots decreased by 21% and sales decreased by 16%. Illinois has decreased in the number of stores and operations at a higher rate than the national level, though sales nationally fell significantly more than Illinois.

The national and state level data comparing flats, hanging baskets, and potted plants with the number of operations, total sales, and number of units sold shows a decline affecting the horticultural industry. Society is shifting away from the smaller retailer, because of trends within communities and price changes within the economy. Without the local retailer, a sense of community can be lost with less opportunities to purchase custom bouquets from local florists or have a personalized experience in the garden center. Smaller retailers give the customer the opportunity to learn one-on-one how to care for the plants, the proper tools they will need, and how to maintain the health of the plant. Smaller garden centers have pride in their business, because of their passion for horticulture and their customers. In the future shopping for potted plants, flats or hanging baskets could become more commercialized, and ordered online, lacking the personal connection local retailers convey. Larger industries can operate, with the changing trends in horticulture, but they cannot compete with a garden center’s personalized experience.

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### THE ROLE OF TRM13, TRM 18, AND TRM33 PROTEINS IN THE ARABIDOPSIS CELL MORPHOGENESIS

Presenter(s): Abdullah, Abu Habib Md, Graduate, Biological Sciences

Mentor: Dr. Viktor Kirik

Authorship: Abu Habib Md Abdullah, Mark Frye, Viktor Kirik

Despite the absence of centrally organized Microtubule Organizing Centers (MTOCs) plant cells organize microtubules in ordered arrays essential for division, expansion, and shape acquisition. TONNEAU1 (TON1) proteins in plants share homology with the human centrosomal protein Fibroblast growth factor receptor 1 Oncogene Partner (FOP). Both proteins are shown to be involved in the organization of microtubule arrays. The molecular function of the TON1A protein remains to be elucidated. It was shown to interact with a family of TRM (TONNEAU1-like Recruiter Motif) proteins that includes 34 members. Our goal is to reveal the functions of the TRM proteins in the cytoskeletal array organization, cell shape, and cell division. We have found that the overexpression of TRM13, TRM18, and TRM33 proteins reduces trichome branching. The TRM13-GFP and TRM33-GFP proteins localize in the cell cortex, while the TRM18-GFP signal is predominantly found on the nuclear envelope. The nuclear envelope and cell cortex are established non-centrosomal MTOCs in animal and plant cells. The difference in localization of TRM13 and TRM18 proteins suggests a hypothesis that these proteins may play a role in microtubule organization at these locations. To understand the molecular function of TRM13 and TRM18 proteins we are testing the function of their motifs in localization and cell shape.

## THE NEMATODE *C. ELEGANS* DETECTS MAGNETIC FIELDS USING AN IRON-DEPENDENT TRANSDUCTION MECHANISM

Presenter(s): Akinosho, Aalimah, Graduate, Biological Sciences

Mentor: Dr. Andrés G. Vidal-Gadea

Authorship: Aalimah Akinosho, Temitope Awe, Andrés G. Vidal-Gadea

While many animals across taxa are known to detect and orient the magnetic field of the earth, until recently no receptor had been identified in any species. Several hypothetical mechanisms have been proposed to explain how different species may detect the earth's magnetic field. These can be summarized as: **a)** the chemical hypothesis, where light is believed to generate free radicals that can align with the earth's magnetic field and be detected by modified photoreceptors in the retina's of birds and other animals; **b)** the electric induction hypothesis, where animals moving quickly through a conductive medium like sea water experience currents induced by the earth's magnetic fields that are then detected by electric sensors; and **c)** the magnetic particle hypothesis, which proposes a functional link between iron particles and transduction channels which are able to sense the force imparted on iron particles by the earth's magnetic field.

Our lab demonstrated that the nematode *C. elegans* orients to magnetic fields using a pair of sensory neurons (the AFD neurons). However, it remains undetermined how *C. elegans* accomplish the detection of magnetic fields. My thesis project is to use behavioral, molecular, and physiological approaches to systematically test each known magnetic transduction hypothesis in order to assess how these nematodes accomplish this sensory feat. Preliminary findings indicate that nematodes rely on an iron-based mechanism for magnetic transduction.

Understanding how these tiny nematodes detect and orient to the magnetic field of the earth will shed light on one of the most enigmatic and most poorly understood sensory modalities found in the natural world.

## HOW DO *T. SCRIPTA* GONADS DIFFER IN GERM CELL AND HEAT-SHOCK PROTEIN GENE EXPRESSION POST-HATCH?

Presenter(s): Aldrich, Colt, Undergraduate, Biological Sciences

Mentor: Dr. Rachel Bowden

Co-Mentor: Dr. Ryan Paitz

Authorship: Colt Aldrich, Clinton Warren, Madison Wilken, Rachel Bowden, Ryan Paitz

Organisms that utilize temperature-dependent sex determination (TSD) rely on the surrounding thermal conditions during embryonic development to dictate whether their bipotential gonads develop into either testes or ovaries. This process occurs during a specific window of embryonic development, when these organisms undergo distinct molecular cascades that drive differentiation as the gonads respond to temperature cues. In addition, genes related to germ cell development and heat-shock may temporarily show distinct patterns as gonads differentiate and/or respond to temperature. Yet, little is known about how these differences at the level of the gonads persist beyond sex-determination or may present as sex differences post-hatch. We utilized the red-eared slider turtle (*Trachemys scripta*), a model organism in TSD studies, to explore how genes related to gonadal sex determination, germ cell (GC) development, and heat-shock proteins (HSP) might differ in their baseline expression between testes and ovaries of hatchlings. In short, the expression of sex-specific genes in the developing gonads of *T. scripta* are induced by either warm, female-producing temperature or cool, male-producing temperature that then promote either ovarian or testis development, respectively. In addition, *T. scripta* gonads appear to increase GC-related gene expression during ovarian development relative to testis development.

Meanwhile, HSPs buffer cells from environmental stressors and tend to rapidly respond to shifts in temperature. Given these patterns, we compared the expression of one testis-promoting gene (*Dmrt1*), two ovary-promoting genes (*Foxl2*, *Cyp19*), three GC genes (*Dazl*, *Nanos1*, *Vasa*), and six HSPs (70-5, 70-8, 90A, 90AB, 90B, and 110) between the ovaries and testes of hatchlings. We confirmed that *Dmrt1* expression was significantly higher in the male hatchlings than the female hatchlings, and vice versa for *Foxl2* expression, suggesting that the differences in these genes which appear during sex determination persist post-hatch. Interestingly, *Dazl* expression was expected to be higher in the female hatchlings, but no sex-specific expression was detected, whereas *Nanos1* expression was significantly higher in ovaries relative to testes. Therefore, *Nanos1* should be further studied as a regulator of gonadal development and its possible functions in the hatchling ovary. Lastly, we found no significant sex difference in the baseline expression of HSP genes, unsurprising given that post-hatch temperatures remained neutral across the post-hatch period. Our findings suggest that some embryonic differences persist while others change post-hatch. Alternatively, some differences in gene expression between ovaries and testes may not arise until after hatch.

## IDENTIFICATION OF ADDITIONAL REGULATORY GENES CONTROLLING ADHESION IN *VIBRIO CHOLERAE*

Presenter(s): Alexander, Joseph, Undergraduate, Biological Sciences

Mentor: Dr. Kyle Floyd

Authorship: Joseph Alexander, Debajyoti Basu, Anindita Saha, Kyle A. Floyd

*Vibrio cholerae* is an aquatic gram-negative facultative anaerobe, and the pathogen behind the human diarrheal disease cholera. *V. cholerae* has been a persistent pathogenic partner throughout human history, and until relatively recently has been one of the leading causes of preventable deaths in wartime alongside typhus, typhoid and pneumonia. Deeper understanding of the host-pathogen interactions will lead to greater efficacy in preventative measures. *V. cholerae* environmental colonization and persistence is mediated by attachment to surfaces, and biofilm formation, driven by the type IV mannose-sensitive hemagglutinin (MSHA) pilus system. MSHA pilus production is controlled by a pair of genetic operons (msh-I and msh-II), which are predicted to be regulated by three differential promoters (msh-I: P1/P2, and msh-II: P3). Previously, our lab identified the transcriptional regulatory protein FadR as a positive regulator of msh-I operon expression. Computational analysis revealed that only the msh-I P2 promoter contains a consensus binding sequence for the FadR protein, and analysis of msh promoter expression utilizing a plasmid-based transcriptional reporter showed significant reduction in P2 expression upon deletion of the *fadR* gene. However, upon deletion of *fadR*, we also observed an unexpected increase in P1 promoter expression. This increase in P1 expression suggests that, despite lacking the matching consensus sequence, the FadR protein still exerts some sort of regulatory effect on the other promoters of the msh operons. My project seeks to identify these additional regulatory pathways that impact msh-I P1 promoter expression in the absence of FadR. To this end, I established a transposon mutant library in a *V. cholerae* strain lacking *fadR*, utilizing a mini-Tn10 transposable element that randomly inserts into the bacterial genome to disrupt either genetic coding regions or regulatory regions of genes. Through insertion of a reporter plasmid utilizing the P1 promoter region to drive expression of luminescence, I am able to directly quantify changes in promoter activity. From this analysis I have identified eight additional annotated genes, and one putative gene, that are potentially involved in regulating msh gene expression in conjunction with FadR. Future directions for this investigation will involve generating formal in-frame deletions of each identified gene, and quantifying alterations in function to further explore the wider regulatory aspect of FadR protein.

## **THE NEWLY DISCOVERED GENE RCRB IS THE MAIN DRIVER BEHIND UROPATHOGENIC ESCHERICHIA COLI'S INCREASED RESISTANCE TO HYPOCHLOROUS ACID**

Presenter(s): Bennis, Mehdi, Undergraduate, Biological Sciences

Mentor: Dr. Jan-Ulrik Dahl

Authorship: Mehdi Bennis, Sadia Sultana, Jan-Ulrik Dahl

Urinary tract infections (UTIs) are among the most prominent bacterial infections affecting about 150 million people worldwide, burdening healthcare costs. 70-80% of all UTIs are caused by uropathogenic *Escherichia coli* (UPEC), which commonly resides harmlessly in the gut but turns into a serious pathogen upon entry in the urinary tract where they can cause significant morbidity and mortality. To establish a successful infection, UPEC needs to access the urinary tract, ascend to the bladder to colonize, and invade the bladder cells. Before colonization, however, UPEC must overcome an onslaught of the host's defense mechanisms including attacks by innate immune cells such as neutrophils. Neutrophils sense and eliminate invading pathogens by generating a toxic cocktail of antimicrobial compounds, including hypochlorous acid (HOCl). HOCl is also the active ingredient of household bleach, one of the most potent disinfectants worldwide but can be generated in the human body mainly by the heme-containing enzyme myeloperoxidase. Not surprisingly, HOCl is highly effective in killing microorganisms by interacting with several biomolecules. Recently, we discovered that UPEC is significantly more resistant to HOCl and neutrophil-mediated killing compared to other *E. coli* pathotypes, which appears to be mediated by the *rcrABR* operon, as a deletion of one its target genes, *rcrB*, renders UPEC significantly more susceptible to HOCl-mediated stress, however, the mechanism behind it remains unclear. In this study, we investigated (i) the impact of a *rcrA* deletion in *rcrB*-deficient cells' resistance against HOCl (ii) The role of RcrB in quenching extracellular HOCl. Our study further contributes to understanding how UPEC counters HOCl stress during phagocytosis. Consequently, this defense system sheds light on a potential novel immunotherapeutic application that uses the body's innate immune response during infections.

## **DECODING THE PAST: EVOLUTIONARY HISTORY OF NORTH AMERICAN DEER MOUSE POPULATIONS ON THE GULF ISLANDS**

Presenter(s): Berg, Rachel, Graduate, Biological Sciences

Mentor: Dr. Pirmin Nietlisbach

Authorship: Rachel Berg, Pirmin Nietlisbach

Anthropogenic habitat fragmentation is increasing the number of small and isolated organismal populations, and the long-term effects of these recent isolations are not well understood. Small populations are at increased risk of extinction via demographic stochasticity and inbreeding depression. It is thus essential to identify populations that have been isolated over long periods of time to use as model systems to study consequences of isolation. Geographic barriers, such as a rise in sea level, create natural population divergence. Investigating island populations may help in the discovery of long-term isolated populations to be used as model systems. We studied historic population isolation of North American Deer Mice (*Peromyscus maniculatus*) in the Gulf Islands of British Columbia, Canada. These islands were isolated after sea-level rise following the Pleistocene ice age. We hypothesized that the order and timeline of island separation, due to a rise in local sea level, effects the phylogenetic relationship of island populations, through genetic isolation. We live trapped Deer Mice on nine of the Gulf Islands, as well as in urban Vancouver. We took a tissue sample from each trapped mouse for DNA extraction. Whole genomes were sequenced with low-depth next generation sequencing techniques, with a subset sequenced at high depth. Preliminary analyses indicate strong genetic isolation between populations. Furthermore, high depth and low depth samples from the same population group together on the phylogenetic tree, thus high depth samples will be used for further downstream analysis to determine time in isolation. Understanding the phylogenetic relationship and divergence times of these populations will provide insight into the evolution of small, isolated populations and how some have persisted through time.

## ARE THEY READY? IMMUNE PRIMING AGAINST EMERGING INFECTIOUS DISEASES IN BUMBLE BEES

Presenter(s): Calhoun, Austin, Graduate, Biological Sciences

Mentor: Dr. Ben Sadd

Authorship: Austin C. Calhoun, Ben M. Sadd

Selective pressures from fitness losses associated with pathogen infection have led to the evolution of diverse mechanisms that alleviate pathogen harm. Invertebrates have evolved a memory-like innate immune response, called **immune priming**, which increases individual protection upon secondary pathogen exposure. This phenomenon can offer general or specific immune protection and can also occur across generations. Investigating the natural relevance of such protective phenomena is important for species of economic and ecological concern, like bumble bees, where novel pathogen exposure represent a threat to health.

Here we explore the specificity of immune priming against emerging infectious diseases (EIDs), specifically the honey bee virus Israeli Acute Paralysis Virus (IAPV). We hypothesize that prior pathogenic experience boosts infection resistance and tolerance to secondary pathogen exposure, however, differential exposures will precipitate mismatch costs. We subjected worker bumble bees to different priming treatments, including injected low dose or heat-killed virus of IAPV, or non-infective double-stranded RNA constructs mimicking IAPV or Deformed Wing Virus (DWV). Subsequently, we quantified measures of infection tolerance (via survival assays) and resistance (via absolute pathogen loads by RT-qPCR) following a higher dose of IAPV either 2, 7 or 14 days after the priming treatment. We find no evidence for beneficial immune priming in this system. A follow up showed that this holds true independent of the secondary exposure dose, but confirmation for the priming agents activating antiviral pathways is currently being verified via transcriptomic analysis. These results are concerning for native bumble bee health as they suggest evolved immune strategies shown to be effective against bacterial pathogens are not effective in the face of viral EID threats.

## **STUDYING THE MECHANISMS OF MIGRAINE VISUAL AURAS IN AN INVERTEBRATE BRAIN**

Presenter: Crowe, Grace, Undergraduate, Biological Sciences

Mentor: Dr. Allison Harris, Physics

Co-Mentor: Dr. Wolfgang Stein, Biological Sciences

Authorship: Grace Crowe, Allison Harris, Wolfgang Stein

Around 300 million people worldwide suffer from migraines with visual auras. Auras are thought to be part of the initiation of migraines and are caused by a wave of inactivity that spreads over the visual cortex. This 'spreading depression' (SD) is thought to be caused by a loss of potassium homeostasis in the extracellular space around cortical neurons. However, the mechanisms by which SD is initiated remain unclear. The study of SD in mammalian systems is complicated by the complexity of the cortical network, a large number of contributing factors, and limited measurement capacity for large brain areas. Invertebrate systems can overcome many of these limitations, but there are currently only a handful of studies that indicate that SD exists in invertebrates. No mechanistic studies have been performed to demonstrate that SD spreads as a wave throughout the invertebrate brain or whether it shows the hallmarks of the mammalian SD. We use the genetic techniques available in the fruit fly, *Drosophila melanogaster*, to express fluorescent markers in the fly brain that allow us to detect spreading waves of neuronal activity. Our data indicate that SD spreads across large areas of the fly brain, and that it can be reliably elicited. Our results further demonstrate that SD is not just elicited in a single location, but can originate in several different brain areas, providing novel insights into SD initiation. We are currently testing whether the spreading wave is affected by changes to the potassium homeostasis, a hallmark of mammalian SD.



## **EFFECTS OF EXTRA-PAIR PATERNITY ON PROVISIONING EFFORT OF MALE HOUSE WRENS (TROGLODYTES AEDON)**

Presenter(s): Dart, Avery, Graduate, Biological Sciences

Mentor: Dr. Pirmin Nietlisbach

Authorship: Avery Dart, Charles Thompson, Scott Sakaluk, Pirmin Nietlisbach

Some animals form socially monogamous pair bonds in which a male and female mate and raise young together. However, individuals within a socially monogamous pair bond may still mate with other individuals; this mating is defined as extra-pair mating (EPM). Extra-pair paternity (EPP) occurs when offspring arise from EPM. In wild birds, EPM is approximated by EPP. Males benefit from EPP by siring additional offspring without any investment aside from sperm. In contrast, from a female's perspective, EPP does not inherently increase the number of offspring they produce. Females are limited by egg production and the time it takes to raise those young, regardless of the father. However, females can still benefit from EPM. When females engage in EPM they may gain fertility assurance, access to sperm from higher quality males, and access to better foraging grounds. There are also potential costs to EPM for females, including a decrease in paternal effort by their social mates if they suspect paternity threats. I am investigating how male provisioning is affected by EPP and am studying these questions in a well-established house wren system. I am recording provisioning behaviors with video cameras and determining paternity using genetic markers. Individuals are identified by the colored bands on their legs. I am testing if males with more extra-pair young in their nests reduce provisioning rates. My research seeks to understand how EPP may benefit or cost females and how it changes male behavior.

## DEVELOPING IN PLANTA PROTEIN INTERACTION ASSAY

Presenter(s): Draper, Katelyn Olivia, Graduate, Biological Sciences

Block, Mary, Undergraduate, Biological Sciences

Mentor: Dr. Viktor Kirik

Authorship: Katelyn Draper, Mary Block, Trevor Rickerd, Viktor Kirik

Yeast-2-Hybrid (Y2H) is a common way to study protein-protein interactions in living yeast cells. Developing a Plant-2-Hybrid (P2H) assay will allow plant scientists to observe protein interactions in their native environment. Similarly to Y2H, the P2H assay, which we are developing, is using two constructs: a bait and prey. The bait construct will contain the GL2 promoter for expression in trichomes, a DNA binding domain, and a Gateway cassette, which can be switched out for any protein of choice. The prey construct will be using a Myb5 promoter, an activation domain, the Gateway construct, and a fluorescent marker. If the two proteins do interact and bind to one another, then Gal4, a DNA binding domain and VP16 activation domain will come together and activate transcription of the fluorescent reporter Histone EGFP. In order to develop this assay, a positive and negative control will be used by utilizing proteins involved in trichome development. GL3 is a transcription factor that binds to Myb23 at a domain found in the 96 terminal amino acids of GL3. Deleting these 96 amino acids allows for a reliable negative control. After this assay is performed in planta results will be confirmed with a screening for fluorescence. In addition, the FLIM-FRET microscopy, in which one fluorescent protein is able to activate another due to proximity will be used to independently confirm the validity of the P2H. With both proximity measurements attained from FLIM-FRET and a positive result from P2H, researchers will be able to make test proteins interacting in plant cells.

## **THE MECHANORECEPTOR PEZO-1 IS REQUIRED FOR NORMAL MUSCLE FUNCTION AND PLASTICITY IN THE STRIATED MUSCULATURE OF THE NEMATODE C. ELEGANS**

Presenter(s): Fazyl, Adina, Graduate, Biological Sciences

Mentor: Prof. Andrés, Vidal-Gadea

Authorship: Adina Fazyl, Adithya Komandur, Andrés Vidal-Gadea

Muscle cells are unique in having the ability to generate the mechanical forces required to translate animals in their environment. To accomplish this, they must continuously match their anatomical and physiological structure to ever-changing internal and external demands. While much is known about how muscles alter their force-generating machinery, or how nervous systems monitor and alter whole muscle organ function, relatively little is known about how individual muscle cells detect and adapt to changes in force output demands.

Our lab identified the mechanoreceptor channel PEZO-1, an ortholog of the human PIEZO channel family, to be highly expressed in the striated musculature of the nematode *C. elegans*. We used RNA interference, mutant analysis, calcium ratiometry, and in-depth kinematics to investigate the contribution of PEZO-1 mechanoreceptors to normal muscle function under conditions requiring differential muscle outputs (i.e. swimming vs crawling). We find that loss of PEZO-1 from muscles resulted in altered muscular output and calcium kinetics. Our work suggests that cell-specific proprioceptive feedback from mechanoreceptors might contribute to the ability of individual muscle cells to modulate their output to match internally and externally driven changes.

## TESTING FOR SEX DIFFERENCES IN RESPONSE TO OXIDATIVE STRESS

Presenter(s): King, Lilly, Undergraduate, Biological Sciences

Mentor: Dr. Ryan Paitz, Biological Sciences

Authorship: Lilly King

In humans, it has been shown that when females experience stress during pregnancy, male offspring appear to be more susceptible to detrimental consequences such as reduced growth and survival. One hypothesis is that female fetuses are less vulnerable to oxidative damage that might occur during stressful events. We have previously shown paraquat, a known inducer of oxidative damage, can lead to reduced growth and survival in chicken embryos. To test whether chicken embryos exhibit sex-specific responses similar to the pattern in humans, we injected chicken eggs with paraquat and tested for sex-specific patterns of growth and survival. We will then use two different antioxidants to test whether the negative effects of paraquat can be prevented. For one antioxidant, we will use trolox, an antioxidant that is a water-soluble derivative of vitamin E. For our second antioxidant, we will also use glutathione, an endogenous antioxidant known to decrease oxidative damage. We will have four different treatments - the first treatment will consist of injecting water into chicken eggs as a control. The second group will be injected with paraquat dissolved in water. For our third group we will inject trolox into the egg along with paraquat. For our final group we will inject glutathione along with paraquat. Using a PCR test, we will analyze the sex of the embryo to decipher whether there was a difference in growth and survival related to sex. These results will inform us about a potential sex-based difference in response to oxidative stress and show us whether antioxidants prevent negative effects on growth and survival.

## **TESTING FOR LOSS OF SK-3-BASED SPORE KILLING AFTER DELETION OF THREE NEUROSPORA CRASSA DNA INTERVALS: V377, V382, AND V383**

Presenter(s): Klann, Makenna, Undergraduate, Biological Sciences  
Okleiteris, Carolina, Undergraduate, Biological Sciences  
Paulikas, Paulina, Undergraduate, Biological Sciences  
Mentor: Dr. Tom, Hammond  
Authorship: Makenna Klann, Carolina Okleiteris, Paulina Paulikas, Tom Hammond

*Neurospora crassa* is a fungus that serves as a model organism for genetic research. *N. crassa* Spore killer-3 (Sk-3) is a genetic element transmitted to offspring through spore killing. Sk-3 is located on Chromosome III and it is thought to require two genes for spore killing. These two genes are the poison gene, for killing, and the antidote gene, for resistance to killing. While the Sk-3 resistance gene has been identified (*rsk*), the Sk-3 killer gene has not yet been identified. The primary goal of this study is to identify the killer gene by investigating the role of three DNA intervals, referred to as V377, V382, and V383, in spore killing. Previous studies suggest that these intervals are within a region of Chromosome III that is required for spore killing. To determine if these intervals are required for spore killing, DNA deletion vectors were constructed and used to replace intervals V377, V382, and V383 with hygromycin resistance genes in *N. crassa* Sk-3 strain RDGR170.3. Here, we present the current results of our research. These results will contribute to future studies towards identifying the Sk-3 killer gene.

## INVESTIGATING SK-3-BASED SPORE KILLING THROUGH DNA DELETIONS IN NEUROSPORA CRASSA

Presenter(s): Krivograd, Sophie, Undergraduate, Biological Sciences

Lynn Madison, Undergraduate, Biological Sciences

Mentor: Dr. Tom Hammond

Authorship: Sophie Krivograd, Madison Lynn, Tom Hammond

Meiotic drive describes a process in which selfish alleles are recovered in more than half of a progeny generation. It is a type of gene drive and it has been discovered in strains of *Neurospora*, a filamentous fungus, through its spore killing mechanism. One of the most studied meiotic drive elements within *N. crassa* is Spore-killer 3 (Sk-3). Previous studies have indicated that there is a genomic region within Sk-3 that encodes resistance to spore killing and another that encodes an element that is required for spore killing. Sk-3's resistance gene, *rsk*, has been identified. However, the exact region that mediates Sk-3's spore killing mechanism is currently unknown. In a previous study, it was found that a mutation called *rfk-2<sup>UV</sup>* disrupts spore killing by Sk-3. To better understand the region of Chromosome III in which *rfk-2<sup>UV</sup>* is located (its exact location is unknown), we constructed deletion vectors to replace two DNA intervals (V374 and V391) with hygromycin resistance gene markers (*hph*). Transformants were crossed to produce offspring, and offspring were tested to determine if they possess the ability to kill ascospores. Our findings will contribute to future efforts to determine the molecular nature of *rfk-2<sup>UV</sup>* and why this mutation disrupts the ability of Sk-3 to kill spores.

## **IDENTIFYING THE EFFECT OF INDIVIDUAL QUALITY ON THE PRODUCTION OF A SECOND BROOD IN HOUSE WRENS (TROGLODYTES AEDON)**

Presenter(s): Leischner, Lauren, Graduate, Biological Sciences

Mentor: Dr. Pirmin Nietlisbach

Authorship: Lauren Leischner, Charles Thompson, Scott Sakaluk, Pirmin Nietlisbach

Because breeding season length and climatic conditions limit the number of offspring migratory birds can produce, some species produce two broods in a season to maximize reproductive success. However, in species such as the house wren (*Troglodytes aedon*) not all individuals produce a second brood even if they have enough time to do so. We investigated whether variation in individual quality, in addition to timing, explains some of the variation in the likelihood of producing a second brood. Long-term data indicate that females that nest early tend to be older and have an increased probability of producing a second brood. This indicates that higher quality females breed earlier. It is therefore unclear whether the production of a second brood is solely attributable to the constraints of time or also affected by female quality. To test this question, we cross-fostered eggs between earlier-nesting females (presumed high quality) and later-nesting females (presumed low quality), causing high quality females to raise hatchlings later in the season than they otherwise would, allowing us to examine the effect of quality while controlling for the effect of time using unmanipulated control nests. We also examined whether high-quality traits of age, body condition, and territory quality were associated with the production of a second brood in the long-term dataset. If quality is heritable and related to the production of a second brood, responding to selection for double brooding would require genetic changes in the population.

## **THE NOVEL WINTER CASH COVER CROP PENNYCRESS PROMOTES STREAM HEALTH WITH ECONOMIC BENEFIT TO PRODUCERS**

Presenter(s): Meyer, Ryan, Graduate, Biological Sciences

Mentor: Dr. Bill Perry

Authorship: Ryan Meyer, Bill Perry, Nicholas Heller, Robert Rhykerd

Nutrient export from intensive row crop agriculture, particularly in the Upper Midwestern United States, negatively impacts local and downstream aquatic ecosystem structure and function. To maintain stream and river health, techniques to reduce nutrient loss must be implemented in Midwestern agriculture. Winter cover crops, e.g., cereal rye, winter oats, tillage radish, used in Illinois cover less than 10% of fields. The novel cover crop, pennycress (*Thlaspi arvense*), is one of several winter oilseed crops that may provide cool season revenue for farmers while functioning as an effective cover crop. Our goal is to understand the potential for pennycress to reduce nutrient export in tile drained fields, which are common in the agricultural Midwest. We used replicate (n=3) 0.8 ha plots comparing soil porewater nutrient reductions in pennycress and fertilized pennycress relative to fallow winter conditions for four years. Pennycress reduced soil porewater nitrate-nitrogen by 53.3% and fertilized pennycress by 33.8% relative to fallow reference conditions. In the pennycress treatment, nitrate-nitrogen concentrations fell from 14.0 mg/L (15.1 mg/L in fertilized pennycress) in March to 1.4 mg/L (6.1 mg/L in fertilized pennycress) in June, showing an improved ability to sequester nutrients over the course of the growing season. We demonstrate that pennycress has significant potential to reduce nutrient loss from commercial agricultural systems in Illinois. However, we also found that early season establishment is crucial, and fertilization of pennycress may negatively impact the potential to reduce nutrient loss.



## **DELETION OF DNA INTERVALS V376 AND V389 WITHIN THE SK-3 SPORE KILLER OF NEUROSPORA CRASSA**

Presenter(s): Munn, John, Undergraduate, Biological Sciences  
Galvan, Pedro, Undergraduate, Biological Sciences  
Mentor: Dr. Tom Hammond, Biological Sciences  
Authorship: John Munn, Pedro Galvan, and Tom Hammond

In *Neurospora* fungi, the ascospores formed during reproduction will most often be black and viable. Occasionally, these ascospores will end up inviable and will be white or yellow. The discovery of a selfish genetic element called Spore killer (Sk) in 1979 gave researchers insight into a mechanism that causes some *Neurospora* crosses to produce 4 black, viable ascospores and 4 inviable, white ascospores. In these 4:4 splits, the Spore killer genetic element causes the death of half the ascospores. There are now three known spore killers in *Neurospora*: Sk-1, Sk-2, and Sk-3. We are studying Sk-3. In an Sk-3  $\times$  Sk-3-sensitive (Sk-S) cross, the Sk-3 genes are transmitted to the four black, viable ascospores, and, through a poorly understood mechanism, the Sk-3 genes kill ascospores that fail to also inherit the Sk-3 genes. The Sk-3 genes reside on Chromosome III, but the exact location of each gene is unknown. Preliminary results suggest that a DNA interval called V350 may harbor a critical Sk-3 gene. For example, deletion of the V350 interval eliminates Sk-3 spore killing. Here, we explore the deletion of additional DNA intervals located within or near V350. Specifically, we are testing the role of DNA intervals V376 and V389 in Sk-3 spore killing. The work presented here should help determine why V350, and perhaps V376 and V389, are required for spore killing by *Neurospora* Sk-3.

## **SPREADING DEPRESSION IN THE NERVOUS SYSTEM OF LARVAL FRUIT FLIES**

Presenter(s): Nelson, Ella, Undergraduate, Biological Sciences  
Mentor: Dr. Wolfgang Stein, Biological Sciences  
Co-Mentor: Dr. Allison Harris, Physics  
Authorship: Ella Nelson, Grace Crowe, Wolfgang Stein, Allison Harris

Spreading depression (SD) is a slowly propagating wave of inactivity spreading across the cortex in disorders such as ischemia, stroke, and brain injury. Preceded by neuronal hyperactivity, this temporary suppression of electrical activity in large areas of the cortex can have debilitating consequences. SD is best known for causing visual auras in migraineurs that precede the headache pain. While SD has been studied for decades, key questions about its initiation remain, including whether there are similarities or differences in how SD is elicited between individuals. Recently, SD has been shown to be elicited by rapid cooling of the insect brain, including that of the fruit fly, *Drosophila melanogaster*. Here, we demonstrate that SD also occurs in the central nervous system of larval flies when cooled. We use our new assay to investigate inter-individual differences between animals by measuring at what temperature larvae experience SD, and whether larvae experience SD at the same temperature. We employ fluorescent microscopy to detect neuronal activity in the nervous system of *Drosophila* larvae. Larvae were placed on a cooling plate and the temperature was lowered from 19°C to approximately -10°C. Our data demonstrate that rapidly lowering temperature initiated SD in *Drosophila* larvae. In all cases, SD began at the posterior end and propagated anteriorly, spreading throughout the central nervous system. However, we noticed that SD was not initiated simultaneously across animals, suggesting that there are inter-individual differences. We are currently analyzing the temperatures at which SD occurs, and the percentage of animals that show SD.

## **IDENTIFYING THE LOCATION OF THE RFK-2 SPORE KILLER GENE ON CHROMOSOME III IN THE FILAMENTOUS FUNGUS *NEUROSPORA CRASSA***

Presenter(s): Patel, Princy, Undergraduate, Biological Sciences  
Oblinger-Hammond, Dayton, Undergraduate, Biological Sciences  
Mentor: Dr. Tom Hammond  
Authorship: Princy Patel, Dayton Oblinger-Hammond, and Tom Hammond

Meiotic drivers are selfish genetic elements that skew their transmission in their favor. In the filamentous fungus *N. crassa* one such meiotic driver is known as Spore killer-3. In a cross between an spore killer strain (Sk-3) and a wild-type strain (Sk-sensitive) only the half of ascospores (sexual spores) that contain the spore killer genes survive while the other half are not viable. Previous studies have established that a gene called *rfk-2* (required for spore killing) is essential for spore killing activity of Sk-3. It is thought that the *rfk-2* gene is located on the left arm of Chromosome III. The aim of this study is to identify the exact location of *rfk-2* to better understand Sk-3 based spore killing. We are interested to see if deletion of two DNA intervals, referred to as V378 and V380, disrupt Sk-3-based spore killing. To test this, we used DNA replacement vectors to replace V378 and V380 with hygromycin resistance markers (*hph*) in *N. crassa* strain RDGR170.3. The successfully transformed hygromycin resistant strains were crossed with two spore killing-tester strains: RTH1623.1 and RTH1623.2. The spore sacs containing ascospores from this cross will be imaged to analyze the effects of replacement of V378 and V380 on Sk-3-based spore killing.

## ACTIVATION OF THE LIVER X RECEPTOR REGULATES STEROID METABOLISM

Presenter(s): Reynolds, Delaney, Undergraduate, Biological Sciences

Mentor: Dr. Ryan Paitz

During times of stress, humans and other vertebrates produce increased levels of glucocorticoids. Glucocorticoid exposure during pregnancy can have detrimental effects on both fetal development and the long-term ability to respond to stressors. Steroid metabolism in the placenta can regulate exposure to these maternal glucocorticoids and potentially prevent negative effects. In birds, the extra-embryonic membranes contain an enzyme, 5 $\beta$ -reductase (AKR1D1), that converts corticosterone (an active glucocorticoid) to 5 $\beta$ -corticosterone (an inactive glucocorticoid). The aim of this study is to test the hypothesis that activation of the Liver X Receptor (LXR) regulates AKR1D1 expression. To test this hypothesis, eggs (n=60), were divided into 3 treatment groups and dosed with a synthetic LXR ligand (T090137), a natural LXR ligand (22-R hydroxycholesterol), or an oil only control group and incubated for two days. Then eggs were sampled to collect the extra-embryonic membranes for the quantification of AKR1D1 using qPCR. The results showed that both the natural ligand and synthetic ligand induced AKR1D1 expression. From there a second experiment was completed to test whether increased AKR1D1 levels confer protection against the negative effects of corticosterone. To test this, 120 eggs were divided into three treatment groups of corticosterone only, oil only, and lastly the natural ligand (Cort22 RHC) plus corticosterone. After being dosed the embryos incubated for 14 days and after the incubation period, they were inspected for effects on growth and survival. Results show that increased levels of AKR1D1 expression did not protect from the lethal effects of corticosterone. By understanding the role of the LXR in regulating steroid metabolism, we can learn more about the ability of embryos to protect against the negative effects of glucocorticoids.

## **USING TRANSFORMATION VECTORS TO IDENTIFY THE LOCATION OF A SPORE KILLING GENE IN NEUROSPORA CRASSA**

Presenter(s): Rohrig, Isabella G., Undergraduate, Chemistry  
Jones, Layla, Undergraduate, Biological Sciences  
Wilder, Bethany, Graduate, Biological Sciences  
Mentor: Dr. Tom Hammond  
Authorship: Layla Jones, Isabella G. Rohrig, Bethany Wilder, Tom Hammond

The genetic code, or DNA, of an organism is organized into chromosomes. Some isolates of the model filamentous fungus *Neurospora crassa* harbor a selfish genetic element called Spore killer-3 (Sk-3). While the Sk-3 genetic element has been mapped to a three million base pair interval of *N. crassa* Chromosome III, an interval that contains hundreds of protein-coding genes, it is thought that only a few genes in this interval are critical for Sk-3's selfish behavior. We have targeted two DNA intervals within Sk-3 for deletion. These intervals were chosen based on preliminary evidence that they are near or within a region that is critical for Sk-3 function. Here we present the results of the experiments we have performed to test the hypothesis that both intervals, referred to as V350 and V388, are required for Sk-3 function.

## WHAT MAKES A PILUS? DETERMINING THE IMPACT OF *MSH* ON *MSHA* PILUS PRODUCTION IN *VIBRIO CHOLARAE*

Presenter(s): Saha, Anindita, Graduate, Biological Sciences

Mentor: Dr. Kyle A. Floyd

Authorship: Anindita Saha, Joseph Alexander, Debajyoti Basu, Kathleen Nguyen, Gursewak Bains, Ben Ross, Kyle A. Floyd

The aquatic bacterium, *Vibrio cholerae*, is the cause of the deadly gastrointestinal disease cholera. Each year there are ~3-5 million reported cases of cholera, resulting in ~100,000-140,000 deaths. The ability of *V. cholerae* to form multi-cellular biofilms is associated with its environmental survival and persistence. Most currently circulating pandemic strains of *V. cholerae*, attach to environmental surfaces and initiate biofilm formation using the type IV mannose-sensitive hemagglutinin (MSHA) pilus. Loss of MSHA pilus production results in attenuation of surface colonization and biofilm formation. Therefore, understanding the biogenesis and regulatory mechanisms that drive MSHA pilus production is vital to deciphering *V. cholerae* environmental survival. MSHA pili are encoded within two predicted genetic operons; *msh-I* (*mshHIJKLMNEGF*) and *msh-II* (*mshBACDOPQ*). Many of the *msh* genes are homologous to similar type IV pilus genes in *Pseudomonas aeruginosa* and *Myxococcus xanthus*, however, there are *msh* genes which show little to no homology. My goal is to investigate the uncharacterized components of the *msh* operons, and their contribution to *V. cholerae* surface attachment and biofilm formation. To this end, I have successfully generated in-frame marker-less deletions of each *msh* gene individually, along with complementation plasmids for each gene. Analysis of MSHA pilus production for each deletion and complementation strain, via hemagglutinin (HA) assay, have demonstrated that *msh* genes *mshI*, *mshJ*, *mshK*, *mshL*, *mshM*, *mshN*, *mshE*, *mshG*, *mshA*, *mshC*, *mshD*, *mshO*, and *mshP* are vital for MSHA pilus production. Deletion of genes *mshH*, *mshF*, *mshB*, and *mshQ* were observed to still support MSHA pilus production, suggesting these genes might play an accessory role in pilus assembly or function. Analysis of major pilin subunit (MshA) protein production via immunoblot, demonstrated similar MshA levels among each deletion mutant (except  $\Delta$ *mshA*), suggesting that pilus components are produced but not assembled among these deletion mutants. Future studies will seek to supplement these observations using fluorescence microscopy for direct pilus visualization, and quantification of cell-surface pilus levels via flow-cytometry. Together, these studies will elucidate genes important for MSHA pilus production, with the aim of developing new strategies to reduced *V. cholerae* environmental survival and persistence.

## PEPTIDE MODULATION SUSTAINS TEMPERATURE ROBUSTNESS IN PATTERN-GENERATING NEURONS

Presenter(s): Sanford, Mason, Graduate, Biological Sciences

Mentor: Dr. Wolfgang Stein

The rise in ocean temperatures and extreme weather conditions have posed significant challenges for marine wildlife, particularly for ectothermic aquatic animals that live in intercoastal areas, where they experience extreme daily to seasonal temperature fluctuations. Maintaining nervous system function in extreme temperatures is particularly critical because the nervous system controls various biological processes, including decision-making, respiration, and other vital behaviors. Recent studies have suggested that neuromodulators play a crucial role in enhancing the temperature robustness of the nervous system.

The effects of neuromodulation on temperature robustness were initially characterized in the stomatogastric nervous system of *Cancer borealis*, an Atlantic crab used for studying how neural circuits generate rhythmic behaviors via central pattern generators (CPGs). Increased temperatures cause CPG's rhythmic behaviors to fail. However, peptide neuromodulators, either released hormonally or by neurons, enable these CPGs to become more robust against extreme temperatures.

We hypothesized that neuromodulators are crucial in achieving temperature robustness in other species as well. To test this, we isolated the CPG from the projection modulatory neurons, allowing the ability to manipulate the nervous system with and without neuromodulation in *Callinectes sapidus*. We recorded CPG activity and exposed it to rising temperatures until it became arrhythmic, either with or without heating the modulatory neurons. Data indicate that rhythmic activity was maintained at higher temperatures when modulatory projection neurons were heated along with the CPG (n=14). This suggests that peptide neuromodulation supports CPG temperature robustness in *Callinectes sapidus* and that this phenomenon is not specific to one crab species.

## **INVESTIGATION THE EFFECT OF THE HOCL DEFENSE PROTEIN RCRB ON ANTIBIOTIC SUSCEPTIBILITY IN UROPATHOGENIC E.COLI**

Presenter(s): Simpkins, Tyler, Undergraduate, Biological Sciences

Mentor: Dr. Jan-Ulrik Dahl

Urinary tract infections (UTIs) are a common infection costing billions of dollars in treatment worldwide. Uropathogenic *E. coli* (UPEC) are the major culprits of UTIs and specifically adapted to overcome the harsh environment of the urinary tract, which includes high osmolarity and low nutrient availability. Upon entry of the urinary tract, the pathogen will encounter attacks by members of our innate immune system. Specifically, neutrophils are recruited to the infection site aimed to kill UPEC in a process named oxidative burst. During the oxidative burst, neutrophils generate large amounts of hypochlorous acid (HOCl), a potent antimicrobial that causes significant macromolecular damage in the ingested pathogen with drastic consequences for their survival. However, UPEC has evolved strategies to combat the effects of HOCl exposure. Among these are transcriptional regulators that sense the presence of reactive chlorine species, such as HOCl, and upregulate specific HOCl defense genes. Our lab identified the gene exclusively responsible for UPECs increased HOCl resistance: *rcrB*. We started to characterize RcrB's mode of action and found that RcrB is an inner membrane protein and controls the HOCl influx into the cell. In my project, I tested whether the presence of RcrB – either in the presence or absence of HOCl- affects the uptake of commonly prescribed antibiotics. My data implies that there is a synergistic stress response in UPEC in the presence of an aminoglycoside antibiotic gentamicin and HOCl. While there is little to no synergistic effect observed with ciprofloxacin and carbenicillin. My data will help understand *rcrB*'s role in the pathogenesis of UPEC.



## EXPLORING THE ROLE OF GLUTATHIONE IN MITIGATING IRON-INDUCED OXIDATIVE STRESS IN CHICKEN EMBRYO DEVELOPMENT

Presenter(s): Smiley, Brendan, Undergraduate, Biological Sciences

Mentor: Dr. Ryan Paitz

In humans, an estimated 40-60% of implanted ova may be lost before birth as the result of embryonic mortality. Embryo mortality can be a result of many factors, one of which includes iron overload. Iron is essential for various physiological functions. However, it is toxic when present in excess. We investigated the consequences of iron exposure on developing chicken (*Gallus gallus*) embryos by injecting eggs early in development with varying concentrations of iron gluconate. The results demonstrated a dose dependent response to iron, with the survival at the highest dose (500  $\mu$ g) being reduced to 65% compared to 93% survival in control eggs. This indicated higher concentration injections lead to higher mortality rates. The mortality rates observed could potentially be attributed to an increase in oxidative stress induced by the iron and potentially ferroptosis. These adverse effects underscore the necessity for efficient iron regulation and oxidative stress management to prevent cellular dysfunction and death especially during embryonic development. Furthermore, we sought to investigate the potential of glutathione (GSH), an antioxidant, in mitigating iron-induced mortality in chicken embryos. We hypothesized that supplemental GSH would protect developing embryos exposed to high concentrations of iron by counteracting oxidative stress caused by labile iron during embryonic development. To test this, we injected eggs early in development with either water, iron gluconate (500  $\mu$ g), iron gluconate plus GSH, or iron plus buthionine sulfoximine (BSO). BSO is an inhibitor of GSH synthesis. Therefore, we predicted that iron plus BSO would result in more embryo mortality when compared to iron alone. The results of this study show that our iron treatment only reduced survival from 93% in control eggs to 83% in the iron only treatment. There was no significant effect of GSH in improving survival rates in chicken embryos exposed to iron. Furthermore, BSO did not have a significant effect on embryo survival rate when compared to iron alone. This suggests our iron treatments only have modest effects on survival (if any) and that inhibiting GSH production does not worsen the effect of iron exposure. The results of this study indicate the need for further research into the role that iron plays in inducing mortality in embryonic development and whether embryos have GSH independent mechanisms that might protect them from iron exposure.

## **THE LINK BETWEEN MALE AGGRESSION AND IMMUNITY: A CRITICAL BUT NEGLECTED LIFE-HISTORY TRADE-OFF**

Presenter(s): Szwed, Sydney, Graduate, Biological Sciences

Mentor: Dr. Ben Sadd

Co-Mentor: Dr. Scott Sakaluk

Authorship: Sydney Szwed, Ben Sadd, Scott Sakaluk

Life-history theory posits that organisms distribute limited resources amongst growth, maintenance, and reproduction. In many systems, male aggression is a key component determining access to females and hence reproductive success, whereas immunity contributes to maintenance, ensuring survival and future mating prospects. We hypothesize that there is a trade-off between investment in aggression and immunity. This trade-off could be realized through one of two non-mutually exclusive routes, with immune investment determined by either an intrinsic difference in male investment into aggression and immunity, independent of their deployment, or through direct costs upon competitive engagement. This study investigates the nuances of the aggression-immunity trade-off in male field crickets, *Gryllus assimilis*, to determine, (i) whether the outcome of male-male aggressive interactions is associated with baseline immune investment, and (ii) how engaging in aggression affects future immunity. Male aggression will be quantified using established protocols and combined with immune assays spanning cellular and humoral immunity and resistance to infection. We predict lower baseline immunity in subsequently dominant males compared with subordinate males, demonstrating an intrinsic cost of investing in aggression. Additionally, we predict that engaging in aggression (i.e., fights with rivals) will decrease immunity compared with control males, with the reduction more pronounced in dominant males. This work will provide important insights into a frequently assumed, but little studied, trade-off between aggression and immunity. An integrative assessment of this trade-off and the context for its realization will contribute to our understanding of factors maintaining variation in immunity and other key life history traits.

## **SOCIAL RESURRECTION: EXPLORING IF SOCIAL INTERACTIONS RESTORE DISTURBED BENEFICIAL MICROBIAL COMMUNITIES OF BUMBLE BEES**

Presenter(s): Timsina, Ravi, Graduate, Biological Sciences

Mentor: Dr. Ben Sadd

Authorship: Ravi Timsina, Ben Sadd

Eusociality, the hallmarks of which include cooperative breeding, division of sterile and reproductive castes, and overlap of generations, represents a major evolutionary transition. Eusociality, and social living more generally, have several associated benefits but also counter costs, affecting their evolution. The ecological dominance of many eusocial insects suggests advantages of group living, with benefits including reduced predation risk, better resource utilization, and increased tolerance of adverse conditions. Conversely, there are costs, including an increased likelihood of pathogen transmission due to individual proximity and high relatedness. However, little attention has been given to the transfer of beneficial microbes among group individuals as an additional benefit of sociality. Both intrinsic, including host immunity, and extrinsic factors, including infection and antibiotic exposure, can disrupt the structure and functioning of a beneficial microbiota, leading to dysbiosis. We hypothesize that sociality can maintain a healthy gut microbiota, with social interactions facilitating the spread of beneficial microbes or resurrecting beneficial microbial communities following dysbiosis. Using the bumble bee *Bombus impatiens*, we will test this hypothesis by disturbing a focal individual's gut microbiota through a stimulation of host immunity or antibiotic treatment, and subsequently expose these individuals to solitary or social settings. Subsequently, we will assess gut microbiota structure and health effects of focal individuals. We predict that dysbiotic gut microbial communities will be resurrected by social interactions, accompanied by associated health benefits. This work will further our understanding of host-microbiota relationships, including how social transmission of beneficial microbes may favor the evolution of social living.

## THE RAPID TIME-COURSE RESPONSE OF HEAT-SHOCK PROTEIN GENES IN DEVELOPING RED-EARED SLIDER EMBRYOS EXPERIENCING NATURALISTIC HEATWAVE CONDITIONS

Presenter(s): Warren, Clinton, Graduate, Biological Sciences

Mentor: Dr. Rachel Bowden

Co-Mentor: Dr. Ryan Paitz

Authorship: Clinton Warren, Madison Wilken, Hannah Warfel, Rachel Bowden, Ryan Paitz

Developing oviparous ectotherms are particularly susceptible to shifts in ambient temperatures. For many turtles, bouts of sudden heat (“heatwaves”) are common in natural nests and can impact developmental outcomes depending on their timing and duration. Yet, few studies have considered the time-course response of genes involved with protecting cells and tissues against adverse thermal conditions during development. Heat-shock proteins (HSPs) are molecular chaperones that protect against adverse stimuli and are likely important in an embryo's response to heatwaves. Indeed, past data suggests that gonadal expression of several HSP genes differ between constant warm and cool conditions in red-eared slider turtle (*Trachemys scripta*) embryos. Here, we studied how quickly four HSP genes (*hsp90AA*, *90AB*, *90B*, and *110*) respond to naturalistic heatwave conditions ( $31\pm3^{\circ}\text{C}$ ) across multiple distinct tissues in *T. scripta* embryos, as well as how quickly their expression returns to baseline when temperatures return to pre-heatwave conditions ( $26\pm3^{\circ}\text{C}$ ). In addition, we investigated the potential effects of developmental stage and prior heat exposures on responsiveness by monitoring embryo-wide expression of HSP genes through the early stages of development following repeated, discontinuous heatwave exposures. These studies may provide a greater understanding of how turtle embryos rapidly respond to thermal shifts and how these responses may change throughout development.

## **A BEHAVIORAL ASSAY FOR CRAYFISH TO DETERMINE PREFERRED HABITAT TEMPERATURES AFTER ACCLIMATION**

Presenter(s): Whittington, Lily, Undergraduate, Biological Sciences

Mentor: Prof. Wolfgang Stein

Authorship: Lily Whittington, Mackenzie Seymour, Wolfgang Stein

Ambient temperature plays an important role in animal survival and their physiological functions, especially in poikilothermic animals whose internal body temperature is determined by environmental temperatures. While poikilotherms are unable to use internal mechanisms for thermoregulation, it has been hypothesized that poikilotherms who experience wide temperature ranges in their habitat use compensatory mechanisms, such as behavioral and neuronal modifications, to survive. Invasive poikilothermic species, such as the marbled crayfish (*Procambarus virginalis*), have spread globally to habitats with distinct temperature ranges, including Europe, Madagascar, and Japan. This suggests that marbled crayfish can acclimate to a wide temperature range; however, the compensatory mechanisms that may play a role in acclimation remain unknown. We aim to develop a behavioral assay to investigate how acclimation to varying temperatures affects marbled crayfish behavioral responses with the long-term goal to study neurophysiological and molecular underpinnings of acclimation. Crayfish will be acclimated to two different habitat temperatures (23 and 27°C). After acclimation, we will expose individual crayfish to a temperature gradient between 18 and 32°C in a choice assay that allows them to select their preferred ambient temperature. Temperatures will be measured along the gradients, and animal movements will be recorded on video. We will analyze animal locations in 45-minute trials. We predict that crayfish will choose an ambient temperature that corresponds to their acclimated habitat temperature.

## **ELEVATED DAZL EXPRESSION IS ASSOCIATED WITH WARMER INCUBATION TEMPERATURES AND ESTROGENS IN *T. SCRIPTA* EMBRYOS**

Presenter(s): Wilken, Madison, Graduate, Biological Sciences

Mentor: Dr. Rachel Bowden

Co-Mentor: Dr. Ryan Paitz

Authorship: Madison, Wilken, Bert Foquet, Clinton Warren, Rachel Bowden, Ryan Paitz

Primordial germ cells (PGCs) arise early in embryonic development, migrate to the gonads once they begin to develop, and ultimately give rise to oocytes or spermatogonia in many animals. For species with genetic sex determination, PGCs share sex-specific genotypic information with gonadal cells, while in species with temperature-dependent sex determination (TSD), PGCs arrive at a bipotential gonad that may still develop into a testis or an ovary. It was thought that as gonadal differentiation occurs, PGCs respond to gonad specific cues to differentiate towards oocyte or spermatogonia fates, respectively. However, recent research in the red-eared slider *Trachemys scripta* suggests that PGCs may actually respond to temperature before sex is determined, playing a more active role in sex determination. Specifically, these studies found female-producing temperatures (FPTs) tended to promote higher germ cell counts that coincided with subsequent ovary development. Here we characterize how PGCs respond to estrogens in *T. scripta* by quantifying the expression of a well conserved marker of meiosis (deleted in azoospermia-like, *Dazl*). We found higher *Dazl* expression under FPTs (31°C) than male-producing temperatures (MPTs, 26°C). We also found evidence that *Dazl* expression was induced by biologically relevant doses of estradiol prior to gonadal differentiation. These preliminary results provide insight into how PGCs may be influenced by the developmental environment before gonadal differentiation under TSD.

## CHEMISTRY

### **DEVELOPING A MASS SPECTROMETRY-BASED METHOD FOR PROCESSING FINGERNAIL SCRAPING EVIDENCE IN FORENSIC INVESTIGATIONS**

Presenter(s): Anderson, Madelynn G., Undergraduate, Chemistry

Mentor: Dr. Christopher C. Mulligan

Authorship: Madelynn G. Anderson, Christopher C. Mulligan

Studies have shown that electrospray ionization- mass spectrometry (ESI-MS) can be achieved by using a wooden toothpick as a medium to sample and analyze target chemicals like drugs of abuse. Here, a solvent and high voltage is directly applied for extraction and ionization. We hypothesize that such a methodology can be used to process fingernail scraping evidence to test for drugs of abuse and other contraband for forensic purposes. This work details our efforts develop this method, utilizing manicurist training models as a mock surface, placing them in contact with target species in similar processes that humans would be exposed. Processing of these samples is accomplished via an open-air ion source and mass spectral analysis. Progress to date will be presented in this poster.

## **BRONSTED CORRELATION OF THE O-ALKYL GROUP ON THE HYDROXIDE-DEPENDENT BREAKDOWN OF O-ALKYLATE CARBINOLAMIDES**

Presenter(s): Arndt, Thomas, Graduate, Chemistry  
Stewart, Sarah, Graduate, Chemistry  
Park, YeJun, Graduate, Chemistry

Mentor: Dr. Richard Nagorski

Authorship: Thomas Arndt, Sarah Stewart, YeJun Park

As the number of compounds of pharmacological importance possessing O-alkylated carbinolamides continues to grow, so too does the questions surrounding their aqueous reactivity. The acid-catalyzed reactions of O-alkylated carbinolamides react at the same rate as their related carbinolamides, which has been interpreted as rapid conversion of the O-alkylated compounds into their carbinolamide derivatives. The hydroxide-dependent reactions have not been as easy to interpret. The effect of substituents on the reaction of N-(alkoxybenzyl)benzamide derivatives have not exhibited a clear trend with respect to the hydroxide-dependent reaction but the data seems best fit with  $\sigma^+$ . This suggests the departure of the O-alkyl group and developing positive charge on the benzyl carbon. The one clear effect that has been observed is the rate difference between N-(ethoxybenzyl)benzamide and N-(methoxybenzyl)benzamide, with the methoxy compound reacting 6.8-fold faster than the ethoxy derivative. This poster will detail the data collected to date and the effect of varying the  $pK_a$  of the O-alkyl group on the reactivity of the O-alkyl carbinolamide. The second-order rate constants for the hydroxide-dependent breakdown of the O-alkyl carbinolamides will be plotted against the  $pK_a$  of the alcohol used to provide a Bronsted correlation of the hydroxide reaction.



## **RAPID, DIRECT SCREENING OF PRIORITY METAL CONTAMINANTS IN ENVIRONMENTAL SYSTEMS WITH NOVEL MASS SPECTROMETRIC METHODS**

Presenter(s): Chilaka, Jonathan, Graduate, Chemistry

Mentor: Dr. Christopher C. Mulligan

Authorship: Jonathan N. Chilaka, Christopher C. Mulligan

Trace amounts of metals are relatively common in our environment, and although some metals are essential to sustain life, exposure to elevated levels of toxic metals bears health risks. Hence, there is a need to examine their presence in environmental samples. While various methods exist for sensitive and selective analysis of metal contaminants in environmental matrices, they can suffer from extensive sample preparation and cost. Complexation reaction is one of the techniques employed in metal extraction, and ambient ionization techniques have been implemented for the analysis of environmental samples in their native state while cutting down on experiment cost and increasing throughput. Here, we investigate the use of 3D-printed cone spray ionization-mass spectrometry (3D-PCSI-MS), a direct ionization technique, along with specialty reagents to allow on-demand metal profiling in soil samples. This technique enables real time complexation, extraction, filtration, and ionization of the metal species in a single vessel, minimizing the need for multi-step processing. This method was characterized by utilizing ligands, free metal ions and a high-resolution mass spectrometry, and the measurement accuracy was determined using quality control samples.

## **BORON MEDIATED [5+2] CYCLOADDITIONS**

Presenter(s): Corrie, Seth, Graduate, Chemistry

Mentor: Dr. Andrew Mitchell

Authorship: Seth Corrie, Andrew Mitchell

The Mitchell group is interested in utilizing boron to mediate [5+2] cycloadditions. The use of a tether reduces the entropic requirements necessary for a [5+2] cycloaddition but limits the scope and utility of the reaction. One option to overcome this downside is to employ the use of a temporary tether that can be severed after the [5+2] reaction is completed. Ideally, this tether would be functionalized to allow for further modification after cleavage of the tether. Previous studies by the Mitchell group have demonstrated the capabilities of DABO ligand tethers to facilitate cycloadditions with vinyl boron species. Unfortunately, they have proven considerably more stable than initially believed, which has resulted in a tether that cannot be cleaved. New approaches to a boron-nitrogen tether are under investigation and have yielded promising results with tethers that have much greater utility than the previously studied DABO ligand tethers.

## **SYNTHESIS AND AQUEOUS KINETICS OF UREA DERIVATIVES OF CARBINOLAMIDES: N-(HYDROXYPHENYL)-N-PHENYL UREA DERIVATIVES**

Presenter(s): Homan, Lilly, Undergraduate, Chemistry  
Orunesajo, Emmanuel, Graduate, Chemistry

Mentor: Dr. Richard Nagorski

Authorship: Lilly Homan, Emmanuel Orunesajo

Our group has long been interested in the aqueous reactivity of carbinolamides and how peptidylglycine- $\alpha$ -amidating monooxygenase (PAM) catalyzes their breakdown. The aqueous kinetic studies have provided valuable information in how this functionality reacts, which in turn provides mechanistic information that can be used to frame studies investigating how the enzyme system catalyzes the reaction of carbinolamides. An area that has been of interest to our group for some time is the enzyme ureidoglycolate lyase, which is part of the Uric acid cycle. This enzyme catalyzes the decomposition of ureidoglycolate into glyoxylate and urea. Carbinolamides are formed from amides and aldehydes while the substrate for ureidoglycolate is an aldehyde and urea. While some reactivity similarity would be expected between these two sets of compounds, no studies on the aqueous reactivity of urea carbinolamides have been performed. We have synthesized and initiated the aqueous kinetics of N-(hydroxyphenyl)-N-phenyl urea derivatives to probe the reactivity and the mechanisms by which they react under aqueous conditions.

## **AMIDE ASSISTED DEAROMATIVE INTRAMOLECULAR OXIDOPYRYLIUM BASED (5+2) CYCLOADDITION REACTIONS**

Presenter(s): Promise, Ifeanyichukwu E., Graduate, Chemistry

Mentor: Dr. Mitchell, Andy

The ability to synthesize cycloadducts from simple molecules is continually being developed by organic chemists and it is considered as one of the most useful tools in organic synthesis. This is because there are many naturally occurring biomolecules containing intermediate ring sizes (such as the seven-membered ring) and fused ring structures (which may include bicyclic heterocycles), which synthetic chemists seek out to make with readily available starting materials. The Mitchell research group is focused on understanding various factors, limitations, and mechanisms related to the silyloxypyrone alkene [5+2] cycloaddition reaction, with the use of commercially available starting materials. In general, intermolecular cycloadditions are difficult to come by, however, we successfully synthesized different cycloadducts with various amide tethers via an intramolecular [5+2] cycloaddition mechanism at moderate temperatures. Amide tethers with bulky groups, tend to lock the alkene / Indole moiety, underneath the pyrone toward an achievable cycloaddition, and in due course, we propose the ability to cleave the amide bond of these cycloadducts to assist additional promising synthetic routes.

## HOW DO METALATION AND RING-FUSION AFFECT SURFACE-LEVEL ADSORPTION OF TETRAPYRROLIC MACROCYCLES? : SYSTEMATIC FIRST-PRINCIPLES STUDIES

Presenter(s): Suthaharan, Sivanujan, Graduate, Chemistry

Mentor: Prof. Bhaskar Chilukuri

Co-Mentors: Prof. Ursula Mazur, Prof. K W Hipps

Authorship: Sivanujan Suthaharan, Ursula Mazur, K W Hipps, BhaskarChilukuri

Porphyrins (P) and Phthalocyanines (Pc) are planar aromatic molecules comprising a core tetrapyrrolic macrocycle. Molecular functionalization of the porphyrins and phthalocyanines have become significant in synthetic chemistry, molecular electronics, and surface science. Most of the transition metal elements can be incorporated into the core macrocycle. These complex systems are widely investigated in the context of highly ordered functionalized adsorbates on surfaces. In this study, free-base and metalated forms of P and Pc adsorbed to gold (Au111) and highly-ordered pyrolytic graphite (HOPG0001) surfaces are investigated against varying degrees of ring-fusion. Further, surface binding energy trends with presence of Ni and Co metals at the tetrapyrrolic ring centers and orbital-hybridization-driven charge redistribution are computed using quantum mechanical density functional theory (DFT). Density of states of the adsorbate - surface systems provide insights on energy level alignment. This study aims to demonstrate a systematic and a comparative analysis of the adsorbate - surface interactions in terms of adsorbate conformations, energy level alignment, local electronic structure and charge redistribution employing periodic DFT calculations.

**This Poster Has Been Canceled**

## ENHANCED STABILITY OF THIOLATED ENZYME IMMOBILIZED ON GOLD NANOPARTICLES

Presenter(s): Walder, Jason, Undergraduate, Chemistry

Mentor: Dr. Jeremy Driskell

Authorship: Jason Walder, Faith Breausche, Annelise Somerlot, Jeremy Driskell

Gold nanoparticles (AuNPs) have become a focus of scientific research as they are easily manipulated and have many applications in biotechnology. Specifically, protein-nanoparticle conjugates have several applications in fields such as drug delivery, imaging, or biosensing.

This study focuses on the effects of chemical modification of enzymes on the stability, immobilization, and enzymatic activity upon adsorption to AuNPs. Specifically, horseradish peroxidase (HRP) and its thiolated analog (THRP) are compared to deduce the impact of thiolation and immobilization on the enzyme's activity and stability. Enzymatic activity is measured through the application of UV-vis spectroscopy and an enzyme-substrate reaction with 2,2'-Azinobis [3-ethylbenzothiazoline-6-sulfonic acid]-diammonium salt (ABTS). Both temperature and time in solution are important factors related to structural changes that impact enzymatic activity. The enzyme response to these parameters is important for defining storage conditions and viability in biological application. In this work, the enzymatic activity of HRP and THRP were compared with that of AuNP-HRP and AuNP-THRP conjugates as a function of time (0 h – 1 month) and temperature (4 – 50 °C). Our results establish that chemical modification of HRP to install a thiol functional group does not impact the secondary structure or activity compared to that of native HRP. Moreover, both enzymes show a similar temperature response, in which nearly a complete loss of enzymatic activity is observed within 72 h at 50 °C and 1 month at 22 °C and 4 °C. Conversely, immobilization of the enzyme on AuNPs extended the shelf-life with THRP-AuNP conjugates maintaining approximately 80% enzymatic activity after 1 month at 4 °C. These results highlight the potential for protein modification and immobilization to substantially extend protein shelf- life and enhance biological function.

## **TOWARDS A COMBINED SPECTROSCOPIC/SPECTROMETRIC APPROACH FOR PROCESSING MODERN FORENSIC DRUG EVIDENCE**

Presenter(s): Wiggins, Emily, Graduate, Chemistry

Mentor: Dr. Christopher Mulligan

Authorship: Emily Wiggins, Ebenezer Bondzie, Jamie R. Wieland, Jun-Hyun Kim, Christopher C. Mulligan

Rapid confirmation of drug contraband, either in the field or more expeditiously in the forensic laboratory setting, has the potential to streamline the front end of the forensic science process by providing time-sensitive determinations of probative value from chemical evidence. rapidly assessing the probative value of chemical evidence directly at the crime scene or policing activity. This, in turn, can provide law enforcement personnel with necessary information in a timely manner, which in many cases is crucial. However, any new methodology must meet minimum standards for generating prosecutorial information (e.g., SWGDRUG recommendations). This work examines the coupling of portable DART-MS with Raman spectroscopy from a singular sampling of emerging drug evidence types to provide such a capability.

## COMMUNICATION

### **THE ROLE OF EMPLOYEE ADVOCACY IN PROMOTING POSITIVE CORPORATE REPUTATION: AN EXPLORATORY STUDY OF EMPLOYEES OF HIGHER EDUCATION INSTITUTIONS**

Presenter(s): Anani, Janet Laadi, Graduate, Communication

Mentor: Dr. John Baldwin

Authorship: Janet Laadi Anani

Employee advocacy has drawn significant attention in reputation management research and is of great interest to communication scholars. Despite its ubiquitous nature, little is known about how employee advocacy contributes to promoting the reputation of higher education institutions. This study fills the gap by drawing on in-depth interviews to explore the motivations, strategies, and outcomes of employee advocacy in a large midwestern US university. The study showed that employees of higher education institutions promoted the reputation of the institution through word of mouth, their social media platforms, or the use of institution apparel. Additionally, pride was a key factor that drove employee advocacy, especially amongst employees who were alumni of the institution as a result of their long connection to the university. Findings highlight the dynamics of employee advocacy, which provides directions for future related studies.



## **WORKPLACE INTERACTION: EMPLOYEES' PERCEPTION OF MANAGERS' WILLINGNESS TO SHARE INFORMATION**

Presenter(s): Edema, Clementina, Graduate, Communication

Mentor: Dr. John Baldwin

Authorship: Clementina Edema

Vertical communication plays an integral role in the running of an organization; this involves the process of information sharing between managers and employees within the same organizational structure, where the communication of information can determine the success or failure of the organization and the people working there. This study explores the dynamics of manager-employee interaction in the workplace and employees' perceptions of their managers' willingness to share work-related information with them. After a focus group discussion with eight participants across the United States, I used thematic analysis to analyze the data. The result highlights employees' positive and negative experiences when working with managers, cultural differences, and communication style as a factor in how managers interact with them.

## **THE TRUE REFLECTION OF BEAUTY: A THEMATIC ANALYSIS LOOKING AT GENDER REPRESENTATION IN THE BEAUTY INDUSTRY THROUGH ADVERTISEMENTS**

Presenter(s): Mueller, Kate, Graduate, Communication

Mentor: Dr. John Baldwin

Authorship: Kate Mueller

This study examines gender representation and diversity as portrayed in advertisements produced by the beauty industry. Through a thematic analysis of 25 popular film advertisements from the website Ads of the World from the past three years this study examines the beauty industry's use of gender representations and contribution to gender stereotypes. The reflection of representation in the beauty industry has been closely examined as the industry continues to strive to become more inclusive regarding race and body diversity often leaving out gender. Popular marketing tactics such as "femvertising" are examined as a way in which companies work to target specific genders. This study found through the examination of visual imaging that these popular advertisements focus on depictions of over-sexualization, natural beauty, intersectionality, strength, and power to capture gender targeted advertisements when selling beauty products.

## **CULTURAL COMPETENCY APPLICATION ON COLLEGE CAMPUSES**

Presenter(s): Snelling, Cassandra, Graduate, Communication

Mentor: Dr. John Baldwin

Co-Mentor: Dr. Lance Lippert

As higher education institutions continue to diversify, the development of intercultural communication competence becomes part of a lifelong journey toward being more empathetic and knowledgeable of those around us. This project presents the development of a two-day retreat workshop to enhance intercultural communication skills. Teaching techniques such as case studies, group activities, self-reflection, storytelling, food sharing, and media address different student learning styles. I will apply concepts and theories to the design and assessment of their workshop. The workshop moves first-year students beyond tolerance to cultural humility and kindness towards each other's differences. The workshop will enhance the student's personal growth, translating to inclusivity, respect, collaboration, and learning in the classroom environment. From a community perspective, a cultural humility retreat contributes to minimizing stereotypes, recognizing one's biases, and appreciating other cultures.

## **SEX SELLS, NOT SPORTS: HOW WOMEN STUDENT-ATHLETES FUNCTION AND NAVIGATE THROUGH AN NIL CULTURE**

Presenter(s): Sugimoto, Kaylee, Undergraduate, Communication

Mentor: Dr. Byron Craig

This qualitative study examined how women collegiate athletes navigate and function within a name, image, and likeness (NIL) culture through the collection of 977 comments from LSU gymnast Olivia Dunne's Instagram profile, who is the highest-paid NIL woman athlete.

Initially, 1,000 comments were collected, but 23 were eliminated due to being written in a non-English language or lacking cohesion. Data was analyzed through coding and thematic analysis. Results displayed four broad themes (attraction, sexualization, objectification, and disrespect, criticism of social media appearance, and support of career and life). Broadly, Dunne's NIL success was not built upon her skills as an athlete, but rather on her physical appearance, attractiveness, and sexual appeal. Though the study was done over a short period of time and only examined Instagram, the results hold implications for universities with athletes participating in NIL (e.g., holding workshops), NIL brand deals (e.g., creating a focus on women's athletic ability over appearance), as well as future directions for research (e.g., the mental and emotional effects NIL has on a woman student-athlete, the personal challenges women student-athletes face when navigating NIL, and how women with different intersectional identities navigate a NIL culture).

## **“YOU LOSE A PARENT, BUT THE PARENT IS STILL ALIVE:” COMMUNICATING AMBIGUOUS LOSS WITHIN ESTRANGEMENT**

Presenter(s): Wolff, Miriam, Graduate, Communication  
Murray, Taylor, Graduate, Communication  
Mentor: Dr. John Baldwin  
Authorship: Miriam Wolff, Taylor Murray

Family estrangement between parents and adult children is increasingly recognized as a complex phenomenon, yet remains understudied compared to its prevalence. This research examined experiences of grief and communication difficulties related to estrangement through qualitative interviews with 8 individuals (7 adult children, 1 parent), ranging from ages 18-65, who underwent emotional and/or physical distancing from a family member.

These interviews consisted of 6-10 questions and were 15-50 minutes long. A thematic analysis of interview transcripts revealed profound feelings of loss and unresolved mourning stemming from the severed parent/child relationship. Participants described sadness, nostalgia, shame, and perpetual grief over losing meaningful bonds while the estranged relative still lives. Communicating such feelings of loss with others proved challenging, with most relying on avoidance, vagueness, or humor when discussing the estrangement. Accounts additionally emphasized deficient communication as central to fueling the original relational rift and obstructing reconciliation. Overall, findings illuminate the trauma of "frozen grief" resulting from ambiguous loss in estranged families. Difficulty coping with uncertain loss appears tied to communication inhibition and lasting internal turmoil. By highlighting estrangement's connections to suppressed grief and ambiguous loss, this study expands conceptualizations of how such emotionally confusing relational ruptures damage family bonds over time. Practical implications center on the need for social support and open communication to alleviate estrangement's devastating impacts.

## COMMUNICATION SCIENCES AND DISORDERS

### VALUE DIRECTED STRATEGIC PROCESSING IN AGE RELATED HEARING LOSS

Presenter(s): Manoj, Mukta, Undergraduate, Communication Sciences and Disorders  
Welsh, Caitlyn, Graduate, Communication Sciences and Disorders  
Mentor: Dr. Shraddha Shende  
Authorship: Mukta Manoj, Caitlyn Welsh, Shraddha Shende, Raksha Mudar

The increasing life expectancy of humans has emphasized the significance of sensory deficits on cognitive function in aging adults. Emerging evidence demonstrates that hearing loss in older adults is a modifiable risk factor for dementia, promoting the exploration of the connections between auditory functions and cognitive abilities. Previous research has shown that older adults with age-related hearing loss (ARHL) experience changes in various cognitive tasks, relative to older adults with no hearing loss. However, research on changes in value-directed strategic processing, a high-order cognitive function, in those with mild severity of ARHL has been relatively unexplored. This research project aims to examine if (1) value directed strategic processing is different between older adults with ARHL and older adults with normal hearing, and (2) the relationship between speech-in-noise recognition, a common problem experienced by those with ARHL, and strategic processing.

We used an in-house developed value directed strategic processing task. Data analysis included conducting one-way ANOVA to examine differences on the value-directed strategic processing task. Preliminary analysis reveals no significant group differences on value-directed strategic processing; however, trends are noticed. Correlational data was analyzed with Pearson's  $r$ . No significant correlations were observed. Additional data is currently being analyzed, which will be presented during the symposium.

## **CAREGIVER FEEDBACK ON EI TELETHERAPY SERVICES DURING COVID-19**

Presenter(s): Olsen, Mallory, Undergraduate, Communication Sciences and Disorders

Mentor: Dr. Jamie Smith

Co-Mentor: Dr. Ciera Lorio

This study investigated the experiences of families receiving therapy services in the early intervention system during the early months of the COVID-19 pandemic. The abrupt transition to telehealth services was particularly challenging for many parents of young children, and in this internet survey, they were invited to describe both positive and negative aspects of online service provision. Analysis of their responses indicated that family outcomes were influenced by a variety of factors. Implications for providers are discussed.

## **GENDER DISPARITIES IN HEALTH PROFESSIONS: EXPLORING SALARY DIFFERENCES BETWEEN MALE AND FEMALE DOMINATED SPECIALTIES**

Presenter(s): Parker, Sarah, Undergraduate, Communication Sciences and Disorders  
Verticchio, Maggie, Undergraduate, Communication Sciences and Disorders  
Clay, Taylor, Graduate, Communication Sciences and Disorders  
Mast, Daniel, Graduate, Communication Sciences and Disorders  
Whitcomb, Molly, Graduate, Communication Sciences and Disorders  
Mentor: Dr. Antony Joseph  
Authorship: Sarah Parker, Maggie Verticchio, Taylor Clay, Daniel Mast, Molly Whitcomb,  
Antony Joseph

This project sought to investigate the correlation between gender and average salary across various clinical specialties, encompassing disciplines such as Audiology, Diet and Nutrition, Medical Technology, Occupational Therapy, Optometry, Pharmacy, Physical Therapy, Podiatry, Psychology, Social Worker, Speech-Language Pathology, Family Practice Medicine, Nurse Practitioner, Chiropractor, and General Dentist. Data on average salaries were collected from publicly available online sources, revealing substantial variation among specialties, with Social Workers having the lowest average salary (\$55,350) and Family Medicine Physicians the highest (\$224,460). The analysis unveiled a significant gender disparity in certain professions, with Social Work being predominantly female-dominated (81%) and Family Medicine Physicians predominantly male-dominated (61%). Specifically focusing on Audiology, a specialty largely represented by female clinicians (84%), the average salary was \$72,861, contrasting with male audiologists who earned an average of \$106,601. These findings suggest that certain health professions may exhibit lower salaries for females, particularly in fields where the majority of practitioners are women.



## **THE IMPACT OF STUDENT CONFERENCE REGISTRATION FOR HEALTH PROFESSIONAL MEMBER ORGANIZATION**

Presenter(s): Verticchio, Maggie, Undergraduate, Communication Sciences & Disorders  
Parker, Sarah, Undergraduate, Communication Sciences & Disorders  
Clay, Taylor, Graduate, Communication Sciences & Disorders  
Mast, Daniel, Graduate, Communication Sciences & Disorders  
Whitcomb, Molly, Graduate, Communication Sciences & Disorders  
Mentor: Dr. Antony Joseph  
Authorship: Maggie Verticchio, Sarah Parker, Taylor Clay, Daniel Mast, Molly Whitcomb

The primary aim of this project was to compare the most recent rate for conference registration fees, using a sampling of health professional member organizations. A secondary aim was to evaluate if these organizations offered a discount for students and if that fee was correlated with median salary level. Online, publicly available sources were used to collect data on the clinical specialties including Audiology, Diet and Nutrition, Medical Technology, Occupational Therapy, Pharmacy, Physical Therapy, Social Worker, Speech- Language Pathology, Family Practice Medicine, Nurse Practitioner, Chiropractor, and General Dentist. We were unable to locate the conference registration fees for Music Therapy, Optometry, and Podiatry. When comparing the student member conference fee to the professional conference fee, we discovered that the average student fee was 40% of the professional fee. We determined that the lowest student conference fee rate was 3% (Medical Technology) and the highest was 69% (Occupational Therapy). The student fee for Audiology was 14% of the professional conference fee, which was almost one third of the average rate. Because the conference fee for Audiology students has been significantly discounted, we examined whether this has impacted student membership retention.

## CRIMINAL JUSTICE SCIENCES

### JUVENILE SEX OFFENSE REGISTRATION LAWS STATE-BY-STATE COMPARISON

Presenter(s): Russell, Gaby, Undergraduate, Criminal Justice Sciences

Mentor: Dr. Joanne Savage

After completing a short research paper about juvenile sex offending being largely based on adult sex offense research and policies as well as how states across the US have different requirements for juvenile sex offense registration laws, I wanted to conduct further research on the specific variances in juvenile sex offense registration laws in most states. There is not one strict national law regarding juvenile sex offense registration requirements giving states the liberty to determine how to handle juvenile sex offense registration laws, amongst other topics. Looking at over 30 states registration requirements for juvenile sex offenders allowed for some common themes to be seen. Some states have different tiers for the sentence depending on the offense. Some states allow for early termination past a certain age or dependent upon the juvenile's behavior during their sentence term, while other states do not allow for any special relief provisions for juveniles. There is also variance in states requiring juveniles to be placed on the public sex offender registration. Some allow for offenders to eventually be removed from the sex offender registration after a certain amount of time and some allow for juveniles who committed a sex offense to get this expunged from their record. While I do not have much experience doing legal research, I was able to gain more confidence in finding specific laws referenced in state-by-state comparison sites, improve my understanding of legal jargon and the loopholes associated with state laws, and build on my research skills regarding legal research as preparation for a career in law. I was also able to improve my presentation skills and gained more confidence in explaining legal research in easy-to-understand language to people.

## **THE IMPACT OF SEXUAL VICTIMIZATION ON BEHAVIORAL CHANGES AND ACADEMIC PERFORMANCE AMONG COLLEGE STUDENTS: A STUDY AT ILLINOIS STATE UNIVERSITY**

Presenter(s): Wade, India, Graduate, Criminal Justice Sciences

Mentor: Dr. Jessie Krienert

This study investigates the impact of sexual victimization on behavioral changes and academic performance among college students at Illinois State University. Using a quantitative self-report design, data was collected through an online survey from 229 students. Results revealed significant effects of sexual victimization on behavior, including changes in college experience, social life, and personality. Victims reported feeling less safe and respected on campus compared to non-victims. Additionally, victims experienced negative effects on academic performance, with a decline in GPA. Findings underscore the need for comprehensive support systems and prevention efforts within university settings to address sexual violence.

Further research is needed to explore additional factors influencing victimization patterns and inform targeted interventions for reducing sexual violence on college campuses.

## ECONOMICS

### **SMALL INVESTORS' GAMESTOP STRATEGY IN THE 'DUMB MONEY' MOVIE: A GAME THEORY ANALYSIS**

Presenter(s): Monehin, Anthony, Graduate, Economics

Mentor: Dr. Susan Chen

This paper utilizes a game of strategy to analyze the GameStop short squeeze involving small investors, as portrayed in a scene in the movie "Dumb Money" (2023). It examines how individual rationality and collective outcomes interact, highlighting decision-making complexity. The analysis focuses on a simultaneous move game between two types of small investors namely Riri, a student, and Jenny, a full-time nurse. The freezing of the Reddit page and the buy-in options on the Robinhood trading app add complexity to the game. The study emphasizes game theory's transformative potential in enhancing decision-making, particularly in dynamic environments such as financial markets.

## **GAME OF STRATEGY MODEL ON A MOVIE TITLED MAGIC MIKE'S LAST DANCE WRITTEN BY REID CAROLIN IN 2023 ON NETFLIX**

Presenter(s): Omitoyin, Grace, Graduate, Economics

Mentor: Dr. Susan Chen

Magic Mike's Last Dance (2023) showcases the various outcomes of what dance does to the human species, especially with the belief that people can be numb, disconnected, and desensitized. This paper examines strategic interactions between Maxandra Rattigan, a wealthy woman from London grappling with divorce and depression, and Mike Lane, a middle-aged Millennial white male who finds himself adrift in a sea of failed relationships and unfulfilled dreams. A simultaneous-move game will analyze Maxandra's strategies to leverage her connection with Mike for further business opportunities.

## ENGLISH

### **“MOM, DAD, ARE YOU OK?”: CHAPERONING, EMPATHY, AND AETONORMATIVITY IN MENTAL HEALTH PICTURE BOOKS**

Presenter(s): Cintron-Gonzalez, Edcel Javier, Graduate, English

Mentor: Dr. Mary Moran

Discussions on mental health in children's literature have become essential to understand how adult authors are opening spaces to have conversations about mental health. In *Children's Literature as Critical Thought*, Kenneth B. Kidd explains how "children's literature is a set of experiments in thinking and feeling" (4). Therefore, the proposed paper will explore mental health picture books by utilizing three main theories – Meeusen's concept of chaperoning between parents and children, representations of adult mental health in picture books as an opportunity for empathy, and how adults talk with their children about mental health issues as a way against aetonnormative practices into talking to children about specific issues. I will examine the picture books *Pockets Full of Rocks: Daddy Talks About Depression* by Yair Engelberg and *A veces mamá tiene truenos en la cabeza* by Bea Taboada. The act of chaperoning opens the space for parents to be placed in the same reader/viewer position as the child while reading picture books. Empathy is used to answer questions the child reader might have about the mental health situations the characters are having, which then places the adult as a resource to explain how "feelings for the other – feelings of sympathy, compassion, tenderness, and the like – produce motivation to relieve the suffering of the person for whom empathy is felt" (4). Therefore, chaperoning and empathy serve as key points to describe the work mental health picture books are doing for both a child and adult audience.

## **QUEERNESS THE ILLNESS: THE VICTORIAN INVENTION THAT CHANGED HOW WE UNDERSTAND SEXUALITY**

Presenter(s): Rimer, Louane, Undergraduate, History

Mentor: Dr. David Hansen, English

Viewed as taboo, scholarly work on venereal disease before the 20th century was rare in academic spaces. This gap in research was filled by 19th-century Spiritual Health communities, which sought to combine theology and medical practice for 'healthier' living and saw STD treatment as another aspect of this process. However, as their work needed to be spiritually based, research done in this setting was often inaccurate and unscientific.

Spiritual health leaders pressed heavily that disease was a product of moral character. 'Immoral' sexual acts, mainly anything done without the purpose of reproduction, were considered a moral failing, which would inevitably lead to poor health by their model. Male sexuality outside of reproduction; specifically self-copulation and male-to-male copulation, were considered especially dangerous to one's health. Due to a lack of more reliable research, the first standardized science textbooks used in U.S. K-12 schools after WWII relied heavily on sources created by the spiritual health movement to fill in research gaps on sexuality studies. If this is the case, then adults today would subconsciously project 19th-century misinformation when discussing sexuality, identifying a possible link between one's education and their political biases. A guideline was formed to help identify specific links. For a source to be considered relevant to the initial 19th-century studies, it must either directly quote and or source it, mention phrases coined by it, or reverberate sentiments that could be easily linked to it. This project was split into two parts, looking for a connecting factor between the text and the belief. First, writing done by three spiritual health community leaders from the mid-19th century and three STD researchers from the 1950s was compared to search for underlying linguistic similarities. Secondly, a sociological survey was conducted on adults aged 40+ with a control group of adults aged 18-40 educated at the K-12 level in the U.S. The survey consisted of questions regarding the subject's education on sexuality and their current beliefs. Their answers were analyzed under the same guidelines as the studies from the 1950s. While there are a variety of factors playing into current misinformation, the generational impact of the spiritual health movement appears to play a leading cause in the current misinformation cycle plaguing American perspectives on gender and sexuality.

## **CONSONANT CLUSTER REDUCTION IN THE MONOMORPHEMIC FINAL CLUSTER OF -ST AS PRESENTED IN AFRICAN AMERICAN ENGLISH**

Presenter(s): Stogsdill, Kara, Undergraduate, English

Mentor: Dr. K. Aaron Smith

This study examines the final consonant cluster reduction rate in African American English (AAE) utilizing speech samples from the Corpus of Regional African American Language (CORAAL). Words with the final consonant cluster -st were examined for the rate of cluster reduction. Cluster reduction rates were compared across speaker gender, sample date, and three phonological positions- before a vowel, an oral stop, and a consonant. The reduction rate was then compared to the frequency of the word use, with the prediction that speakers would reduce at a higher rate and outside of the normal parameters for reduction when using high-frequency words. Word frequency rates were determined through information provided by the Oxford English Dictionary's word frequency bands. The hypothesis is that high-frequency words will be reduced more than less frequent words. High-frequency words will also have a higher reduction rate before a vowel even though that is the dispreferred deletion environment and where reduction should be least likely. Higher frequency words will also reduce at the highest rates before an oral stop, as speech patterns will reduce the final consonant cluster more likely at the end of an utterance. The objectives of this study are straightforward and guided by the following research questions. Does consonant cluster reduction occur more in high-frequency words than in less common words? The initial theory was the more common the word was, the likelier it would be to have a reduction in the ending consonant cluster. Is consonant cluster reduction more likely to happen at an oral stop in speech than when speech is continuous? The initial theory is that natural speech patterns make it more likely for these ending sounds to fall off when speech ends. I created two primary research objectives to answer these questions. Objective 1 was to analyze the speech samples to determine the overall reduction rate in each target word. Then, reduction rates would be compared to word frequency to determine if higher-frequency words reduce at higher rates. Objective 2 was to compare the positive samples for reduction to the syntactical structures of the target word to determine if reduction occurs more frequently when followed by an oral stop, consonant, or vowel. A secondary research objective was to compare positive samples across sociolinguistic categories of age and gender to determine if there is a reduction trend among these categories.



## **FAMILY AND CONSUMER SCIENCES**

### **EXPLORING AI IN RETAIL: INNOVATIONS IN VISUAL DISPLAY DESIGN**

Presenter(s): Ho, Linh, Graduate, Family and Consumer Sciences

Mentor: Dr. Yoon Jin Ma

Authorship: Linh Ho, Yoon Jin Ma

Artificial intelligence (AI) is opening a creative process in a new era of innovation and efficiency in design, particularly in visual merchandising. The aesthetic appeal of retail displays has enormous potential as a key selling point and enhancing brand identity. Today, retailers use visual merchandising to make them stand out in the market and ultimately draw more customers. This study explores using an AI generator to investigate elements and principles of the art of design in the visual display of retail stores, aiming to identify strategies that promote marketing campaigns and raise levels of design through specific brand display concepts in stores.

Utilizing an AI image generator based on the design fundamentals, presenting the elements and principles of art and design to examine various genres of images for a visual display by applying different prompts. Results will be compared to derive the most effective suggestion for the image creation process. A roadmap may be developed based on the findings.

This study will provide practical insights for design managers in using technology to create different types of displays that effectively grab the customers' attention, hopefully leading to more sales. It also suggests an innovative and appealing way to signage, posters, banners, and other displays in order to promote seasonal sales programs and highlight brand values.

Moreover, educators can use these guidelines as a foundation resource for teaching students the first step to applying AI to their design purpose, preparing them for the fashion industry's quickly changing styles and technologies.

## THE CONSUMERS ACCEPT FACTORS OF CLOTHING SUBSCRIPTION RENTAL SERVICES

Presenter(s): Huang, Nai-Chun, Graduate, Family and Consumer Sciences

Mentor: Dr. Christina Soyoung Song

Authorship: Nai-Chun Huang, Christina Soyoung Song

The rapid evolution of the fast fashion industry has significantly influenced consumer behavior, leading to an accelerated rate of textile waste and heightened environmental impact. Amidst growing concerns, the industry is witnessing a paradigm shift towards a circular consumption model, fueled by increased consumer awareness and a preference for green consumerism. This shift is evident in the rising popularity of clothing rental subscription services such as Rent the Runway, which have shown potential in reducing textile waste and altering consumer spending habits. This study aims to delve into the reasons behind consumer enrollment in clothing rental subscription services, investigating the role of consumers in promoting product reuse and stimulating alternative markets.

The sharing economy, facilitated by peer-to-peer platforms and markets, offers a promising solution to issues like resource overconsumption, environmental pollution, and poverty. This model emphasizes the superiority of access over ownership, offering benefits such as cost, time, and space savings, along with positive environmental impacts through reduced production and consumption. Botsman and Rogers (2010) highlight that the sharing economy is not solely driven by environmental considerations. Psychological factors, such as individual attitudes towards clothing rental services, and material motivations, including the appeal of the brand and quality of clothing, also play a significant role in shaping consumer behavior. These motivations extend beyond ecological concerns, reflecting a complex interplay of factors influencing consumer choices.

This research proposes that the rise in circular consumption, driven by clothing rental subscription services, could be a transformative force in the fashion industry. These services not only address environmental issues but also cater to contemporary consumer needs like innovative styles, space efficiency, and affordability. Our model aims to unravel the multifaceted motivations behind consumer participation in clothing rental subscriptions, offering insights into how these services can further the goals of sustainable consumption and waste reduction in the fashion sector.

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**This Poster Has Been Canceled**

## **CAN LUXURY FASHION BRANDS AND SOCIAL RESPONSIBILITY GO HAND IN HAND? AN ANALYSIS OF RECENT CSR REFORMS ON ANIMAL CRUELTY PRACTICES FOR FUR IN LUXURY GIANTS.**

Presenter(s): Kaur, Mankirat, Graduate, Family and Consumer Sciences

Mentor: Dr. Yoon Jin Ma

Authorship: Mankirat Kaur, Yoon Jin Ma

Luxury fashion houses, for an exaggerated period of time, have used animal skins for leather, feather, and fur, extracted specifically from lizards, alligators, foxes, buffalo and more to produce exotic fabrics used in their high-end collections. Every second, three animals die just for their fur and as of now, the fur industry is worth \$22 billion, however it is banned in 19 European countries. While companies like Stella McCartney are embracing vegan fashion and removing animal cruelty, luxury giants like Max Mara Fashion Group, spread across 105 countries continue to use animals, specifically for fur extracted from the fur farms of Finland and China. According to Vogue 2021, people condemn the use of animals in fashion and 80% of the surveyed consumers acknowledged the welfare of animals while shopping.

This research investigates reforms and initiatives taken by luxury fashion brands to end the practice of animal cruelty for acquiring fur considering the current situation. Through content analysis, we compare 20 famed luxury companies' recent CSR and environmental responsibility reports to identify their current and future stance on the application of animal fur in their designs. We investigate the credibility of the information through current news articles, top animal welfare organizations, NGO websites, and controversies regarding the analyzed companies. The collected data and research aim to clarify the recent development of policies and strategies, together with the direction of the major fashion players in eradicating the practice of animal cruelty for fur in the luxury fashion market.

# UNVEILING THE AMPLIFYING IMPACT OF FASHION ON SELF-ESTEEM

Presenter(s): Kaur, Mankirat, Graduate, Family and Consumer Sciences

Mentor: Dr. Christina Soyoung Song

Authorship: Mankirat Kaur, Christina Soyoung Song

Fashion, an artistic medium for self-expression, significantly impacts our psychological well-being and emotions. The choice of attire can transform mood and enhance confidence, serving as a tool for improving emotional states and advancing in professional and personal realms. This study aims to explore the relationship between fashion and self-esteem, focusing on the understanding and appreciation of one's body type, the development of a unique style, the influence of fashion influencers, and the social impact of clothing.

## Hypotheses:

1. Awareness of one's body type positively affects self-esteem.
2. Unique personal styling boosts self-esteem.
3. Emulating fashion influencers' styles enhances self-esteem.
4. Understanding the social impact of attire influences self-esteem.

Theoretical implications of this study include understanding fashion's psychological impact and its integration into mental health improvement methods. Managerial implications are evident in self-improvement programs and business strategies for styling firms, offering insights for enhancing self-esteem and confidence through fashion. In conclusion, this research underscores the empowering aspect of fashion styling as a form of self-expression. It provides evidence of how fashion can foster a healthier lifestyle, both internally and externally, by influencing perceptions and encouraging individuals to dress for themselves, not just societal norms. This study aims to extend knowledge in fashion styling, emphasizing its significance in fostering a positive self-image and well-being.

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## **THE FUTURE OF FITTING ROOMS: ARE VIRTUAL TRY-ON MIRRORS A SMART CHOICE FOR THE FUTURE OF RETAIL?**

Presenter(s): Pearson, Bree, Undergraduate, Family and Consumer Sciences  
Watson, Emma Undergraduate, Family and Consumer Sciences  
Caserio, Caroline, Undergraduate, Family and Consumer Sciences  
Mentor: Dr. Christina Soyoung Song  
Authorship: Bree Pearson, Emma Watson, Caroline Caserio, Christina Soyoung Song

With ever-evolving technology, trying on clothes in fitting rooms has become more advanced and convenient than ever before. The fashion industry is embracing this advancement by introducing smart mirrors that could potentially revolutionize the shopping experience both in-store and at home. With virtual try-on technology, customers can now digitally try on clothing and accessories using devices such as phone cameras or digital mirrors that layer the items onto the customer. Major players such as Ulta and Sephora now offer customers the ability to try on makeup through smart technology and apps, while H&M is utilizing tech-enabled shopping experiences to enhance customer interest in their store. Our research aims to uncover the benefits of smart mirror technology, including how it can influence consumers' clothing choices, and how it can be further improved to provide a seamless and immersive shopping experience.

Virtual try-on technology, exemplified by smart mirrors, is redefining the retail experience in the fashion industry. This technology provides a highly personalized and engaging shopping experience, addressing common challenges such as inaccurate self-measurement and the time-consuming trial of finding well-fitting clothes. By facilitating easier and faster selection processes, these mirrors not only enhance shopping convenience but also inclusivity, as seen in their adoption by major brands like Adidas and Macy's. This technological advancement has significantly influenced both brick-and-mortar and online sales, notably reducing the high return rates associated with online purchases. Despite its benefits, the technology's widespread implementation remains limited, with many retailers yet to embrace it. Additionally, some customers express reluctance due to the absence of physical interaction with the clothing, highlighting the need for businesses to make this technology more accessible and user-friendly. Fitting rooms, a staple in fashion retail, benefit greatly from the integration of smart mirrors. These advanced mirrors offer more than just reflections; they provide personalized clothing recommendations, styling tips, and even visualizations of outfits in different colors. Their role in enhancing the customer experience is crucial, catering to diverse needs and preferences. Moreover, smart mirrors create a unique and enjoyable shopping experience, which can be leveraged by businesses for brand promotion through customer-generated content on social media.

In summary, virtual try-on technology, particularly through smart mirrors in fitting rooms, offers a transformative shopping experience, combining convenience, personalization, and enhanced customer engagement via social media, with potential for further adoption and improvement in the retail sector.

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## RESTAURAN DESIGN FEATURES IMPACTING THE EXPERIENCE OF HARD-OF- HEARING INDIVIDUALS

Presenter(s): Ross, Olivia, Undergraduate, Family and Consumer Sciences  
Kmieciak, Lorin, Undergraduate, Family and Consumer Sciences  
Mentor: Dr. Reem Bagais  
Authorship: Olivia Ross, Lorin Kmieciak, Alaina Zajac, and Reem Bagais

**Background:** Restaurants are popular social gathering spaces that need to be equipped to handle a wide variety of people on a daily basis. According to US Foods, 63% of people care most about atmosphere and experience when dining out (The Dining Dispatch: 2023 American Dining Habits, 2023). Additionally, the National Institute of Deafness and Other Communication Disorders stated that about 15% of American adults, approximately 37.5 million people, ages 18 and older report having some trouble hearing (Quick statistics about hearing, 2021). Hearing related disabilities often go unnoticed and are typically invisible, eliminating the opportunity for impromptu accommodations. Therefore, addressing the increasing need for inclusivity in restaurant design can be best met through the enhancement of the pre-existing space. The purpose of this research is to highlight the deficiencies of restaurant design for hard-of-hearing individuals and provide design guidelines in that regard. This research allows for diverse individuals to co-exist within commercial spaces more effortlessly.

**Method:** This research aims to address how existing restaurants can adapt new design considerations to a diverse and inclusive range of users, including those with hearing difficulties. The study used two methods: (1) Observing human behavior in an upscale, bi-level restaurant setting and (2) identifying design criteria related to people that are hard-of-hearing established in the literature. The research question is: What design guidelines can be easily implemented in an existing upscale, bi-level restaurant to fit the needs of people who are hard-of-hearing? Data was gathered from on-site observations based on environmental conditions, path and wayfinding, behavioral settings, and ergonomics of restaurant design.

**Findings:** The research findings underscored accessible design guidelines and solutions specifically tailored for individuals with hearing impairments in upscale, bi-level restaurants. These insights were derived from both direct observations and empirical findings. The observation provided insights into areas of strength, exemplified by light fixture selection, ceiling design, and separation of spaces, and areas that require improvement, such as noise level, material selection, and wayfinding. The empirical findings provided evidence of design solutions related to the population of interest, including acoustical solutions, signage, and choreographed lighting design.

**Significance:** The incorporation of inclusive design elements into an existing space offers the improvement of function, accessibility, and experience for all users. This research will provide an understanding of the importance of inclusive restaurant design and offer design guidelines for the hospitality industry, restaurant owners, and designers. The creation of design guidelines allows all users, including the hard-of-hearing users, to comfortably recognize and utilize restaurant spaces.



## **FABRICATING THE FUTURE: DESIGNERS' INTENTION TO USE NOVEL TEXTILES IN MANUFACTURING**

Presenter(s): Scace, Ali, Undergraduate, Family and Consumer Sciences

Mentor: Dr. Christina Soyoung Song

Authorship: Ali Scace, Christina Soyoung Song

This study explores the integration of novel textiles in product design, focusing on designers' motivations. Novel textiles, characterized by their unique fabrication through nanotechnology, offer distinctive properties and consumer benefits. Sensor technology and external finishes in the manufacturing of novel textiles enable these fabrics to perform various functions (Textile Focus, 2023). For instance, water-wicking textiles, vital for swimmers, enhance efficiency in water by reducing drag, a feature not possible with regular fabrics. This advanced textile technology is essential for swimmers to achieve their maximum potential, as traditional fabrics would significantly impede performance. Besides water repellence, novel textiles also offer protection from environmental factors, monitor health, and provide fire, UV, and bacteria resistance, as well as odor and stain wicking properties (PTI, 2019). The field is continuously evolving, with developers innovating textiles that boast self-cleaning features, sensors for vital sign monitoring, and even luminescent fabrics that illuminate independently (Fibre2Fashion, 2013).

Drawing from these studies, this research posits that designers are likely to opt for novel textiles when they offer (1) physical protection against external elements, (2) performance enhancement, (3) health monitoring capabilities, (4) comfort, and (5) durability to consumers. It is anticipated that these benefits will significantly motivate designers to incorporate novel textiles in product development, thereby delivering a multitude of advantages to consumers.

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# **This Poster Has Been Canceled**

## **REVIEW OF AI APPLICATIONS IN THE FASHION INDUSTRY**

Presenter(s): Tellez, Chantal, Undergraduate, Family and Consumer Sciences

Mentor: Dr. Christina Soyoung Song

Authorship: Chantal Tellez, Christina Soyoung Song

Artificial intelligence (AI) has been incorporated into many industries, including engineering, physics, and retail businesses. In the fashion retail sector, AI has improved efficiency in supply chain management, cost and pricing analysis, design development, mass customization, consumer marketing, and product merchandising. With the increasing importance of AI, this study reviews the current status of AI applications in the fashion industry to synthesize current knowledge in the field and provide a comprehensive overview. The findings summarize that AI integration is particularly evident in fashion marketing campaigns, app development, and in-store technology for enhancing advertising effectiveness, customer shopping experiences, and providing product information and personalized recommendations. By examining existing literature, this study identifies new areas for future research needed to continue technological innovation in the fashion industry and contributes to advancing knowledge in AI technology adoption.

## HISTORY

### MAPPING ROMAN MARBLE

Presenter(s): Fried, Amalie Undergraduate, History

Mentor: Dr. Kathryn Jasper

Mapping Roman marble is beneficial for the understanding of the economical context that the marble trade existed within. By being able to map Roman marble --and connect it to the Diocletian price ranges as defined in Diocletian's edict of maximum prices --researchers can have better perceptions of the Roman economy, culture, and the magnitude of wealth portrayed with marble.

## **MAPPING ROMAN AGRICULTURE IN NORTHWEST BOLSENA**

Presenter(s): Ridinger, Lillian, Undergraduate, History

Mentor: Dr. Kathryn Jasper

My proposed poster will present preliminary results from research conducted on the site of Valle Gianni as part of the Northwest Bolsena Archaeological Project during summer 2023. Located near the town of Gradoli in Lazio, Valle Gianni contains the remains of a monumental Roman fountain (nymphaeum) and wine press. Answering questions about the identity and motivations of the nymphaeum's owner depends on understanding how the construction of the nymphaeum related to the agrarian economy. The goal of this project was to collaborate with Dr. Kathryn Jasper in her work reconstructing ancient agricultural economies and trade networks around the monument. The project sought to create a GIS model of Roman agriculture in the region. Two questions guided the design of the model: Which crops were grown in the region at given in moments in time? And what were the approximate yields of these crops? We attempted to understand pre-modern approaches to agriculture that could inform a GIS model. As medieval agricultural practices resemble ancient approaches more than modern, we collected data from the oldest documents recording medieval agriculture in northern Lazio from around the year 1000 through 1300. These documents describe property transactions that include references to agriculture, waterways, and natural resources in the region. We concluded that the region historically had both small- and large-scale agriculture but that most of the landscape was broken into small pieces, and relations between landowners and tenants determined the organization of crops.

## **THE DISPLACED PERSONS QUESTION: A TURNING POINT IN THE POLISH AMERICAN CONGRESS' LOBBYING ACTIVITIES**

Presenter(s): Zawadzka, Wiktoria, Undergraduate, History

Mentor: Dr. Katrin Paehler

Authorship: Wiktoria Zawadzka

The end of WWII found many people uprooted and in need of food, medicine, and shelter. As a short-term solution, these people were labelled as displaced persons (DPs) and placed in DP camps. Based on interallied agreements, these people were to be repatriated to their countries. However, many non-Jewish DPs did not want to return to their homeland, which were now under the Soviet sphere of influence. On the other hand, Eastern European Jews did not have any home to return to and hoped to resettle outside of Europe.

The literature thus far focuses on the struggles of Jewish DPs and the efforts of Jewish-American lobbies to change United State immigration law. They hoped to amend the pre-war immigration system to increase the number of Jews allowed into the country. However, Polish-American lobbying efforts are rarely discussed. Their inclusion allows for a more nuanced understanding of both the DP issue and the eventual change in immigration law.

My research focuses on these Polish-American lobbying agencies. The Polish American Congress (PAC), a large political umbrella organization representing Polish-American interests, was one of these agencies. Aware of the DP issue, this organization exercised its desire to provide aid through numerous lobbying efforts; their chief focus was to amend immigration law to allow an increased number of Poles into the United States.

My work sketches the lobbying activities of the PAC in the run-up to the DP Act of 1948, with a particular focus on their Report to Secretary Byrnes on Conditions in Polish Displaced Persons Camps in the American Zone of Occupation in Germany. This report described the conditions in the camps, using this as a basis for their demand to change immigration law. In combination with their political savvy and persistent media presence, this report was able to garner favor from politicians and aid in passing the DP Act of 1948.

Taking this report into consideration is critical to understanding the history of lobbying for the DP Act and DP issues in general. By providing a clear history of this report, the history of DPs is represented in a more accurate light; one that closes previous gaps of knowledge on the issue.

## INFORMATION TECHNOLOGY

### MACHINE LEARNING BASED KNOWLEDGE DISCOVERY FOR PRECISION MATERNAL FETAL MEDICINE

Presenter(s): Ellaboina, Vishnu Vardhan, Graduate, Information Systems

Mentor: Dr. Nariman Ammar

Authorship: Ellaboina, Vishnu Vardhan<sup>1</sup>, MSc; Nandipati, Sai Kiran<sup>1</sup>, MSc; Howard, Elizabeth<sup>2</sup>, PhD; Olet, Susan<sup>2</sup>, PhD; Price-Haywood, Eboni<sup>2</sup>, MD, PhD; Nariman Ammar<sup>1,2</sup>, PhD

<sup>1</sup> Illinois State University ; <sup>2</sup>Ochsner Health, New Orleans, LA; <sup>3</sup>

**Objective.** Electronic Health Records (EHRs) provide an incomplete picture of care when it comes to pregnancy episodes. Pregnancy episodes of care in EHR data may suffer from documentation inaccuracies, coding errors, missing information, or data inconsistently coded across patients. Also, data fields for start and end of pregnancies and gestational age (GA) at birth do not currently exist in a consistent form within EHRs, making it challenging to ascertain pregnancy episodes and gestational aging. Another issue with EHR data is healthcare disparities arising from long-standing data inequality among ethnic groups.

The aim of this study is two-fold: a profile analysis of the top N unique pregnancy episode profiles within the EHR based on both landmark milestones, encounter types, and delivery outcomes; a clustering analysis to identify sub cohorts of pregnancy episodes and the upstream factors that potentially influence the pregnancy risk level within each cluster.

**Method.** To identify profiles, we first leveraged concepts related to pregnancy (e.g., gestational timing, fetal stage development, etc.) from the Observational Medical Outcomes Partnership (OMOP) concept sets that have been established in literature to robustly and precisely phenotype pregnancy episodes using gestational aging, pregnancy start, pregnancy end, and landmark time frames throughout a pregnancy's progression to provide temporal context. We then applied unsupervised machine learning (cluster analysis) to a subset of episodes retrospectively collected between 2016 and 2023 of patients 18 and older who established care at a facility within an academic hospital in the US.

**Results.** The findings from the cluster analysis identified sub cohorts in the dataset that share common demographic and clinical characteristics. The clinical characteristics differentiated between high risk and low risk pregnancies while the demographic characteristics shed light on the common risk factors for high risk pregnancy outcomes.

**Conclusion.** The clusters that we have identified helped us identify sub cohorts of pregnancy episodes. We are currently investigating transfer learning, a supervised unbiased multiethnic machine learning algorithm to construct and evaluate a predictive model. The approach will guarantee fairness not only in the population selection phase of machine learning pipelines but also during the learning and model building phase. The supervised learning will allow us to predict common health outcomes among pregnant patients, such as Preeclampsia and Gestational Diabetes. We will leverage Transfer learning to predict the outcomes while accounting for disparities in the dataset.

## This Poster Has Been Canceled

## TEMPERATURE EFFECTS ON NEURONAL ACTIVITY

Presenter(s): Jaswal, Twinkle, Undergraduate, Information Technology

Mentor: Dr. Rosangela Follmann

Co-mentor: Dr. Epaminondas Rosa

Authorship: Twinkle Jaswal, Epaminondas Rosa, Rosangela Follmann

Neurons, serving as the essential components of the nervous system, facilitate information transmission through a combination of electrical impulses and chemical signals between different brain areas. Within this intricate neuronal network, synchronization is a crucial phenomenon where multiple neurons fire action potentials simultaneously. Synchronization not only coordinates brain activity but also aids in memory consolidation, fostering effective collaboration across different brain regions. Nevertheless, when synchronization becomes excessive, it can lead to the manifestation of brain disorders like epilepsy.

Computational modeling of neurons offers a robust tool for understanding neurological processes, including disorders like epilepsy. This is a condition affecting approximately 50 million people globally, with several possible causes and having temperature identified as a potential trigger for seizures.

Understanding the broader impact of temperature on health, maintaining the body's baseline temperature is crucial, as deviations, even by a few degrees, can have detrimental consequences. Hyperthermia, associated with sudden infant death syndrome, for example, involves an elevated temperature at the time of death. Additionally, in children, heightened temperatures commonly act as triggers for febrile seizures. By connecting the intricate dynamics of neurological processes, and temperature-related health risks, our research endeavors to contribute to a more comprehensive understanding of epilepsy and its possible connections to temperature. In this work, we developed a biophysical model to simulate and analyze a network of coupled neurons following the functional connectivity prior to the onset and during the seizure itself. We also investigated how change in temperature in the proposed model can trigger seizures, mimicking the conditions observed during fever induced seizures in infants. The computer simulations we perform use a quantitative neuron network model based on the Hodgkin-Huxley equations and offer a meaningful mathematical representation of neural processes associated with epileptic seizures. Our results may contribute to aiding in the understanding of epileptic seizures and in developing much needed detection and prevention strategies for them.

## ENHANCING EMERGENCY DEPARTMENT CROWDING ASSESSMENT: A MULTIFACETED APPROACH

Presenter(s): Nandipati, Sai Kiran, Graduate, Information Technology

Mentor: Dr. Nariman, Ammar

Authorship: Sai Kiran<sup>1</sup>, MSc, Nariman Ammar<sup>1,2</sup>, PhD, Lixuan Ji, MD<sup>3</sup>, Ami Yuen<sup>4</sup>, Jonathan Bidwell, PhD<sup>2</sup>, Daniel Fort, PhD<sup>2</sup>

<sup>1</sup> Illinois State University; <sup>2</sup>Ochsner Health, New Orleans, LA; <sup>3</sup> Tulane University, New Orleans, LA; <sup>4</sup> University of Queensland, Queensland, Australia; <sup>3</sup>;

**Objectives:** Emergency Department (ED) overcrowding poses significant challenges for healthcare institutions. ED crowding scores can help physicians respond to high ED volumes. However, existing scores often fail to capture and reflect perceived crowding conditions on the ground. In this study, we aimed to improve our understanding and management of ED crowding.

**Method:** After conducting a literature review we identified and derived 72 crowding metrics from the input-throughput-output domain framework. We then utilized a previously administered survey asking in-person ED staff working in two small to medium-sized hospitals in the US to report perceived ED crowding scores on a scale of 0-200 every four hours for three months in 2021. We aligned the window-level crowding score survey data with patient and facility-level Electronic Health Record (EHR) data retrospectively collected during the same study period by sampling the 72 metrics at both four-hour and one-hour windows. We designed and conducted 24 Machine Learning (ML) experiments utilizing 5 regression-based algorithms, 5 multi-level classification-based algorithms, and 5 binary classification algorithms using a subset of the 72 metrics to predict crowding scores for both 1-hour and 4-hour windows. **Results:** Our results demonstrate the efficacy of Support Vector Regressor (SVR) for regression analysis, achieving an AUC of approximately 0.8. Furthermore, Random Forest emerged as the optimal classifier for multi-classification analysis (AUC ~0.9) and binary classification analysis (AUC ~0.9). The best metrics in predicting crowding score are as follows:

- Number of patients with acuity level 3 at the end of the window
- Mean and maximum waiting room time for admitted patients (minutes)
- Number of patients waiting in the ED during the window
- Average and maximum decision to discharge time for IP admit patients (minutes)
- Number of female patients in the ED during the window
- Total number of vacant beds in the ED during the window
- Patient to provider ratio: Total patients divided by available providers
- Average ED length of stay for admitted patients during the window (minutes)

**Conclusion:** Our findings revealed the superiority of our Machine Learning models in predicting perceived crowding, resulting in a substantial improvement over Our results indicate that our models can outperform the nationally established NEDOCS score. Our future work includes incorporating a workflow analysis of the most common unique ED profiles distinguishing between acute care and fast track patients.



## FRAMEWORK FOR ANALYZING BRAIN ACTIVITY IN REAL TIME

Presenter(s): Whitney, Nathan, Undergraduate, Computer Science  
Mentor: Dr. Rosangela Follmann  
Co-Mentor: Dr. Epaminondas Rosa  
Authorship: Nathan Whitney, Epaminondas Rosa, Rosangela Follmann

The brain is a complex organ with billions of neurons that interact with each other, providing many functions through neuronal synchronization. Understanding the mechanisms underlying this synchronization is important for studying memory consolidation, sleep disorders, Parkinson's disease, and epilepsy. Brain activity can be recorded using electroencephalogram (EEG) headsets which read the electrical activity of certain areas of the brain. In this work we developed an approach for collecting and analyzing EEG data in real-time. This approach consists of detecting the emergence of synchronization which in the case of epilepsy means a seizure is underway. Real-time EEG data analysis allows for faster detection of events associated with neuronal disorders, possibly predicting brain events before they happen, or showing real-time brain activity with motor movements. This can allow for the development of preventive measures to stop abnormal brain activity from spreading through the brain.

## KINESIOLOGY AND RECREATION

### DIFFERENCES IN HEART RATE VARIABILITY, STRESS SCORES, COHERENCE, AND VO2 BY COVID-19 VACCINATION STATUS

Presenter(s): Deer, Nina, Graduate, Kinesiology and Recreation  
Morse, Mady, Undergraduate, Kinesiology and Recreation  
Mentor: Dr. Dennis, Karen  
Authorship: Nina Deer, Mady Morse, Karen Dennis, Alex Wolfe

**INTRODUCTION:** Stress has been shown to influence heart rate variability (HRV) (Taelman et al., 2009). HRV describes the time interval between heartbeats and is correlated to overall aspects of health and disease, including cardiovascular disease and cardiovascular mortality. During stressful events, the sympathetic nervous system is activated. Physiologically, stress appears in the form of lowered HRV, with decreased parasympathetic (PS) activity, increased sympathetic (S) activity, and increased levels of cortisol.

Alternatively, shifting the autonomic balance towards increased PS activity can be achieved through stress managing training and practice using management methods. Rhythmic breathing and active self-generating positive emotion training may shift the autonomic nervous system (ANS) balance towards increased PS activity (Culbert, 2014). Multiple reports have indicated that COVID-19 vaccination may be related to autonomic nervous system dysfunction, which may be partially explained by a systemic inflammatory response (Nushida et al., 2023). HRV and its association with inflammatory conditions has been extensively investigated (Williams et al., 2019). HRV is a strong indicator of autonomic function, while both acute and chronic inflammation are also closely related to autonomic dysfunction.

**PURPOSE OF THE STUDY:** The purpose of this study is to identify differences in heart rate variability, perceived stress (stress index SI), coherence, and VO<sub>2</sub> following implementation of stress-reduction techniques and physical activity comparing subjects who received COVID-19 vaccination and those who did not. **METHODS:** Students enrolled in a personal health/wellness course reported COVID-19 vaccination status and underwent measures to assess physical fitness, heart rate variability (HRV), coherence, and stress index. Students enrolled in a health and wellness course during the fall of 2023 were subjects for the study. Throughout the 16-weeks, students participated in physical activities that targeted improving fitness, which was assessed through pre- and post-testing. HRV measurements were gathered at both pre- and post-testing using the HeartMath emWave Pro software measured by a pulse plethysmograph ear sensor along with physical fitness data (ht, wt, body comp., VO<sub>2</sub> (1-mile walk test)) and SI (State-Trait Anxiety Inventory for Adults, Polar Tri-Fit software). Weekly “Release It” assignments were given through the HeartMath Institute website to focus on teaching students how to implement breathing techniques, attitude, and heart-brain connection in their own lives. **RESULTS:** A total of 64 students provided vaccination status, with 40.6% receiving the COVID-19 vaccine. Paired-sampled t-tests were calculated to examine differences in pre- and post- assessments, separated by vaccination status. The results of this study found statically significant differences between measures of R-R intervals ( $t_{(25)} = -.2.36$ ,  $p = .027$ ) and VO<sub>2max</sub> ( $t_{(30)} = -.4.44$ ,  $p < .001$ ) in the non- vaccinated group. Cohen’s effects size values suggest a “medium” and “large” practical significance respectfully. Statistical significance was not reached for any other health measures for either the vaccinated or non-vaccinated group. **CONCLUSION:**

Differences were observed in R-R intervals and VO2 max in the non- vaccinated group. There were no significant differences in the vaccinated group. The other measures did not reach significance. The results contradict the literature whereas those who did not receive the vaccine had a decrease in HRV. In the future, the study should be repeated to measure the long-term effects of COVID-19 vaccination and HRV. There is data to support stress reduction techniques and improving HRV however, the current data is inconsistent in finding differences between COVID vaccination status and HRV scores.

## CONCURRENT VALIDITY AND RELIABILITY OF THE VERTICAL JUMP AND STANDING BROAD JUMP TESTS IN YOUTH

Presenter(s): Faamoe, Isaac, Graduate, Kinesiology and Recreation

Mentor: Dr. Kelly Laurson

Authorship: Isaac Faamoe, Kelly Laurson, Tyler Kybartas, Samantha McDonald

Muscular power is an important component of fitness with implications for bone health, explosiveness in movements, and predicting long-term health outcomes. However, the literature is scarce concerning commonly used muscular power field tests among youth, including vertical jump (VJ) and standing broad jump (SBJ). **PURPOSE:** To investigate the relationship between VJ and SBJ, as well as factors impacting reliability of each movement. **METHODS:** Approximately 600 students (9-14 years of age) in grades 4-8 participated in the testing of the VJ and SBJ. Pearson correlations were used to evaluate relationships between jump variables and intra-class correlations (ICC) were used to examine reliability of the VJ and SBJ. **RESULTS:** VJ had a positive and strong relationship with SBJ ( $r = 0.74$ ), all  $p < 0.05$ .

ICC analyses demonstrated VJ had a moderate reliability ( $ICC = 0.54$ ,  $p < 0.05$ ) with SBJ. **CONCLUSIONS:** Pearson correlations show the VJ has a positive and strong relationship with SBJ. The VJ displays moderate reliability with SBJ. While each are used as field assessments of lower body power in youth, each contributes unique variance during assessment. Further investigation is needed to better determine this unexplained variance.

## **SEGMENTAL LEAN MASS ANALYSIS: COMPARING DUAL-ENERGY X-RAY ABSORPTIOMETRY AND THE INBODY 570**

Presenter(s): Ruman, Faith, Graduate, Kinesiology and Recreation

Mentor: Dr. Kelly R. Laurson

Body composition is important in understanding overall health and making informed decisions relative to lifestyle, such as diet and physical activity. Dual-Energy X-Ray Absorptiometry (DXA) is currently the gold standard for assessing body composition, working off of a three-component model of fat mass, bone mass, and non-bone lean mass. Additionally, DXA can be used to examine segmental lean mass of different body pieces (e.g., trunk, legs, arms). Similarly, the InBody 570 (IB-570) is a noninvasive device that sends electrical current through the body in order to estimate body composition via bioelectrical impedance (BIA). The IB-570 can also be used for segmental composition. The purpose of the proposed study is to investigate the agreement in segmental body composition measures assessed by DXA and eight-electrode Bioelectrical Impedance Analysis (BIA) in college-aged adults. To our knowledge, there are currently no studies comparing the IB-570 and the DXA in regards to segmental lean analysis. Existing literature is limited, with some studies comparing only whole body fat and fat free mass or using different versions of the InBody BIA device. Through this study, we hope to determine if the less expensive and less invasive IB-570 can be an accurate and more feasible method compared to DXA for segmental body composition analysis.

## META-ANALYSIS COMPARING TRADITIONAL ACUPUNCTURE POINTS AND AHI- POINTS: DELAYED-ONSET MUSCLE SORENESS

Presenter(s): Shao, YuFang, Graduate, Kinesiology and Recreation

Mentor: Dr. Kelly R. Laurson

Authorship: YuFang Shao, Kelly R. Laurson

Delayed onset muscle soreness (DOMS) is a type of muscle injury that can occur following moderate-to-high intensity physical activity. More recently, acupuncture has been considered as an alternative treatment method for muscle injury, which includes DOMS. However, there have been no specific investigations into potential differences when using traditional acupuncture (points based on traditional Chinese medicine theory), Ashi-acupuncture (points not on Chinese meridian, also known as tender points), or sham-acupuncture (superficial points, or points neither on the Chinese meridian nor the tender points) for treatment of DOMS.

**PURPOSE:** To investigate the effectiveness of acupuncture treatment with traditional acupoints, Ashi points, and sham acupuncture to treat exercise-induced DOMS. **METHODS:** Data collected through November 2023 were reviewed, sourced from seven digital databases. The study focused on reviewing the acupuncture points selection and location and treatment methods, pain measured on a visual analog scale (VAS) right after intervention was set as outcome.

Data was compiled and evaluated using meta-analyses. **RESULTS:** A total of six articles were included. The results showed that there were no significant differences between VAS for all groups (all  $p > 0.05$ ). The standardized mean difference (SMD) of the VAS right after treatment between the Ashi-points and control group was 0.65 (95% CI: -3.4, 5.2). Similarly, comparisons of the Ashi-points with sham acupuncture (SMD = -1.5, 95%CI: -7.4, 3.2) and traditional points (SMD = -0.21, 95%CI: -5.1, 4.5) were also not significantly different.

**CONCLUSION:** Acupuncture was not an effective treatment for DOMS, regardless of using Ashi, traditional, or sham acupuncture treatment.

## MATHEMATICS

### **AN EMPIRICAL TEST OF CONDITIONAL AND UNCONDITIONAL CAPITAL ASSET PRICING MODEL (CAPM): APPLICATION IN TESLA STOCK**

Presenter(s): Ahmed, Gulzar, Graduate, Mathematics

Mentor: Prof. Xing Wang

Authorship: Gulzar Ahmed, Xing Wang

CAPM is the crucial model to measure the relationship between expected return and risk related to an asset. It assumes a positive relation between the return on an asset and the risk (beta coefficient) associated with that asset. The systematic or market risk (alpha) is also an important factor for the assessment of asset price.

Most prominently, the CAPM does not explain why, over the last 40 years, small stocks outperform large stocks, why firms with high book-to-market (B/M) ratios outperform those with low B/M ratios (the “value premium”), or why stocks with high returns in the previous year continue to outperform those with low prior returns (“momentum”). This paper aims to empirically observe the unconditional and condition CAPM. We ensured the specification of the application of CAPM using econometric models and tested the assumption of these models. Further, we applied the most suitable model to forecast the average returns of Tesla after analyzing both unconditional and conditional CAPM models. Our linear regression model results show the risk factor beta value is 1.19 for TESLA which means that TESLA stocks are more volatile than the overall market. It implies that 1 % change in the stock market the TESLA stock return will change by 1.19 %. Further, we apply the conditional CAPM using ARCH and GARCH models that contain the conditional variance of the residual to calculate the short-term shock and represent the long-term persistence to forecast TESLA average returns. Based on our forecast, this paper implies that TESLA stock returns will decrease for September and October 2023.

## NURSING

### MUSIC IN THE NICU

Presenter(s): Baxter, Alyssa, Undergraduate, Nursing

Mentor: Dr. Denise Hammer

**Objective:** A literature review was completed as part of a Honors Independent Study in Nursing to explore the effects of music interventions on infants in the neonatal intensive care unit (NICU).

**Background:** The NICU can be a stressful environment for infants due to unpleasant stimulation from testing, procedures, and monitors. This can lead to elevated vital signs (heart rate, respirations, and oxygenation), poor feeding, and longer hospital stays. Music played in the background during their stay is being explored as an intervention to improve the infants' status.

**Methods:** This literature review was conducted with a thorough search of the CINAHL database to answer the question: "In infants during their stay in the NICU, how does music affect their vital signs, length of stay, and quality of feeding"? Search terms used were "NICU" OR "neonatal intensive care unit" OR "special care" OR "baby unit" OR "newborn intensive care" AND "music therapy" OR "music intervention" OR "musical therapy." We limited the sources to peer reviewed articles in the English language from 2018-2023. We reviewed the abstracts of each of these articles to determine which ones were applicable to our research question.

**Results:** Twenty-three articles were found applicable and selected for further review. Using the Johns Hopkins Nursing Evidence-Based Practice Model, fourteen of the full articles reviewed were of high quality and nine of them were of good quality. Researchers for these studies showed that the infants' heart rate, blood pressure, and respirations positively decreased when music was played. Oxygen saturation level and sleeping times improved with musical intervention. Some studies researchers found a decrease in hospital stay length for infants that regularly received music. However, in other studies researchers did not find a true causational relationship between the music and the infant's condition improving since the infants were receiving a variety of nursing interventions during their stay.

**Conclusion:** The findings from the literature review indicate a positive relationship between music and the infant's health in the NICU. However, more studies would need to be completed to find a strong correlation.



## **IMPACT OF MUSIC ON THE RELATIONSHIP BETWEEN PARENTS AND INFANTS IN THE NEONATAL INTENSIVE CARE UNIT AND AT HOME**

Presenter(s): Leffers, Rebecca, Undergraduate, Nursing

Mentor: Dr. Denise Hammer

**Objective:** This literature review investigates the use of music interventions for parents and family members of infants in the neonatal intensive care unit (NICU) and once home. This literature review was completed as an honors independent study. The research question addressed is: How can the use of music impact the relationship between parents and their infants in the NICU and once home?

**Background:** The NICU is a very stressful environment for both the infants and family members. A variety of interventions have been studied to address stress for both the infant and their family in the NICU. Music in the NICU is one of these interventions. Researchers evaluated music interventions to determine if there is an improvement in relationships between infants and their parents and if there is any health improvement for the infant.

**Methods:** This literature review was conducted in Fall of 2023 using the CINAHL database. The search was conducted by three honors nursing students together, then each student reviewed the articles that fit that nursing student's research question. The search was limited to peer reviewed articles written in English. The search terms used were "NICU" OR "neonatal intensive care unit" OR "special care" OR "baby unit" OR "newborn intensive care" AND "music therapy" OR "music intervention" OR "musical therapy". We reviewed the abstracts of each of these articles to determine which ones were applicable to our research question.

**Results:** For this research question, fifteen articles were found applicable and were selected for review. The articles were rated according to the Johns Hopkins Nursing Evidenced-Based Practice Models. The main uses for music intervention were for relaxation and decreased anxiety, parent/infant bonding, and bereavement support. The music interventions were performed both in the hospital and in home care settings.

**Conclusions:** Music is a positive intervention for the relationship between parents and their infants in the NICU setting and when NICU infants are home. Music increases the emotional and physical bond between parent and infant. In cases where an infant is too sick and must transition into palliative care, music can help parents cope with their loss. Overall, additional research should be performed, but according to this research music does positively impact the relationship between parents and infants.

## PHYSICS

### WHY IS THERE MORE REJECTED ENERGY?

Presenter(s): Cole, Seth, Undergraduate, Physics

Mentor: Dr. David Marx

According to the EIA (Energy Information Agency) and LNL (Lawrence Livermore National Laboratory), The amount of rejected energy has been going up since at least 2005. Primary reasons for this include different methodologies to gather the data, and massive decreases in industrial efficiency. This decrease in the amount of useful energy has big implications that would impact government and private sector policy. This decrease ought to be investigated and brought to light so that more of the scientific community and general public are aware of the increase of this rejected energy. Understanding the reasoning behind the increase in rejected energy could motivate innovations to increase efficiencies which would be beneficial to the public and private sectors.

## MODEL EQUATIONS FOR C. ELEGANS' THERMOTAXIS

Presenter(s): Gomez, Lylia, Undergraduate, Physics

Mentor: Dr. Epaminondas Rosa Jr.

Authorship: Lylia Gomez, Zach Mobbille, Andres Vidal-Gadea, Rosangela Follmann,  
Epaminondas Rosa Jr.

*Caenorhabditis elegans* is a free-living worm inhabiting temperate environments across the Earth. This animal demonstrates to possess various properties that are relevant in human biology, including temperature sensing. The work presented here aims at improving the understanding of the underlying mechanisms of *C. elegans* locomotion response in cool and warm environments. We incorporate temperature features into a set of differential equations to create a mathematical representation of *C. elegans* Amphid Finger-like (AFD) neurons. The animal uses its memory of the cultivation temperature to perform migration behavior in temperature gradients. Our computational output shows consistency with experimental results, replicating the calcium dynamics of a real AFD neuron during temperature experiments. Using color maps in Arrhenius-based parameter space, we study how our model neuron responds to temperature variations. The findings suggest that intracellular activity observed in response to such changes may be caused by oscillating inputs to the cyclic nucleotide-gated (CNG) ion channels in the dendrite. This proposes a methodology for predicting the calcium response of AFD neurons in *C. elegans* in different temperatures.

To further this work, and with the question “What is the mechanism behind the AFD neuron’s ability for temperature sensing and making a decision on a particular motor output?” driving this research, we expand upon the single AFD neuron model by introducing an additional AFD neuron to study the finer motor outputs and details of the mechanism behind *C. elegans*’ thermotaxis. The presence of two neurons, positioned on the left and right sides of the presumed nose of the animal, serves the purpose of sensing temperatures on either side of the worm. Based on the sensed temperatures and the cultivation temperature, the neurons produce a motor output that leans either left or right. Through data representing differences in the calcium peak time responses of the neurons, we construct color maps to better understand the mechanism of thermotaxis at different temperature points. They indicate that the presence of two sensors, rather than just one, facilitates the worm’s decision-making process to move on one direction or the other.

## DETECTION OF OPTICAL ANAPOLES IN MID-INDEX SEMI-CONDUCTING NANOSPHERES

Presenter(s): Hardaway, Alexander, Undergraduate, Physics  
Sevik , Robert, Undergraduate, Physics  
West, Carter, Undergraduate, Physics  
Mentor: Dr. Uttam Manna  
Authorship: Alexander Hardaway, Robert Sevik, Carter West, Prachi Sarwara, Mahua Biswas,  
Uttam Manna

This study explores the concept of a "Kerker anapole" within the context of Mie scattering, a phenomenon that suggests that, under specific conditions known as Kerker conditions and with dipolar excitation, pure electric or magnetic scattering regimes can emerge, resulting in zero total scattering efficiency in the optical range. To investigate this, we illuminated spherical titanium dioxide (TiO<sub>2</sub>) particles (average size ~1.1 microns) with tightly focused Gaussian beams (TFGBs) to mimic dipolar fields' scattering properties. Our research involved measuring the scattering spectra of individual particles in both forward and backward directions. The obtained results revealed distinct dips corresponding to the 1st and 2nd Kerker conditions. Remarkably, the scattering minima observed in the backscattered spectra closely matched those in the forward scattering spectra under TFGB illumination. This alignment indicates the presence of a Kerker anapole—an optical state with potential implications for overcoming current limitations in optical devices related to inefficient coupling and light directionality. This study sheds light on a fascinating optical phenomenon and its potential applications in addressing challenges faced by existing optical devices.

## COMPUTATIONAL MODEL FOR STUDYING THE TOPOLOGICAL INFLUENCE ON NEURONAL SYNCHRONIZATION

Presenter(s): Herbert, Carter, Undergraduate, Physics  
De Oliveira, Jonas, Graduate, Physics

Mentor: Dr. Epaminondas Rosa Jr.

Co-Mentor: Dr. Rosangela Follmann

Authorship: Carter Herbert, Jonas De Oliveira, Rosangela Follmann, Celso Abud, Elbert Macau,  
Epaminondas Rosa

Epilepsy is the most common neurological disorder affecting about 50 million people worldwide, according to the World Health Organization. It arises from abnormal synchronous electrical activity in the brain caused by a range of conditions including congenital abnormalities, genetics, oxygen deprivation, and temperature dysregulation, usually accompanied by fainting. In addition, seventy percent of patients living with epilepsy could have a better quality of life and live seizure-free if properly diagnosed and treated. With that in mind, we create a complex neuronal network aiming at investigating specific areas of the cerebral cortex possibly implicated in modulation of the dynamics of synchronization associated with epilepsy. We employ the Kuramoto phase oscillator model to control the dynamics between the different cortical regions to investigate the onset of synchronization. We use the Hypertext-Induced Topic Search (HITS) algorithm originally developed to rank internet pages to identify the most influential nodes in the cortex network. The results obtained consider one scenario using the original network, and two other scenarios in which we consider a disturbance to simulate the action of an antiepileptic drug. The disturbance reduced the intensity of connections of a group containing random nodes and the group with nodes chosen by the HITS algorithm by 50%. We analyzed the synchronization curves for the three scenarios, noticing that the set of nodes derived from the HITS algorithms presented a major suppression of synchronization when compared to the original network and the random set. This preliminary result using a relatively simple mathematical model may enhance our understanding of topological influence on seizures and how to deter synchronous behavior in the brain. For future works, we aim to investigate the neural network using more sophisticated and realistic dynamics given by a Hodgkin-Huxley-type neuron and to approach how temperature effects can trigger epilepsy.

## **INVESTIGATION OF THE EFFECTIVENESS OF NON-TRADITIONAL ELECTRIC FIELD DIAGRAMS**

Presenter(s): Nevin, Miranda, Undergraduate, Teaching and Learning  
Jose Marquez, Undergraduate, Teaching and Learning

Mentor: Dr. Raymond Zich, Physics

Many students report difficulties interpreting electric field diagrams. This study investigated the effect of non-traditional electric field diagrams on student comprehension. Modified diagrams were created where the thickness of the electric field lines corresponds to the magnitude of the electric field. Other diagrams emphasized the direction of the electric field. Students enrolled in an introductory electricity and magnetism course were presented traditional and modified diagrams and asked to identify field strength and direction. Results when students are asked E-field magnitude questions on diagrams emphasizing magnitude and direction questions on diagrams emphasizing direction, showed higher correctness rates than with traditional electric field diagrams. A follow-up study with randomized presentation order of traditional and non-traditional electric field diagrams and swapped question content showed correctness rate did not depend on order of diagram type and improved correctness rate when direction questions were asked about magnitude diagrams and magnitude questions about direction diagrams.

## **NANOMATERIALS PATTERNING INVOLVING UNDERGRADUATES AT ILLINOIS STATE UNIVERSITY**

Presenter(s): Nichols, Lane, Undergraduate, Physics  
De Gante, Gabby, Undergraduate, Physics  
Mentor: Dr. Mahua Biswas  
Authorship: Lane Nichols, Carter Herbert, Gabby De Gante, Sudarshana Patra, Mahua Biswas,  
Uttam Manna

The fabrication of nanoscale structures and studying their science is the key point for the innovation of new emerging technologies in different fields. The use of nanomaterials for the fabrication of different optical, magnetic, chemical, biomedical, and microelectronics devices has received tremendous attention because of lower power consumption, faster response, and higher performances. Due to the small size and precision necessary to make these devices, making nanomaterials with a tunable structure, size, and composition is critical. In our experimental physics laboratory at Illinois State University, we use block copolymers (BCPs) as templates in a process called sequential infiltration synthesis (SIS) to fabricate nanostructures with different morphology by selectively infiltrating inorganic material inside a patterned polymer. BCPs are a special type of polymer with self-assembling properties to create nanopatterns of different characteristics which can be tuned by adjusting the properties of BCPs such as molecular weight and volume fraction. During our study, we have explored a variety of BCPs for the use of SIS, including poly(styrene-*b*-methacrylate) (PS-*b*-PMMA) and polystyrene-block-poly( $\alpha$ -caprolactone) (PS-*b*-PCL). In our lab, using these nanostructures of BCP as guiding patterns we fabricate nanopatterns of various inorganic materials such as aluminum oxide (Al<sub>2</sub>O<sub>3</sub>), silicon dioxide (SiO<sub>2</sub>), and aluminum nitrides (AlN). We characterize these nanopatterned structures using scanning electron microscope (SEM), Energy-dispersive X-ray spectroscopy (EDX), and Fourier Transform infrared spectroscopy (FTIR). In our presentation, we will discuss the fabrication process of nanomaterials using BCP and SIS and will show the structural and physical properties of the fabricated nanostructures.

## **NITRIDE NANOPATTERNING FOR OPTOELECTRONIC ADVANCEMENTS**

Presenter(s): Patra, Sudarshana, Graduate, Chemistry

Mentor: Dr. Mahua Biswas, Physics

Co-mentor: Dr. Uttam Manna, Physics

Authorship: Sudarshana Patra

Nanopatterning of inorganic materials is an emerging field with a wide range of applications such as optoelectronics, photonics, energy, and biomedical engineering. Group III nitride materials particularly Gallium Nitride (GaN) and Aluminum Nitride (AlN), are noteworthy due to their exceptionally wide bandgaps, enabling emissions across the ultraviolet (UV) and visible spectrum. Nitride-based planar structures are commonly used for blue LEDs and recently nanostructures have gained attention for growth on low-cost dissimilar substrates, better light extraction properties, and carrier confinement. Nitride material growth is challenging due to high-temperature requirements and lattice mismatch with conventional substrates. We used Sequential Infiltration Synthesis (SIS) to develop nanopatterns of AlN, allowing for scalable and well-ordered growth of patterned nanomaterials. We have used polystyrene-b-polymethylmethacrylate (PS-b-PMMA) self-assembled nanostructures as a guiding pattern. We analyzed the nitride patterns using Scanning electron microscopy and Fourier transform infrared spectroscopy. Nanopatterning nitride materials with SIS could lead to new, cost-effective substrate-independent nitride-based optoelectronic device applications.



## COLLOIDAL SYNTHESIS OF HIGH REFRACTIVE INDEX SILICON NANOPARTICLES

Presenter(s): Sarwara, Prachi, Graduate, Chemistry  
Mentor: Dr. Uttam Manna  
Co-Mentor: Dr. Biswas Mahua  
Authorship: Prachi Sarwara, Sudarshana Patra, Robert Sevik , Uttam Manna,<sup>†</sup>, Mahua Biswas<sup>\*</sup>

High refractive index dielectric nanoparticles (index of refraction,  $n > 3$ ) have proven to be a great advancement over plasmonic nanoparticles due to their less dissipative losses and ability to achieve large resonant enhancement of both electric and magnetic near-fields. Silicon, being a high refractive index material, shows stronger magnetic resonances and, therefore, offers the opportunity to enhance magnetic-light-matter interactions at the nanoscale. In our Nano-chemistry Lab at ISU, we have synthesized spherical Si nanoparticles with dimensions ranging from 100-200nm using a high-temperature fabrication method. The process starts with annealing in the furnace, which results in the conversion of SiO to Si embedded in SiO<sub>2</sub>. It is followed by a hydrofluoric acid etching process to separate the Si nanoparticles and then wash them with water. The final result is Si nanoparticles dispersed in water. The size and optical properties of the sample were determined by a combination of scanning electron microscopy and UV-VIS spectroscopy. Currently, we are working on preparing solutions of monodispersed particles using the sucrose density gradient method. The synthesized colloidal solutions of nanoparticles will be utilized for optical trapping and manipulation and the demonstration of electromagnetic duality in our laboratory.

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<sup>†</sup> umanna@ilstu.edu

<sup>\*</sup> mbiswas@ilstu.edu

## POLITICS AND GOVERNMENT

### **ASSESSING THE IMPACT OF WATER SALINITY ON WOMEN'S HEALTH IN COASTAL AREAS: AN ANALYSIS BASED ON THE RIGHT TO WATER AND SANITATION**

Presenter(s): Ahsan, Md Imran, Graduate, Politics and Government

Mentor: Prof. Dr. Noha Shawki

Authorship: Md Imran Ahsan, Suriya Akter

This paper critically examines the human rights situations of women in coastal areas of Bangladesh with a special focus on the harmful effects of water salinity on health. Coastal areas in Bangladesh are particularly susceptible to climate change-induced challenges, including salinization of water sources. Our analysis investigates the intersectionality of environmental degradation and human rights, emphasizing the disproportionate impact on women's health.

Based on the human rights framework, our study explores how saline water worsens existing inequalities, limiting women's access to clean drinking water, adequate sanitation facilities, and essential healthcare services. By centering human rights principles, we highlight the interconnectedness between environmental degradation and violations of women's rights to water and sanitation, emphasizing the right to health, and safe living conditions.

As Bangladesh struggles with escalating sea-level rise, with projections indicating a substantial increase by 2100, the prevalence of water salinity poses a grave threat to coastal communities' well-being and rights. About 73 percent of the population is deprived of drinking water in coastal areas (BEDS, 2020). About 20 million people have already faced the crisis of drinking water in the salinity areas of Bangladesh (World Bank, 2020). Our analysis underscores the urgent need for comprehensive interventions that address this issue's human rights dimensions.

While existing research has studied various health consequences of water salinity, our study fills a gap by focusing on the violations of human rights—the right to water and sanitation. Coastal women disproportionately bear the burden of water salinity and face heightened risks due to their reliance on contaminated water sources for daily activities.

By highlighting the right to water and sanitation principles, our analysis provides valuable insights for policymakers, advocates, and practitioners to develop inclusive and rights-based strategies aimed at mitigating the adverse effects of water salinity on women's health and well-being in coastal regions.

## **NAVIGATING CHANGE: THE EVOLVING PATTERNS OF CHILD, EARLY AND FORCED MARRIAGE NORMS**

Presenter(s): Barua, Proma, Graduate, Politics and Government

Mentor: Dr. Noha Shawki

Child, early and forced marriage (CEFM), which constitutes a form of gender- based violation, is an extremely serious issue. The United Nations Children's Fund reports that every year approximately 12 million girls worldwide enter marriage before reaching the age of 18. According to Girls Not Brides, an organization dedicated to ending child marriage, one in five girls globally get married before they turn 18. The World Bank has projected that there are currently more than 650 million women who were married during their childhood. Child marriage is still common in many countries, despite international agreements like the Convention on the Rights of the Child, The Universal Declaration of Human Rights, and Convention on the Elimination of All Forms of Discrimination Against Women. In this paper, I use a constructivist approach to explain how child marriage norms have evolved to define child marriage as a violation of human rights. I employ the framework put forward by Finnemore and Sikkink, which comprises three separate stages that define the lifespan of norms. The steps encompassed in this process are the norm emergence stage, the norm cascade stage, and the norm internalization stage. I address the following questions in this study: Is there ongoing change in child, early and forced marriage norms? Which stage of the norm cycle are they currently in? Data from the United Nations General Assembly, Girls Not Brides, the Human Rights Council, and other sources are used to explore these questions. I find that the norms pertaining to child, early and forced marriage are evolving and are currently in the second phase of the norm evolution process.

## **HUMAN RIGHTS AND DEMOCRATIZATION: THE ROLE OF THE UNIVERSAL PERIODIC REVIEW**

Presenter(s): Henrichsmeyer, Allison, Undergraduate, Politics and Government

Mentor: Dr. Noha Shawki

Authorship: Allison Henrichsmeyer

The Universal Periodic Review (UPR) is a mechanism under the umbrella of the United Nations (UN) Human Rights Council (HRC) that encourages compliance with international human rights law and provides accountability for individual states in that area. However, because the authority of the UN does not supersede state sovereignty, the UPR's authority, by extension, is not universal in practice. This study will provide a window into the UPR's effectiveness by examining its results and effects in Senegal. Before diving into the case study, it is important to understand the institutional and legal framework that forms the foundation for the UPR, which is what the first section will focus on. The literature review then provides an overview of previous works assessing the UPR's effectiveness and what factors play a role throughout the process. After establishing that background, the three cycles of the UPR in Senegal are discussed through the lens of several prevalent human rights issues in the country. Ultimately, the study concludes that despite ongoing challenges that limit the UPR's ability to ensure immediate, concrete change in national human rights compliance, it remains an effective tool of accountability within the international community and will only grow in its legitimacy and effectiveness in the future.

## **HOW POLITICAL INTEREST SHAPES BELIEFS ABOUT CORRUPTION**

Presenter(s): Johnson, Zachary, Undergraduate, Politics and Government

Mentor: Dr. Kerri Milita

Americans have widely different perceptions about corruption in government. In this study, I examine how an individual's political interest affects how severe they perceive government corruption to be. I propose that political interest has a non-linear relationship with beliefs about corruption. At the low end of political interest, individuals are unlikely to engage with news media coverage of corruption. On the other end, at high levels of political interest, individuals are unlikely to have any major change in perceptions of corruption based on media coverage. Those with moderate level interest may be most susceptible to media and campaign rhetoric related to corruption, and should be more likely to have cynical feelings about government.

## **GENERATIVE AI'S RISK OF COPYRIGHT INFRINGEMENT AND ITS POTENTIAL INTELLECTUAL PROPERTY RIGHTS**

Presenter(s): O'Dowd, Sara, Undergraduate, Politics and Government

Mentor: Prof. Calli Farrell

Co-Mentor: Prof. Thomas McClure

Authorship: Sara O'Dowd

Technology has always been a powerful force, in recent years, that force has grown in leaps and bounds. Now, generative AI can produce creative content, a task previously that required a human mind to do, going as far as to sometimes produce work in the styles of specific artists. This raises multiple worries, including if these program's ability to produce such content violates the intellectual property rights of artists, as well as who claims the intellectual property rights for AI generated works. This study explores generative AI's potential to infringe on copyright, generative AI's theoretical ability to claim intellectual property rights based on the philosophical framework the rights stem from, and the common law thus far established.

# **U.S. INVASION OF AFGHANISTAN: A CRITICAL ANALYSIS OF AMERICAN SOUTH ASIAN POLICY**

Presenter(s): Tasdan, Kerem, Undergraduate, Politics and Government

Mentor: Dr. Ali Riaz

Authorship: Kerem Tasdan

This study will offer a critical analysis of U.S. foreign policy in South Asia specifically centered around America's invasion of Afghanistan in 2001 and its aftereffects. The 2001 Invasion of Afghanistan was a pivotal moment not only in the geopolitical landscape of the nation of Afghanistan but also in shaping the outline of American foreign policy in the broader South Asia region. This study embarks on a critical examination of the multifaceted repercussions stemming from the U.S. intervention in Afghanistan, analyzing its profound impact on the destabilization of Afghanistan itself and its intricate ramifications on the broader South Asian geopolitical dynamics. Additionally, this study delves into how the invasion inadvertently contributed to the erosion of America's reliability and credibility as a beacon of democracy and stability in international relations. By analyzing the impacts of this pivotal invasion, this study reveals the interconnectedness between the aftermath of the invasion of Afghanistan and wider failed U.S. South Asia policy, arguing that both phenomena are ultimately tied to challenges that have strained America's diplomatic standing in the region. The results of this analysis suggest that the U.S. can form more consistent foreign policy in South Asia through genuine strengthening of multilateral relations, leveraging the beneficial aspects of international institutions, and fostering meaningful economic development goals tailored to the needs of the individual nations.

## PSYCHOLOGY

### FIRST-GENERATION COLLEGE STUDENTS' PERCEPTION OF LEARNING

Presenter(s): Alvarado, Giselle, Undergraduate, Psychology

Mentor: Dr. Dawn McBride

Authorship: Giselle Alvarado

The purpose of this research study is to investigate how first-generation college students perceive their learning compared to non-first-generation students. I plan to sample from the PSY 231 students in the Spring 2024 semester. Students will participate in a survey that will measure student's perceptions of learning based on three separate variables: confidence level, preparedness, and positive affectivity (how positively they view their learning). In this survey, students will be given multiple statements and be asked to rate how much they agree with these statements using a 5-point Likert scale. Later in the semester, I will look at participants' actual grade on a Unit Exam to compare their perception of learning with their actual performance in the PSY 231 course. I expect the first-generation students to have significantly lower ratings than students who are not first-generation students. These findings will hopefully confirm my hypothesis that first-generation students perceive their learning more negatively overall and are less confident and prepared. I also hypothesize that first-generation students and non-first-generation students will show significant differences in grades.



## **INVESTIGATING THE EFFECT OF TASK TYPE AND DELAY ON PROSPECTIVE MEMORY**

Presenter(s): Caruso, Dante, Graduate, Psychology  
Curescu, Clarissa, Undergraduate, Psychology  
Liew, Ryan, Graduate, Psychology

Mentor: Dr. Dawn McBride, Psychology

Authorship: Dante Caruso, Clarissa Curescu, Ryan Liew

Prospective memory (PM) describes our ability to remember the information necessary for completing a future task. PM tasks are generally divided into two categories: time-based PM tasks and event-based PM tasks. Time-based tasks are either scheduled for a particular time in the future or are to be performed after a certain time interval has passed, whereas event-based tasks are to be completed when an external event occurs. In the current experiment, participants were asked to send a text message to the researchers either at a particular time in the future (time-based) or in response to a text received from the researcher (event-based). Target response times were 1 day, 3 day, or 6 days after the initial session. Our results showed that as the delay increased, the participant's task completion rate declined for both the time-based and event-based conditions. We also found that participants in the event-based conditions completed their PM task at a significantly higher rate than participants in the time-based conditions. Research has shown that most people tend to plan future tasks almost exclusively as time-based tasks, but our results suggest that people may be more likely to complete their prospective memory tasks if they plan them as event-based tasks rather than time-based ones.

## **CAN VIDEO COMPARISON FACILITATE CHILDREN'S STEM LEARNING?**

Presenter(s): Cripe, Jada, Undergraduate, Psychology

Mentor: Dr. Alycia Hund

Co-Mentor: Alexis Colwell

Authorship: Jada Cripe, Alycia Hund

Embracing STEM (Science, Technology, Engineering and Mathematics) learning is paramount for young children as it fosters critical thinking, problem solving, and a curiosity-driven mindset. This not only equips them for future technological progress but also encourages a deeper understanding of the world around them. The purpose of this study was to assess the efficacy of a video-based comparison in instructing 54 6- and 7-year-old children about the role of a diagonal brace in providing stability within a structure—a fundamental engineering concept. Children were divided between three different conditions: Comparison, Single Model, and No Training. Children in the comparison group were presented with a video of two metal towers (one diagonally braced, one horizontally braced). The researcher in the video demonstrated the stability of both towers by pushing on them. Children placed in the Single Model condition viewed one video of the stable tower pushed by the researcher.

Following the video, participants of the Comparison and Single Model group were asked to describe what made the diagonally braced structure solid. Children in the No Training condition saw no video and were not asked to form an explanation. All groups participated in a relational reasoning task, a transfer task, and a mental transformation task following this.

Parents of participants were asked to fill out a questionnaire about their child's interest in STEM concepts and spatial language. It was hypothesized that children in the comparison group would apply more brace-based explanations than children in the Single Model group and the No Training group. The hypothesis was not supported by the data collected. It was further hypothesized that children in the comparison group would perform better on the Transfer Task than that of the Single Model group. This hypothesis was not supported. Lastly, it was hypothesized that all three tasks were going to be positively correlated between an interest in STEM and parent reported spatial language use. This was found to be partially supported by the data, and there was a positive correlation found between spatial language and brace-based explanations within the transfer task. Ultimately, the study aimed to highlight the importance of spatial language and STEM learning in a virtual format and provided a basis for further research to be conducted on this topic in the future.

## **EVALUATING THE EFFECTIVENESS OF MULTIPLE READING COMPREHENSION INTERVENTIONS USING MEASURES OF LEARNING SPEED: A BRIEF EXPERIMENTAL ANALYSIS**

Presenter(s): Daly, Evan, Graduate, Psychology

Mentor: Dr. Gary Cates

Authorship: Evan Daly, Andrea Smith, Danielle Gesell, Stephanie Guo, Kathleen Shields, Meredith Spraggon, Gary Cates

Brief experimental analyses were conducted to evaluate the effectiveness of multiple reading comprehension interventions. Specifically, changes in comprehension accuracy from pre to post test and measures of learning speed were obtained for two middle school students. The interventions included question preview and a combined condition with question preview, click or clunk, and repeated reading. Results indicate the combined condition resulted in a larger increase in comprehension accuracy and more instructional time when compared to the question preview condition. Discussion focuses on using measures of learning speeds to evaluate interventions, limitations, and directions for future research.

## ATTENDANCE AND ONLINE/IN-PERSON EXAMS

Presenter(s): Del Valle, Ivellisse, Graduate, Psychology

Mentor: Dr. Dan Ispas

Authorship: Ivellisse Del Valle, Taylor Flinn, Alexandra Ilie, Dan Ispas, Dan Lannin

### A. Purpose:

Class attendance is one of the strongest predictors of grades (Crede et al., 2010). Attendance offers opportunities for distributed practice which is linked with increased retention (Cepeda et al., 2006). However, most of the research on the relationship between attendance and grades was conducted in traditional classrooms with in-person exams with very few studies examining actual attendance policies (Crede et al., 2010). During the Covid-19 pandemic, universities have made the switch to online exams. While a lot of universities have returned to in-person teaching, online and hybrid options remain popular with students (Morrison, 2022) and are common offerings for universities. The purpose of this study is to examine the impact of an attendance policy on both online exams and in-person exams using a quasi-experimental design rarely used when examining the relationship between attendance and academic performance (Crede et al., 2010).

### B. Procedure:

The data was collected across two semesters in an introductory statistics class at a large Midwestern university. In the second semester, an attendance policy was implemented which required students to attend at least 20 lab sessions in order to achieve the maximum points for attendance in class. Data on exams was retrieved from the online course management platform at the end of the semester. The exams administered were identical across both semesters.

### C. Results:

Exams 1 and 2 were both online exams during both semesters. The SPSS Exam was in person during both semesters. There were no statistically significant differences between the two semesters on the two online exams: Exam 1 and 2. The SPSS Exam showed a statistically significant difference with Semester 2 students (the semester with attendance policy) scoring higher:  $t = -2.59$ ,  $p < .01$ ,  $d = -.39$ . The full results are presented in Table 1.

While not a focus of this analysis, we do note that within the attendance semester ( $n = 95$ ) we found a correlation of  $r(93) = .52$ ,  $p < .001$  between attendance scores and total points in the class.

### D. Conclusions:

It appears that attendance is linked with improved exam performance only for in person exams not for online exams. We recommend additional research in this area to inform policy on attendance since hybrid and online classes are likely to remain popular.

## **WORKPLACE DISCRIMINATION OF IMMIGRANTS AND ACCENT-BASED MICROAGGRESSIONS**

Presenter(s): Del Valle, Ivellisse, Graduate, Psychology

Mentor: Dr. Kimberly Schneider

Authorship: Ivellisse Del Valle

### **Purpose:**

This study examined experiences of immigrant workers in the U.S. and links between workplace discrimination, harassment, accent-based microaggressions, and health. The Center for Immigration Studies classified 14.2% of the 2021 U.S. population as immigrants (Camarota & Zeigler, 2022) so their workplace experiences are critical to examine. Using Conservation of Resources theory (Hobfoll et al., 2000) and previous empirical evidence of correlates of racial harassment and discrimination (Bergman et al., 2007; Schneider et al., 2000), we predicted that accent-based microaggressions, years in the U.S., and perceived fluency would predict workplace racial discrimination and harassment, and that these would predict health correlates. We also predicted that accent-based microaggressions would contribute to the prediction of harassment and discrimination beyond the impact of fluency and years in the U.S.

### **Methodology:**

A sample of 91 working adults who immigrated to the U.S. completed a voluntary online survey. Most participants were from either Latin America (30.8%) or Eastern Europe (29.7%) and had been in the U.S. an average of 12.83 years (SD = 10.40). The Health Satisfaction subscale of the Retirement Descriptive Index and the Health Conditions Index (Smith et al., 1969) were used to assess health correlates. Language fluency was assessed with the item, "How well do you feel you speak English?". The Racial Discrimination Scale (Bergman et al., 2007), the Ethnic Harassment Experiences scale (Schneider et al., 2000), and the Perceived Discrimination Based on Accent Scale (Wated & Sanchez, 2006) assessed discrimination, harassment, and microaggressions. Accent-based microaggressions include coworkers making jokes about one's accent or feeling pressured to eliminate one's accent.

### **Results:**

Significant correlations were found between discrimination, microaggressions, harassment, and health correlates (see Table 1). Using multiple regression, we found that accent-based microaggressions and years in the U.S. significantly predicted discrimination and harassment with accent-based microaggressions as the best predictor, explaining significant variance beyond fluency and years in the U.S. (see Table 2).

### **Implications:**

Accent-based microaggressions and years in the U.S. were related to ethnic harassment at work; perceptions of one's fluency did not significantly predict these experiences. Accent-based microaggressions were also related to health correlates, with a negative relationship with health satisfaction and a positive relationship with health symptoms. These results emphasize how discrimination negatively impacts immigrant workers' well-being, particularly for individuals who have been in the U.S. longer and are the targets of microaggressions at work related to their accents.

## **HOW WE THINK CHANGES WHAT WE REMEMBER: THE ROLE OF ENCODING STRATEGIES ON CREATING FALSE MEMORIES**

Presenter(s): Dow, Michael, Graduate, Psychology

Mentor: Dr. Dawn McBride

Authorship: Michael Dow

The current study was designed as a replication and extension of Coane et al.'s (2020) feature boost effect, using a list-learning paradigm to create simple false memories for words related to the studied lists. Coane et al. (2020) found that taxonomically-related lists increase false memories when compared to other lists without this taxonomic relation; they called this a "feature boost." In the current study, we examined the effect of encoding instruction (item-specific vs. relational encoding) on the feature boost effect. Huff and Bodner (2013) found that with non-taxonomic lists, item-specific encoding reduced source-monitoring errors and reduced false memories, and relational encoding increased source-monitoring errors and increased false memories. In the present experiment, three encoding conditions are being tested: instructions for simply reading the words (control) or instructions focusing encoding on item-specific or relational information about the words in the lists. All participants will view both taxonomic and non-taxonomic related lists and then be given an old-new long-term recognition test. The expected results are that relational encoding will increase the feature boost effect relative to the control condition and item-specific processing will decrease the effect relative to the control condition.

## **PERFECTIONISM AND SUBSTANCE USE AMONG COLLEGE STUDENTS: INVESTIGATING THE MEDIATING ROLE OF EMOTION DYSREGULATION**

Presenter(s): Duong, Michelle, Graduate, Psychology

Mentor: Dr. Laura Finan

Authorship: Michelle Duong, Laura Finan, Suejung Han

We investigate relations among perfectionism, emotion dysregulation, and substance use outcomes (alcohol and cannabis) among college students. Specifically, we examine if perfectionism dimensions (strivings and concerns) are related to substance use and if this relationship via emotion dysregulation. Findings will provide insight into the personality- emotional-behavior interrelations among college students' lives.

## COGNITIVE REFLECTION TESTS AND ACADEMIC PERFORMANCE

Presenter(s): Flinn, Taylor, Graduate, Psychology

Mentor: Dr. Dan Ispas

Authorship: Flinn, T., Ilie, A., Ispas, D., Schneider, K., Iliescu, D.

### A. Purpose

Dual processing theories (e.g., Exans & Stanovich, 2013) posit the existence of two types of processing when dealing with a situation: Type 1 (fast, intuitive) and Type 2 (effortful, reflective). Humans are more likely to use Type 1 processing (we are more likely to be cognitive misers). There are differences in these tendencies and cognitive reflection tests (CRTs, Frederick, 2005) have been developed to measure individual differences in miserly tendency (Toplak et al., 2014). However, not much is known about the relationship between CRTs and academic performance. The goals of the current study are to examine and compare the criterion-related validity of numerical and verbal CRTs, and to explore the incremental validity of CRTs over personality and cognitive ability.

### B. Procedure

We are in the process of conducting a cross-lagged study with undergraduate participants enrolled in two Statistics courses (approximately 210 students) at a Midwestern university. At Time 1 (Data Collection Completed - September 2023), participants filled out measures of CRTs, personality, cognitive ability, and demographics. At Time 2, in December 2023 we will retrieve their academic performance indicators from the course records. We used two CRTs: the Numerical CRT (Toplak et al. 2014) and the Verbal CRT (Sirota et al., 2021). Personality (Big Five) was measured with the 60-item BFI-2 (Soto & John, 2017). Cognitive Ability was measured by proxy using the students' ACT scores (Koenig et al., 2008). Academic Performance will be conceptualized as the students' Total Points in the class and their Final Exam Scores, both will be retrieved from course records in December 2023.

### C. Results

We will be examining the correlations between each CRT, personality traits, cognitive ability, and the indicators of academic performance. Additionally, we will examine the incremental validity of each CRTs over personality and ACT scores. We will also conduct a relative weights analysis. We will run these analyses in December 2023 as soon as the semester ends, and we will be having access to the students' final exam and total points in their courses. The study will be fully completed by January 2024.

### D. Conclusion

Our study will help clarify the role of CRTs as an individual difference and the relationship between verbal and numerical CRTs and academic performance.



## **SUPPORTING EDUCATOR WELLBEING AND RETENTION THROUGH COLLABORATIVE ACTION RESEARCH**

Presenter(s): Garcia, Andrea, Graduate, Psychology

Mentor: Dr. Adena Meyers

Educator attrition has increased in recent years, especially within school districts characterized by high needs. High stress levels, job dissatisfaction, organizational instability, difficulties in managing student behavior, and increased demands are among factors contributing to educator burnout and, in some cases, abandonment of the profession (Brasfield et al., 2019; Herman et al., 2017). The present study highlights the findings of a Participatory Action Research (PAR—see Chevalier & Bickles, 2019) project in which university and district administrators collaborated to inform program development aimed at supporting staff wellbeing. A survey containing items related to turnover intentions, burnout, interest in wellness programming at the individual, interpersonal, school, and district/community levels was distributed to assess staff's overall well-being, needs, and interest in wellness programs. Based on the responses provided by 254 participants, results indicated only a modest interest in district-sponsored wellness programming while the highest interest was related to school-level factors. Across the district, educators reported high turnover intentions and open-ended responses overwhelmingly indicated respondents believed wellness programming should be optional. Although these data are geared toward developing interventions to address school-level needs in supporting teacher wellness within a specific district, these data build upon prior research indicating that remedying educator attrition and uplifting wellness requires a multi- component strategy where educator voices are amplified and considered in the planning process.

## THE POSSIBLE EFFECT'S OF VIDEO-GAMES ON STRESS AND ANXIETY

Presenter(s): Goodman, Trevor, Graduate, Psychology

Mentor: Dr. Suejung Han

### Purpose:

Research has shown that video game playing can decrease stress. For example, Rupp and colleagues (2017) found that video games slightly decreased worry and distress after bouts of vigilance. Importantly, one study examined different dimensions of video game playing experiences such as enjoyment, immersion (i.e., losing track of time when playing), and self-efficacy (Langer & Sanchez, 2019). The results showed that people who played the games for enjoyment performed better, compared to their other group that was playing games for educational purposes. However, these aspects of game playing have not been examined in relation to stress reduction among college students. I hypothesize that (a) video game playing will decrease felt stress and that (b) such stress reduction will be associated with felt enjoyment, felt immersion, and perceived self-efficacy.

**Procedure:** Participants were 49 college students (9 men, 40 women, 0 non-binary, mean age = 18.6) enrolled in a Midwestern university and have been recruited through the Psychology Department SONA system for research participation credits.

After giving informed consent, participants took a pre-survey online using their device, were given multiple choices of games to play, played one of their choice for 15 to 20 minutes, and then completed the post-survey. Both surveys include a modified Perceived stress scale (Cohen et al., 1983), Positive and Negative Affect Schedule scale (Watson et al., 1988), and a modified Video Game Pursuit Scale (Langer & Sanchez, 2019).

**Results:** The paired samples T-tests showed that stress decreased significantly after playing video games with a medium effect size ( $t = 2.98$ ,  $p = .05$ ,  $\text{Cohen's } d = .435$ ) Negative emotions also significantly decreased after playing video games with a large effect size ( $t = 5.94$ ,  $p < .001$ ,  $\text{Cohen's } d = .866$ ). Linear regressions analyses with changes in stress, positive emotions, and negative emotions as dependent variables and gaming experiences as independent variables revealed no significant results, except that feeling immersed during the game predicted increase in positive emotions significantly ( $\beta = .694$ ,  $p < .001$ ).

### Implications:

The findings of this study do show that playing video games have a positive effect on people both in the decrease of stress as well as a decrease in negative emotions. As no gaming dimensions explained stress reduction, future research should examine why and how such stress reduction occurs after playing videogames.

## **RACIAL AND ETHNIC DEMOGRAPHIC REPRESENTATION IN CAREGIVER INVOLVEMENT RESEARCH**

Presenter(s): Guo, Stephanie, Graduate, Psychology

Mentor: Dr. Shengtian Wu

Students from minoritized backgrounds are underrepresented in psychological research. As research informs practice in psychology, underrepresentation in research can result in the usage of culturally inappropriate assessment, intervention, and consultation practices for minoritized student populations. The current study aims to analyze the representation of students in the United States (U.S.) with minoritized racial and ethnic backgrounds in peer-reviewed school psychology research on caregiver involvement published in the School Psychology and School Psychology Review journals from 2013 to 2020. The study uses coded racial and ethnic demographic data from 18 empirical studies with a total of 15,565 child participants and compares the data to national K-12 student demographic reference data published by the National Center for Education Statistics (NCES). Results indicate that Asian, Latiné, Native American, and Pacific Islander students were represented significantly less than in the reference data, Black and multiethnic students were represented significantly more than in the reference data, and white students were not significantly represented differently compared to the reference data. These results emphasize ongoing concerns related to underrepresentation in school psychology research and highlight the need for greater representation of individuals from several racial and ethnic backgrounds in research regarding caregiver involvement in school-based services.

## **PRELIMINARY EFFECTIVENESS OF THE BODY PROJECT FOR HIGH SCHOOL STUDENTS**

Presenter(s): Harrell, Ty, Undergraduate, Psychology  
Meyer, Derek, Graduate, Psychology  
Hoge, Maxine, Undergraduate, Psychology  
Walsh, Matt, Undergraduate, Psychology  
Loer, Jacob, Undergraduate, Psychology  
Mentor: Dr. Suejung Han  
Authorship: Ty Harrell, Derek Meyer, Maxine Hoge, Matthew Walsh, Jacob Loer, Suejung Han

This study examines the preliminary effectiveness of an adapted gender-inclusive version of the Body Project, an eating disorder prevention program, for high school students. The original Body Project (Stice et al., 2008) was developed for college-aged women mostly and for college men recently. We aimed to offer the program (a) for high school students given that body image concerns may peak during adolescence (e.g., Toselli et al., 2023) and (b) for all men, women, and transgender and non-gender conforming (TGNC) students given that TGNC students report an increased level of body image concerns (e.g., Richburg & Stewart, 2022). Extensive literature has shown its efficacy among college women and men in preventing the onset of eating disorders and decreasing negative mood, body dissatisfaction, and self-esteem contingency upon body weight and shape (Stice et al., 2008) as well as for high school girls (e.g., Stice et al., 2009). However, no studies have examined its gender-inclusive version for high school students. We hypothesized that the levels of disordered eating behaviors, self-esteem contingency on body shape and weight, and body satisfaction would decrease after program completion. Students' perceptions of helpful aspects of the program were also explored.

This study was advertised at a local high school that is affiliated with the university of the authors. The study was approved by the IRB and high school administration. The program's implementation (four weekly 1-hour sessions,  $n=6$ ) was sponsored by two teachers. With parental consent and student assent, a pre-survey was administered, followed by the first session. The first two program implementations were facilitated by trained undergraduate researchers (i.e., the first four authors) with another implementation planned to occur before the symposium. After the fourth session, a post-survey was distributed. Both surveys include the Eating Disorder Diagnostic Questionnaire (Fairburn & Beglin, 2008), Ideal-Body Stereotype Scale-Revised (Stice, Fisher, & Martinez, 2004), Satisfaction and Dissatisfaction with Body Parts Scale (Berscheid, Walster, & Bohrnstedt, 1973), and demographic questions. The post-survey also includes open-ended questions about what participants found beneficial.

Due to the nature of the data collection, the current sample size ( $n=6$ ) did not allow for pre- and post-program mean comparisons on the dependent variables, but descriptive data suggests a trend toward positive outcomes indicating the benefits of a gender-inclusive version. Students reported appreciation for group solidarity and open discussion. Future research could examine these as mediating mechanisms for changes.

## **EXPECTATIONS AND ANXIETY: EXPLORING THE EFFECTS OF EXPECTATIONS ON COGNITIVE AND SOMATIC ANXIETY EXPERIENCES**

Presenter(s): Jeronimus, Joy, Graduate, Psychology

Mentor: Dr. Kelly Clemens

Response expectancies are anticipations of one's own automatic reactions (Kirsch, 1985) and have been shown to influence subsequent anxiety experiences. The present study aims to better understand how response expectancies differentially influence the somatic and cognitive dimensions of anxiety. 201 participants from the general population were recruited using the Prolific participant recruitment system and were randomized to one of two expectation conditions: anxiety expectation or control. Participants ( $N=201$ ,  $M_{age} = 41.67$ ,  $SD=14.76$ ) indicated their expectations for somatic and cognitive anxiety before watching a brief anxiety-provoking video. Finally, participants completed measures of experienced somatic and cognitive anxiety. It is hypothesized that individuals in the anxiety expectation condition will experience higher levels of somatic, but not cognitive, anxiety than those in the control condition. Results of an independent sample t-test of cognitive anxiety experienced showed for the anxiety expectation ( $M= 1.82$ ,  $SD= .81$ ) and control group ( $M=1.82$ ,  $SD=.70$ ), significance  $t(199)= 2.365$ ,  $p=.010$ . Expectations were also a predictor of experienced anxiety  $F(1,99)= 55.825$ ,  $p<.001$ ,  $R^2=.219$ . Better understanding the influence of response expectancy on different dimensions of anxiety may help to inform when expectancy plays a role in anxiety experiences, which in turn may begin to provide guidance for how interventions might be personalized to best address individuals' symptoms.

## **DO PROBING DYNAMICS DIFFER WHEN PERCEIVING DIFFERENT PROPERTIES OF THE PROBE-SURFACE SYSTEM?**

Presenter(s): Kashyap, Arghya, Graduate, Psychology

Blankson, Kwesi, Undergraduate, Psychology

Mentor: Dr. Jeffrey Wagman

Co-Mentor: Dr. Alen Hajnal

Authorship: Arghya Kashyap, Kwesi Blankson, Alen Hajnal, Jeffrey Wagman

People use different exploratory movements to perceive different properties of a hand-held object and different exploratory wielding movements to perceive different properties of a wielded object. In two experiments, we investigated whether people use different exploratory probing movements to perceive different properties of a probe-surface system. In the first experiment, participants probed a surface and attempted to perceive either the length of the probe or the distance of the probed surface. Participants were able to differentiate these two properties, but there was no difference in the complexity of the exploratory probing movements (as quantified by effort-to-compress, ETC). In a second experiment, participants probed a surface and attempted to perceive either an affordance (whether they could stand on that surface) or a geometric property (angle of inclination) of that surface. Given that previous research has shown differences in the complexity of exploratory postural movements when visually perceiving these two properties of a surface, we expect to find differences in the complexity of the exploratory probing dynamics across conditions in this experiment. The results will be discussed in terms of the reciprocity of perceiving and acting and the fundamental difference between perceiving affordances and geometric properties.

## CONTEXT OF COLLEGE STUDENTS' ALCOHOL AND OTHER SUBSTANCE CO-USE: A QUALITATIVE ANALYSIS

Presenter(s): Kuhn, Rory, Undergraduate, Psychology  
Koerwitz, Anna, Undergraduate, Psychology  
Mentor: Dr. Laura Finan  
Authorship: Laura Finan, Anna Koerwitz, Rory Kuhn

### Purpose

The prevalence of alcohol, tobacco, and other drug use in college students ranges from 41.3-69.8% (El Ansari et al. 2021). Notably, co-use of alcohol and other drug use can lead to serious repercussions such as various health concerns and decreased effectiveness of treatments for abuse disorders (El Ansari et al. 2021). As such, it is critical to evaluate what contexts lead to alcohol and other substance co-use so that preventative measures can be established. Previous research has mainly focused on how environmental, social, and situational contexts individually contribute to the individual use of substances in young adults in college (e.g., Lipperman-Kreda et al., 2018). However, there is a dearth of examining the interactions of these individual context characteristics that contribute to the co-use of substances. Therefore, we used semi-structured qualitative interviews with college students to investigate interactions among various context characteristics that are associated with alcohol and other substance co-use.

### Procedure

College students (N=18; Mage=20.56, SD=2.01; 61% female) from a large Mid-Western University were invited to participate in a research study about their alcohol and other substance use. Interested participants completed an online screener questionnaire. Those who reported using alcohol and another substance at the same time (e.g., stimulants, cannabis, etc.) in the past two-weeks were contacted to participate in an interview. Semistructured interviews began with a pile sorting task designed to begin conversation. Next, participants were asked a series of open- ended questions (with probing for depth and clarification) about the social, location, situational, and affective elements of the contexts in which they used alcohol and another substance.

### Results

When describing the context characteristics of co-use contexts, participants reported nine main interactions between the individual contexts: location-situational, social-situational, social-affect, social-location, social-affect-location, social-location-situational, affectsituational, affectlocation, and affect-social-situational (see Table 1). The location-situational (N=31) and social- situational (N=35) context interactions were found to be the most prevalent among the participants.

### Conclusions

Research shows that co-use of alcohol and other substances is linked with adverse outcomes and the characteristics of the contexts where substance co-use occurs can impact use behavior. Findings from this study highlight the unique ways in which these context characteristics interact and contribute to the limited research in this area. Results may be important for prevention programming aimed at supporting college students' health and well-being and reducing engagement in health risk behaviors.

# **DIFFERENTIAL RELATIONS AMONG SUBTYPES OF CHILDHOOD MALTREATMENT, COMPONENTS OF EMOTION REGULATION, AND INTERNALIZING SYMPTOMS: A MEDIATION MODEL**

Presenter(s): Lamansky, Taelor, Graduate, Psychology

Mentor: Dr. Laura Finan

Authorship: Taelor Lamansky, Laura Finan

Childhood maltreatment, emotion regulation, and internalizing symptoms have all been independently associated with one another (e.g., Gruhn & Compas, 2020; Sharratt et al., 2023). Further, emotion regulation has been supported as a mediator between experiences of childhood maltreatment and internalizing symptoms (e.g., Espeleta et al., 2018; Jennissen et al., 2016). However, the majority of research in this area relies on composite measures rather than parsing out distinct components of each variable to assess differential relations among them. The present study attempts to fill in gaps and provide insight into seeming inconsistencies revealed by previous research related to the mediating role of emotion regulation components in the associations between childhood maltreatment subtypes and internalizing symptoms.

The present study assessed differential relations among five subtypes of childhood maltreatment (i.e., physical, sexual, and emotional abuse; physical and emotional neglect), six domains of emotion dysregulation (i.e., lack of awareness, understanding, and acceptance of emotions; difficulties refraining from impulsive behavior and engaging in goal directed behavior when confronted with emotion; and having limited access to emotion regulation strategies perceived to be effective), and internalizing symptoms (i.e., depression, anxiety, and stress), all measured via self-report questionnaires.

Among 653 participants, SEM path analysis indicated that emotional abuse, sexual abuse, and physical neglect were all positively associated with internalizing symptoms; emotional neglect was negatively associated with internalizing symptoms; and physical abuse was not significantly associated with internalizing symptoms. Mediation analysis indicated that all components of emotion dysregulation except for lack of awareness and impulse control difficulties partially mediated the relations between childhood maltreatment and internalizing symptoms. Further, maltreatment subtypes displayed complicated patterns of differential associations in terms of significance, magnitude, and valence with components of emotion dysregulation.

Among the first of its kind, this study carries salient implications for related fields of research and practice. Results not only support the existence of differential associations among childhood maltreatment subtypes, components of emotion regulation, and internalizing symptoms, but also suggest that their relations may be more complex than anticipated. Consequently, there are ample directions for future research and sizable implications for the development of increasingly individualized and targeted therapeutic interventions for affected populations.



## **MEDIA REPRESENTATION (AND LACK OF) AS SOCIAL INCLUSION AND EXCLUSION**

Presenter(s): Lim, Zhi Quan, Graduate, Psychology  
Hicks, Travis, Graduate, Psychology

Mentor: Dr. Eric Wesselmann

Co-Mentor: Dr. Jordan Arellanes

Authorship: Zhi Quan Lim, Travis Hicks, Eric Wesselmann, and Jordan Arellanes

Media research typically focuses on the effects of positive versus negative depictions of individuals from different identity groups. Little research compares how media portrayal (or lack thereof) compares to interpersonal social inclusion/exclusion. We hypothesize that media representation can be experienced similarly to interpersonal forms of social inclusion, and a lack of representation can be experienced similarly to ostracism.

Across three studies, participants listed an identity category important to their self-concept, then engaged in an adapted autobiographical recall paradigm. In Study 1, participants were assigned randomly to one of three groups. Two groups were asked to recall a time when their identity category was either represented or absent in the media. Group three served as the control condition, writing about an unrelated event. Study 2 replaced the representation condition with a condition requiring some participants to recall a time when they experienced interpersonal exclusion. Study 3 combined the conditions of studies 1 and 2, and participants were randomly assigned to either the representation, absence, exclusion, or control groups.

Participants in all studies completed measures of perceived social value, feelings of being excluded, and basic psychological need satisfaction.

In Study 1, participants in the represented condition reported higher perceived value when they saw their identity group represented compared to participants from other conditions; there was no difference between the absence condition and control. Participants in the absent condition felt more excluded and had lower basic need satisfaction than participants from the other two conditions. In Study 2, participants in the exclusion condition reported feeling more excluded and less basic need satisfaction than participants from the other two conditions. In Study 3, the exclusion condition participants felt the most excluded, followed by absence condition participants, control condition participants, and finally positive representation participants.

The results of these studies were mixed. Positive Representation participants recalled feeling higher value and reported greater basic need satisfaction than participants from other conditions. While there was no significant difference in perceived value between participants in the absence and control conditions, exclusion condition participants felt significantly less basic need satisfaction across all studies than other groups, including those in the absent condition. Collectively, these data suggest there are some overlaps between the media representation and social exclusion literature, though there may be unique effects to each experience that need further exploration.

## **THE ROLE OF GENDER DIVERSITY IN BODY DISSATISFACTION AND DISORDERED EATING AMONG COLLEGE- AGED STUDENTS**

Presenter(s): Meyer, Derek, Undergraduate, Psychology  
Harrell, Ty, Undergraduate, Psychology

Mentor: Dr. Suejung Han

Authorship: Derek Meyer, Ty Harrell, Suejung Han

Disordered eating is associated with mortality (Iwajomo et al., 2021), and psychosocial functioning (Bohn et al., 2008). Eating disorder research has mainly focused on cisgender women (Thapliyal et al., 2018). However, in college aged samples, gender diverse people exhibit disordered eating behaviors at significantly higher levels than cisgender counterparts (Diemer et al., 2015). The present study examines how the feelings of distress that transgender and gender non-conforming (TGNC) people face relate to their eating behaviors. Given feelings of gender dysphoria and gender minority stress, TGNC people would experience heightened discomfort with their eating and body across multiple domains.

However, such lived experiences have not been examined at the phenomenological level. It is crucial to understand how the lived experience of TGNC people, in relation to their gender identity, impacts how they feel about their bodies and their interactions with food.

Snowball sampling will be used to recruit college students (N = 10) who self-identify as transgender or non-binary. After agreeing to participate by completing an informed consent form via an online survey, they will be asked to complete the Eating Disorder Examination- Questionnaire 6.0 (Fairburn & Beglin, 2008) providing descriptive data about their disordered eating behaviors online. They will then be interviewed via Zoom by the first author. In the semi-structured interview, participants will be asked questions designed to ascertain how their gender identity relates to their body and how they interact with food (e.g., "In what ways do you think your eating relates to your gender expression?"). Probing questions will be employed to further expand on certain topics that participants bring up organically. The Consensual Qualitative Research method (Hill & Knox, 2021) will be used to identify themes and codes from the interviews. Another trained student researcher will be recruited for the analysis. Member checking will serve as the audit.

The results of this study fill a gap in eating disorder literature by describing how the lived experience of TGNC individuals connects to their eating behaviors. Understanding the domains through which body dissatisfaction and disordered eating behaviors are perpetuated among gender diverse people may assist clinicians in understanding their clients. This understanding may help clinicians provide better care to their clients.

## **THE INTERSECTIONAL EXPERIENCES OF RACISM AND ABLEISM FOR BLACK AUTISTIC INDIVIDUALS**

Presenter(s): Moore, Raven, Graduate, Psychology  
Jackson, Tyra, Graduate, Psychology  
Towner, Jazmine, Graduate, Psychology  
Bradley, Brittany, Graduate, Psychology

Mentor: Dr. Brea Banks

Authorship: Tyra Jackson, Raven Moore, Jazmine Towner, Brittany Bradley

Research centering the experiences of autistic people from an intersectional lens is limited. The focus of the current study surrounded the experiences of autistic individuals who are racialized as Black, as we were specifically interested in exploring how ableism and anti-Black racism influence individuals' access to socially just interventions and resources. Given our focus on ableism and anti-Black racism, our research was founded in critical theories that center the experiences of individuals holding these minoritized identities (i.e., Critical Race Theory and DisCrit). We recruited Black autistic adults and caregivers of Black autistic people and interviewed them about their experiences with diagnostics and access to resources. After transcribing the recorded interviews, we used thematic analysis to examine data. Results of the study will be discussed in the current presentation, as well as implications for practice and future research.

## SELF-PRESENTATIONAL CONCERNS AFTER A GETTING-ACQUAINTED INTERACTION

Presenter(s): Morn-Toro, Carlos, Undergraduate, Sociology

Hoveke, Lily, Undergraduate, Psychology

Herman, Nolan, Undergraduate, Sociology

O’Gara, Kaysee, Undergraduate, Sociology

Strain, Audrey, Undergraduate, Psychology

Adams, Haley, Undergraduate, Psychology

Beckman, Kaley, Undergraduate, Sociology

Haislip, Nicole, Undergraduate, Sociology

Kuhn, Rory, Undergraduate, Psychology

Laux, Sydney, Undergraduate, Sociology

Spranger, Kinlee, Undergraduate, Sociology

Youngman, Dela, Undergraduate, Sociology

Mentor: Dr. Susan Sprecher

Authorship: Carlos Morn-Toro, Lily Hoveke, Nolan Herman, Sara Galati, Kaysee O’Gara, Audrey Strain, Haley Adams, Kaley Beckman, Nicole Haislip, Rory Kuhn, Sydney Laux, Kinlee Spranger, Dela Youngman

There are benefits of interacting with strangers, including enhanced mood (Sandstrom & Dunn, 2014). However, people often avoid interacting with strangers in part because of worry about the impression they will make. Self-presentation theory (e.g., Schlenker & Leary, 1982) argues that people are motivated to make positive impressions on others but worry that they may not. Although self-presentational concerns (SPC) have been measured as a stable characteristic, little research has measured SPC directly after a first meeting between two strangers. Some people may be especially likely to ruminate about what others think of them. In addition, some aspects of an interaction may heighten SPC. For this poster, we analyzed data collected in a prior getting-acquainted interaction study conducted at Illinois State University (Sprecher, 2021). That study focused on predictors of affiliative outcomes experienced after the interaction. For this poster, we analyzed (previously unpublished) data on the participants’ SPC expressed after the interaction. We explored whether the mode of communication and type of getting-acquainted task affected SPC. We also examined whether SPC varied as a function of shyness and attachment style. 103 dyads (majority female-female) participated. After completing a pre-interaction survey, the dyads interacted either face-to-face or over Skype (randomly assigned). The type of self-disclosure task (also randomly assigned) was either a closeness-generating procedure (Aron et al., 1998), a small-talk task, or an unstructured discussion. After the interaction, each member completed another online survey. The pre-interaction survey included a 13-item Shyness Scale (Cheek, 1983) and Bartholomew and Horowitz’s (1991) ratings of attachment styles. The post-interaction survey included a 4-item measure of SPC (e.g., “I was concerned about the way I presented myself to others”). On a 1 (low) to 7 (high) response scale, the overall mean of SPC was 2.98 (SD =1.72). No significant difference was found in SPC as a function of mode of communication or self-disclosure task. However, SPC was positively associated with shyness ( $r=.42$ ,  $p<.001$ ), a fearful attachment style ( $r=.22$ ,  $p=.001$ ), and a preoccupied attachment style ( $r=.14$ ,  $p=.04$ ); and negatively correlated with a secure attachment style ( $r=-.18$ ,  $p=.008$ ). In conclusion, the good news is that the overall level of self-presentational concerns after an interaction was not

high. Nonetheless, some people (those who were shy and those who had insecure attachment styles) had higher self-presentational concerns. We encourage future research that can help develop interventions to decrease such concerns, which will likely lead people to seek more weak-tie interactions.

## IS HELP-SEEKING STIGMA EMBEDDED IN SOCIAL NETWORKS? AN EMPIRICAL SOCIOGRAM INVESTIGATION

Presenter(s): Nelson, Ryan, Undergraduate, Psychology  
Curry, Alex, Undergraduate, Psychology  
Igoe, Emily, Undergraduate, Psychology  
Mentor: Dr. Dan Lannin  
Authorship: Ryan Nelson, Alex Curry, Kenyae Campbell

Stigma associated with seeking psychological help is a barrier to therapy utilization (Corrigan, 2004; Lannin & Bible, 2022). It comprises negative labels and stereotypes about help-seeking at the societal level (public stigma), among close relationships (stigma of close others), and applied to the self (i.e., self-stigma; Link & Phelan, 2001; Vogel & Wade, 2022). Self-stigma is a most proximal predictor of help-seeking behaviors and is theorized to develop when others' stigmatizing beliefs are internalized and applied to oneself. Expanding on previous research, this study investigated associations between participants' perceptions of their close relationships and help-seeking stigma. Participants completed a sociogram wherein they diagrammed their social network (Kitayama et. al., 2009). On the sociogram, participants included symbols that reflected, a) their attitudes toward others in their network, b) perceptions of others' distress, c) whether others had disclosed a mental illness, d) whether others had sought professional help, e) whether others had referred the participant to seek help, and f) whether the participant had referred that other to seek help. Participants then completed items assessing psychological distress, perceived stigma of close others, self-stigma of seeking psychological help, and demographic information. As of October 2023, 93 participants have been sampled and approximately 200 participants should be sampled by April 2024. Partial correlations were examined among study variables, controlling for participants' psychological distress. Results (see Table 1) indicated that the perception that others stigmatized seeking psychological health was inversely related to the number of a person's close relationships that had sought psychological help ( $r = -.24$ ). People reported lower levels of self-stigma of seeking help when their social network had higher average levels of psychological distress ( $r = -.22$ ), more people who had disclosed having a mental illness ( $r = -.21$ ), more people who had sought psychological help ( $r = -.26$ ), and more people who had recommended the participant seek help ( $r = -.29$ ).

The present study's results highlight the social nature of mental health related stigma. Lower stigma levels were generally related to having social networks where psychological distress and help-seeking are more common and where people were willing to refer close others to seek help when needed. Greater openness and disclosure of mental health concerns within a person's social network may help normalize this behavior and buffer against concerns of stigmatization.

## EXPOSURE TO DIVERSITY

Presenter(s): Nettnin, Ryan, Undergraduate, Psychology

Mentor: Dr. Suejung Han

Open and empathetic attitudes toward different races and cultural groups are important for interpersonal functioning (e.g. making close bonds and friendships towards others) in increasingly diversified society. Therefore, it is critical to identify what promotes such attitudes to find ways to implement them. Among many, exposure to different perspectives and cultures growing up through parental socialization, formal education, and/or community involvement may be essential for promoting such attitudes, Ellison et al. (2011) suggested that exposure to more diverse groups can be important in having more positive views for outgroups. Paulker et al. (2017) also discovered that when the white students were exposed to a different culture their modern racism decreased, as well as their social dominance orientation. The purpose of this study is to identify how exposure to different cultures while growing up will affect cultural empathy. The hypothesis is that more exposure to diversity while growing up will be associated with higher level of cultural empathy. College students that attend Illinois State University will be recruited through the Psychology Department SONA system for research participation credits. An online survey of the study will include the Scale of Ethnocultural Empathy (SEE, Wang et al. 2003), the Universal-Diverse Orientation Scale (Miville et al., 1999), and 8 items on exposure to diversity developed for this study. To ensure content validity of the newly developed items, undergraduate researchers rated each item on construct validity and only the items rated highly (i.e., 5 or above on the 7-point Likert scale) were included. The Implicit Association Test (IAT, Greenwald et al. 1998), a computerized cognitive task will be also used as an indicator for implicit racial bias.

Participants will come to the Psychology research lab, sign the informed consent form, and complete the survey and the IAT. The order of the survey and the IAT will be counterbalanced. The IRB is under preparation and full results will be presented at the symposium.

## MESOSYSTEMIC INFLUENCES ON JUVENILE JUSTICE OUTCOMES

Presenter(s): Osman, Farhia, Graduate, Psychology

Mentor: Dr. Adena Meyers

Authorship: Erin Marchand, Kalysa Pampuch, Megan Mahoney, Blake Tennent

According to ecological theory research, the mesosystem is the interactions between the various microsystems of an individual (e.g., family, school; Newman and Newman, 2020). Applying ecological theory to the juvenile justice system, the interactions between the family, the school system, the court and probation system, etc. are all part of the youth offender's mesosystemic influences. Research and professionals involved within the juvenile justice system universally acknowledge that family and parental involvement is a protective factor for youth offenders (Burke, et al., 2014; Mallett, 2010; Schwalbe, 2012). Probation officers describe positive parental support as a partnership in care for the child, and emphasize uncooperative parents undermine youth participation and success in final outcome (Schwalbe, 2012). However, there is a lack of clarity upon how to quantify and measure family engagement (Schwalbe, 2012). This research operationalizes family engagement through the frequency of contact between the family and juvenile justice professionals. And it will utilize this definition to explore the relationship between family involvement and probation outcomes, and thus, mesosystemic influences upon the youth offender's final disposition.

Using archival data records of low-risk juvenile offenders from a rural Midwestern county, the researchers systematically coded records for analysis. A total sample of 505 subjects was used for analysis. Key variables of interest were used to compare contact between successful and unsuccessful completers of probation service. Additionally, binary logistic regression models were used to determine the likelihood of a successful outcome with higher contact frequency. Acknowledging youth with longer days of service would have more opportunities of contact, the researcher reported all contact data as a ratio divided by total days of service. It is hypothesized that higher frequency of contact will be significantly associated with successful disposition status, and family contact specifically.

A significant difference was for the unexpected direction of unsuccessful status. While some, logistic models provided context of likelihood of successful disposition while controlling for additional variables (e.g., total number of charges). Results from this study will add to the literature by providing an operationalization of family engagement within the juvenile justice system. It also highlights the communication between the probation system and family through the language of ecological theory, and the mesosystemic influences of the youth offender upon their probation outcome.



## **DEPRESSION AND ANXIETY IN CHILDREN WITH AUTISM: IMPLICATIONS OF THEORY OF MIND**

Presenter(s): Pampuch, Kalysa, Graduate, Psychology

Mentor: Dr. Karla Doepke

While there is abundant research on Theory of Mind (ToM) in children with autism spectrum disorder (ASD), much of this research does not discuss what this means for mental health implications. The current presentation aims to determine implications of ToM on anxiety and depression in children and adolescence. Mental health disorders, specifically anxiety and depression, have immense implications on a person's well-being, however limited research has been done surrounding mental health in children and adolescence with ASD. The current study aims to determine relationships and predictors of these mental health aspects using Theory of Mind (ToM), a widely studied concept in individuals with ASD. This study had 12 participants (10 male, 1 female), aged between 9-16 years old. Most of the participants were white (11 white, 1 Latiné). Each participant completed one task battery and two self-report rating scales. To determine the participants' ToM, the Theory of Mind Task Battery (Hutchins et al., 2014) was used. Anxiety was measured through the Revised Children's Manifest Anxiety Scale – Second Edition (RCMAS-2; Reynolds & Richmond, 2008). Lastly, depression was measured through the Children's Depression Inventory – 2<sup>nd</sup> edition (CDI-2; Kovacs, 2011). A significant relationship was found between all 3 variables. Additionally, higher ToM was predictive of higher anxiety and depression scores across all participants. This study adds to existing literature on ToM on individuals with ASD while also highlighting the implications higher ToM has on mental health. Often times, individuals are less likely to receive support for these mental health needs, and this study emphasizes the need to intervene earlier with mental health supports for children with ASD.

## **EMBRACING DIVERSITY IN SUPERVISION: NAVIGATING DIVERSE IDENTITIES AND EXPERIENCES**

Presenter(s): Shaull, Marissa, Graduate, Psychology

Mentor: Dr. Shengtian Wu

Authorship: Marissa L. Shaull, Shengtian Wu

Supervision is defined as a professional relationship in which a more experienced individual in a specific profession provides guidance, support, and oversight to a less experienced individual/s (Newman et al., 2018). Supervision serves as a mechanism for maintaining professional standards, ensuring ethical guidelines, and promoting best practices within a space that allows for collaboration, consultation, and ongoing learning (Newman et al., 2018). Students from marginalized identities, including but not limited to race, ethnicity, gender identity, sexual orientation, and disability, face disproportionate challenges within the supervisory process. When supervisors fail to recognize and address the experiences and needs of graduate students with diverse identities, it can harm their professional development (Soheilian et al., 2014). Supervisors play a critical role in creating a safe and inclusive space for trainees of all backgrounds, where their identities and experiences are valued and supported to allow for professional growth and well-being (Hagler 2020).

## **ASYNCHRONOUS FUNCTIONAL ANALYSIS TRAINING: A NEW APPROACH TO EDUCATING EDUCATORS**

Presenter(s): Shields, Kathleen, Graduate, Psychology  
Cremer, Hannah, Graduate, Psychology  
Norman, Kaley, Graduate, Psychology

Mentor: Dr. Shengtian Wu

Authorship: Kathleen Shields, Hannah Cremer, Kaley Norman, Shengtian Wu

Telehealth is an interactive service delivery method of providing a variety of mental health services and resources to areas by using video technology (Backhaus et al., 2012). Telehealth increases the opportunity for school psychologists to collaborate with school personnel from all over the country from a central location session (Bice-Urbach & Kratochwill, 2016). The use of platforms (e.g., Zoom) provides professionals with the option to record sessions for team members to review at a later time. Consultation via telehealth addresses many of the barriers faced by mental health providers and schools while also increasing overall mental health equity. Telehealth services that have been found beneficial when implemented within the educational field include trial-based functional analysis training (TBFA; McGarry et al., 2022), preference assessments (Machalicek et al., 2009), behavior intervention plans (Bice-Urbach & Kratochwill, 2016), and singular behavioral interventions (Hay-Hansson & Eldevik, 2013). Despite the established benefits of telehealth, its applications remain relatively novel in the field of school psychology and elements of the format have yet to be explored in the literature. Little, if not any, research has explored the process of training educators using a purely asynchronous telehealth format. The current study aimed to further examine the benefits of telehealth by training educators how to conduct TBFA in an asynchronous manner.

## **THE IMPACT OF INSTRUCTIONAL TIME ON READING COMPREHENSION IN JUNIOR HIGH SCHOOL STUDENTS**

Presenter(s): Smith, Andrea, Graduate, Psychology

Mentor: Dr. Gary L. Cates

Authorship: Andrea Smith, Evan Daly, Danielle Gesell, Gary Cates

Reading comprehension is a skill used to evaluate the extent to which a student understands the content and context of what they read. Two reading comprehension strategies include click and clunk, and repeated reading. While past research has indicated there isn't a best reading intervention strategy for students, there is a lack of research evaluating and comparing the time needed to implement reading interventions. The present study aimed to assess the effectiveness of different reading interventions among two junior high school-aged students, with a focus on determining the most time-efficient approach. This evaluation was conducted by using inferential and factual multiple-choice questions as indicators of intervention effectiveness. Intervention results were varied for both students. These findings suggest educators and schools should determine the most efficient strategies to teach students by using accuracy and instructional time. Future research is needed to explore the extent to which these results generalize to additional academic subjects.

## **MANUAL THERAPY FOR TRIGGER POINTS IN THE DELTOID**

Presenter(s): Torres González, Nitza, Graduate, Psychology  
Concepción Cabán, Lourdes, Graduate, Psychology

Mentor: Dr. Brea M. Banks

Authorship: Lourdes D. Concepción Cabán, Nitza M. Torres Gonzalez, Brea M. Banks

Youth with disabilities encounter unique obstacles in expressing and exploring their sexual identity. Although research suggests that youth with disabilities experience similar sexual development processes as their non-disabled peers (Bonder et al., 2021), how they are treated, educated, and viewed significantly varies from their counterparts (Baines et al., 2018). Ableist attitudes and beliefs can create barriers, perpetuating stereotypes that undermine disabled youth's sexual agency and self-perception (Gordon et al., 2004). Such experiences may lead to diminished physical and psychological health, confusion about one's sexual identity and sexuality status, and overall well-being (Shah, 2017). The proposed presentation will challenge barriers and promote a more inclusive understanding of sexuality for youth with disabilities so that all will have equal access to sexuality-related information and services (Bonder et al., 2021).

To achieve this goal, the proposed presentation will focus on the complex relation between sexuality and ability, as Presenter(s)s will address key issues and highlight the need for a more inclusive approach to understanding and supporting youth with disabilities. By examining the existing research, this session will provide a comprehensive understanding of the complexities surrounding the intersection of sexuality and ableism for adolescents. Presenter(s)s will explore the challenges faced by youth with disabilities in expressing and exploring their sexual identity, including societal barriers, ableist stereotypes and microaggressions, and misconceptions.

## **EVENT CENTRALITY AND POSTTRAUMATIC GROWTH: THE ROLE OF MEANING MAKING**

Presenter(s): Verdeyen, Haileigh, Graduate, Psychology

Mentor: Dr. Suejung Han

Authorship: Haileigh Verdeyen, Suejung Han

### **Problem**

Research shows that experiencing traumas can cause problematic life outcomes (e.g., McLaughlin & Lambert, 2018), particularly for when individuals consider the traumatic events as central to their identity (e.g., Keshet et al., 2018). However, research shows such event centrality could also promote post-traumatic psychological growth (PTG). It has not been clear when event centrality causes post-traumatic distress vs. PTG. I suggest that meaning making (i.e., searching for meaning in one's life after trauma and found meaning) could play a moderating role in PTG (Groleau et al., 2013).

The study hypotheses are: (a) Event centrality will be positively but weakly associated with PTG; (b) Meaning making moderate the association between event centrality and PTG such that when meaning making scores are high, the association between event centrality and PTG will become stronger.

### **Procedure**

College students at a Midwestern university will be recruited to an online survey of this study through the Psychology Department SONA system. Studies show that majority of college aged students have experienced at least one traumatic event (e.g., Read et al., 2011) and that 21% of those reported a traumatic experience during a two month period in college. The power analysis suggested a minimum of 55 participants needed for the power of .08. The measures include Life Event Checklist [LEC; (Gray et al., 2004)], Centrality of Events Scale [CES; (Berntsen & Rubin, 2006)], and the Posttraumatic Growth Inventory [PTGI; (Tedeschi and Calhoun, 1996)]. Meaning making will be measured using two items from a previous study.

(Spero, 2016), the deliberate rumination subscale of the Event Related Rumination Inventory (Cann et al., 2011), and a 14-item survey developed for this study.

To test the hypotheses, a moderated regression analysis will be conducted using SPSS PROCESS (Hayes, 2018), with event centrality as the independent variable, PTG as the dependent variable, and meaning making as the moderator. The IRB review is underway. Online survey data collection is planned to be completed by January 2024. Data analysis will be conducted in February 2024 for the full results to be ready to present at the conference in April 2024.

### **Expected Implications**

The results of this study have potential to improve therapy for those with traumatic experiences by focusing on the meaning making process. In addition, this study has the potential to allow for better understanding of how growth can be promoted.

## EMOTION-REGULATION BENEFITS OF MUSIC LISTENING VERSUS TALKING WITH OTHERS

Presenter(s): Walis, Emma, Undergraduate, Psychology  
Bopp, Mallory, Graduate, Psychology

Mentor: Dr. Jeffrey Kahn

Authorship: Jeffrey H. Kahn, Aubrey Thimesch, Emma Walis, Mallory Bopp

Among the possible coping strategies used to recover from an unpleasant event, talking with others has a profound impact on regulating distress (Garrison & Kahn, 2010). Disclosure enables emotional expression, empathy, and interpersonal support (Zaki & Williams, 2013). Among young adults, listening to music is as common a coping strategy as disclosure (Kahn et al., 2022), and listening to music regulates emotion through introspection and expression (van Goethem & Sloboda, 2011). This suggests parallel regulation benefits, but, to our knowledge, there have been no naturalistic, direct comparisons made between benefits of emotional disclosure and listening to music; this comparison was the aim of our study.

College students (N = 116) completed a 14-day diary study. Participants described the day's most unpleasant event, its intensity (Garrison & Kahn, 2010), the degree to which they listened to music and talked with others about the event, and the benefits gained from that coping strategy, including their emotional expression, emotional awareness, feeling that others shared the experience, and interpersonal support (Kahn et al., 2022).

Based on daily reports, analyses addressed whether participants were as likely to talk with others about unpleasant events as they were to listen to music. We also examined whether emotional disclosure led to similar benefits compared to listening to music. Analyses were based on an examination of means and correlation coefficients. Preliminary analyses determined nearly identical correlations between experiencing regulation and (a) talking to others and (b) listening to music.

We expected that, consistent with previous research, results of this study would support that listening to music as a way to process distressing emotions mirrors benefits associated with emotional disclosure practices (Kahn et al., 2022). Echoing theoretical frameworks of interpersonal emotion regulation (Zaki & Williams, 2013), listening to music after a distressing event may promote emotional well-being akin to social interactions, reflecting practices such as emotional expression, support, and coping (Swaminathan & Schellenberg, 2015). The poster will elaborate on these findings, examine the interplay of interpersonal emotion regulation, and offer suggestions for future research.

## SEXUAL HARASSMENT OF ADOLESCENT WORKERS: GENDER AND COPING DIFFERENCES

Presenter(s): Williams, Sarah, Undergraduate, Psychology

Kuhn, Rory, Undergraduate, Psychology

Mentor: Dr. Kimberly Schneider

Authorship: Sarah Williams, Rory Kuhn, Kimberly Schneider

**Purpose:** The U.S. Bureau of Labor Statistics reported in 2023 that 21.6 million youth ages 16-24 were employed (United States Bureau of Labor Statistics, 2023), primarily in service industries with prevalent sexualized behaviors (Blackstone, 2014). While extensive research has addressed adolescent work, there is less regarding their sexual harassment and coping. Although part-time work is theorized to be a context in which adolescents develop their self-concepts and work ethics (Hill, 1983; Arnett, 2000), less is known about how adolescents choose to cope with harassment they encounter. Our study focused on how adolescents' coping with harassment may be similar or different from adults' coping.

**Method:** Surveyed participants were 234 college students (97 males; 137 females; ages 18-19) who gave retrospective accounts as working adolescents (ages 15-18). Demographic variables, such as age, job title, and hours worked per week, were collected along with additional measures of harassment experiences and coping strategies. To assess harassment experiences, female participants were given the Sexual Experiences Questionnaire (SEQ; Fitzgerald et al., 1988), and male participants were given the Sexual Harassment of Men Scale (SHOM; Berdahl, Magley, & Waldo, 1996). Coping strategies were assessed with a shortened version of the Coping with Harassment Questionnaire (CHQ; Fitzgerald, 1990).

**Results:** Like adult samples, gender harassment was experienced most frequently by adolescent females (70%), followed by unwanted sexual attention (56%) and sexual coercion (14%). Adolescent males most frequently experienced gender harassment that included lewd comments (60.8%), gender harassment focused on enforcement of male stereotypes (37.1%), unwanted sexual attention (30.5%), and, least frequently, sexual coercion (5.2%). The most common coping strategy reported by adolescent female targets was behavioral disengagement (reported by 93.5% of the harassed respondents), followed by cognitive engagement and behavioral engagement (54.3% and 52.7%, respectively), whereas cognitive disengagement was fewer targets (47.3%). Cognitive engagement was the most common strategy adolescent males used to cope (50.5%), followed by cognitive disengagement (41.3%), behavioral disengagement (40.7%), and behavioral engagement was used least frequently (34.8%).

**Conclusions and Implications:** Findings from this study indicate that adolescent workers experience higher incidences of sexual harassment than reported by adult samples of academic and private sector workers. Correlations between harassment and coping strategies also emerged. These results may be beneficial to parents as they prepare their adolescent to work outside the home, high school counselors who may guide teens through stressful experiences, and to adolescents themselves as they negotiate the world of work.



## PARENT-CHILD INTERACTION AND DEVELOPING RESILIENCE IN YOUNG CHILDREN

Presenter(s): Yum, Seungok, Graduate, Psychology  
Brzezniak, Emilia, Undergraduate, Psychology  
Castor, Arely, Undergraduate, Psychology  
Charles, Mahika, Undergraduate, Psychology  
DeGould, Sarah, Undergraduate, Psychology  
Nelson, Ryan, Undergraduate, Psychology  
Perez, Kimberly, Undergraduate, Psychology  
Sullivan, Tyler, Undergraduate, Psychology  
Thompson, Raegen, Undergraduate, Psychology  
Weber, Caitlyn, Undergraduate, Psychology  
Wissler, Abby, Undergraduate, Psychology

Mentor: Dr. Alycia M. Hund

Authorship: Seungok Yum, Emilia Brzezniak, Arely Castor, Mahika Charles, Sarah DeGould, Ryan Nelson, Kimberly Perez, Tyler Sullivan, Raegen Thompson, Caitlyn Weber, Abby Wissler, Alycia M. Hund,

Early childhood is an important period to develop resilience due to social, academic, and emotional benefits for later development. Previous studies pointed out that parental warmth and support can enhance resilience in children by increasing children's self-esteem and self-regulation (Harter, 1998; Moghaddam et al., 2017). In contrast, hostile and coercive parent-child interactions can disturb developing resilience by increasing children's internalizing symptoms and behavioral difficulties (Bor & Sanders, 2004; Stevenson & Crnic, 2013). Although previous studies examined resilience in children, most of the research relies on parent-reported measures of resilience (King et al., 2021). The purpose of this study was to investigate how parental warmth and support, or hostile and coercive behaviors relate to resilience in preschool children during a challenging puzzle task. To date, 37 children aged 4 to 5 years and their parents have participated. Parents were asked to complete the Parent Behavior Inventory (PBI) to measure parent-child interaction styles (support/engagement and hostility/coercion) and the Strengths and Difficulties Questionnaire (SDQ) to measure their perceptions of resilience about their children. Children participated in a challenging puzzle task that consisted of five puzzle sets (a possible puzzle, 3 impossible puzzles, and a possible puzzle), which were adapted from two previous studies (Cole et al., 2007; King et al., 2021).

After each puzzle, children were asked to rate their resilience by answering three items (positive self-evaluation, hopefulness, and motivation) using a 5-point Likert scale with stars or faces. We predict that children's self-rated resilience will positively correlate to warm/supportive parent-child interactions but negatively to hostile/coercive parent-child interactions. We also expect that parents' perceived resilience about their children will positively correlate to warm/supportive parent-child interaction but negatively to hostile/coercive parent-child interactions. This study may provide details for families, practitioners, and researchers to help support young children's resilience.

## SOCIAL WORK

### **CAREGIVERS OF CHILDREN WITH PHYSICAL AND MENTAL HEALTH CONCERNS: WHAT ARE THEIR NEEDS AND OBSTACLES TO CARE**

Presenter(s): Barnes, Desiree, Graduate, Social Work

Mentor: Dr. Christopher Gjesfjeld

Parents who care for a child with a physical or mental health condition appear to be impacted by greater health and mental health concerns themselves. These parents may require specific services yet may present with specific challenges accessing to these resources. These supports, which may include health or mental health services, assist these parents in caring for their children. This study sought to identify obstacles that caregivers are experiencing, if any, in obtaining resources for their mental and physical health conditions. In addition, we wanted to understand how they rate their own ability to provide care to children with mental or physical health conditions. We created a 11-question survey that was provided to parents/caregivers of students within District 87. This data will provide insight into the needs of our parents and possible services that may be lacking within the community. Understanding how parents view their ability to meet the needs of their children may assist future efforts to link these caregivers/parents to necessary support to improve their caregiving.

## **MCLEAN COUNTY DRUG COURT TARGET POPULATION**

Presenter(s): Birditt, Bailey, Graduate, Social Work

Mentor: Dr. Kate Sheridan

The National Association of Drug Court Professionals, recently renamed "All Rise" provides evidence-based best practice standards for drug court programs operate. The guidelines are the blueprint for desired outcomes for individuals involved in the criminal justice system as a result of substance use and mental health disorders. Drug courts are most effective for individuals with higher risks of reoffending and high needs in terms of substance use and addictions treatment. This proposed study aims to determine whether or not McLean County Drug Court is reaching the defined target population: high-risk / high-need. Eligibility criteria along with demographic information will be reviewed to assess any disparities in referrals, admissions, and graduation rates utilizing the Equity and Inclusion Assessment Tool (EIAT).

The purpose of this study is to explore whether McLean County Drug Court has equivalent access and retention for all who qualify for the program.

## **FACTORS LEADING TO STAFF LONGEVITY IN TWO RURAL ELEMENTARY SCHOOLS**

Presenter(s): Casselman, Carly, Graduate, Social Work

Mentor: Dr. Chris Gjesfjeld

The study I am conducting aims to look at a few different areas and objectives. I wish to better understand what leads to overall staff longevity within Olympia North and Olympia West Elementary Schools, as well as what factors lead to this longevity. I chose to study this area because I felt that there was a plethora of prior research done on staff turnover and teacher turnover in schools, as well as how that affects students' learning and achievement. I wanted to look more into what leads teachers to stay, and how that differs from prior institutions they had worked at. I want to look into more specific characteristics of what a school or administration has that is a desirable trait for staff members working there. I feel that this type of research can help support schools with high turnover in ways they can improve some specific characteristics.

I am going to gather this data by designing a survey that will gather some baseline information, such as age, race, and number of years in a given district. I will next provide various multiple choice options which will gather reasons why a staff member left their previous district or position. This will help compare one institution to another and pick out some specific characteristics. This will be conducted in the form of a Google Survey, and emailed out to all staff members at the two schools that I am placed at. The survey will be available to complete for around two weeks to accommodate for the busy schedules of the school staff, and hopefully increase the likelihood of the majority of the staff completing it.

I anticipate this study will provide me some more insight into some desirable characteristics of certain schools, along with the values that the staff hold when considering a school. I anticipate that overall staff support and administrative support will be one of the higher-picked options, and that it is one of the leading factors of staff longevity. I also anticipate that overall school location will be another large factor.

## **FIRST STAR ACADEMY-RESEARCH**

Presenter(s): Crowder, Diamond, Graduate, Social Work

Mentor: Dr. Kate Sheridan

First Star Academy is a program on ISU campus offered to youth in care currently in high school in Illinois. First Star helps foster youth in preparing for college including Saturday Academies throughout the year focusing on skills needed to apply and be successful as a college student. The program enrolls approximately 12 high school students annually. First Star Scholars also attend a 2-week summer immersion program on ISU campus. The purpose of this proposed study is to examine the topics of interest for upcoming programming from the perspective of First Star Scholars. There is no interaction with human subjects in this proposed study because the focus groups were already conducted earlier this year. Focus group participants included nine high school-aged students, 14-18 years of age.

Research will be conducted by listening to and transcribing the focus group recording, and identifying themes that the Academy can use to adjust the upcoming Summer Immersion Program.

## **THE EFFECTIVENESS OF CALMING STRATEGIES IN THE GENERAL EDUCATION CLASSROOM**

Presenter(s): Dillman, Alexandra, Graduate, Social Work

Mentor: Dr. Kate Sheridan

The purpose of this proposed study is to examine the effectiveness of tier 1 SEL calming strategies in the general education classroom at Washington District 50 in Washington, Illinois.

Participants include both K-8 grade students and adults aged 18 of age or older.

Participants will be invited to complete a survey. A second source of data is the Illinois Renewal SEL study that was completed at the end of last school year by teachers and students in grades K-8.

## THE IMPACT OF BRIEF EXERCISE ON EMOTION REGULATION

Presenter(s): Fields, Allie, Graduate, Social Work

Mentor: Dr. Christopher Gjesfjeld

For many individuals with mental health diagnoses, medication alone is insufficient to manage their symptoms. Finding the right combination of mental and physical health treatment to balance wellness can be difficult, and once found, can be a struggle to maintain long-term.

Marsha Linehan had that knowledge in mind when she developed dialectical behavior therapy (DBT). Originally developed for chronically suicidal individuals, DBT has since been found to be evidence-based for multiple mental health and addiction disorders. DBT consists of several skills—mindfulness, interpersonal effectiveness, emotion regulation, and distress tolerance— designed to help individuals live lives worth living. One of the emotion regulation skills is the

PLEASE skill-- Treat Physical L illness, balance Eating, avoid mood-Altering substances, balance Sleep, and get Exercise. Brief exercise has been shown to reduce emotional vulnerability, especially when individuals can pick the type and length of exercise. This study aims to examine the impact brief aerobic exercise has on emotion regulation.

Adult participants will be recruited from the outpatient behavioral health department at Carle BroMenn Outpatient Center. Participants must engage either in dialectical behavior therapy group skills training or individual DBT therapy. A pre-test, post-test method will be used with questions from the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004).

Participants will complete the questionnaire and receive education on the PLEASE skill. They will then be encouraged to engage in aerobic exercise twenty minutes a day, three to four days per week over the course of two weeks. The pre-and post-test results will be compared to assess their exercise habits and emotion regulation strategies.

Results are forthcoming; however, it is anticipated that individuals who frequently engage in brief aerobic exercise over two weeks will report lower levels of emotional vulnerability and improved emotion regulation than those who do not engage in brief aerobic exercise. Prior research has shown the numerous benefits of exercise, but not specifically looked at the benefits of brief aerobic exercise on emotion regulation. Improved emotion regulation skills can positively affect one's sense of well-being and give them the mastery needed to maintain healthy lives worth living.

## **READMISSION RATES FOR PATIENTS ON ONE FLOOR OF A HOSPITAL**

Presenter(s): Gulik, Stephanie, Graduate, Social Work

Mentor: Dr. Kate Sheridan

This research explores the readmission rate for patients on one floor of a hospital. I'm looking to find a pattern within the patients who often are readmitted and if there is any additional support as well as information we could provide to these patients in order to reduce readmission.

The instrument I have created will be sent to 16 people in various roles on the hospital floor.

The information collected from the staff will be used to gain better insight of the treatment we provide to patients after they are discharged. This information will help me better understand the factors that go into a patient's readmission.



## **EXECUTIVE FUNCTIONING IN HIGH SCHOOL FRESHMAN**

Presenter(s): Hacaga, Theadora, Graduate, Social Work

Mentor: Dr. Kate Sheridan

Spartan Stretch which a study hall where a variety of social emotional interventions are implemented with students in grades 9-12. Some of the scheduled Spartan Stretch times are set aside as a study hall to complete assignments. The Spartan stretch period is 30 minutes on Monday, Tuesday, Wednesday and Friday. Interventions include, for example, online work, worksheets, and other activities aimed at helping students manage their academics and learn social emotional skills.

This proposed study aims to assess executive functioning skills among Freshman at Sycamore High School of being able to organize their academic requirements, organize personal commitments and time management such as use of a planner, organizing and composing note taking skills, checking and sending emails, and managing assignment due dates and creating a plan to recognize and correct missing assignments.

All Spartan Stretch Freshman students will be invited to complete a global checklist. A defined group of students that are enrolled in Spartan Stretch will be invited to complete a pre-post test.

## **EXPLORING TRUANCY: THROUGH THE LENS OF A PARENT LIAISON**

Presenter(s): Jefferson, Valeria, Graduate, Social Work

Mentor: Dr. Chris Gjesfjeld

Truancy, unexcused absence from school, is a longstanding and widespread issue throughout the world. When students are absent from school their academic performance/progression, social functioning, mental health, prosocial behaviors, and overall livelihood, is impacted. The reasons for truancy are broad and diverse in nature and go beyond choice at times. Those reasons include environmental, psychological, and social factors. Research has identified reasons for truancy and how it adversely affects students, however, research on developing and testing interventions and strategies connected to the causes of truancy is unsatisfactory. This case study's purpose is to obtain more in-depth understanding of patterns and experiences of truancy in middle school children (ages 11-14yrs) through the lens of a parent liaison.

To further investigate the issue of truancy, a 6-item interview will be conducted with a parent liaison from a Junior High school located in central Illinois. Responses will be recorded and transcribed through Otter transcription software. Additionally, quantitative data will be collected using chronic absenteeism data from fall 2019- fall 2023 from the school district. Results from this study have not yet been collected, however, I anticipate results will cover 3 main concepts: student experience, interventions, and effectiveness of interventions.

In the interim, responses from this study will contribute to the ongoing discussion of developing more sophisticated interventions that will reverse the rise of truancy rates and address the barriers to attending school for students and families. In other words, interventions will be connected to the causes of truancy and thus, produce an increase in school attendance. The limitations of the study include the years in which data was collected. For example, The COVID-19 pandemic could serve as a confounding variable. Additionally, relying on one subject for a broad topic that is complex in nature and therefore, may not be representative of the entire truant population.

## **RACIAL IDENTITY, SPECIAL EDUCATION ELIGIBILITY, AND BEHAVIORAL REFERRALS IN SPECIAL EDUCATION**

Presenter(s): Pecoraro, Joie, Graduate, Social Work

Mentor: Dr. Chris Gjeffeld

Special education teachers should consider a multitude of factors when referring students for special education evaluation. The evaluation process- and potential eligibility- can become convoluted with personal bias, thus not prioritizing the child's needs. Minority students are particularly susceptible to such bias, especially in predominantly White areas. To avoid promoting a special education culture which disproportionately impacts minority students, the present research seeks to identify existing correlations between students' special education eligibility, racial identity, and their received behavioral infractions. The researchers wish to understand whether or not racial identity is related to students' eligibility categories, or how they're treated behaviorally within the school. The present study will also collect qualitative data to ask questions regarding special education teachers' perceptions of their own practice, and what factors they consider when making special education referrals.

## **DO EDUCATORS PERCEIVE POSITIVE CHANGE IN STUDENT SOCIAL, ACADEMIC, AND EMOTIONAL BEHAVIOR WITH EVIDENCE-BASED SEL LESSON IMPLEMENTATION?**

Presenter(s): Rutledge, Hailey, Graduate, Social Work

Mentor: Dr. Christopher Gjesfjeld

In recent years, there has been a growing recognition of the crucial role that Social Emotional Learning (SEL) holds in education. This growing recognition is being driven by evidence of its benefits for students' academic achievement and their overall well-being. Social Emotional Learning includes a wide range of skills and competencies that are important for students to have the ability to navigate through life. The skills associated with SEL includes self-awareness, self-management, responsible decision-making, social awareness, and relationship skills. More research is showing that students participating in SEL programs exhibit improved academic performance, enhanced social-emotional skills, and reduced behavioral issues.

This research aims to explore the significance of implementing evidence based SEL programs in educational settings, focusing on the perspectives of teachers as key stakeholders. It explores the findings of various research studies, including a comprehensive survey conducted among teachers, administrators, and parents, which underscored the short-term and long-term benefits of SEL, such as improved mental health and positive relationships.

Central to the exploration of this research, is the evaluation of the effectiveness of a universal SEL program, Kindness in the Classroom (KiC), implemented in a rural elementary school district. This program, developed by Random Acts of Kindness, emphasizes kindness as a core value and provides structured lessons aimed at fostering prosocial behaviors and enhancing SEL skills among students. Initial findings from an unpublished study located within their website revealed promising outcomes, including higher ratings of prosocial behaviors and improved SEL skills among students.

My research is aimed at further examining the impact of SEL programs on student behavior, particularly focusing on changes observed from pre- to post-implementation of the KiC curriculum. A Google Form survey will be utilized to gather feedback from teachers regarding their perceptions of student behavior following the introduction of SEL lessons. This data will provide valuable insights for stakeholders, enabling informed decision-making regarding the continuation and refinement of SEL programming in the school district. This data will be collected with Google forms twice over the school year to observe any changes.

By investigating educators' perspectives on SEL implementation and its effects on student behavior, this research aims to contribute to the ongoing discussions on effective strategies for promoting social-emotional development in educational settings.

## **PARENTS' PERCEPTION OF SOCIAL EMOTIONAL LEARNING NEEDS AT BOYS AND GIRLS CLUB BLOOMINGTON-NORMAL**

Presenter(s): Sellmyer, Hannah, Graduate, Social Work

Mentor: Dr. Kate Sheridan

The purpose of this proposed study is to determine the social-emotional education needs of Club Members at the Boys and Girls Club of Bloomington-Normal as perceived by their parents or guardians. Participants will include adults over the age of 18. Participants will be invited to complete a survey regarding the perceived needs of their child. The information will be used to inform social-emotional programming topics.

## **EXAMINING TEACHER'S PERCEPTION OF SOCIAL PROBLEM-SOLVING SKILLS IN PRE-KINDERGARTEN CHILDREN**

Presenter(s): Stewart, Deanna, Graduate, Social Work

Mentor: Prof. Christopher Gjesfjeld

Authorship: Deanna Stewart, Christopher Gjesfjeld

The development of social problem-solving skills is a critical aspect of a child's early developmental journey. Over time, children learn to identify a problem, generate potential strategies to resolve the problem, decide upon which strategy to use, and put into practice the solutions to problems (Nakamichi et al., 2019; Romano et al., 2019). School Social Workers are often tasked with helping children develop social problem-solving skills. However, in early learning (3-5 years old), many social workers depend on the data provided by the classroom teacher to determine the child's competence with this developmental skill.

This project is a qualitative approach to analyzing how teachers perceive social problem-solving skills in pre-kindergarten children. It is hypothesized that their perception of this skill impacts how they collect and report data which is reflected in the Unit 5 School District's observational assessment system.

I will administer a voluntary survey for each pre-kindergarten teacher of a blended and special education classroom. Gaining a better understanding of the teacher's perception of social problem-solving skills could provide more insight on Brigham Early Learning's consecutive low scoring in this domain of social- emotional development. Further, implications for findings include possible curriculum changes or staff trainings in the future for Brigham Early Learning Center.

## **UNIVERSAL SOCIAL EMOTIONAL SCREENER AT BOYS AND GIRLS CLUB OF BLOOMINGTON- NORMAL**

Presenter(s): Strader, Abbi, Graduate, Social Work

Mentor: Dr. Kate Sheridan

Boys & Girls Club of Bloomington-Normal is an out of school setting that provides a trauma informed space for youth ages five to seventeen. BGCBN operates after school programming for about two to four hours. The purpose of the study is to summarizing and analyzing the existing data of universal screener Strengths and Difficulties questionnaire collected by Boys and Girls Club of Bloomington-Normal in October 2023. This data from the SDQ will be used to develop programs for members of the Boys & Girls Club. Scores in the clinically significant range will be used to identify members for specific interventions. Participants are aged seventeen and younger.

## **PERSPECTIVES OF THE SCHOOL SOCIAL WORKER**

Presenter(s): Torrissi, Cassie, Graduate, Social Work

Mentor: Dr. Kate Sheridan

The primary objective of this study is to investigate the various perspectives concerning the role and functions of a school social worker at Miller Elementary School in Westmont IL.

Participants include school staff aged 18 of age and older. Participants will be invited to complete a survey electronically.

This study is not human subjects research because there is no intent to develop or contribute to generalizable knowledge or disseminate findings publicly.



## **SOCIAL EMOTIONAL HEALTH IN ADOLESCENTS**

Presenter(s): White, Ashley, Graduate, Social Work

Mentor: Dr. Kate Sheridan

The aim of this study is to help adolescents at Dwight Public Schools manage their internalizing behaviors by enhancing the social services provided.

## **OVERALL SUCCESS RATE OF LIFE SKILLS AND PROFESSIONAL DEVELOPMENT FOR STUDENT-ATHLETES AT ISU**

Presenter(s): White, Destiny, Graduate, Social Work

Mentor: Dr. Kate Sheridan

The Karin L. Bone Athletic Study Center is a space strictly for student-athletes to help with success in college.

The purpose of this study is to examine the overall success rate of life skills and professional development for student-athletes. Participants include adults ages 18-24 years old.

Participants will be college age student-athletes, ages 18-24 years-old, asked 30 questions via questionnaire about life skills and professional development through the lens of athletics.

## **CROSS-CULTURAL EFFECTIVENESS OF THE EDINBURGH POSTNATAL DEPRESSION SCALE (EPDS)**

Presenter(s): Yeboah, Yaa Adubia, Graduate, Social Work

Mentor: Dr. Christopher Gjesfjeld

Perinatal depression is a prevalent disease that affects many women during pregnancy and after delivery. If not addressed, it can negatively affect their newborn baby and immediate family members. Research indicates that the Edinburgh Postnatal Depression Scale (EPDS), which is well-known for its multilingual translation, is a screening tool used globally to alleviate the negative implications of prenatal depression.

This study assessed the cross-cultural effectiveness of the Edinburgh Postnatal Depression Scale (EPDS) using a grounded theory of explorative qualitative approach. The researcher conducted in-person one-on-one interviews with the Family Case Managers (FCM) of Mclean County Health Department, who answered six major open-ended questions, and the aim was to explore the variables/content of the questionnaire and whether the variables/content of the screening assessment form (EPDS) include cultural/ethnic groups.

Data will be forthcoming in April 2024. The findings will help stakeholders understand the validity and reliability of EPDS scores across different cultural groups and if the scale's cultural sensitivity and effectiveness need to be improved.

### **AN EXPLORATION OF MENOPAUSE: YOUNG PEOPLE'S PERCEPTIONS OF WOMEN IN MENOPAUSE, AND MENOPAUSAL WOMEN'S EXPERIENCES**

Presenter(s): Fleming, Fiona, Graduate, Sociology and Anthropology

Mentor: Dr. Susan Sprecher

Authorship: Fiona Fleming

Menopause is a transitional phase in a woman's life, and society is filled with negative stereotypes of women in menopause. Menopause is a difficult period for many women due to hormonal fluctuations, changes in their bodies, and various other health effects. Aging in general for women is stigmatized due to societal beauty standards, and menopause serves as a marker of the transition into later adulthood (Chrisler 2011). The negative stereotypes of menopause in the media can cause the general public to hold negative perceptions regarding menopausal women (Gannon and Stevens 1998). Additionally, the views held by close others can affect how women in menopause view themselves and their menopausal transition (Li et al. 2013). The purpose of my study was to build off prior research surrounding perceptions of menopause and look specifically at young people's perceptions of women in menopause.

My study utilizes an experimental vignette method, which seeks to examine young adults' perceptions of a hypothetical woman as a function of whether it is explicitly stated that she is undergoing menopause, as well as a function of the age of the woman (either 43 or 60). The dependent variables in this study are the participants' perceptions of the temperament of the woman in the vignette (e.g., moods such as depression, anxiety, or irritability), the perceptions of the woman's capability to handle everyday tasks (both in the home and at work) and perceptions of her relationship with her children and spouse (such as if the couple is still sexually active). These variables were assessed through several questions relating to the target's relationships and actions. The sample for this study was a convenience sample consisting of young adults between the ages of 18 and 25, and participants were primarily through emails sent to ISU students, as well as through my own social media platforms.

Preliminary results show that the participants perceived the woman quite similarly (on the various dimensions assessed) regardless of her age or menopause status. Limitations of this study will be discussed, and plans for a follow-up study assessing middle-aged women's own experiences and attitudes toward menopause will be presented.

## **IMPRESSION FORMATION FROM ONLINE DATING PROFILES: WHAT TYPES OF STATEMENTS LEAD TO MORE ATTRACTION AND DOES IT DEPEND ON THE GENDER OF THE AUTHOR IN THE PROFILE?**

Presenter(s): Herman, Nolan, Undergraduate, Sociology and Anthropology  
Adams, Haley, Undergraduate, Psychology  
Beckman, Kaley, Undergraduate, Sociology and Anthropology  
Haislip, Nicole, Undergraduate, Sociology and Anthropology  
Kuhn, Rory, Undergraduate, Psychology  
Laux, Sydney, Undergraduate, Sociology and Anthropology  
Spranger, Kinlee, Undergraduate, Sociology and Anthropology  
Youngman, Dela, Undergraduate, Sociology and Anthropology

Mentor: Dr. Susan Sprecher

Authorship: Nolan Herman, Haley Adams, Kaley Beckman, Nicole Haislip, Rory Kuhn, Sydney Laux, Kinlee Spranger, Dela Youngman, Susan Sprecher

Dating platforms are a popular way in which couples meet (Nader et al. 2019; Rosenfeld, 2021). For example, the Pew Research Center reports that 3 in 10 Americans have utilized an online dating platform (Vogel & McClain 2023). The increasing popularity of online dating has led both users and researchers to question what statements in an online dating profile may appeal to other users and lead to attraction. Although the searching process may vary across dating platforms, most require users to create a profile that describes themselves and that may lead other users to find them appealing enough to message or respond to a message (Finkel et al. 2012). The purpose of our study is to examine the types of statements (presented in a hypothetical online dating profile) that would be judged to be most likely to lead to attraction by other users. We are also interested in whether the perceived desirability of statements depend on the gender of the hypothetical author. Data were obtained from 326 respondents from two universities and a Prolific sample (MAge = 23.94; 66.4% women). Participants completed an online survey where they were asked to rate 8 hypothetical statements on how they think online users might respond to the statement if included in a dating profile. The participants rated each statement on a 7-point response scale (1 = decrease attraction greatly; 4 = no effect; 7 = increase attraction greatly).

Participants were randomly assigned to imagine the author of the profile as either a young man or a young woman and indicate how those of the opposite gender would react to the statements. Preliminary results indicate that the most appealing statements referred to participation in sports, having a dog, and the presence of a healthy work-life balance. A statement about previous relationships was expected to have the least positive impact on the target's desirability. To examine whether the appeal of the statements differed based on the gender of the author, a series of independent t-tests were performed. The results demonstrated that for most of the statements, participants who thought the author was a male expected the information would lead to more attraction from other users than did participants who thought the author was a female. With dating

platforms becoming a popular way for couples to meet, the understanding of what profile statements are likely to increase attraction is useful to both users and future researchers.

## THE SELECTION AGAINST WISDOM TEETH

Presenter(s): Kooistra, Rachael, Undergraduate, Sociology and Anthropology

Mentor: Dr. Shelby Putt

This survey investigates people's dental history with wisdom teeth and asks them such questions as to when they got them removed, how many wisdom teeth they had, and if they caused any pain. The main purpose is to find any correlation between the disappearance of wisdom teeth from the human dental record due to pain that they cause within people's mouths. I surveyed 100 people and asked those who did develop wisdom teeth if they were removed due to pain. The focus of this study was to see if the reduction of our jaw size has caused increased pain from the eruption of the third molars and if they are being selected against in our evolution. While it may not always be noticeable, the human body is always evolving. One way the body has changed from its earliest form is through teeth. Homo Erectus is when the dental record becomes more comparable to that of modern-day Homo Sapiens. The teeth that are the subject of this study are the third molars which include teeth 1, 16, 17, and 32. However, due to the change in morphology, the need for these third molars has decreased. In Homo Sapiens, these molars erupt between the ages of 18-24, meaning that they usually do not break through the gums of the maxillary or mandible until someone is at least 18. Presently, humans cook more food, which makes it softer, causing our jaw size to shrink. Due to the shrinkage of jaw size, it has been theorized that our third molars cause pain and crowding of teeth within the mouth and that is why they are removed. This was my theory prior to the survey; however, the results showed a different story. The majority of people did not get their wisdom teeth removed due to pain. In fact, most did not experience any pain due to their wisdom teeth. I concluded that people had their wisdom teeth removed before any pain could be felt. It is also important to note that 11% of people who took this survey never developed wisdom teeth. While 11% does not seem like a lot, out of 100 people that is over 1/10 of the participants and is a finding I would like to further investigate with a larger pool of participants.

# **THE ROLE OF SOCIAL IDENTITIES AND COMPASSIONATE LOVE IN PERCEPTIONS AND DETERMINATIONS OF TREATMENTS FOR A DRUG OFFENDER: A VIGNETTE STUDY**

Presenter(s): Odeh, Yasmin, Graduate, Sociology and Anthropology

Mentor: Dr. Susan Sprecher

Co-Mentor: Dr. Justin Turner

## **Problem**

The shift from a focus on rehabilitation to the more punitive, “tough on crime,” approach to illegal behavior in the U.S. has been enacted in no small way by policies connected to the use and abuse of drugs. The disparities between crack and powder cocaine—two chemically similar substances—have headlined this shift (Vagins and McCurdy 2006). However, research is scarce on laypeople’s approval of deterrence approaches for drug offenses, including as a function of types (e.g., powder vs. cocaine possession). This study examined people’s perceptions of prosecutorial decisions for drug offenders—whether they are punished, rehabilitated, or both—and whether people perceived the offenders differently based on their socioeconomic status (SES) and use of crack versus powder cocaine.

## **Procedure**

A vignette study was conducted with approximately 250 college students. The vignette contained two stages. The first described the offender, including manipulations of the type of cocaine and the offender’s SES; the second revealed a court decision with three conditions—prison sentence, rehabilitation, or both. Dependent variables included the participants’ reactions to the target (e.g., recommended punishment in Stage 1; reaction to the hypothetical court decision in Stage 2). Individual difference variables of the participants, including political identity and their propensity to experience compassionate love (Sprecher and Fehr 2005), was also measured.

## **Analysis/Results**

For stage 1, a 2 x 2 ANOVA will be conducted to examine the main effects of the MIVs (cocaine type and SES) and the interaction effect on participants’ reactions to the target in the vignette. For stage 2, a one-way ANOVA will be conducted to look at the main effect of the MIV (court decision) on participants’ reactions to the court decision. Variation in the participants’ reactions as a function of the type of offense, the SES of the target, and the participants’ characteristics (e.g., compassionate love for strangers), is expected. Data analysis is currently underway (findings are to be determined prior to the symposium).

## **Conclusions and Implications**

This study seeks to examine how people perceive criminal justice approaches, specifically in the context of drug crimes, and how perceptions may differ based on individual difference variables, such as compassionate love, and it fills gaps in criminal justice and sociological literature pertaining to realistic judgments vis-a-vis the survey’s experimental design and its inspection of certain difference variables.



# **BREAST CANCER KNOW-HOW: INVESTIGATING SCREENING WILLINGNESS AND RISK FACTOR KNOWLEDGE AMONGST FEMALE FACULTY, STAFF, AND GRADUATE STUDENTS OF A SELECTED MIDWEST UNIVERSITY IN THE UNITED STATES OF AMERICA**

Presenter(s): Oshaji, Esther, Graduate, Sociology and Anthropology

Mentor: Dr. Winfred Avogo

**Background:** Breast Cancer (BC) is the second leading cause of cancer deaths in women worldwide. Early detection remains a primary practical approach to combat the disease. Despite having one of the highest BC rates in the world, there is a dearth of literature on the knowledge of BC risk factors and willingness to undergo screening among university students, faculty, and staff in the U.S. Drawing on the constructs of the Health Belief Model, this study is conducted to determine the knowledge and predictors of BC screening behaviors among a distinct population of female graduate students, faculty, and staff at a U.S. Midwestern University, an essential group given that BC risks increase with age. Understanding the perceived susceptibility, benefits, and risks of BC among this demographic is crucial to determining individual determinants of health behavior and developing critical intervention techniques to reduce BC threats to the younger population as they age and decrease mortality among the elderly population via early detection.

**Method:** This study uses the quantitative research approach to draw a systematic sample size of 500 respondents. The online survey collects data using a structured questionnaire. The study instrument includes sections on knowledge of risk factors, barriers to and willingness to undertake screening. Data is analyzed using descriptive and multivariate statistics.

**Results:** Preliminary results indicate a significant relationship between variables of knowledge, perceived susceptibility, benefits, barriers, and socio-economic factors and women's screening behaviors.

**Conclusion:** Based on the findings of this study, implementing a health belief model-based educational intervention about BC at different phases of life is vital to fight the disease.

## **This Poster Has Been Canceled**

## **MIGRATION AND THE LIFE COURSE: A CASE STUDY OF AFRICAN FEMALE INTERNATIONAL GRADUATE STUDENTS AT ILLINOIS STATE UNIVERSITY**

Presenter(s): Yawson, Vivian, Graduate, Sociology and Anthropology

Mentor: Dr. Winfred Avogo

Authorship: Vivian Yawson

The number of graduate and undergraduate students from Africa in the United States (U.S.) is fast rising. Migration is a significant turning point in one's life. Despite the increase in research on international students in the U.S., not much is known about the educational experiences of African students from a life-course perspective. This study aims to leverage current trends and patterns in international migration to examine student migration from the life course framework. This framework offers a valuable theoretical opportunity to explore the opportunities, challenges, and tradeoffs female international graduate students from Africa encounter when pursuing education abroad. Drawing on qualitative techniques using narrative life histories, this study aims to gather detailed data from nine female international graduate students from Africa at Illinois State University. Narrative life histories have long been used in studies of immigration and emigration with reference to integration and cultural identity. They can be usefully deployed to the subjective and interdependent experiences of migrants in changing contexts. Preliminary findings reveal a delay in life transitions like marriage and childbearing for this population. Family and household decision-making on migration and challenges of adjustment to campus systems, integration, and cultural identity are some of the salient findings being highlighted.

# **This Poster Has Been Canceled**

## TEACHING AND LEARNING

### HIP HOP AS TECHNOLOGY: A NEW MATERIALIST PERSPECTIVE

Presenter(s): Patel, Viraj

Mentor: Dr. Anna Smith

Authorship: Viraj Patel

As the preferred genre of music for 16–29-year-olds (Backus, 2022; Götting, 2021), Hip Hop music is used to supplement teaching and learning in two unique ways. First, artifacts of Hip Hop culture (lyrics, videos, graffiti etc.) serve as sites of analysis. For instance, in Kelly's (2023) high school ELA a student analyzed lyrics of *Chaining Day* by J. Cole to discover how metaphors can be used to articulate unique facets of materialism. Secondly, practices of Hip Hop serve as frameworks for teaching academic concepts. For instance, Rice (2003) used the principle of sampling to teach composition and writing practices to college students.

In this conceptual piece, I outline Hip Hop as a technology which augments the *processes* of teaching and learning. Pea (1985) defines cognitive technology as “any medium that helps transcend the limitations of the mind, such as memory, in activities of thinking, learning, and problem solving” (p. 168). As evident from examples above, Hip Hop serves this function.

However, as Shouse (2005) states “the pleasure that individuals derive from music has less to do with the communication of meaning, and far more to do with the way that a particular piece of music ‘moves’ them” (para 11). Hence, in this poster I employ the lens of New Materialisms (NMs) to argue that an examination of how Hip Hop generates affect or “moves” people augments contemporary understandings of the processes of teaching and learning.

First, I argue that Hip Hop music facilitates an entanglement (Barad, 2007) between students, teachers, and subject matters and actively disrupts an individual present and places it into a collective consciousness which serves as a new ground for teaching and learning.

Second, I show how a NMs approach to Hip Hop helps shift the focus of this entanglement from specific, predetermined products (e.g., assignments or assessments) to students and teachers' meaning-making processes. In this way, a NMs view of Hip Hop in the classroom highlights teaching and learning as verbs, not nouns.

Still, a NMs view of Hip Hop in the classroom has significant implications. Namely, the uncensored exposure to Hip Hop can be dangerous, and “run the risk of exacerbating, rather than challenging, existing biases and stereotypes of minoritized communities” (Kelly, 2023, p. 10). Hence, the use of Hip Hop to generate affect in the classroom requires continual ethical considerations from students as well as teachers.

## TECHNOLOGY

### STRATEGY IDENTIFICATION OF THE INTEGRATION OF DIVERSITY, EQUITY, BELONGING, AND INNOVATION IN THE CONSTRUCTION INDUSTRY

Presenter(s): Gandla, Sai Ram, Graduate, Information Technology

Mentor: Dr. H. Sally Xie, Technology

Numerical insights were developed for actionable strategies to promote Diversity, Equity, Belonging, and Innovation (DEBI) within construction education and the broader industry. However, the integration of DEBI in the industry lacks strategies to improve inclusivity within construction education and the professional sphere. This research plans to utilize questionnaires targeting both students and industry professionals and seek to shed light on the current state of DEBI. To pinpoint the areas for development, this research project started with literature review.

In addition to the wage disparities among different gender groups, the designed questionnaire survey will advocate for increased representation of underrepresented groups and aspire to foster an educational and professional environment that values diversity as a key component of innovation and success. One of the expected findings will be how instructors can invigorate an inclusive culture, transforming schools into welcoming communities. Another factor will revolve around teaching strategies and pedagogies aimed at enhancing student education and fostering professional learning communities. To ascertain the survey's psychometric attributes, we will conduct descriptive, exploratory factorial, and confirmatory factorial analyses. IRB review will be conducted. Then, during the trial phase, questionnaires will be sent through Qualtrics to the ISU community to learn the best practices and needs of DEBI in teaching and learning.

In conclusion, the findings highlight the urgent need for targeted DEBI initiatives in construction education and the industry at large. By integrating DEBI principles more thoroughly, we can work towards a construction sector that is not only more equitable and inclusive but also more capable of addressing the challenges of the modern world.

## **SYSTEM VALIDATION OF A VIRTUAL REALITY-BASED TEEN DRIVER TRAINING PROGRAM**

Presenter(s): Gupta, Dolly, Graduate, Technology  
Ji, Nathan, Graduate, Technology

Mentor: Dr. Isaac Chang

Authorship: Dolly Gupta, Nathan Ji

In collaboration with a prominent insurance company, we are developing an immersive, virtual reality (VR)-based driving simulator that can assess and analyze the driving habits of young drivers. Ensuring that this system is an effective tool for teen drivers requires the validation of its functionality. The validation process will involve the assessment of a driver utilizing a simulated environment and a route plan for standardized examination. The user will engage in multiple maneuvers and driving scenarios in the simulation, reflecting real-world situations and criteria on the “on-road examination” by Illinois’s Driver Test.

For this purpose, simulation data, including the virtual environment’s telematics (e.g., speed, torque, deceleration) and driving behaviors, will be collected. Combined with observations, the collected data will help validate the system's ability to reflect driving behaviors accurately. Our framework for validation will be based on the correlation between the proposed models and real-life driving situations. Once validated, this VR-based driver training program will boost the learning process for teen drivers and expand the potential use cases in low-risk training environments.

## Afternoon Session Abstracts

### AGRICULTURE

#### ASSESSMENT OF WITHIN STORE QUALITY VARIATION OF FRESH PORK LOINS

Presenter(s): Griffin, Mackenzie, Undergraduate, Agriculture

Mentor: Dr. Justin Rickard

The objective of this study was to characterize the quality of pork loins sold by store franchises located in the same geographical area. Two major grocery store chains were visited, each with three locations in the Bloomington-Normal area. Three fresh pork loins were purchased from each store location, where available, and transported to the Illinois State University Meat Lab. Loins were subsequently evaluated for the following: color, marbling, and firmness. Following subjective analysis, the loins were fabricated into center-cut chops (n=16) and allowed to bloom for 15 minutes. Following bloom, chops were weighed prior to being packaged. Each chop was labeled, placed on a foam tray with an absorbent pad, and overwrapped in an oxygen-permeable polyvinylchloride film before subsequent objective color evaluation. Instrumental color measurements [ $L^*$  (lightness),  $a^*$  (redness),  $b^*$  (yellowness)] were taken for each chop with a HunterLab Miniscan XE Plus Spectrophotometer using a  $D_{65}$  illuminant,  $10^\circ$  observer, and 35-mm aperture. Chops were then stored in the Illinois State University Meat Lab for 7 d at  $7^\circ\text{C}$  to simulate retail conditions. During retail simulation, color measurements were taken on d 0, 1, 3, and 7. On d 7, chops were removed from packaging and weighed to determine package purge (PP). The chops were then cooked to a final internal temperature of  $71^\circ\text{C}$  and subjected to tenderness analysis via Warner-Bratzler Shear Force (WBSF). Statistical analysis included mean, standard deviation, and range. Minimal variation was observed in subjective quality measurements, WBSF, or PP, within each store location. When looking across store franchises using these criteria, the results remained consistent with minimal variation observed. In locations 1 and 2 (Store 1) significant differences in the  $L^*$  values were measured on d 0, 1, 3, and 7. Location 1 consistently displayed the largest range in  $L^*$  values, regardless of evaluation day. In location 2 (Store 2) significant variation in the  $L^*$  values were also measured on all evaluation days. When comparing  $L^*$ ,  $a^*$ ,  $b^*$  values across franchises, the  $a^*$  and  $b^*$  values remained consistent across both store locations and franchises. There were substantial differences measured in  $L^*$  values across the Store 1 locations on d 1, 3, 7 as well as the Store 2 locations on d 0. The data recorded in this study suggests that the quality of pork loins remains consistent and uniform both within store and across the studied franchises.

## **EVALUATING STUDENT STRESS IN AN ANIMAL SCIENCE COURSE WITH UNSUPERVISED LIVESTOCK EXPERIENCE**

Presenter(s): Lawrence, Jayden, Graduate, Agriculture

Mentor: Dr. Drew Lugar

Authorship: Jayden Lawrence

Animal Science demographics are shifting from students that come with an abundance of experience, to students that do not have any prior animal experience. It is important to note the present student demographics, could be impacting student mental health. In a semester long Parturition Management course, students attend overnight, unsupervised shifts during the birthing process of sheep, cattle, and pigs. Throughout the course, physiological measurements via heart rate variability (HRV) and psychological stress data via Perceived Stress Surveys (PSS) were collected, along with student demographic and background data. Both units of stress data were compared back to baseline measurements taken on campus during the daytime to quantify the stress caused by the class. Heart rate variability did not differ in this study ( $P > 0.15$ ) in all of the demographic variables measured. The data analysis showed that students had the highest level of change in PSS (cPSS) in lamb watch, the first species of the class ( $P < 0.01$ ).

Students that had expert level experience had the greatest cPSS among all other levels ( $P < 0.01$ ). They also showed that, ethnicity, academic sequence, and hometown population played a role in how high cPSS was. These findings may be due to self-reporting of their prior animal experience, which may have resulted in bias towards their true experience level. It is also possible that this study needs to be completed in the introductory level course that has students' first collegiate interaction with animals, to capture their initial college stress levels associated with animals. However, the physiological stress results showed no significant differences among the demographic categories, or the species measured. This is likely due to the timing of the course taking place overnight because it is suggested that heart rate variability measurements are most accurate when taken in the morning.

# BUYER VALUATION OF SPORT HORSES SOLD THROUGH ONLINE AUCTIONS

Presenter(s): Stiverson, Whitney, Undergraduate, Agriculture

Mentor: Dr. Michelle Kibler

The United States has become a large part of the global equine industry with approximately 7 million horses, contributing \$122 billion and 1.7 million jobs to the U.S. economy. While thoroughbred racing is common among the general public and accounts for \$15.6 billion, sport horses and the competition sector account for the second largest economic contribution in the equine industry at \$11.8 billion (American Horse Council Foundation, 2017). According to the World Breeding Federation For Sport Horses, sports horses are bred to compete in hunters, jumpers, dressage, three-day eventing, and marathon-driving. They have also concluded that sellers and breeders of sport horses lack current information indicating buyer preferences (breed, color, height, etc.), which may affect their success in marketing to potential buyers (2021). Sport horses continue to grow more popular, with data from 2007 to 2014 indicating that the number of registered horses with the United States Equestrian Federation increased by almost 10,000 (Lampert, 2015). Therefore, for the market to succeed, up-to-date data needs to be available to bridge the understanding of expectations between buyers and sellers.

Existing studies have shown that buyers searching for post-racing thoroughbreds indicate their interest in young, chestnut or gray/roan, geldings with competition experience (Camp et al., 2023). Other studies that focus on stock-type horses have determined buyers seek out unique-colored mares that are more mature and accomplished (Kibler & Thompson, 2020). Although data is limited, other sport horse research indicates that a horse with less education may be more sought after (Ashburn et al., 2021).

This study will analyze the results of eight online sport horse auctions that took place in 2023 (SportHorseAuctions.com). With hundreds of sport horses sold, sellers provide basic information such as breed, sex, color, age, and more detailed information dealing with bloodlines and ancestry. The objective of this study is to use regression analysis and descriptive statistics for sport horses sold at online auctions to determine the relationship between the characteristics of sport horses (breed, sex, color, age, height, experience) and buyer valuation. This research will quantify horse experience based on the seller's input of discipline keywords and collect information on the location of sellers. The results of this study will provide updated data to educate sellers and breeders of sport horses on the importance of different characteristics most sought after by buyers, to help them succeed within the market.

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## **IMPACT OF WINTER COVER CROPS ON SOYBEAN YIELD AND SEED QUALITY**

Presenter(s): Stockmaster, Ashley, Graduate, Agriculture

Mentor: Dr. Rob Rhykerd

Winter cover crops are being used in the Midwest to reduce nutrient runoff from agricultural fields and show potential to mitigate climate change. However, some have expressed concern that cover crops may reduce summer cash crop yields. This study evaluates the impact of selected cover crops on soybean yield and quality. A field study was conducted at the Western Illinois University Research Farm in Macomb, Illinois. The experimental design was a block design replicated four times. Winter cover crop treatments consisted of a pea-clover-radish-oat mix, wild pennycress, golden pennycress, cereal rye, annual rye, and a fallow (reference) plot. Soybeans were the summer cash crop planted in June 2023. After the soybeans grew throughout the summer and reached maturity, they were ready for harvest in October 2023. During the harvesting process, the soybean yield was measured using a yield monitor. To evaluate soybean seed quality, plants were harvested by hand from a six-foot strip of the two center rows of the plots. The number of plants harvested from each plot were then counted for a plant population. Seeds were removed from the pods by hand after the plants had been air dried. Soybean seed samples were then analyzed for indicators of seed quality using a Near Infrared (NIR) Spectrometer. The NIR measured moisture, fiber, protein, oil, and ash. Results showed no significant differences in soybean yield. The winter cover crops had no impact on soybean seed quality. Longer term studies are needed to better show the impact of cover crops on summer cash crop yield and quality.

## **NUTRIENTS TRANSPORT AND CYCLING IN ANEROBIC CO-DIGESTION OF SOYBEAN BIOMASS, COVER CROPS, AND SWINE MANURE**

Presenter(s): Stoner, Shelby, Graduate, Agriculture

Mentor: Dr. Liangcheng Yang, Health Sciences

Co-Mentor: Dr. Rhykerd Rob

Cover crops have many purposes to improve soil quality, water quality, soil health, reduce soil fertilizer use, and increase nutrient availability to cash crops. Most of the benefits of cover crops are discussed due to the below ground presence of cover crops, but the aboveground biomass can serve as a source of sustainable energy through anaerobic digestion. The nutrients in the above ground biomass can also be recycled and reused through land application of digestion effluent. We have tested anaerobic co-digestion of cover crop, soybean, and swine manure using both small and pilot scale digesters and analyzed NPK nutrients in different forms and their distributions. It was observed that co-digestion improved biogas production. The liquid fraction of the digestion effluent contained about the same amount of the Ammonium Nitrogen and Organic Nitrogen, and about 60-80% of the Potassium, while the solid fraction of the digestion effluent contained more Organic Nitrogen than the Ammonium Nitrogen. Overall, 94% Nitrogen, 94% Phosphorus, and 85% Potassium were recovered in the digestion effluent from the 60:40 soybean-swine manure mixing conditions. Ammonia Nitrogen in biogas will be measured in pilot scale experiments in spring 2024. Cover crops including rye grass, annual rye, and PCRO (pea, clover, radish, oat) mix were planted in September 2023 and will be harvested and tested in anaerobic digesters in spring and summer 2024 for energy production and nutrient cycling.

## BIOLOGICAL SCIENCES

### EFFECT OF CORTICOSTEROIDS PREDNISONE AND DEFLAZACORT ON THE CALCIUM KINETICS OF DYSTROPHIC MUSCLES

Presenter(s): Aidoo, Erinda, Undergraduate, Biological Sciences

Mentor: Dr. Andrés Vidal-Gadea

Authorship: Erinda Aidoo, Kiley Hughes, Annamarie Hyer, Andres Vidal-Gadea

Duchenne muscular dystrophy (DMD) is an X-linked degenerative disease that affects 1 in about 5000 live-born males. The disorder is caused by mutations leading to the absence of the dystrophin protein in muscles. It is characterized by increased calcium levels in the muscle, progressive muscle degeneration, loss of ambulation, respiratory insufficiency, and early death. At present the only available treatment consists of the corticosteroids prednisone and deflazacort. While these steroids extend life and ambulation by about a decade, they are accompanied by numerous side effects that limit their use. To date, it remains unclear how these corticosteroids produce their beneficial and detrimental effects on DMD patients. Our lab studies the pathophysiology of DMD using the nematode *C. elegans*. Like human DMD patients, dystrophic worms experience increased muscular calcium levels and undergo muscle degeneration and early mortality. Furthermore, previous work has shown that, like DMD patients, dystrophic worms also benefit from treatment with prednisone and deflazacort. We are therefore using this tiny nematode to investigate how these corticosteroids produce their beneficial and detrimental effects on dystrophic muscles. Understanding how these drugs work in dystrophic muscles will allow us to identify alternative compounds that might be more powerful or less susceptible to induce unwanted side effects. To this end, we are measuring calcium kinetics, and muscular function in the muscles of healthy and dystrophic nematodes treated with these corticosteroids. We further plan to probe the mechanism of action of these steroids by using RNA interference to test the role played by potential targets of deflazacort and prednisone. This work has the potential to point the way to improved therapeutics for the treatment of Duchenne muscular dystrophy.

## THE POTENTIAL ROLE OF *C. ELEGANS*' AMSH GLIA IN COORDINATION OF ESCAPE RESPONSES TO AVERSIVE STIMULI

Presenter(s): Awe, Temitope, Graduate, Biological Sciences

Mentor: Dr. Andrés Vidal-Gadea

Authorship: Temitope Awe, Aalimah Akinosho, Jessica Adams, Shifat Niha, Wolfgang Stein, Andrés Vidal-Gadea

Glia are non-neuronal cells in the nervous system that play vital roles in supporting the function and structure of neurons and in modulating neuronal activity. The extent of their contributions in sensory processing and integration is the subject of ongoing investigation. The amphid sheath glia of the nematode *C. elegans* (AMsh) surrounds and supports a dozen sensory neurons in the head of the worm. AMsh directly respond to aversive odorants and mechanical stimuli, and they have been implicated in contributing to escape responses. They mediate the adaptation of avoidance behaviors to repeated aversive odorant via GABA signaling. However, the behavioral significance and molecular mechanisms of AMsh's response to mechanical stimuli remain unresolved. We used mutant analysis, RNA interference, behavioral analysis, and calcium imaging to investigate the role of AMsh in mechanosensation and their contribution to escape behaviors in *C. elegans*. We found in freely-crawling animals that AMsh activity peaks only coincided with the termination of escape reversal behaviors following nose touch stimuli. Additionally, genetic ablation of AMsh resulted in prolonged reversal durations in response to nose touch. These findings suggest that *C. elegans*' AMsh play an important role in terminating escape responses to nose touch. We next identified key molecules required for nose touch transduction by AMsh. Lastly, we found that AMsh modulation of nose touch-induced reversal duration is mediated by GABAergic signaling. This demonstrated an overlap of mechanism in the AMsh modulation of escape responses to aversive odorants and mechanical stimuli.

## CHOLERA WHO? CHARACTERIZATION OF A NOVEL REGULATORY SYSTEM THAT CONTROLS *VIBRIO CHOLERAE* PATHOGENESIS

Presenter: Basu, Debajyoti, Graduate, Biological Sciences  
Mentor: Dr. Kyle Anthony Floyd  
Authorship: Anindita Saha, Gursewak Bains, Joseph Alexander

*Vibrio cholerae* is a naturally occurring aquatic bacterium, facultative human pathogen, and causative agent of the life-threatening gastrointestinal disease cholera. Environmental survival of *V. cholerae* is enhanced by its ability to form multicellular biofilm communities, mediated by the type IV mannose-sensitive hemagglutinin (MSHA) pilus. However, during early stages of host infection, cell-surface presentation of MSHA pili triggers innate immune responses to induce bacterial clearance. Therefore, proper regulation of MSHA production is vital to facilitate the transition of *V. cholerae* from colonization of the environment to colonization of the host. Previously, our lab identified the fatty acid metabolism regulator protein (FadR) as a putative transcriptional enhancer of MSHA pilus production under environmental conditions, and observed a putative FadR consensus binding sequence within the second promoter region (P2) of the first *msh* (*msh-I*) operon. In the absence of *fadR*, analysis of *msh-I* P2 promoter expression using a plasmid-based transcriptional reporter, showed a ~7-fold decrease in P2 expression compared to wild-type. Activity of FadR is negatively regulated by long-chain fatty acids (LCFAs), a major component of the mammalian diet. Based on these observations, we hypothesized that LCFAs serve as a host-derived signal to down-regulate MSHA pilus production during *V. cholerae* infection through inactivation of FadR. To test this hypothesis, we examined the addition of known FadR ligands on *msh-I* P2 promoter expression in wild-type *V. cholerae*. Addition of saturated LCFAs myristic (carbon residues: double bonds, 14:0) and palmitic (16:0) acids showed no significant reduction of *msh-I* P2 expression. Supplementation of unsaturated LCFAs, including oleic (18:1) and palmitoleic (16:1) acids, showed a significant reduction in *msh-I* P2 promoter expression over a range of concentrations extending from 16 - 2000  $\mu$ M. Further analysis with a unsaturated trans isomer of oleic acid (elaidic acid, trans-9-18:1) and linoleic acid (18:2), both showed a similar reduction in *msh-I* P2 expression. These data suggest that unsaturated LCFAs modulate FadR-mediated expression of the *msh-I* P2 promoter, to regulate MSHA pilus production and aid in the transition between environmental and host colonization. Future studies will further validate this novel regulatory network, and define the role of FadR and unsaturated LCFAs on *V. cholerae* surface colonization and biofilm formation within the environment and the host.

## NESTLING SIZE AND ORNAMENTATION INTERACT TO SHAPE EARLY DEVELOPMENT IN HOUSE SPARROW FAMILIES

Presenter(s): Border, Shana, Graduate, Biological Sciences

Mentor: Dr. Matthew Dugas

Authorship: Shana Border, Matthew Dugas

In many nuclear families, dependent offspring receive unequal shares of parental investment. Initial overproduction can be adaptive from the perspective of parents, but parents must be able to identify appropriate candidates for favorite status. We studied early nestling development in house sparrows (*Passer domesticus*), a species in which the loss of some brood members is common, testing the prediction that body mass and carotenoid-rich flange colors are important to nestling success. There was substantial variation in both traits within broods, even only one day after hatching. Nestlings low in the within-brood mass hierarchy gained more mass if they displayed more carotenoid-rich flanges than broodmates. Position in the color hierarchy did not, however, predict mass gain for individuals that were heavier than their broodmates. Nestlings that were heavier or had more carotenoid-rich mouths were also less likely to be the victim of brood reduction. Our results suggest that house sparrow parents use both nestling body size and mouth color when making allocation decisions. Understanding both how and when offspring traits and parental preferences function is key to understanding how selective pressures act on offspring-parent communication.

## REFINING THE *RFK-2* LOCUS OF *SK-3* IN *NEUROSPORA CRASSA*

Presenter(s): Bowen, Thera, Undergraduate, Biological Sciences

Mentor: Dr. Tom Hammond

Authorship: Thera Bowen, David Liu, Tom Hammond

Meiotic drive is a non-Mendelian inheritance phenomenon where selfish genetic elements change gene transmission in their own favor. This phenomenon occurs in the fungus *Neurospora crassa* during spore killing. When a strain carrying a spore killer genetic element is crossed with a non-spore killing wild type strain, the cross will produce half viable and half inviable offspring. The *N. crassa Sk-3* spore killer is found on Chromosome III. *Sk-3* is one of the most studied meiotic drive elements in *Neurospora* fungi and it is thought to require a killer gene and a resistance gene for spore killing. While the killer gene has not been identified, recent work has isolated a mutation (*rfk-2<sup>uv</sup>*) that disrupts spore killing. Although this mutation has been mapped to Chromosome III, its exact location is not known. In this work, we investigate the role of two DNA intervals in *Sk-3*-based spore killing. These DNA intervals, referred to as V373 and V386, are thought to reside within or near *rfk-2<sup>uv</sup>*. Our results will contribute to future efforts to identify the *Sk-3* killer gene.



## **PEDIGREE FORMATION AND PARENTAL LINEAGING IN HOUSE WRENS**

Presenter(s): Canon, Maria, Undergraduate, Biological Sciences  
Rodriguez, Ashley, Undergraduate, Biological Sciences  
Steinberg, Kaitlyn, Undergraduate, Biological Sciences  
Boland, Sarah, Undergraduate, Biological Sciences  
Dart, Avery, Graduate, Biological Sciences  
Mentor: Dr. Pirmin Nietlisbach  
Authorship: Maria Canon, Ashley Rodriguez, Kaitlyn Steinberg, Sarah Boland, Avery Dart, Pirmin Nietlisbach

The genetic consequences of inbreeding (i.e. reproduction among relatives) usually leads to reduced survival and reproductive success of plants and animals. Specifically, extra-pair paternity is when there is mating outside of the social pair bond, and there are many things still unknown about it. The major question is why some individuals participate in extra-pair reproduction while others do not. It is unknown whether or how females benefit from extra-pair mating, thus additional studies are needed. Genetic paternity testing allows us to detect extra-pair paternities in populations, and if done across multiple generations, allows constructing pedigrees. A genetic approach provides an accurate and useful way to track extra-pair mating in populations and study the causes and consequences of this behavior. We collected blood samples from adult and nestling house wrens from a population near Illinois State University. We extracted DNA and used polymerase chain reaction to amplify 12 variable genes. We will then quantify the length variation of these genes and use them to identify parents of all nestling birds. We will present data about the genetic variation in house wrens as well as parentage data. This will allow us to quantify how many offspring in each nest resulted from extra-pair reproduction. Having detailed pedigrees of this house wren population allows us to trace related offspring in neighboring nests, giving us a better understanding of their mating system.

## NEGATIVE GEOTAXIS IN CRAYFISH

Presenter: Clark, Kyle, Undergraduate, Biological Sciences  
Lane, Kristen, Undergraduate, Biological Sciences  
Mentor: Dr. Wolfgang Stein

Negative geotaxis, the tendency of organisms to move against the force of gravity, is a fundamental behavior observed across various taxa. In this study, we aimed to elucidate whether crayfish exhibit negative geotaxis and whether this behavior is dependent on individual size and environmental conditions.

We used a climbing assay, in which crayfish were placed at the bottom of a cylinder and allowed to climb ad libitum and quantified their climbing activity during 10-minute trials. We tested animals of 5 cm, 4 cm, and 2 cm size. We found evidence that 2 cm small animals had the highest climbing propensity, 72%, in the 10 cm cylinder. Our results indicate 50% of the 5 cm large animals climbed in a 10 cm wide cylinder. Climbing preference increased to 90% in a 30 cm wide cylinder, indicating that the surrounding space influenced climbing behavior. We found a similar result for 4 cm large animals. 60% of the 4 cm large animals climbed in a 10 cm wide cylinder. Climbing preference increased to 87.5% in the 30 cm wide cylinder. These data suggest that crayfish show robust climbing behavior when exposed to a large environment.

Since our climbing assay did not give the animals the option to climb down, we also tested crayfish on an incline that examined climbing preference at 30- and 60-degree angles. We are currently analyzing the results of our angled climbing assay.

## THE EFFECT OF STRESS ON FEMALE PREFERENCE IN MULTIMODAL COMMUNICATION DURING COURTSHIP DISPLAYS

Presenter(s): Enevold, Alyssa, Graduate, Biological Sciences

Mentor: Dr. Fernanda Duque

Authorship: Alyssa Enevold, Fernanda Duque

Species use complex displays with concurrent signals to communicate. This process, known as multimodal communication, can include signals that stimulate different sensory modalities, such as visual, auditory, and olfactory signals. The nature of multimodality leads to the question of whether one signal is preferred by the receiver over the other or if the combination of signals is the most preferred. Such preference becomes even more relevant in the context of mate choice because courtship displays are often multimodal. In addition, animals face different stressors in the wild, and this stress may affect a female's perception of signals, her assessment of potential mates, or whether she wants to mate at all. Male house sparrows (*Passer domesticus*) use multimodal signaling in their courtship display which consists of chirping while puffing their chest and hopping in front of the female. We will assess female preference for the mate's multimodal display over presentations of single sensory modalities (visual and auditory, respectively) under unstressed and stressed conditions. Using a Y-maze, females will be presented with three signal options: typical multimodal display, sound-only, and visual-only. We will assess female's preference based on which option she approaches and how long it takes her to go to one or another. We predict that an unstressed female will prefer the multimodal option as that is the typical display in the wild, while we will see no preference in the stressed females. Understanding how stress affects female preference for multimodal signals will shed light on how the physiological state of an individual can influence their perception of communication signals and subsequent behavior. In the future, we will investigate how stress affects gene expression in the brain of female house sparrows which will assess courtship signals to better understand the neural mechanisms underlying decision making in social contexts.

## LOCALIZATION AND FUNCTION OF TONNEAU1 RECRUITING MOTIF (TRM) IN *ARABIDOPSIS THALIANA*

Presenter(s): Falk, Tyler, Graduate, Biological Sciences

Mentor: Dr. Viktor Kirik

Authorship: Tyler Falk, Trevor Rickerd, Giulian Frontier, Viktor Kirik

Plants use a specific microtubule array called the preprophase band (PPB) to properly orient the cell wall during cytokinesis and act as a guide during division.

One of the proteins essential for the PPB formation is TONNEAU (TON1). TON1 has been shown to work in complex with TON1 recruiting motifs (TRM) proteins. This is a superfamily of 34 different proteins, grouped into eight subfamilies, and an outgroup consisting of five TRM proteins.

To study the function and localization of the TRMs we used different promoters to express TRM proteins fused to GFP. The GL2 promoter was used to overexpress TRMs in the trichome and root epidermal cells, and a ubiquitous TP1 promoter was used for expression throughout the plant. Preliminary data showed that overexpression with GL2 causes underbranching in *Arabidopsis thaliana* trichome cells. In addition, each TRM's native promoter was acquired by amplifying the proximal sequence upstream of the gene and then fused to GFP to ensure that localization of the TRMs with the previous promoters is correct and matches expression with the native promoter. TRMs that seem to localize to microtubules were crossed with a plant expressing a microtubule marker mScarlet-TUA to analyze co-expression.

## **DECREASING SEED GLUCOSINOLATE CONTENT IN THE OILSEED PLANT, PENNYCRESS (*THLASPI ARVENSE* L.)**

Presenter(s): Gautam, Liza, Graduate, Biological Sciences

Mentor: Prof. John Sedbrook

Authorship: Liza Gautam, Abby Vollmer, Brice Jarvis, Dalton Willians, Ratan Chopra, Shengjun Liu, Win Phippen, Mary Phippen, John Sedbrook

Pennycress (*Thlaspi arvense* L.; Field Pennycress) holds considerable potential for producing “climate-smart commodities” including low-carbon-intensity biofuels and animal feed while sequestering carbon and nutrients in farm soils. For pennycress to reach its full potential as an oilseed-producing winter cash cover crop grown on hundreds of millions of acres throughout the world, domestication traits must be improved including reduced seed glucosinolate content. Glucosinolates are secondary metabolites found in Brassica species including pennycress which have pungent odors and deter herbivory by producing toxic compounds upon tissue damage. Reducing seed glucosinolate content in pennycress without compromising plant fitness has been particularly challenging given the high levels this plant produces, hence its nickname “stinkweed”. We have targeted loss-of-function mutations in the pennycress MYC3 transcription factor gene using CRISPR-Cas9 genome editing, identifying a decrease in seed glucosinolate content 40 percent to about 75  $\mu\text{mol/gm}$  without affecting plant growth. We also generated myc3 mutations in combination with mutations in the HAG1 and /or HAG3 transcription factor genes, through cross pollinations and/or CRISPR multiplexing, identifying previously undescribed changes in seed glucosinolate content, succeeding in reducing seed glucosinolate levels to near the regulatory limit of 30 micromol/gram without negatively impacting plant growth and seed yields. We will present these findings and discuss our efforts combining these genetic changes with other mutations that improve agronomic traits and together constitute domesticated pennycress. Taken together, our work has identified and validated gene targets and domestication trait mutations which are now being introduced into commercial pennycress varieties.

## CHARACTERIZING AND INTERROGATING DROUGHT RESILIENCE IN THE WINTER OILSEED CROP PENNYCRESS

Presenter(s): Gautam, Liza, Graduate, Biological Sciences

Mentor: Prof. John Sedbrook

Authorship: Liza Gautam, Nikhil Jaikumar, Carol Kiam Assato, Arjuman Lima, Ryan Bayliss, Maggie Marlino, Amanda Darcy, Abby Volmar, and John Sedbrook

Drought damage to crops is a major threat to food security and is becoming a growing problem due to climate change. Amongst all abiotic stresses, drought is the most impactful on soil biota and crop productivity. According to the National Integrated Drought Information System (NIDIS), in 2020, 40% of the United States was under drought, and it is predicted that this number will continue to rise in the forthcoming years due to global warming. Pennycress (*Thlaspi arvense*) is a member of the *Brassicaceae* family related to canola and *Arabidopsis* that is being rapidly developed as an oilseed- producing winter cover crop for the U.S. Midwest and other temperate growing regions. As part of our efforts in domesticating this new crop, we are focusing on further understanding how pennycress responds to drought and identifying genetic changes that can improve drought tolerance without negatively impacting plant growth and seed yields. To broaden knowledge, we developed assays to test pennycress seedlings' and plants' responses to drought including water withholding and chemical treatments that mimic drought. Our preliminary analyses indicated that pennycress naturally has drought tolerance, which may overlap with its extreme cold tolerance. Using CRISPR-Cas9 mutagenesis, we generated pennycress single, double, and triple mutants targeting different genes like ABA-induced transcription repressors (AITRs) -*AITR2*, *AITR5* and *AITR6*, Early Response to Dehydration 15 (*ERD15*), U-box E3 ubiquitin ligases *PUB22* and *PUB23*, and WRKY transcription factor (*WRKY6*) shown to be negative regulators of drought responsiveness in other species. Preliminary phenotypic analyses of these mutant lines also support our hypotheses that pennycress may have relatively higher drought tolerance than its close relative, the model plant *Arabidopsis thaliana*. These data will be presented and discussed.

## SONG DIALECTS IN A BIRD WITH HIGHLY PRECISE TIMING OF NOTES (*MICROCERCULUS MARGINATUS*)

Presenter(s): Geyer, Tara, Undergraduate, Biological Sciences

Mentor: Dr. Carlos Rodriguez-Saltos

Authorship: Tara Geyer, Dr. Carlos Rodriguez-Saltos, Dr. Fernanda Duque

Vocal learning may allow birds such as the scaly-breasted wren (*Microcerculus marginatus*) to reach levels of precision at timing their notes that are comparable to those of professional musicians. An initial approach to studying vocal learning in any animal is the characterization of vocal dialects, which are geographically restricted variations in communication signals often resulting from cultural evolution. Despite a long history of studying dialects in songbirds, little is known about dialects in the timing of the notes in bird song. In this study, I will test whether *M. marginatus* has dialects based on the timing of its notes. I will use a crowd-sourced database to download recordings of *M. marginatus* songs from throughout the entire species distribution, in Central and South America. I will characterize timing patterns in the songs of *M. marginatus* by measuring the duration of intervals between the notes. Based on the pattern of succession of silence intervals, I will classify the songs into one of the four variants already described in the literature or a new variant if necessary.

Finally, I will test whether the vocal variants differ according to the geographic populations of *M. marginatus*. Finding dialects would suggest that *M. marginatus* learns the timing of its notes, establishing this bird as a potential model organism for studying mechanisms of timing in communication signals and how they are regulated by learning and practice.

## INVESTIGATING DNA ELEMENTS THAT CONTROL MEIOTIC DRIVE BY *SPORE KILLER-3* IN *NEUROSPORA CRASSA*

Presenter(s): Green, Brandon, Undergraduate, Biological Sciences

Mentor: Dr. Tom Hammond

Meiotic drive causes the transmission of certain genes to be more common than expected by chance alone. Within *Neurospora* fungi, there is a complex genetic element called *Sk-3*, for *Spore killer-3*. This complex genetic element spans a large interval of Chromosome III that contains 100s of genes, at least two of which are critical for meiotic drive. One of these genes is *rsk*. While the exact location of *rsk* is known, the exact location of the second critical gene is unknown. Previous work has identified an interval called V350, which when deleted prevents *Sk-3* meiotic drive. To better understand this phenomenon, we are deleting an interval called V390, which is located centromere-distal to V350 on the left arm of Chromosome III. Experiments to determine the effect of V390 deletion on *Sk-3* meiotic drive are in progress. The results presented here should shed light on the role of both DNA intervals, V350 and V390, in *Sk-3* meiotic drive.

**This Poster had been Cancelled**



## INSIGHTS INTO PROTEIN LOCALIZATION AND DEVELOPMENTAL PATTERN FORMATION USING A DROSOPHILA PROTEIN-TAGGING SYSTEM

Presenter(s): Hasan, Sumaiya, Graduate, Biological Sciences

Mentor: Dr. Kevin Edwards

Authorship: Sumaiya Hasan, Karli Erdahl, Fawwaz Ali Chowhan, Brandon Bernicky, Kevin Edwards

The environment inside the cell is highly structured, with myriad protein-protein interactions controlling the subcellular location of each protein; localization in turn regulates the protein's ability to do its job. For example, a “gene-control” protein (transcription factor) may migrate into the nucleus to regulate gene expression only under specific conditions, or a protein may associate with specific membrane-bound compartments to anchor them or move them within the cell. To identify novel protein localization mechanisms in an unbiased manner, we generated lines in *Drosophila* (fruit fly) using molecular markers to label individual genes. Our lab developed the hostile takeover (*Hto*) gene tagging method, which enables the researcher to activate the tagged genes at discrete times and in particular cell types during development. The *Hto* transposon inserts randomly in the genome, and upon activation it makes mRNA with the coding region of mCherry Red Fluorescent Protein (RFP) fused to that of the next downstream gene. The resulting fusion protein can be tracked in the cell using confocal microscopy. We previously used a live-embryo screen to recover ~50 lines with new RFP localization patterns in epidermal cells. Here we show results from a similar screen using embryo muscle cells. Two recovered lines create proteins that collect in small structures that might be protein aggregates or organelles. One of these seems to accumulate in pre-existing structures, therefore its behavior is unlikely to be due to aggregation. *Drosophila* is best known for yielding useful mutant phenotypes that can connect genes to their functional pathways in the cell or in development. To take advantage of this power, we have screened for *Hto* fusions that produce visible adult mutant phenotypes. Here we present 12 lines from a screen for fusions that disrupt wing development. Each line has a distinct wing phenotype and fusion protein localization. The line *SNK* makes fusion associated with the cell cortex and nucleus that produces multi actin-based wing hairs instead of one per cell in typical wings. *SNK* is on the X chromosome, but a core set four genes that specify wing hairs are on the autosomes. Thus, the line identifies a novel member of this pathway.

## INVESTIGATING RCRB'S ROLE IN UROPATHOGENIC ESCHERICHIA COLI 'S RESISTANCE TO HYPOCHLOROUS ACID

Presenter(s): Jackson, Charles, Undergraduate, Biological Sciences

Mentor: Dr. Jan-Ulrik Dahl

Authorship: Charles Jackson, Sadia Sultana, Jan-Ulrik Dahl

Modern medicine has made great strides in eradicating many diseases that were thought untreatable years ago. Despite the surge in medical research, pathogenic microorganisms still linger and cause significant morbidity and mortality to humans. One such organism is uropathogenic *Escherichia coli* (UPEC), the common cause of urinary tract infections (UTIs). UTIs are conventionally treated with antibiotics; however, UPEC strains are increasingly developing multidrug resistance. Hence, an essential aspect of treating UTIs would be to develop alternate therapeutic options.

In general, our immune systems are well-equipped to fight against invading pathogens. Innate immune cells, neutrophils, generate toxic antimicrobial hypochlorous acid (HOCl) to kill pathogenic organisms. Recently, Dahl lab found that UPEC's are more resistant to HOCl and neutrophil-mediated killing compared to other *E. coli*s. Dahl lab also identified the *rcrB* gene is responsible for the observed sensitive phenotype as deletion of the gene render UPEC's highly susceptible to HOCl (Sultana et. al 2022). However, how RcrB confers UPEC HOCl resistance is still unknown. Therefore, the goal of my proposed research was to understand the mechanisms behind RcrB-mediated bacterial HOCl-resistance. RcrB is located in the membrane of bacteria; and bioinformatic analyses showed it crosses the membrane four times and contains redox active amino acids, such as methionine and lysine. Methionine and lysine amino acids are well known for their antioxidant activities therefore, we hypothesize that RcrB likely plays a role as a HOCl-detoxificant.

To investigate this hypothesis, I initially performed a quenching assay where I quantified the amount of HOCl remaining in the media containing wildtype (WT) UPEC CFT073 or RcrB-deficient mutant ( $\Delta rcrB$ ) cells. And, indeed, our data suggests that the expression of RcrB potentially detoxifies the HOCl. To further confirm our hypothesis, I continued to pursue the quenching assay using a recombinant version of  $\Delta rcrB$  cells. Together this finding will solve the mystery of how UPEC utilizes RcrB to defend HOCl-stress.

## INVESTIGATING THE ROLE OF THE *ydeH* GENE IN BIOFILM PRODUCTION

Presenter: Jacobson, Grady, Undergraduate, Chemistry

Mentor: Dr. Jan Dahl

Urinary tract infections (UTIs) are among the most commonly acquired bacterial infections worldwide that affect 150 million people every year.

Women are particularly prone to developing UTI, which become increasingly difficult to treat due to emerging antibiotic resistance. The most common UTI is caused by *Uropathogenic E. coli* (UPEC), which exists harmlessly in the gut, but colonizes the bladder upon entry into the urinary tract, where they cause cystitis. Moreover, patients with catheters are at high risk for catheter associated UTIs, because UPEC adhere to and form a protective extracellular matrix forming stress- and treatment-resistant biofilm communities. To switch from the free-floating to the biofilm growth, bacteria modulate their gene expression, turning down motility related genes and induce biofilm genes, such as *ydeH*. The goal of this research is to investigate the extent to which antimicrobials affect *ydeH* expression. I performed *PydeH-lacZ* fusions and tested the effect of AGXX, a novel silver-containing antimicrobial, on the promoter activity by determining the beta-galactosidase activities. I found that the higher concentrations of AGXX lead to increased biofilm production, which shows that AGXX is not a good antimicrobial for targeting biofilms.

## FREQUENCIES OF DELETERIOUS ALLELES IN SMALL, HIGHLY ISOLATED POPULATIONS

Presenter(s): Koeplin, Madeline, Graduate, Biological Sciences

Mentor: Dr. Pirmin Nietlisbach

Authorship: Madeline Koeplin, Pirmin Nietlisbach

Genetic drift, or the alteration of gene frequencies due to random chance, is strongest in small populations. This includes deleterious, or harmful, alleles. Weakly, moderately, and highly deleterious alleles may be impacted in different ways depending on the size of the affected population, but this has rarely been researched in wild populations. The deer mouse (*Peromyscus maniculatus*) populations in the Canadian Gulf Islands are a great system to study varying deleterious allele frequency. These populations differ in size from one island to another, and genomic studies have shown that these populations are strongly isolated from each other. The objective for my study is to determine how highly and moderately deleterious allele frequencies differ in differently sized populations. I will determine this by studying island populations of deer mice in Canada's Gulf Islands. I will use samples collected in 2021, 2022, and 2023, as well as from the upcoming field seasons in the summers of 2024 and 2025.

To capture the mice, I will bait and set 120 Sherman live traps, with two traps at each site and sites being eighteen meters apart. When a mouse is found in a trap, I will weight them, visually determine their sex and reproductive status, and collect a small outer-ear sample using a hole punch. If the mouse is an adult, I will also take tail, foot, and ear length measurements. After extraction, sequencing, and amplification, I will then search for heterozygous areas within the genome, which will show differences in genetic diversity in the different populations. This will determine how the frequency of mildly and highly deleterious alleles vary in the differently sized populations. By using the deer mouse populations on the Canadian Gulf Islands, I can address questions regarding how purging and genetic drift can impact the genetic makeup of very isolated and small populations. There have been very few empirical studies regarding how population size and isolation can impact deleterious allele frequencies in natural populations. My study will broaden our knowledge in both evolutionary and conservation genetics, and in the face of increasing habitat fragmentation, this knowledge is needed.

## FIRST DESCRIPTION OF SARCOMERE BRANCHING IN THE MUSCULATURE OF THE NEMATODE CAENORHABDITIS ELEGANS

Presenter: Kollbaum, Sabrina, Undergraduate, Biological Sciences

Mentor: Dr. Andrés Vidal-Gadea

Authorship: Sabrina Kollbaum, Adina Fazyl, Andrés Vidal-Gadea

Sarcomere branching is a recently discovered fundamental aspect of muscle cell architecture that influences force transmission during movement. Despite its importance in human neuromuscular function and disease, and potential implications for diseases such as Duchenne's Muscular Dystrophy (DMD), much remains to be understood about the regulation and function of this phenomenon. In this study, we provide the first description of sarcomere branching in the nematode *C. elegans*, a model organism for muscle research. We characterize sarcomere branching in healthy and dystrophic *C. elegans* strains grown under varying conditions. We document activity-dependent changes in sarcomere branching in healthy nematodes and compare these to a dystrophic strain in a crawling environment to evaluate the impact of genetic muscular impairment. Our findings reveal distinct branching patterns responsive to environmental stress and disease state, with variations in filament thickness, inter-filament spacing, and overall muscle size. These results suggest that sarcomere branching may be an adaptable feature of muscle cells with potential implications for understanding muscle plasticity and developing therapies for DMD. This study advances our knowledge of sarcomere architecture and highlights the utility of *C. elegans* in revealing conserved mechanisms of muscle organization relevant to human health.

## STUDYING A GENETIC ELEMENT REQUIRED FOR SPORE KILLING IN *NEUROSPORA CRASSA*

Presenter(s): Lee, Jalen, Undergraduate, Biological Sciences  
Sands, Julia, Undergraduate, Biological Sciences  
Grampps, Lydia, Undergraduate, Agriculture  
Mentor: Dr. Tom Hammond  
Authorship: Jalen Lee, Julia Sands, Lydia Grampps, Tom Hammond

Some isolates of the fungus *Neurospora crassa* possess a chromosomal factor that causes spore killing, leading to death of ascospores. It has been shown that these chromosomal factors are genetic elements called spore killers. For example, if a cross is performed between a parent with an *Sk-S* (sensitive) allele and a parent with an *Sk-K* (killer) allele, the cross will produce half viable offspring and half inviable offspring, where the inviable half has been killed by spore killing. This phenomenon can be explained by meiotic drive, wherein a selfish gene disrupts the randomness of sexual transmission, favoring its own success. In this study, we focus on a *Neurospora* Spore killer known as *Sk-3*. *Sk-3* is thought to possess both a killer element and a resistance element. The resistance element is *rsk*, a gene that keeps ascospores alive and viable when in the presence of the killer element. However, the mechanism by which the killer element kills ascospores is unknown. A major obstacle to studying the killing mechanism is that the identity of the *Sk-3* killer element itself has remained elusive. Our goal is to identify the *Sk-3* killer element. We have narrowed our search to the left arm of Chromosome III. Specifically, preliminary results have shown that deletion of a 1.3 kb DNA interval, called V350, causes loss of spore killing. This suggests that a regulatory element, or a hidden gene, overlaps with the V350 interval. To help determine why V350 deletion correlates with loss of spore killing, we are examining the deletion of two related DNA intervals (V384 and V385) and reexamining the effect of V350 deletion on spore killing. The results presented here should shed light on the roles of these various DNA intervals in spore killing by *Neurospora Sk-3*.

## EMPLOYING CRISPR GENOME EDITING TO IMPROVE SEED MEAL QUALITY IN THE OILSEED PLANT PENNYCRESS

Presenter: Lima, Arjuman, Graduate, Biological Sciences  
Mentor: Prof. John Sedbrook  
Authorship: Arjuman Lima, Liza Gautam, John Sedbrook

The need for low-carbon-intensity biofuels to mitigate climate change is driving development of new oilseed crops which do not compete with food crops. One such crop is domesticated pennycress (e.g., variety CoverCress™) derived from the weed Field Pennycress (*Thlapsi arvense* L.). Pennycress has extreme cold tolerance and a relatively short life cycle allowing it to fit in the offseason between corn and soybeans in the U.S. Midwest and other temperate regions. Domesticated pennycress varieties have been developed having reduced seed coat fiber content, low erucic acid seed oil content, and which produce over 1,500 pounds of seed per acre in the lower U.S. Midwest, yielding 65 gallons of oil and 1,200 pounds of meal per acre. To improve this new crop further, we are exploring ways to improve seed meal quality through reducing seed glucosinolate and sinapic acid content. Regarding reducing sinapic acid content, two genes in which we have generated mutations using CRISPR-Cas9 targeted mutagenesis are *Ferulic Acid 5-Hydroxylase (F5H)* and *Reduced Epidermal Fluorescence 1 (REF1)*. Studies in rapeseed have shown that sinapate esters with sinapoylcholine (sinapine) contribute to the bitter taste, astringency, and dark color of seed products (Husken et al., 2005, *Molecular Breeding*). During the seed oil processing, sinapate esters gets oxidized and form complexes with proteins, thus lowering the digestibility of the meal. We found that pennycress *f5h* and *ref1* single mutants produced seeds with substantially reduced amounts of sinapic acid. *f5h* and *ref1* mutant plants grew indistinguishable from wild type suggesting that these loss-of-function mutations may be agronomically relevant. These and other data will be presented that explore genetic relationships between reductions in sinapate esters and pennycress seed meal quality.

## COVER CROP EFFECT ON SOIL FUNGAL BIOMASS

Presenter(s): Long, Brenna, Undergraduate, Biological Sciences

Mentor: Dr. Bill Perry

Cover crops can prevent soil erosion, reduce nutrient run-off, and increase soil fungal biomass leading to increased soil fertility. Healthy fungal communities are vital for litter decomposition, nutrient cycling, and mineralization in soils. We investigated the influence of differing cover crops on soil fungal biomass. We collected samples ( $n=3$ ) from plots with cereal rye and pennycress cover crops compared to a fallow reference plot. As a Brassica, pennycress produces glucosinolates which may inhibit fungal and bacterial growth. Thus, we predicted that pennycress plots would have less fungal biomass than cereal rye plots. We tested the samples for microbial carbon and fungal biomass to bacteria ratios using a microBiometer® test kit, then converted the given values to find  $\mu\text{g}$  fungal biomass per gram of soil. Cereal rye had the highest fungal biomass ( $798 \pm 235 \mu\text{g/g}$ ) followed by reference ( $441 \pm 85 \mu\text{g/g}$ ) and pennycress ( $437 \pm 213 \mu\text{g/g}$ ). Fungal biomass did not differ between groups ( $F=1.2$ ,  $df=2$ ,  $p=0.37$ ) given the small sample size. However clear trends in the data demonstrate that differences between groups may be present with increased replication, warranting further investigation. Through glucosinolate production, pennycress may inhibit the establishment of soil fungal communities. To further explore this pattern, we will measure variation in fungal biomass across soil depths and 5 different cover crop treatments- cereal rye, annual rye, golden pennycress, wild-type pennycress, and a pea-clover-radish-oat mix relative to a fallow reference. By doing so we will better understand the influence of cover crops on soil fungal communities.



## RESOURCE SUPPLEMENTATION INFLUENCES PARENTAL INVESTMENT IN AN EGG-FEEDING FROG

Presenter(s): Maertens, Hayley, Undergraduate, Biological Sciences

Mentor: Dr. Matthew B. Dugas

Parents contribute to the fitness of their offspring in many ways including providing meals. Parental care, however, often comes at the cost of other current or future reproductive opportunities, and so caring parents are expected to modulate the level of care they provide as the costs and benefits of care change. Variation in the availability of food resources is one factor that may shape why and how much parents invest in their offspring. We tested the hypothesis that variation in offspring food availability directly impacts parental investment in the mimic poison frog (*Ranitomeya imitator*), a species in which tadpoles are reared in solitary nurseries, can forage for food independently in their nurseries, and consume trophic eggs from parents. We provided broods of tadpoles with increasing amounts of food and quantified the number of trophic eggs parents provided to tadpoles and the number of reproductive eggs parents produced. Regardless of how much additional food tadpoles received, parents produced the same total number of eggs (trophic and reproductive). Parents did, however, produce proportionally more reproductive eggs when rearing tadpoles received the most additional food. Across all supplementation experiments, parents appeared to favor feeding some tadpoles over others with some tadpoles not receiving any trophic eggs at all. Collectively, these results suggest that parental investment in *R. imitator* is shaped at least partially by food availability, and that parents may assess other factors both intrinsic and extrinsic to their offspring when allocating parental investment within and among broods.

## UNUSUAL INTRONS OF THE RFK-1 GENE IN NEUROSPORA CRASSA

Presenter(s): Mahmud, Shahriar, Graduate, Biological Sciences

Mentor: Dr. Tom Hammond

Authorship: Shahriar Mahmud, Gabriela Mendoza-Rangel, Nicholas Rhoades, Tom Hammond

The selfish genetic element *Spore killer-2* (*Sk-2*) is transmitted to viable *Neurospora* ascospores in a biased manner through spore killing. Spore killing is dependent on a gene called *required for killing-1* (*rfk-1*). This gene contains four exons and three introns. Intron 1 is unusual because it contains seven repeats of a 46–48 bp sequence. While the importance of Intron 1 to *rfk-1* function is unclear, our preliminary data suggests that Intron 1 is critical for phenotypic expression of *rfk-1*. Here, we present our current results concerning the roles of *rfk-1* introns in *rfk-1* phenotypic expression.

## **PRAIRIE VAMPIRES: PATHWAYS BY WHICH HEMIPARASITIC *PEDICULARIS CANADENSIS* INFLUENCES COMMUNITY DYNAMICS IN THE PRESENCE OF INVASIVE *LESPEDEZA CUNEATA***

Presenter(s): McGinnis, Cassie, Graduate, Biological Sciences

Mentor: Dr. Victoria Borowicz

Authorship: Cassie McGinnis, Victoria Borowicz

Hemiparasitic plants attach to host plant roots or shoots via specialist structures called haustoria for carbon, nutrients, and water while still retaining functional chloroplasts for photosynthesis. These plants can influence plant communities through theft of resources or modification of nutrient availability, and thus hemiparasites potentially alter prairie biodiversity and resistance to invasion. The native root hemiparasite *Pedicularis canadensis* can alter tallgrass prairie community composition, but how this occurs is not known. Two mechanisms have been postulated. It could act as a Keystone Species if it reduces growth of competitively dominant species more than competitively subordinate species. It could act as an Ecosystem Engineer if it alters nutrient availability for other species through nutrient-rich plant litter and changes the soil microbial community. Through both these mechanisms *P. canadensis* could alter a prairie's susceptibility to invasion. The goals of my thesis research are: (1) to determine the mechanisms by which *P. canadensis* affects its local community, and (2) to determine if *P. canadensis* can impede the establishment and spread of the invasive species *Lespedeza cuneata*. In 2006, 96 1-m<sup>2</sup> plots were established on a restored prairie to test effects of fertilizer and hemiparasite removal on hemiparasite-community relations. The community composition and dry mass of *L. cuneata* and *P. canadensis* in plots were previously assessed in 2015 and all treatments were discontinued. In summer 2024 I will record the presence and percentage cover of species in these plots and determine species richness, relative abundances of species, and dry mass of *L. cuneata* and *P. canadensis*. I will also sample soil from the center of each plot to characterize the soil microbial community. I will use these new data and data from 2015 in structural equation modeling to test hypotheses for the role of *P. canadensis* in the prairie. Knowing how hemiparasites such as *P. canadensis* impact local biodiversity and resistance to invasion and identifying the mechanisms by which they produce these effects can inform prairie management and restoration. Knowledge regarding hemiparasites may help practitioners control invasive species and develop seed mixes for resilient prairie communities.

## **UNDERSTANDING THE ROLE OF ANTIOXIDANT ENZYMES IN PROTECTING AGAINST OXIDATIVE STRESS DURING EMBRYONIC DEVELOPMENT**

Presenter(s): Montalbano, Caitlin, Undergraduate, Biological Sciences

Mentor: Dr. Ryan Paitz

Oxidative stress occurs when tissues experience an imbalance of reactive oxygen species (ROS) and antioxidant defenses. This oxidative stress can cause detrimental damage to key cell structures and the DNA of an embryo. Glutathione peroxidase 1 (GPX4) and thioredoxin (TRX) are two antioxidant enzymes that provide defense against ROS and oxidative damage. Thus in this study, we were interested in the effects of inhibiting these enzymes and how it would affect embryo survival and growth in chickens. The hypothesis is that early embryonic exposure to inhibitors of TRX and GPX4 will result in overall low embryo mortality and weight due to the lack of defense against oxidative stress. Embryonic sex was also assessed through PCR to test for sex-specific responses to the inhibitor treatments. We hypothesized that females will be affected by the inhibition of TRX because the TRX gene is located on the Z chromosome and females only have a single Z chromosome. Our results revealed no effect of either enzyme inhibitor on embryonic survival or growth. There were also no differences between the sexes. Thus from these results, we can conclude that effects of inhibiting antioxidant enzymes might only occur when embryos are faced with an oxidative challenge like paraquat. We then conducted a study investigating embryonic responses to paraquat and potential antioxidant defenses. In this study, the hypothesis is that early embryonic exposure to paraquat will result in low embryo weight and mortality due to the increase of oxidative damage. We also tested the hypothesis that glutathione (GSH) provides protection against the effects of paraquat. We exposed embryos to a drug that reduces cysteine uptake (Erastin), because cysteine is necessary for GSH production. We predicted that exposure to this drug plus the paraquat will result in an even lower embryo mortality and weight compared to paraquat alone. Furthermore, we wanted to see the effects of directly inhibiting GSH synthesis Buthionine sulfoximine (BSO) and predicted early embryonic exposure to BSO plus

## **POLLEN DIET AND THE GUT MICROBIAL COMMUNITY AND HEALTH OF BUMBLE BEES**

Presenter(s): Mwilambwe, Amelie, Undergraduate, Biological Sciences

Mentor: Dr. Ben Sadd

Co-Mentor: Dr. Logan Sauers

Authorship: Amelie Mwilambwe, Logan Sauers, Ben Sadd

Gut microbial communities or microbiota play crucial roles for host health, aiding in digestion, detoxification, and defense. Yet, these communities vary and understanding the factors that influence community membership and function is essential to appreciate the effects on health. There is a clear connection between a host's diet and its gut microbial community, but diet diversity and its relationship is relatively understudied in important pollinating insects. We used the model host-gut microbiota system of a bumble bee to investigate how pollen diet influences its gut microbiota and health. Bumble bees are naturally and agriculturally important pollinators, but land use changes have consequences for their diet. We hypothesize that due to variation in nutrition and diversity diet will affect bumble bee microbiota structure and consequently health. Adult bees were given one of five diet treatments, including no pollen, one of three individual pollen types varying in nutritional content, or a diverse mix of the three pollen types. These bees were sampled for their gut microbiota composition or survival under stressful conditions. Results are still being analyzed, but we predict a diverse pollen diet leads to health microbiota establishment and single pollen diets will differ depending on their nutritional profiles, with the consequences for survival. This work increases our knowledge of the link between diet, gut microbiota and host health in general, and additionally how pollen availability may affect health and conservation of a key pollinator through effects on its microbiota.

## IDENTIFYING NEURONAL EXPRESSION AND FUNCTION OF DYSTROPHIN IN THE NERVOUS SYSTEM OF THE NEMATODE *CAENORHABDITIS ELEGANS*

Presenter(s): Niha, Shifat, Graduate, Biological Sciences

Mentor: Dr. Andrés Vidal-Gadea

Authorship: Shifat Niha, Andres Vidal-Gadea, Adina Fazyl

Duchenne Muscular dystrophy (DMD) is a progressive muscle degenerative disease caused by mutation in the gene encoding the dystrophin protein. Several isoforms of the dystrophin protein are expressed in both muscle tissues and the neurons. Dystrophin in the muscles play critical role in maintaining the structural stability of the muscle fiber; however, its precise functions in neurons remain unknown, as does the mechanism by which its loss contributes to the recognized neurological phenotypes in this condition. Although *C. elegans* are known to carry a homologue of human dystrophin (*dys-1*), and have been used to study DMD for decades, the cellular and subcellular expression pattern of *dys-1* in the neurons is still unknown. The goal of this study is to get a better understanding of the function of dystrophin in the nervous system, and their potential involvement in the neurological phenotypes observed associated with DMD. To identify the neurons expressing different *dys-1* isoforms, we have used a transgenic strain of *C. elegans* containing multiple neuron-specific reporters, each of which expresses a unique combination of fluorophores.

Preliminary data have indicated distinct expression patterns of dystrophin isoforms in different neurons. Behavioral assays using *dys-1* mutants showed diverse abnormalities in the behaviors associated with the neurons expressing the gene. The completion of this study will shed light on an effective system to study the neurological aspects of Duchene muscular dystrophy using *C. elegans*.

## LETHALITY RATES OF HYDROGEN SULFIDE IN CHICKEN EMBRYOS

Presenter: Noel, Jady, Undergraduate, Biological Sciences

Mentor: Dr. Ryan Paitz, Biological Sciences

Authorship: Jady Noel, Ryan Paitz

Bacterial infections during pregnancy are a cause of mortality and preterm delivery in fetuses. These infections occur in maternal tissues such as the uterus or fetal tissues such as the placenta. And while we know infections are linked with infertility, miscarriage, and premature birth, the specific factors that cause these effects remain unknown. Some effects may be mediated by the maternal immune response, while others may be due to a direct response of embryos to the bacteria. Chicken embryos provide an opportunity to determine how embryos directly respond to bacteria because they develop independently from maternal circulation/immune responses. The goal of this study is to isolate the causative agent from bacteria that is responsible for the detrimental effects on growth and survival. Since many bacteria are known to release hydrogen sulfide, a colorless gas that can have negative effects on cells, we tested the effect of hydrogen sulfide exposure on chicken embryo development. High exposure to H<sub>2</sub>S is lethal due to how easily it is oxidized in the presence of ions and metals.

However, minimal concentrations are necessary for essential biological processes such as energy metabolism and disease stress resistance. To test the effect of H<sub>2</sub>S on embryos, we will inject GYY 4173, a water-soluble compound that releases H<sub>2</sub>S to evaluate if H<sub>2</sub>S affects embryonic growth or mortality. The embryos will be divided into 3 groups that will be exposed to a low concentration, high concentration, or vehicle only control. The embryos will be incubated for 2 weeks post-injection and evaluated for change in growth and viability. This experiment can give insight as to what concentrations of hydrogen sulfide are lethal, while also giving insight to limiting embryonic responses to bacteria early in development.

## CAN RELACORILANT PREVENT THE NEGATIVE EFFECTS OF GLUCOCORTICOID EXPOSURE?

Presenter(s): Roseland, Anna, Undergraduate, Biological Sciences

Mentor: Dr. Ryan Paitz

Investigating embryos within the first few weeks of development allows for further understanding of embryonic endocrinology and their responses to their environment. Previous investigations demonstrated that early embryonic exposure to glucocorticoids was lethal, but this lethal effect could be prevented by pharmacologically blocking the glucocorticoid receptor with the drug RU486. Unfortunately, administering RU486 early and late in development also led to decreased embryo mass by day fourteen of development. This effect of RU486 on growth may be due to off-target effects the drug has on other receptors, such as the progesterone receptor. The goal of this study is to use a newer drug (Relacorilant) that is more selective for the glucocorticoid receptor than RU486. Relacorilant is predicted to prevent glucocorticoid induced mortality without decreasing embryonic growth. In order to determine the most effective dosage of Relacorilant that does not decrease embryonic growth, we investigated the effects of varying Relacorilant dosages during the first fourteen days of development and identified several low doses that did not reduce growth. Therefore, the most recent study conducted investigated a variety of low-dose Relacorilant treatments in order to find the most effective dosage in increasing survival following corticosterone exposure. 120 eggs were split into four randomized treatment groups. One group received an injection of oil (Control group). One group received an injection of 10  $\mu\text{g}$  of corticosterone (Cort Only). The other two groups received 10  $\mu\text{g}$  of corticosterone plus 1  $\mu\text{g}$  of Relacorilant (High), or 10  $\mu\text{g}$  of corticosterone plus 0.1  $\mu\text{g}$  of Relacorilant (Low). After the injections were complete, the eggs were then placed to be incubated for 14 days. Following the incubation period, embryos were dissected from the egg and weighed. The results of this study revealed that the low concentration of Relacorilant prevented the negative effects of corticosterone on embryonic growth and resulted in embryos that were similar to the control.



## COOPERATION AMONG ANTIPHONAL-DUETTING PARTNERS

Presenter(s): Schinzler, Rachel, Graduate, Biological Sciences

Mentor: Dr. Carlos Rodríguez-Saltos

Authorship: Rachel Schinzler, Carlos Rodríguez-Saltos

In duetting songbirds, females and males combine their vocalizations. In antiphonal duetting, the birds precisely alternate their vocalizations. Males and females each have certain syllables that are followed by a corresponding syllable from the opposite sex as they build their vocalizations. This precision suggests a strong social bond between partners. We will test this hypothesis using plain-tailed wrens (*Pheugopedius euophrys*). To evaluate the strength of their bond, we will use operant conditioning to test for a preference for the partner's song. Our operant conditioning device is a cage that contains a key on either side of the cage. It has a speaker connected to each key that plays a plain-tailed wren vocalization when pressed. One key has a higher probability of playing the vocalization of the subject's partner. The other has a higher probability of playing the vocalization of a conspecific of the opposite sex. This way, the subject can still have balanced exposure to either individual. We expect that preference for that song will be correlated with the level of coordination between partners. We propose studying coordination among socially bonded birds to understand turn-taking amidst social interactions.

## ESTABLISHING GENOME EDITING IN MARBLED CRAYFISH

Presenter(s): Seymour, Mackenzie, Graduate, Biological Sciences  
Mentor: Prof. Wolfgang Stein  
Co-Mentor: Prof. Andrés Vidal-Gadea  
Authorship: Mackenzie Seymour, Andrés Vidal-Gadea, Wolfgang Stein

Gene editing is a powerful tool to generate insight into development and function of physiological processes, including those in the nervous system. However, few organisms are amenable to gene editing using currently available technologies and to test the neurophysiological effects of that editing. While many organisms studied today can either be genetically modified or measured neurophysiologically, most lack the ability to combine both of these characteristics. We are addressing this issue by expanding genetic tools for use in decapod crustaceans. Decapod crustaceans possess large, well-characterized neurons that have been used as neurophysiology models for several decades. These neurons allow access for real time physiology measurements in both individual neurons and whole circuits with long tissue survival. One species that shows potential for applying genetic tools is the marbled crayfish (*Procambarus virginalis*) because it produces genetically identical offspring through parthenogenesis and has a fully sequenced genome and transcriptome. We aim to establish genome editing in oocytes of this species by using the gene editing system CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) in conjunction with the novel method ReMOT Control (Receptor-mediated Ovary Transduction of Cargo). Traditional applications of CRISPR for germline editing involve delivery of the protein Cas9 to developing eggs, for example through embryonic microinjections, which have low success rates due to high rates of damaging eggs and anatomical barriers. To overcome this barrier, ReMOT Control bypasses individually injecting eggs by molecularly delivering proteins of interest to developing eggs through hijacking the vitellogenesis pathway, which is the naturally occurring process of transporting vital nutrients to eggs in oviparous animals. Injecting vitellogenic females with an arthropod ligand derived from the vitellogenesis pathway bound to Cas9 have shown successful gene editing capabilities in several invertebrates. Based on these observations, we expect Cas9 to be delivered into developing eggs of marbled crayfish. To confirm successful gene editing, we are targeting a phenotype that can easily be detected early in development, such as eye pigmentation (*scarlet*) and eye development (*eyeless*). Our preliminary data indicate that this method of gene editing is successful, making marbled crayfish the first crustacean to have CRISPR/ReMOT Control established. However, our data also indicates that this method may result in lethality in some offspring during larval development. We are currently optimizing this process, and testing the success and effects of editing these genes.

## TEMPERATURE RESPONSES OF CRUSTACEAN DESCENDING MODULATORY PROJECTION NEURONS

Presenter: Steiger, Charlotte, Undergraduate, Biological Sciences

Mentor: Dr. Wolfgang Stein

Authorship: Charlotte Steiger, Liisi Vink-Lainas, Wolfgang Stein

Rapidly changing temperatures are a major challenge to neuronal function. This can cause an imbalance of ionic conductances that are key to normal neuronal and synaptic activity. This is a threat for ectothermic species that experience rapid environmental temperature fluctuations, like natural and climate-change related weather extremes. Nevertheless, some species that possess physiological mechanisms can mitigate the effects of temperature changes in the nervous system and as a result withstand a wide range of temperatures. We have previous data that suggests that the release of peptide modulators in the nervous system enables temperature robustness, while also suggesting that the activity of the modulatory neurons that release the peptides increases with temperature as well. However, this has so far only been investigated in one animal species, the Jonah crab (*Cancer borealis*). We are now testing a second species to investigate the hypothesis that neuropeptide release enables temperature robustness across crustacean species. To test this hypothesis, we investigate temperature responses of descending modulatory neurons in the crustacean stomatogastric (STG) nervous system of green crabs (*Carcinus maenas*). We predict that the firing rates of these neurons will increase with higher temperatures. Specifically, we record the firing rates of the modulatory commissural neuron 1 (MCN1) and its postsynaptic target, the lateral gastric neuron (LG). We dissect and isolate the stomatogastric nervous system and extracellularly record MCN1 and LG. To test whether temperature directly or indirectly affects MCN1 firing rates, we manipulate temperature separately for MCN1 and LG through the creation of petroleum jelly wells with separate temperature control. If MCN1 firing rate increases as predicted, this would indicate that modulatory projection neurons respond to temperature and may contribute to enabling temperature robust neuronal activity.

## **SURVIVAL OF THE FITTEST: UROPATHOGENIC ESCHERICHIA COLI'S INCREASED RESISTANCE TO NEUTROPHILIC ANTIMICROBIAL HYPOCHLOROUS ACID**

Presenter(s): Sultana, Sadia, Graduate, Biological Sciences

Mentor: Jan-Ulrik Dahl

Activated neutrophils generate reactive oxygen and chlorine species (RO/CS) to eliminate invading pathogens in a process named phagocytosis. Hypochlorous acid (HOCl) is the most potent neutrophilic RO/CS and kills pathogens mainly through widespread oxidative damage of cellular macromolecules. Recently, we reported that uropathogenic *Escherichia coli* (UPEC), the common etiological agent of urinary tract infections, is substantially more resistant to HOCl exposure and neutrophil-mediated killing than intestinal *E. coli* pathotypes. We identified the molecular mechanism behind UPEC's increased HOCl resistance: an operon consisting of three uncharacterized genes, *rcrA*, *rcrR*, and *rcrB*. Upon exposure to sublethal HOCl, UPEC cells upregulate this operon. We characterized RcrR as a HOCl-sensing transcriptional repressor that represses the operon during non-stress conditions and becomes inactivated during HOCl-stress, resulting in the expression of target genes *rcrA* and *rcrB*. Moreover, our data confirmed that *rcrB* is particularly crucial for UPEC's increased HOCl resistance; *rcrB*-deficient UPEC strains (both lab strains and clinical isolates) are as sensitive to HOCl as intestinal *E. coli* pathotypes. Alternatively, recombinant expression of RcrB in HOCl-sensitive intestinal *E. coli* renders the strain highly resistant to HOCl.

RcrB is a putative membrane protein with an unknown function; hence, the overarching goal of my research is to identify RcrB's mode of action. We hypothesize that RcrB likely functions as a barrier to potentially reduce HOCl influx into the cell. To decipher the precise mechanism of RcrB, we will now investigate the HOCl-influx into the cell using redox sensing probes and will analyze potential molecular interaction partners of RcrB using immunoprecipitation and proteomics analyses. Deciphering RcrB's role in bacterial HOCl defense will help us to better understand how UPEC survives in HOCl-rich environments such as the urinary tract.

## **INVESTIGATING OXIDATIVE DAMAGE AS A MECHANISM UNDERLYING LETHAL CONSEQUENCES FROM EMBRYONIC EXPOSURE TO CORTICOSTERONE**

Presenter(s): Tillman, Libby, Undergraduate, Biological Sciences

Mentor: Dr. Ryan Paitz

Authorship: Libby Tillman, Ryan Paitz

Vertebrates increase their production of glucocorticoids to coordinate a physiological response to an external stressor. When a developing embryo is exposed to glucocorticoids, it can negatively affect its growth and survival. These effects are hypothesized to arise because activation of the glucocorticoid receptor induces inappropriate gene expression that leads to oxidative damage.

Antioxidants, such as vitamin E, may prevent oxidative damage caused by free radicals. In a previous study, we tested the hypothesis that embryonic glucocorticoid exposure increases oxidative damage and leads to negative effects on growth and survival. We found that adding Vitamin E to corticosterone-exposed chicken embryos did not prevent negative effects on growth and survival. In the current experiment, we will test the same hypothesis, but with two other antioxidants, glutathione and trolox. Trolox and glutathione will be separately injected into eggs already injected with corticosterone, alongside two other treatments of oil (control) and corticosterone in oil. After being incubated for fourteen days, the embryos will be dissected from their shells and weighed. We will determine whether or not introducing an antioxidant to eggs exposed to corticosterone will negate increased mortality and decreased embryonic growth.

Understanding the relationship between glucocorticoid exposure and embryonic effects allows for appropriate action most beneficial for the developing fetus. If oxidative damage explains the cause of these effects, antioxidant use as a preventative measure can be looked into in future studies.

## CHEMISTRY

### TMC-126: CONVERGENT ASYMMETRIC SYNTHESIS OF THE HIV DRUG TMC-126 USING THE CRIMMINS' AUXILIARY IN A NON-EVANS SYN-GLYCOLATE ALDOL ADDITION PATHWAY

Presenter(s): Affram, Kweku Amaning, Graduate, Chemistry

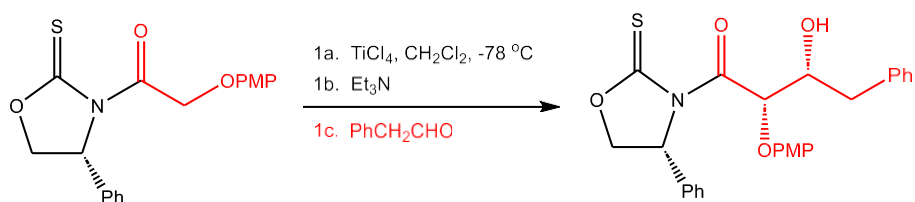
Mentor: Dr. Shawn R. Hitchcock

Authorship: Kweku Amaning Affram, Shawn R. Hitchcock, Joy Odeh

Today, millions of people around the world have HIV and much research have been done in order to treat it. Highly active antiretroviral therapy (HAART) has significantly reduced the mortality and morbidity rate across the world. HAART employs a combination of some classes of inhibitors mainly reverse transcriptase, integrase and protease inhibitors that are potent against the virus but overtime the viral strain develop resistance against the potent HAART combination. TMC-126 is an anti-viral medication used in the treatment of human immunodeficiency virus type 1 (HIV-1). A special area known as the catalytic dyad, formed from two aspartate molecules, is responsible for breaking peptide bonds so that the peptide fragments can be used to propagate the virus. TMC-126 is a protease inhibitor; the alcohol group on TMC-126 interacts with the carboxylic acids on the aspartate molecules in the catalytic dyad to inhibit further protease activity and prevent replication of the virus. Compared to some of the other drugs that are being used, TMC-126 has shown to be the most potent in terms of inhibiting the enzyme and antiviral activity. It is also highly successful in preventing numerous drug-resistant mutations thus making it that much more of an effective treatment.

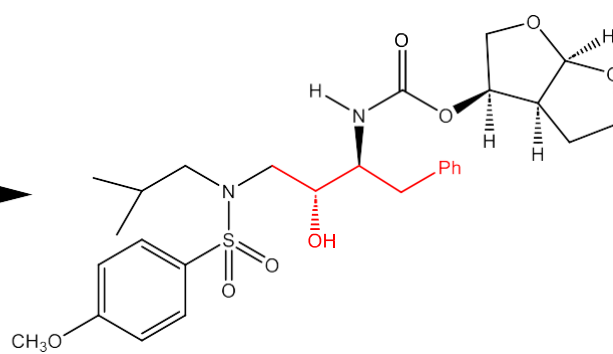
The goal of our research lab is to synthesize this HIV protease inhibitor through an asymmetric glycolate aldol addition approach. We will accomplish this by focusing on the synthesis of a beta lactone that would be used as a building block for this process and ultimately become another pathway in the treatment of this disease.

With this project, we are seeking to develop a more efficient stereoselective method for the synthesis of TMC-126.



*transamidation*  
*borane reduction*  
*bis-nosylation*

*azidation*  
*deprotection*  
*reduction/acylation*



## **OXIDOPYRYLIUM-BASED (5+2) CYCLOADDITIONS WITH AMINE TETHERS**

Presenter(s): Alende, Joy, Graduate, Chemistry

Mentor: Dr. Andy Mitchell

Cycloaddition reactions are fundamental in organic chemistry, effectively synthesizing essential ring structures found in pharmaceuticals and biologically significant compounds. While the [4+2] Diels-Alder cycloaddition is widely known, the (5+2) variant is less recognized. (5+2) cycloadditions involving oxidopyrylium intermediates offer a convenient route for building complex seven-membered ring systems, crucial components in various biological molecules. In this work, we explore the synthesis of substrates with amine tethers to further investigate oxidopyrylium-based (5+2) cycloadditions.

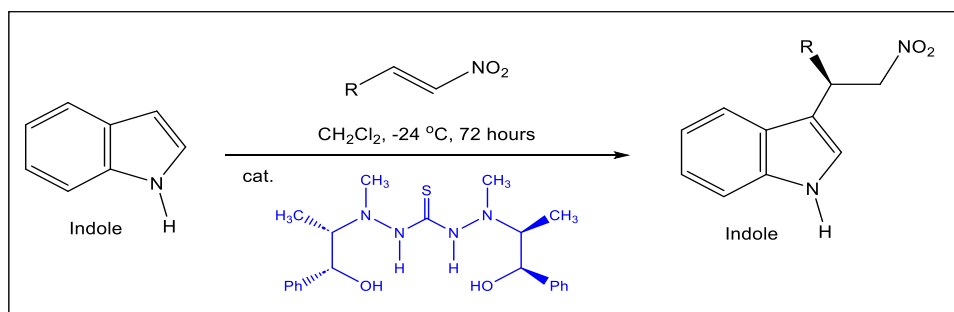
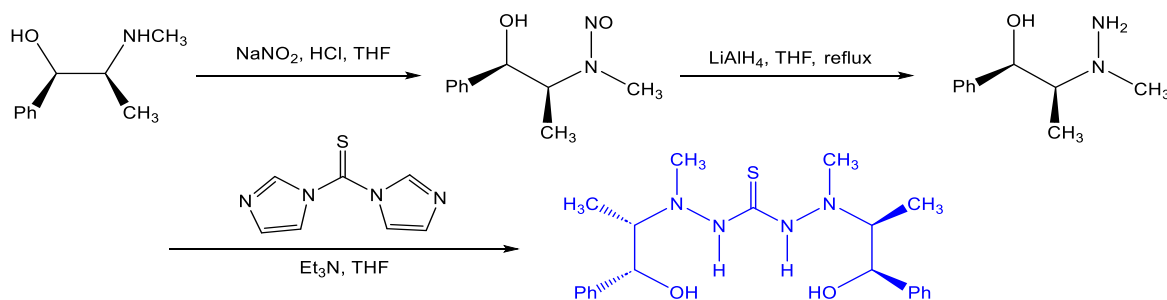


# CHIRAL THIOUREAS BASED ON BETA-HYDROXY-HYDRAZINE TEMPLATES: TOWARDS THE DEVELOPMENT OF A HIGHLY ENANTIOSELECTIVE ORGANOCATALYSTS FOR THE ASYMMETRIC FRIEDEL-CRAFTS REACTION

Presenter(s): Alongi, Gia, Undergraduate, Chemistry

Mentor: Dr. Shawn Hitchcock

Initially discovered in 1877, the Friedel-Crafts reaction was developed as a powerful tool for the direct alkylation of aromatic rings with alkyl halides. The process would grow to encompass numerous alkylating sources such as alcohols and simple alkenes in the presence of an appropriate acid catalyst. The Friedel-Crafts reaction has since evolved into an important foundational reaction with the domain of synthetic organic chemistry. The reaction of heteroaromatic compounds such as indole with nitroalkenes has proven to be a valuable process for the formation of functionalized indole substrates. Often, there is a need to obtain the enantiomerically enriched forms of such substrates for the purposes of medicinal studies. In this context, the organocatalytic asymmetric Friedel-Crafts reaction has been exploited as a key reaction in the synthesis of functionalized indoles. In 2023, Benjamin List and coworkers from the Max Planck Institute have recently explored the use of organocatalysts for unactivated aromatic systems. This recent work appears in the Journal of the American Chemical Society and shows the value of this work. This poster will describe the efforts thus far in synthesizing a new class of chiral thiourea catalysts using (1R,2S)-ephedrine as a key building block. The poster will also describe the efforts that have taken place so far to catalyze the reaction of indole with beta-nitrostyrene in an enantioselective fashion.



**This Poster Has Been Canceled**

## INVESTIGATIONS INTO THE SYNTHESIS OF QUINONE-FUSED CARBAPORPHYRINS

Presenter: Awa, Francis, Graduate, Chemistry

Mentor: Dr. Timothy Lash

Authorship: Francis Awa, Timothy Lash

Porphyrins are macrocyclic derivatives that occur naturally and represent examples of non-benzenoid aromatic systems. Porphyrins have become of great interest as they offer many applications in science and industry. Owing to the immense importance of porphyrins, many related macrocycles have been synthesized. In carbaporphyrins, a carbon atom replaces one nitrogen in the internal cavity, while in N-confused porphyrins (NCPs), an inverted pyrrole unit is incorporated that places a nitrogen at the periphery. Extending the conjugation of porphyrinoid systems is also of great interest and this can be achieved by fusing aromatic rings at one or more of the pyrrole units as in benzoporphyrins and naphthoporphyrins. In previous studies, carbaporphyrins with fused benzene, naphthalene and anthracene units were investigated. In an extension of these studies, the synthesis and properties of carbaporphyrins with fused naphthoquinone or anthroquinone units is under investigation. The preparation of quinone-porphyrin adducts 1 requires the availability of suitable dialdehyde precursors. 1,4-Naphthoquinone and 1,4-anthroquinone underwent Diels-Alder cycloadditions with 1,3-cyclopentadiene to give norbornene adducts 2. Attempts to convert 2 into required dialdehydes 3 were unsuccessful and an alternative strategy was investigated. Reaction of 2 with methyl iodide and 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU) gave dimethoxy derivatives 4. Reaction with potassium permanganate afforded dialcohols that underwent ring cleavage with potassium periodate to afford dialdehydes 5. Condensation of 5 with tripyrrane 6 in the presence of trifluoroacetic acid, followed by oxidation with 2,3-dichloro-5,6-dicyano-1,4-benzoquinone (DDQ), gave modest yields of dimethoxynaphtho- and dimethoxyanthrocarbaporphyrins 7. Current investigations are being directed towards improving the yields of the dimethoxy derivatives and in developing alternative routes to quinone-fused carbaporphyrins 1. The results of this research will demonstrate the influence of fused quinone aromatic units on the spectroscopic properties, aromatic characteristics, and chemical reactivity of fused carbaporphyrinoid systems.

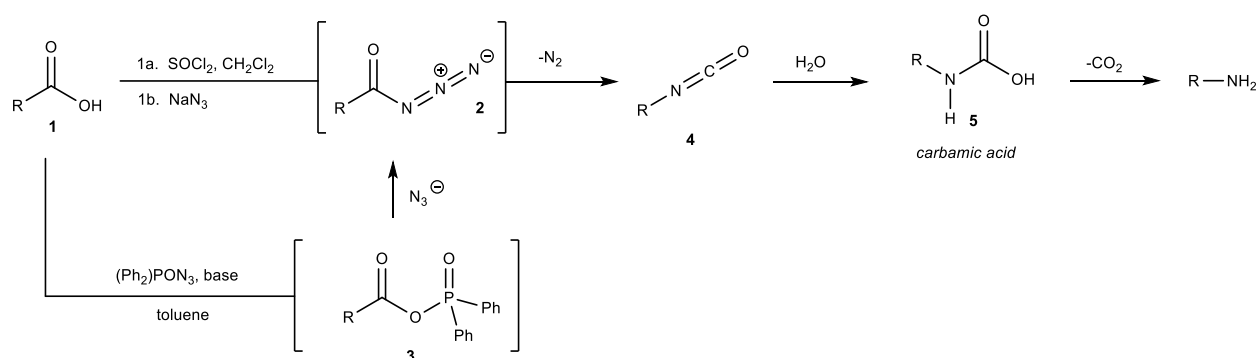
# THE CURTIUS REARRANGEMENT OF (*R*)-ALPHA-METHOXYPHENYLACETIC ACID: ISOLATION OF THE THERMALLY LABILE ISOCYANATE INTERMEDIATE WITH PHENOLIC SUBSTRATES

Presenter(s): Bambalas, Lillian, Undergraduate, Chemistry

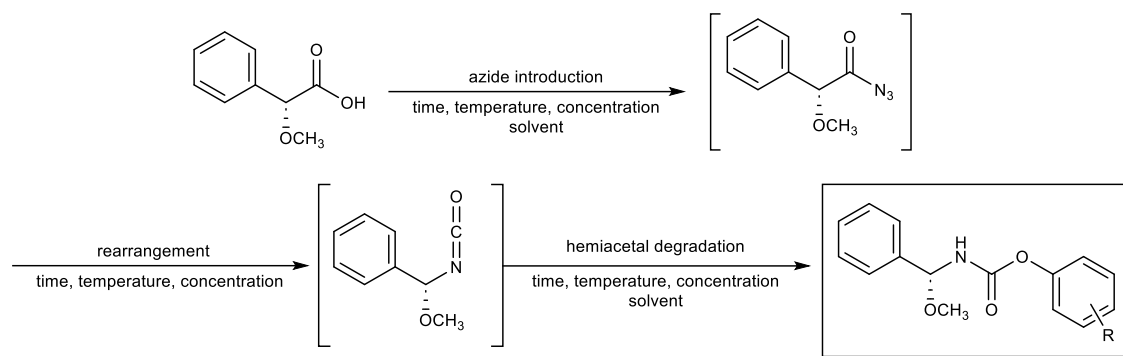
Mentor: Dr. Shawn R. Hitchcock

Authorship: Lillian Bambalas, Joy Odeh, Jordan M. Witte, Shawn R. Hitchcock

The Curtius reaction<sup>1</sup> and its variants (the Lossen rearrangement, the Hofmann rearrangement, and the Schmidt rearrangement) are well-known reactions in synthetic organic chemistry. This class of reactions converts carboxylic acids into amines with the loss of a carbon in the form of carbon dioxide. The overall process has been known for more than a century and has been recently review by Ghosh and coworkers.<sup>1</sup> The Curtius rearrangement can be carried out in a variety of ways. In one variant, a carboxylic acid is converted to the corresponding acyl chloride and then into an acyl azide (**2**) by addition of sodium azide (Scheme 1). Upon heating, the acyl azide undergoes a thermal decomposition to form a transient isocyanate intermediate (**4**) that reacts with water to yield a carbamic acid that releases carbon dioxide to become the free amine. In an alternate pathway, the reagent diphenylphosphoryl azide (dppa) is reacted with carboxylic acid in the presence of a base such as triethylamine to lead to the *in-situ* formation of an activated mixed anhydride (**3**) of the carboxylic acid. This intermediate undergoes nucleophilic displacement with azide to yield the acyl azide that undergoes the thermal rearrangement to form the key isocyanate. In this research program, the stated hypothesis is that the introduction of an electron withdrawing group in the alpha position of the carboxylic acid will allow for the formation of structurally novel systems not normally accessible via conventional synthetic means (Scheme 2). It has been determined through experimentation that the introduction of an alpha-methoxy group to the carboxylic acid causes the isocyanate to form more rapidly than is normally expected and leads to the formation of *O*-methyl hemi-aminals rather than a free amine. This poster describes the discovery work that was initiated to optimize the formation of the isocyanate intermediate and its trapping with a variety of phenolic substrates.



**Scheme 1.** The Curtius Rearrangement.



**Scheme 2.** The Curtius Rearrangement of  $\alpha$ -methoxyphenylacetic acid.

## CHARACTERIZATION OF PROTEIN THIOLATION ON ADSORPTION AND ACTIVITY UPON IMMOBILIZATION TO GOLD NANOPARTICLES

Presenter(s): Breausche, Faith, Undergraduate, Chemistry

Mentor: Dr. Jeremy Driskell

Authorship: Faith E. Breausche, Annelise H. Somerlot, Jason R. Walder, and Jeremy D. Driskell

Conjugation of proteins to gold nanoparticles (AuNPs) is an expanding area of study for its ability to enhance novel drug delivery systems, imaging, immunoassays, and biosensing techniques. This research aims to gather a better understanding and facilitate protein adsorption through alteration of protein chemistry as opposed to modification of the AuNP surface chemistry. In specific, the model enzyme, horseradish peroxidase (HRP), is thiolated via Traut's reagent to increase the robustness and enzymatic activity of the bioconjugate. This is speculated to occur as the addition of a sulfhydryl group increases the protein's affinity for the AuNP surface. This study explores the impact of protein thiolation on the immobilization to the AuNP in addition to the enzymatic activity. Immobilization of HRP and its thiolated analog (THRP) were analyzed through UV-Vis spectroscopy, circular dichroism, zeta potential measurements, and enzyme-substrate kinetics assays. The substrate 2,2'-azinobis [3- ethylbenzothiazoline-6-sulfonic acid]-diammonium salt (ABTS) was utilized to quantitatively evaluate the product development of the bioconjugates. Additionally, the resulting enzymatic activities provide a quantitative method to determine the ratio of enzymes adsorbed per AuNP. Our data show greater adsorption for THRP in comparison to HRP on the AuNP as the interactions are due to the added sulfhydryl group as opposed to electrostatic interactions. The increase in molecules result in a considerable increase in bioconjugate activity. Preliminary studies also suggest that immobilization of THRP extends the lifetime of enzyme structure and function. The outcome of this investigation emphasizes the benefits of protein-AuNP bioconjugate applications in the advancement of medicinal and bioanalytical methods.

## INVESTIGATIONS INTO CONJUGATION PATHWAYS IN ANNULATED PORPHYRINS: SYNTHESIS OF N-METHYLPYRENOPORPHYRINS

Presenter(s): Carpenter, Brian, Graduate, Chemistry

Mentor: Dr. Timothy Lash

Authorship: Brian Carpenter, Timothy Lash

Porphyrins are highly conjugated, strongly colored macrocyclic compounds consisting of four pyrrole units linked by methine bridges. A typical porphyrin contains an 18  $\pi$  electron conjugation pathway that makes it strongly aromatic. The porphyrin system can be modified in a variety of ways, including by the introduction of fused aromatic moieties. In earlier studies, a series of porphyrins with fused pyrene units were synthesized but only minor changes were observed in the UV-vis spectra. Porphyrins have two inner protons that are orientated trans to one another but two nonequivalent tautomers, 1 and 2a, may be present. In tautomer 1, the aromatic conjugation pathway is disconnected from the pyrene, but in tautomer 2a, extended conjugation pathways with up to 30  $\pi$  electrons are possible. In order to gain a better understanding of this issue, an N-methylated pyrenoporphyrin 2b was targeted that blocks tautomerization. Barton-Zard condensation of 4-nitropyrene with ethyl isocyanoacetate in the presence of a phosphazene base gave pyrenopyrrole 3. Alkylation with NaOH and methyl iodide in DMSO gave N-methyl derivative 4a and subsequent cleavage of the ester group with KOH in ethylene glycol at 200 °C afforded 4b. Reaction with 2 equivalents of acetoxymethylpyrrole 5 in acetic acid-isopropyl alcohol afforded tripyrrane 6. Removal of the terminal tert-butyl ester protective groups with TFA and condensation with pyrrole dialdehyde 7 gave N-methyl pyrenoporphyrin 2b. Details of the spectroscopic characterization for 2b will be presented and evidence for extended conjugation presented. The same concepts are currently being applied to the synthesis of N-alkylated porphyrin analogues.

## **DEVELOPING A ONE POT SYNTHETIC PROCESS FROM NITRILES TO OXADIAZOLES: SYNTHESIS OF 1,2,3-OXADIAZOLE ANTIMICROBIAL AGENTS AGAINST PATHOGENIC BACTERIA IN THE GASTROINTESTINAL TRACT**

Presenter(s): Carter, Austin, Graduate, Chemistry

Mentor: Dr. Shawn R. Hitchcock

Authorship: Austin J. Carter, Desmond H. Murray, Shawn R. Hitchcock

1,2,4-Oxadiazoles are 5-membered ring heterocyclic structures that possess an array of biologically important properties. This family of compounds was first synthesized by Tiemann and Krüger in 1884.<sup>1</sup> Interest in these compounds had been limited until the 1960s when the pharmaceutical drug Oxolamine was introduced as a cough suppressant.<sup>2</sup> Further studies with these compounds have led to the discovery of a vast array of biological properties that these compounds have that can be translated into potential medicinal agents. These properties include anticancer, antiviral, antibacterial, antifungal, anti-oedema, and anti-Alzheimer. In addition to this, it has been demonstrated that 1,2,4-oxadiazoles can act as antimicrobial agents against pathogenic bacteria that occur in the gastrointestinal tract. This project is focused on the efficient synthesis of 1,2,4-oxadiazoles from commonly available starting materials. In this regard, the most common starting material for the synthesis of these compounds are compounds known as amidoximes. These materials are synthesized from the reaction of aliphatic and aromatic nitriles with hydroxylamine hydrochloride in the presence of a base. In turn, the amidoximes are typically reacted with an activated carboxylic acid to yield the desired 1,2,4-oxadiazole. In 2018, Zarei<sup>3</sup> published on the feasibility of making the two-step process into a single step process using the Vilsmeier reagent to accomplish this goal. The process proved to be successful, but there is room for growth in this area. The hypothesis for this research is focused on the use of alternate activating agents to conduct a single step reaction that will afford the 1,2,4-oxadiazole from the simple nitrile starting material. Ultimately, this process will then be applied to the synthesis of an oxadiazole based medicinal agent that has been shown to be effective against pathogenic bacteria in the gastrointestinal tract.

## CONVERSION OF MALTOL INTO STARTING MATERIALS FOR CYCLOADDITIONS

Presenter(s): Eifert, Rex, Undergraduate, Chemistry

Mentor: Dr. Andy Mitchell

Authorship: Rex Eifert

The first reaction, the protection of maltol, is achieved through a reaction with *tert*-butyldiphenylsilyl chloride (TBDPS-Cl) and imidazole. The protection reaction is performed to selectively shield the hydroxyl functionality of maltol. The *tert*-butyldiphenylsilyl (TBDPS) group serves as a robust protecting group, allowing further synthetic manipulations to the molecule without altering the TBDPS position. The reaction is monitored using analytical techniques such as NMR and TLC. The product is obtained in good yield and purity and acts as a good intermediate for further reactions such as bromination and then amination toward substrates that will enable study of the key (5+2) cycloaddition.



## SYNTHESIS OF SUBSTRATES TO INVESTIGATE (5+2) CYCLOADDITIONS

Presenter(s): Ervin, Quentin, Undergraduate, Chemistry

Mentor: Dr. Andy Mitchell

The purpose of these experiments was to synthesize materials that would be used for future study of (5+2) cycloadditions. In order to become proficient in the synthesis of substrates for this important reaction, various procedures and techniques have been introduced. Specifically, several known reactions have been conducted including protection of Maltol, bromination of the protected maltol, and amination of that bromide. Techniques used to monitor, purify, and interpret these reactions include Thin Layer Chromatography (TLC), Flash Column Chromatography, and  $^1\text{H}$  and  $^{13}\text{C}$  NMR spectroscopy, respectively. Finally, these reactions provided a foundational experience and a stock of materials for further research toward (5+2) cycloadditions.

## SYNTHESES OF RHENIUM SELENIDE CLUSTERS CONTAINING *PARA*-SUBSTITUTED PHENYLACETYLIDE LIGANDS

Presenter: Helmink, Katie, Undergraduate, Chemistry

Mentor: Dr. Lisa Szczepura

Authorship: Katie Helmink, Cory Hicks, Lisa Szczepura

Recently, we expanded the organometallic chemistry of octahedral rhenium chalcogenide clusters through the synthesis and study of some  $\text{Re}_6$  cluster complexes containing  $\eta^5$ -bound phenylacetylide. The complexes prepared include  $[\text{Re}_6\text{Se}_8(\text{PEt}_3)_5(\text{C}\equiv\text{CPh})](\text{SbF}_6)$  and *cis*- and *trans*- $[\text{Re}_6\text{Se}_8(\text{PEt}_3)_4(\text{C}\equiv\text{CPh})_2]$ . The nature of the cluster-acetylide bond was then interrogated by examining the reactivity of  $[\text{Re}_6\text{Se}_8(\text{PEt}_3)_5(\text{C}\equiv\text{CPh})](\text{SbF}_6)$  with activated alkenes and various electrophilic reagents. We are now in the process of expanding upon the chemistry of these complexes, by synthesizing  $[\text{Re}_6\text{Se}_8]^{2+}$  clusters containing *para*-substituted phenylacetylide ligands. We are interested in using these clusters for electrochemical and photophysical studies and this presentation will specifically focus on the synthesis and full characterization of the following series of complexes:  $[\text{Re}_6\text{Se}_8(\text{PEt}_3)_5(\text{C}\equiv\text{C-C}_6\text{H}_4\text{-X})](\text{SbF}_6)$  (where X =  $-\text{NO}_2$ ,  $-\text{C}(\text{O})\text{OMe}$ ,  $-\text{CH}_3$ , and  $-\text{OCH}_3$ ).

# THE INTERESTING EFFECTS OF TRYPTAMINE, HARMINE, AND HARMALINE ON *LEISHMANIA TARENTOLAE* IN A ROCKING ENVIRONMENT

Presenter(s): Hohman, Grace, Undergraduate, Biological Sciences

Mentor: Dr. Marjorie Jones, Chemistry

Leishmaniasis is considered a neglected tropical disease affecting millions of people worldwide and is caused by the parasitic protozoan *Leishmania* (1). The current treatments for the disease can be costly and have various adverse side effects (2). There have been limited studies on compounds that are used in various religious practices where leishmaniasis is widespread. In some of these regions with a higher prevalence of leishmaniasis, an indole class of hallucinogens called tryptamines, are used in ritualistic practices. Since individuals with leishmaniasis might be exposed to these compounds, it is important to investigate if these indole derivatives are activating or inhibiting the *Leishmania* parasite (3). Studying this will help us better understand if the ceremonial use of the indole compounds in some societies might pose a risk to people in regions where leishmaniasis is endemic. Additionally, growing *Leishmania* cells on a lab rocker can be tested with the aim of getting a more accurate representation of cell growth and viability *in vitro* (4). These conditions offer a better understanding of *Leishmania* cell activity in their hosts because the rocking motion may resemble movement of living organisms. This research tested the effects of either tryptamine, harmine, or harmaline on cell growth and activity of the enzyme, secreted acid phosphatase (SAP), in a static or rocking environment. Preliminary results show that the rocking motion altered the way *Leishmania* cells responded to the indole compounds. The cultures in a constant rocking motion exhibited different growth patterns and SAP production compared to the static cultures.

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## SYNTHESIS OF PORPHYRINOIDS WITH FUSED ISOQUINOLINE UNITS AND THEIR CATIONIC DERIVATIVES

Presenter: Hostert, Jane, Undergraduate, Chemistry

Mentor: Dr. Timothy Lash

Porphyrins have numerous medicinal applications, including uses as photosensitizers in photodynamic therapy. In addition, cationic derivatives of pyridylporphyrins have been shown to be effective telomerase inhibitors that bind with quadruplex DNA. In studies directed towards the synthesis of porphyrinoids with fused aromatic rings, isoquinoline fused structures have been prepared. 5-Nitroisoquinoline reacted with ethyl isocyanoacetate in the presence of a phosphazene base to give isoquinopyrrole **1a**. The ester moiety was cleaved with KOH in refluxing ethylene glycol and the resulting unsubstituted heterocycle **1b** was condensed with two equivalents of acetoxymethylpyrrole **2** in refluxing acetic acid-2-propanol to generate tripyrrane **3**. The tert-butyl ester groups were removed by dissolving **3** in TFA. Following dilution with dichloromethane, condensation with pyrrole dialdehyde **4** and oxidation with 2,3-dichloro-5,6-dicyano-1,4-benzoquinone (DDQ) gave excellent yields of isoquinoporphyrin **5**. Similarly, reaction with indene dialdehyde **6** gave a related isoquinocarbaporphyrin **7**. Reaction of these isoquinoporphyrinoids with methyl iodide in DMF gave cationic derivatives **8** and **9**. The influence of N-alkylations on the spectroscopic properties and aromatic characteristics of these porphyrinoids is currently under investigation.

## **SIMULATED FRAGMENTATION OF TMe-DMe-Lysine<sup>+</sup>: MASS SPECTRA AND MECHANISMS**

Presenter(s): Kobulnicky, Trent, Undergraduate, Chemistry

Mentor: Dr. George Barnes

Authorship: Trent Kobulnicky, George Barnes

Post-translational modifications (PTMs) of proteins play an indispensable role in biological processes. Researchers rely on tandem mass spectrometry to characterize systems that have undergone PTMs. However, standard experimental results do not provide information on the reaction mechanisms that take place or the final structures and protonation state of the products. Computational approaches can provide an atomic-level view of this reactivity and the associated energetics. In this work, we simulate the positive-mode fragmentation of lysine modified with a trimethylated side chain and dimethylated N-terminus (TMe-DMe-lysine<sup>+</sup>).

Results were then compared to experimental results from unmodified lysine and TMe-DMe-lysine<sup>+</sup>.

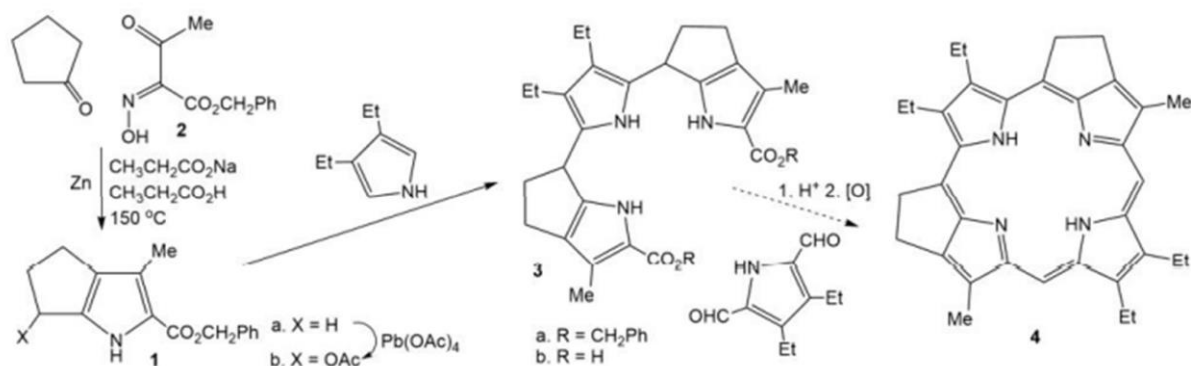
## APPROACHES TO THE SYNTHESIS OF NOVEL PORPHYRINS WITH TWO EXOCYCLIC RINGS

Presenter(s): Marinucci, Nicole, Undergraduate, Chemistry

Mentor: Dr. Timothy Lash

Authorship: Nicole Marinucci, Timothy Lash

Porphyrins are widely investigated due to their potential for applications in numerous areas, including as photosensitizers in photodynamic therapy. Modification of the porphyrin chromophore has been of great interest as this allows the properties of the system to be altered. In this study, the synthesis of porphyrins with fused exocyclic rings is being investigated. Cyclopenta[b]pyrrole **1a** was prepared by reacting oxime **2** with cyclopentanone in the presence of zinc dust at 150 °C. Selective oxidation with lead tetraacetate afforded the corresponding acetoxy derivative **1b** and this was condensed with 3,4-diethylpyrrole in a 2:1 ratio to generate tripyrrane **3a**. Deprotection of the terminal benzyl esters with hydrogen over 10% Pd/C gave the related dicarboxylic acid **3b**. Currently, the preparation of porphyrin **4** with two five-membered exocyclic rings is being pursued. In addition, related structures with extended conjugation are being considered.



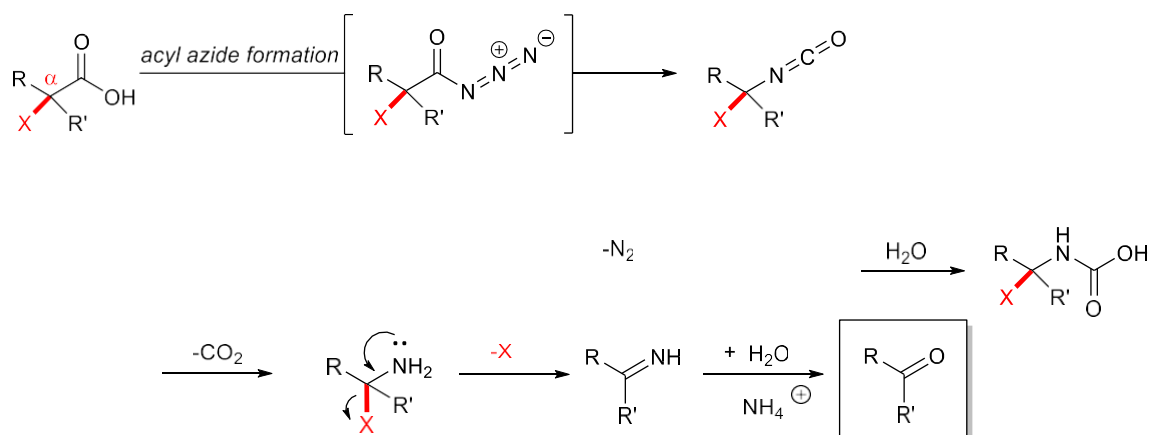
## NEW DIRECTIONS FOR AN OLD REACTION: A CURTIUS REARRANGEMENT DRIVEN DEHOMOLOGATION FROM CARBOXYLIC ACIDS TO ALDEHYDES AND KETONES

Presenter(s): Odeh, Joy, Graduate, Chemistry

Mentor: Dr. Shawn Hitchcock

Authorship: Jordan Witte, Daniel Wright

The Curtius rearrangement has been known for more than 130 years and is a well-known transformation in synthetic organic chemistry that involves the synthetic preparation and Subsequent thermal decomposition of acyl azide with the elimination of nitrogen gas into their corresponding isocyanates. These isocyanates, when exposed to different nucleophilic attack can be converted to the corresponding amines, carbamates, or substituted urea derivatives. In reviewing the Curtius rearrangement, it became of interest to exploit the synthetic intermediates that form in the molecular Rearrangement of the acyl azide. It is hypothesized that it is possible to alter the course of the Curtius rearrangement in such a way that the end products are dehomologated carbonyl compounds such as aldehydes and ketones *rather than amines*. To test this hypothesis, a research plan has been developed that is divided into three phases. The first phase of the proposal is focused on the use of alpha-hydroxycarboxylic acids derived from the petroleum industry as synthetic precursors to carboxylic acids with leaving groups in the alpha-position (i.e., alkoxy, phenoxy, and acyloxy groups). The testing of these substrates in the Curtius rearrangement will serve as the starting point of testing the central hypothesis. The second phase of the research is centered on capturing mechanistic intermediates that will be expected to form. There will also be a focus on testing the scope and limitations of substrate carboxylic acids in this new variant of the Curtius rearrangement. The final phase of this proposed research will be directed towards using the new reaction variant to achieve the synthesis of aldehydes deuterated at the aldehydic position.



Scheme 1. The Proposed alternative route for the Curtius rearrangement.

## **SITE-SPECIFIC CONJUGATION OF HUMAN IgG1 WITH PEPTIDES MEDIATED BY MICROBIAL TRANSGLUTAMINASE (mTG) FOR ADSORPTION TO AuNPs**

Presenter: Osei, Kwame, Graduate, Chemistry

Mentor: Dr. Jeremy Driskell

Authorship: Kwame Osei, Jeremy Driskell

Gold nanoparticles (AuNPs) have been exploited in many emerging technologies due to their unique chemical, optical, electronic, and catalytic properties. AuNPs functionalized with antibodies confer effective surface modification that imparts selective binding to targeted analytes in diagnostic applications or tissues for imaging and drug delivery. Despite extensive efforts, current strategies of AuNP-antibody bioconjugation chemistries are not universally applicable to all antibodies, are pH dependent, result in random orientation leading to diminished activity, and/or have limited stability. In previous works, studies established the role of localized protein charge and thiol functional groups on the orientation and affinity, respectively, for the adsorption of proteins to AuNPs. In this research, we explore the conjugation of a polypeptides to the Fc region of an antibody to facilitate oriented and robust adsorption to AuNPs. Specifically, microbial transglutaminase (mTG) is employed for the site-specific conjugation of the peptide to the Q295 residue that is conserved on the Fc fragment of monoclonal human IgG1. Rationally designed peptides that incorporate a high density of localized positive charge and multiple thiol groups will confer proper orientation and strong affinity, respectively, of the antibody adsorption onto AuNPs. Verification and characterization of the modified antibody include amplite fluorimetric assay for thiol quantitation and mass spectrometry. Dynamic light scattering (DLS) and nanoparticle tracking analysis confirms adsorption of the modified antibody onto the AuNPs, and antigen-binding activity will be quantified to assess orientation of the immobilized antibody. A series of peptides will be investigated to optimize antibody adsorption and will be extended to other antibodies.

Keywords: Bioconjugation, gold nanoparticles, polypeptides.



## **INTERPLAY OF ANION AND SOLVENT COMPOSITION ON ETHENYLPYRIDINE LIGAND COORDINATED SILVER(I) ION PACKING IN THE SOLID-STATE**

Presenter(s): Rohrig, Isabella G., Undergraduate, Chemistry

Mentor: Dr. Gregory M. Ferrence

Authorship: Isabella G. Rohrig, Eric Bosch, Ryan H. Groeneman, Gregory M. Ferrence

The formation and structure of four new silver(I) complexes based upon either methanesulfonate [ $\text{Ag}(\text{CH}_3\text{SO}_3^-)$ ] or hexafluorophosphate [ $\text{AgPF}_6$ ] anions along with the ester- based reactant molecule trans-1-(4-methylbenzoate)-2-(4-pyridyl)ethylene (4-PEBE) are reported. In each of the four complexes, silver(I) ions form coordinated covalent bonds to the 4-pyridyl groups on two 4-PEBE ligands; however, anion identity and crystallization conditions result in various solid-state compositions and architectures. Such architectures do or don't contain significant anion to silver interactions, solvates, and metal coordinated solvates.

Additionally, architectures contain varying degrees of argentophilic interactions or close packing of a pair of silver(I) ions. The four new structures will be compared and contrasted with previously published, related structures that incorporate either trifluoromethanesulfonate ( $\text{CF}_3\text{SO}_3^-$ ) or toluenesulfonate ( $\text{C}_7\text{H}_7\text{SO}_3^-$ ) anions.

## INVESTIGATION OF EFFECTS IN VITRO ON CANCER CELL MODEL SYSTEMS FROM EXPOSURE TO STRONTIUM-BASED OXYFLUORIDES

Presenter(s): Terry, Katelyn, Undergraduate, Chemistry

Mentor: Dr. Marjorie A. Jones

Authorship: Katelyn Terry, David C. Platt, Marjorie A. Jones, Joseph Drinkwater, Eirin Sullivan

Being derived from rats, a common human model species, studies using C6 and PC12 cells have been able to associate their findings with potential therapeutics for human utilization. Both cell types have been used in multiple studies as a model system to study brain tumors, nerve physiology, and pharmacology. Our previous study found that eight novel strontium-based oxyfluorides had negative effects on the cell viability of the parasitic protozoan *Leishmania tarentolae*, a *Leishmania* model species found in reptiles. Leishmaniasis is a vector-borne parasitic disease, caused by the protozoan parasite genus *Leishmania*. Animal and human infections are prevalent in portions of the tropics, subtropics, southern Europe, and as recent studies show, along the Texas-Mexico border. This study reports the first experimental effects of the same eight oxyfluoride compounds introduced to PC12 neuronal or C6 glial cancer cell models in vitro, to further investigate the potential inhibitory effects of these in other model systems. Cultures were exposed to 5  $\mu$ M strontium-based oxyfluorides for 24 hours. In comparison to the DMSO control, several compounds resulted in diminished cell viability, as measured by the MTT viability assay. The C6 cells appeared to be more sensitive to inhibition than the PC12 cells. Data were analyzed as an average absorbance (A 595 nm) of replicates (n=5) and corrected using the average absorbance of cell-free blanks. Among the eight compounds tested, Sr<sub>3</sub>Al<sub>0.9</sub>B<sub>0.1</sub>O<sub>4</sub>F had the largest, while Sr<sub>3</sub>GaO<sub>4</sub>F and Sr<sub>2.5</sub>Ba<sub>0.5</sub>AlO<sub>4</sub>F had the smallest, inhibitory effects.

## **STRUCTURAL DETERMINANTS FOR BINDING AND ENZYMATIC ACTIVITY OF *SULFOLOBUS ISLANDICUS* AND *LISTERIA MONOCYTOGENES* GLYCEROL KINASE**

Presenter: Walis, Sara, Undergraduate, Chemistry

Mentor: Dr. Jon Friesen

Authorship: Sara Walis, Jon Friesen

*Sulfolobus islandicus* (Sisl) is an extremophilic archaea that survives in high temperature, high salt, and low pH conditions. This organism is utilized as a model system by many scientists to understand cellular processes. Another organism that survives in high salt, temperature, and bile conditions is the pathogenic bacterium *Listeria monocytogenes* (Lmon). This bacterium causes the food-borne illness listeriosis. Understanding the molecular processes of archaea and bacteria could lead to further development of treatments of illnesses.

Organisms such as *Sulfolobus* and *Listeria*, along with eukaryotes have a lipid membrane that serves as structure for the cell and is a site of molecular transport and molecular signaling. Many of the lipids found in the membranes contain the molecule glycerol as a backbone. A major precursor to glycerophospholipid synthesis in eukaryotes is glycerol 3-phosphate, which can be produced from glycerol through catalysis by ATP dependent glycerol kinase. Enzyme structure is determined by the protein's amino acids. Since the structure of *Sulfolobus islandicus* and *Listeria monocytogenes* glycerol kinase are not known, a known structure from the organism *Enterococcus casseliflavus* glycerol kinase (EcGK) was used for comparison. Upon analyzing the structure of EcGK the amino acids arginine, glutamate, aspartate, and tryptophan were conserved in all three organisms at the active site. Altering those amino acids could change the catalytic activity of the enzyme, potentially inhibiting or activating it.

The overall goal of this research is to isolate the gene that codes for glycerol kinase in both the Sisl and Lmon genome and express it in *E. coli* cells. For both organisms, glycerol kinase can be kinetically characterized to determine the catalytic efficiency of the enzyme. Site-directed mutagenesis is then carried out on the amino acids present in the active site. This process allows the alteration of nucleotides that could code for an amino acid of similar structure or an amino acid of a completely different structure. Upon alteration, the mutated enzyme can be kinetically characterized to determine the effects of the mutated amino acid on the catalytic activity.

## COMMUNICATION

### **PRESIDENTIAL CANDIDATES' USE OF SOCIAL MEDIA: AN ANALYSIS OF PRESIDENT BOLA AHMED TINUBU'S UTILIZATION OF TWITTER**

Presenter: Asare Kwakye, Isaac, Graduate, Communication

Mentor: Dr. John Baldwin, Communication

This study investigated the utilization of Twitter by Bola Ahmed Tinubu during the 2023 Nigerian presidential elections, focusing on how social media strategies influenced voter engagement and political discourse. The impacts of political campaigns in the United States have been extensively studied and U. S. campaigns are recognized as setting global standards for innovative organizational practices and voter mobilization strategies (Kluver et al., 2007).

Studies suggest the use of digital media. Particularly, social media platforms like Twitter, has become an essential tool for presidential candidates in American political campaigns (Jungherr, 2023; Kim et al., 2018; Richardson, 2023). However, a number of scholars (e.g., Miller, 2005; Miller et al., 2013, Shutter, 1990) have suggested that communication researchers have ignored many parts of the world, including Africa. Also, Nigeria, being Africa's most populous country and one of its largest economies, has a complex and dynamic political environment thus, understanding how social media is used in Nigerian political campaigns could offer insights into the strategies employed in a highly competitive and diverse political landscape. Using a qualitative analysis of Tinubu's tweets, I explored thematic areas including global image projection, campaign dynamics, policy advocacy, and high-profile endorsements. I applied Uses and Gratifications Theory, showing the active role of audiences in political communication. The in-depth analysis of Bola Ahmed Tinubu's Twitter engagement during the 2023 Nigerian presidential elections revealed several key strategic themes in his social media usage such as global image and diplomacy, campaign dynamics and strategic territorial engagement, strategic policy advocacy, and high-profile testimonial endorsement. The study offers insights into the evolving landscape of digital political communication in Nigeria, demonstrating the impact of strategic social media use on shaping political narratives and voter behavior.

## **“MEME-ING” FOR CHANGE: AN EXPLORATION OF GHANAIAN SOCIO-POLITICAL MEMES**

Presenter(s): Elewosi, Millicent, Graduate, Communication

Mentor: Dr. Joseph Zompetti

Authorship: Millicent Elewosi

In a globally dynamic world where the line between the virtual and the physical is blurred, the power that memes exert in social change in both worlds cannot be underestimated. Meme scholars acknowledge the growing interest in its unfolding dynamism across cultures.

Specifically, in this study, I will shed light on how African cartoon memes have become a tool for enacting change in socio-political spheres. Analyzing three memes created by Ghana’s renowned artist, “Tilapia Da Cartoonist,” henceforth known as Tilapia, I employ a satirical criticism in conjunction with Burke’s Perspective by Incongruity to uncover how these memes publicly ridicule perpetrators and dismantle false notions propagated by the government. I conclude that Tilapia employed satire, incongruity, and indigenous artistic techniques to expose follies, dispute false notions, build resonance, and heighten audience consciousness to demand change in online spaces and the real world where economic and political crises affect citizens.

## REPRESENTATION OF EASTERN EUROPEAN AND LATINA WOMEN ON AMERICAN TV: *JANE THE VIRGIN*

Presenter(s): Niftulaeva, Alina, Graduate, Communication

Mentor: Dr. John Baldwin

Authorship: Alina Niftulaeva

This research examines the portrayal of Eastern European and Latina women in *Jane the Virgin* through a feminist media studies lens. It tracks the evolution of these characters, initially constrained by stereotypes that gradually get challenged. While Eastern European women start in limited roles and Latina women struggle with traditional stereotypes, the series later presents more nuanced and multifaceted identities for them. The study emphasizes the influence of media on viewer perceptions and urges creators to offer authentic and positive portrayals. Despite its limitations, this research contributes to the dialogue on media representation, advocating for diverse narratives that challenge stereotypes and reflect human experiences across cultures.

## **RHYTHMS OF REFLECTION: UNPACKING MENTAL HEALTH THEMES IN THE MUSIC OF KANYE WEST AND MAC MILLER**

Presenter(s): Nkanta, Edikan, Graduate, Communication

Mentor: Dr. John Baldwin

Authorship: Edikan Nkanta

In the realm of music, particularly rap, there is a growing trend of openly addressing mental health. The study addresses the limited scholarly exploration of mental health in rap by conducting a thematic analysis of Kanye West and Mac Miller's discography. A combined total of twenty songs from both artists was thematically analyzed. The themes that emerged were drug and substance use, suicide, anxiety, depression, and inner struggle. The study advocates for comprehensive mental health support mechanisms within the music industry and accessible resources to assist artists facing mental health challenges. Future research directions include addressing potential biases in thematic analysis, expanding the study to musicians from diverse genres, and exploring fan interpretations of artistes' mental health narratives.

## **STRATEGIES AND SOLUTIONS FOR BLACK STUDENTS AT HISTORICALLY WHITE INSTITUTIONS**

Presenter(s): Polion, Danielle, Graduate, Communication

Mentor: Dr. Cheri Simonds

Co-Mentor: Dr. Bryon Craig

Authorship: Danielle Polion

The presence of mentorship has been widely acknowledged as a critical factor in the academic and professional success of students across various demographics. However, within the context of Historically White Institutions (HWIs), African American students face unique challenges that call for tailored mentorship dedicated to them. This literature review explores the significance of mentorship for African American students attending HWIs and its role in fostering their academic achievement, personal development, and sense of belonging. In conclusion, the literature review covers the indispensable role of mentorship in enhancing the academic success and overall well-being of African American students at HWIs. It advocates for comprehensive mentorship strategies that address the unique needs and challenges faced by this demographic group, ultimately contributing to greater diversity, equity, and inclusion within higher education institutions. This review of literature will serve as a needs analysis for an upcoming video project. This video project will highlight African American students at ISU and their mentorship's experiences. Once these students are interviewed, I will propose some recommendations for university support of this student population.



## **FREEDOM OF SPEECH IN THE CLASSROOM: ILLINOIS STATE UNIVERSITY**

Presenter(s): Rey, Haley, Graduate, Communication

Mentor: Dr. Cheri Simonds

The debate between freedom of speech and speech regulation in higher education reveals a general lack of understanding among students and teachers. The rules within these academic contexts must stem from state and federal law and depend on circumstances.

For instance, regulation justification varies by campus space and the presence or absence of a syllabus contract in a public college or university. Research methods used in this study include interviews with lawyers, the dean of students, and graduate teaching assistants. The purpose of the present research is to provide accessible advice, policies, and practices for protected and permissible regulation guidelines in the state of Illinois, at Illinois State University, and within ISU's School of Communication, specifically looking at the regulation of speech topics in the Communication as Critical Inquiry (COM 110) program.

## **QUESTIONING GOD: A CRITICAL MEDIA ANALYSIS OF *KEEP SWEET: PRAY AND OBEY***

Presenter(s): Smith, Courtney, Graduate, Communication

Mentor: Dr. Andrew Ventimiglia

Netflix's *Keep Sweet: Pray and Obey* documentary shocked and amazed audiences by revealing the realities occurring within an extremist sect of Mormonism, the Fundamentalists of the Church of Jesus Christ of Latter-Day Saints (FLDS). With settlements throughout the United States, the FLDS is led by the now imprisoned prophet Warren Jeffs, encompasses over 10,000 members, and upholds strict beliefs and unyielding regulations. Utilizing a feminist critique to analyze the text, this paper identifies themes of female subservience, male control, silencings, and perversion were found. Avenues for future research could explore more texts and other frameworks to further understand life in this patriarchal closed religious community.

## **BTS AND THE STORIES OF ARMY: AN INTIMATE LOOK INTO THE CONNECTION BETWEEN FAN AND ARTIST**

Presenter(s): Wills, Elli, Graduate, Educational Administration

Mentor: Dr. John Baldwin

Authorship: Elli Wills

The K-pop industry has steadily been gaining popularity over the past several decades, with groups like BTS and BLACKPINK taking over the Western music scene—and arguably even transcending it. Likewise, the fandom communities of these musical acts have grown, adding to the existing discourse surrounding fan culture, or fandom: what it is, how it operates, and what impact it has on its own fans, other fandoms, and society at large. The relationship between one such fandom and the K-pop group they follow is of particular note: the relationship between ARMY, a fandom with members in the millions, and seven-member Korean band BTS. Many scholars, fans, and scholar-fans consider BTS's global success to be a rare phenomenon. Embedded in this success is the relationship between BTS and their fans, called ARMY (in the K-pop tradition, fans of K-pop groups are given a collective name). To better understand why individuals from all over the world are fans of BTS and how being a fan has impacted their lives, I explore stories and testimonies that ARMY have written about their experience of discovering and interacting with BTS and their music. In my research I examine a sample of ARMY stories to find common themes, which can provide insight into the universal yet deeply personal reasons that individuals are drawn to BTS. These stories reveal the essence of how and why BTS can reach people and bring them together across geographic and language boundaries, highlighting the importance of connection, including intercultural connection, through music and fandom.

## **This Poster Has Been Canceled**

## **WHAT MAKES A CULT CLASSIC: EXAMINING FAN CULTURE AND MEDIA ADAPTIBILITY THROUGH POPULAR MOVIES**

Presenter(s): Witulski, Olivia, Undergraduate, Communication

Mentor: Dr. Andrew Ventimiglia

Cult films are so important to study because they allow for us to understand why people interact with popular media the way that they do. They develop intense audience engagement and use this to understand their own lives. The Narrative Theory of Communication explains this by stating that all people are story tellers, and that people make sense of the world around them using stories. Narrative theorists believe that narratives are so embedded in our lives that we might not even notice that they are there (Shmoop). The easiest way to apply this theory is to analyze and interpret texts like folklore and urban legends – stories passed down through generations about unexplained phenomenon, or questions about the Earth and the surrounding universe before modern scientific technology. But how does this apply to the media and modern society? To answer part of the question, some communications researchers and theorists have utilized the Narrative Theory to focus on how people interact with the media.

This study will utilize the Heathers fan base, fan studies, and audience analysis to understand how people can use popular media, or in this case a cult film and it's two musical adaptations, to either make sense of the world around them or fulfill some kind of personal void that they are not getting in their personal lives.

When analyzing and interpreting these different adaptations of the story, it's important to note that there are some complications when looking at all of these versions. These include loss of fanbase over time, and not being able to properly represent the musical as it was designed to be performed live.

## **This Poster Has Been Canceled**

## **“IT’S LIKELY YOUR MOTHER’S FAULT:” DISCURSIVE CONSTRUCTIONS OF INCEL IDEOLOGY AND FEMALE FAMILY MEMBERS**

Presenter(s): Wolff, Miriam, Graduate, Communication  
Roller, Makayla, Graduate

Mentor: Dr. Lindsey Thomas

Authorship: Miriam Wolff, Makayla Roller

Online incel (involuntary celibate) communities are known for misogynistic views, but research rarely examines the interplay of such perspectives and relations with female family members. Guided by social constructionist theory and the concept of “weaponized subordination,” this study aims to uncover if and how incels’ gender-based extremism manifests discursively. Researchers conducted a qualitative thematic analysis of 30 online incel forum discussion threads containing references to female relatives. Data were coded inductively, using an iterative constant comparative method of coding. Four primary themes emerged around incels’ discursive construction of predominantly mothers and sisters: (1) sexual degradation of female family members (2) normalization and encouragement of physical/sexual violence against female family members (3) blaming mothers as scapegoats for incelism (4) imposing traditional gender role expectations on female family members.

Despite familial ties, incels’ broader misogynistic worldviews permeate talk about female family members. This study provides evidence that online extremist indoctrination is related to a corrosion of domestic relations along gender lines. The research advances understanding of relationships at the intersection of misogynistic radicalization and family communication.

## COMMUNICATION SCIENCES AND DISORDERS

### MEMORY STRATEGIES UNDERLYING STRATEGIC PROCESSING IN AGE-RELATED HEARING LOSS

Presenter(s): Beilstein, Kathryn, Undergraduate, Communication Sciences and Disorders  
Cunningham, Derian, Graduate, Communication Sciences and Disorders  
Mentor: Dr. Shraddha Shende  
Authorship: Kathryn Beilstein, Derian Cunningham, Shraddha Shende, Raksha Mudar

Hearing loss is one of the most common health-related conditions among older adults. There is emerging evidence that suggests age-related hearing loss (ARHL) is one of the most common modifiable risk factors for cognitive decline. However, the relationship between ARHL and higher-order cognitive functions, such as those employed during value-directed strategic processing, remains understudied. Furthermore, to date, no studies have looked at memory strategies used for performing value-directed strategic processing tasks in those with ARHL. The purpose of this study is to examine memory strategies used for value-directed strategic processing between older adults with ARHL and age-matched normal hearing individuals. This study included 17 participants with mild ARHL and 16 age-matched normal hearing controls. We used an in-house developed value-directed strategic processing task. Participants were shown word lists, with one word at a time. Some words were high-value words worth 10-points each and some were low-value words worth 1-point each.

Value was assigned based on letter case, such that uppercase [or lowercase] letters were worth 10-points [or 1-point] depending on the version used. At the end of each word list, participants were asked to recall as many words as possible, with the goal of scoring the highest number of points. Following these trials, participants were then asked if they used any strategies to aid in recall. The reported strategies were collated and were analyzed thematically to understand if, and how, the ARHL group differed from the normal hearing group in use of memory strategies. While a variety of strategies were used, both groups used association as the most frequent strategy. However, it was found that participants within the normal hearing group had a higher frequency of employing multiple strategies within their trials. The current findings are preliminary given that we had a small sample size. Further work is necessary to explore use of memory strategies during higher-order cognitive tasks in those with ARHL.

## **ACCESS TO HEARING HEALTH CARE IN THE U.S. FOR RURAL, CULTURALLY DIVERSE, AND AGING POPULATIONS: MOBILE HEALTHCARE**

Presenter(s): Braasch, Julia, Undergraduate, Communication Sciences and Disorders  
Hanger, Maggie, Undergraduate, Communication Sciences and Disorders  
Clay, Taylor, Graduate, Communication Sciences and Disorders  
Mast, Daniel, Graduate, Communication Sciences and Disorders  
Whitcomb, Molly, Graduate, Communication Sciences and Disorders  
Mentor: Dr. Antony Joseph  
Authorship: Julia Braasch, Maggie Hanger, Taylor Clay, Daniel Mast, Molly Whitcomb, Dr. Antony Joseph

The primary aim of this project was to determine the prevalence, effectiveness, and financial implications of mobile health services and mobile audiology services in the United States. Various search terms were used across 3 databases and resultant articles were analyzed for relevancy. Mobile health units were found to be effective methods of healthcare across the country, particularly benefiting underprivileged groups in rural areas. Challenges such as financial constraints and transportation barriers impede healthcare access for underserved communities, including the elderly and homeless populations. We discovered that some mobile health units are located in urban areas but cannot provide care to those in need. Despite their efficacy, the cost of operating and maintaining a successful mobile health unit is high and challenging to sustain in the long term. While self-reported data from the U.S. Mobile Health Map indicated limited availability of mobile audiology clinics, existing units have had success despite challenges related to ambient noise levels and time-cost efficiency. Although several notable mobile audiology units exist throughout the country, additional resources are needed. We identified a research gap for mobile audiology services and there is a need for comprehensive studies examining the time, resources, and finances involved in establishing and maintaining mobile health and mobile audiology units in rural areas throughout the United States.

## **MY RESEARCH METHODOLOGY WAS GUIDED BY THE QUESTION: DO CHILDREN ADOPTED OUT OF FOSTER CARE EXHIBIT SOCIAL COMMUNICATION DIFFICULTIES, AND IF SO, WHAT TYPES OF DIFFICULTIES DO THEY EXPERIENCE?**

Presenter(s): Giuffre, Caroline, Graduate, Communication Sciences Disorders

Mentor: Dr. Ciera Lorio

Authorship: Caroline Giuffre, Ciera Lorio

Children who have spent time in foster care are often subject to traumatic events during their early years. Research shows that exposure to early trauma is associated with various language difficulties. However, there is a lack of literature related to how time in foster care may impact social language skills. Time in foster care is associated with negative peer interactions and behavior problems. Behavior problems have the potential to negatively affect social development and cause difficulty in forming relationships with others. Frequent interactions and relationships with others are associated with a higher quality of life. As Speech-Language Pathologists (SLPs), our scope of practice includes social skills. This is a population that is likely being underserved in this area.

This survey study asked adoptive parents to report on their children's social skills. The survey questions were developed based on "Everyday Speech: A Social Language Learning Platform," which is an evidence-based curriculum used to teach social skills. After the first draft was developed, it was reviewed by multiple professionals in the field as well as a foster parent. It was then distributed via Facebook to parents who have adopted a child out of foster care between ages 5-17. The same survey was distributed to parents of biological children for comparison purposes. Data from the survey was analyzed and compiled into tables and graphs to illustrate general areas of challenge and strength that adoptive parents reported. Additionally, 5 follow-up phone interviews with adoptive parent participants were completed to gather qualitative data and see how it compared with the quantitative survey data.

Because of the complexity of the backgrounds of children with trauma, many of them have co-occurring disabilities in language or learning. Typically, academic concerns will take priority in the schools, and the schools are where these children are getting support services. However, if they are not given support for social language development, these children may be missing out on forming strong, meaningful relationships. The purpose of this research is to inform SLPs on potential challenge areas in social communication for this population, and clarify where or how to support these children. The ability to connect and engage with others is a lifelong skill, and these children need support so that they can not only succeed academically, but also form worthwhile, powerful connections throughout their lives.



## ACCESS TO HEARING HEALTH CARE FOR VARIOUS POULATIONS USING TELEHEALTH AND TELE-AUDIOLOGY SERVICES

Presenter(s): Hanger, Maggie, Undergraduate, Communication Sciences and Disorders  
Braasch, Julia, Undergraduate, Communication Sciences and Disorders Taylor Clay,  
Graduate, Communication Sciences and Disorders  
Daniel Mast, Graduate, Communication Sciences and Disorders  
Molly Whitcomb, Graduate, Communication Sciences and Disorders  
Mentor: Dr. Antony Joseph

The primary aim of this project was to determine the prevalence of tele-health in the United States, specifically within the field of audiology. Tele-health is a service delivery method that employs telecommunication technologies for the evaluation and management of patients and families virtually. A literature search was conducted to describe how tele-health has been implemented by health clinics. We determined that tele-health has proven to be capable of extending healthcare and making it more accessible and affordable to various populations. Due to its longevity, tele-health was adopted by allied health specialists such as audiologists (e.g., tele-audiology) to provide services for populations who could not be physically present in the clinic; however, the tele-audiology service delivery model presents some challenges. Problems may arise with access to, and the ability to properly use, technology such as secure internet connectivity, ambient noise reduction, and the availability of easy-to-use technologic devices. Yet, it appears that the benefits of tele-audiology generally outweigh most of the competing difficulties. This investigation of the literature demonstrated that tele-health has been available and in use for many years, increasing significantly because of the *COVID-19 Pandemic*, although tele-audiology has been less popular but has continued to evolve with the scope of clinical audiology.

## **AN ANALYSIS OF FATHERS' AND TODDLERS' BEHAVIORS DURING SHARED BOOK READING**

Presenter(s): Kelly, Caitlin, Graduate, Communication Sciences and Disorders

Mentor: Dr. Ciera Lorio

Authorship: Caitlin Kelly, Ciera Lorio

Shared book reading interactions between parents and their children have been studied to draw correlations to a child's vocabulary growth, language development, mathematical scores, and socioemotional skills. However, there is a lack of research regarding fathers' and toddlers' engagement and behaviors during shared book reading interactions. The current study investigated and analyzed father and toddler interactions during shared book reading. The data was collected from a larger longitudinal study. Seven father-child dyads participated in the study ( $M_{age} = 35$  years; range = 30-43 years). The children included four males and two females, and up to two videos were collected for each child at 18 and 24 months. A total of eleven shared book reading videos were collected and coded for parent and child behaviors. All videos were coded using a comprehensive coding manual, and results of the coding revealed fathers and toddlers displayed a wide range of communicative behaviors. Fathers' most common behaviors were modeling language and making comments about the text while reading to their children. The main behaviors toddlers engaged in were commenting, responding, and behaviors showing understanding of print concepts (e.g., turning pages, holding books correctly). At 18 months, toddlers exhibited commenting and responding behaviors through vocal, gestural, and verbal means, and these behaviors increased in frequency when children were 24 months old. This increase was most likely due to children meeting more advanced spoken language milestones at 24 months of age (e.g., increased expressive vocabulary, use of 2+ word utterances). The results of this study will contribute to the limited literature on father-child shared book reading with children under the age of three years.

## COMMERCIAL FOOD FOR PATIENTS WITH SWALLOWING DISORDERS

Presenter(s): Kravik, Sheridan, Undergraduate, Communication Sciences and Disorders

Mentor: Dr. Taeok Park

**Introduction:** When a patient is diagnosed with a swallowing disorder, they're placed on a new diet that focuses on the consistency of food based on swallowing evaluations. Diet modification is used to reduce the burden of swallowing impairment and increasing safety. The purpose of this project was to investigate the available commercial dysphagia food.

**Methods:** Seven dysphagia food companies were selected: Simply Think, Thick & Easy, Thik & Clear, Thick It, Thicken Up, Ready Care, and Nestle. These dysphagia brands are commonly used for patients with a swallowing disorder (Garcia et al., 2005). The data was collected from the official dysphagia food companies' website.

**Results:** Results indicate that the extremely thick level is the most common and the slightly thick level is the least common level of consistency. Further, individuals diagnosed with a slightly thick level dysphagic diet will encounter more of a challenge discovering foods that are safe for them to swallow. The extremely thick level data shows eight different flavors of foods ranging from \$1.298 to \$6.2857 per serving. The slightly thick level data shows one flavor of a food thickener at \$0.4795 per serving.

**Conclusion:** The benefits of diet modification are that patients can maintain their nutrition through diet modification. This project found a lack of variety of foods for different levels of consistency for patients with swallowing disorders. It is necessary to develop more dysphagia food to improve the quality of life for these patients.

## **ENHANCING UNDERSTANDING AND INTEREST IN BILINGUAL SPEECH-LANGUAGE PATHOLOGY: THE IMPACT OF A COMMUNICATION SCIENCES & DISORDERS JOURNAL CLUB**

Presenter(s): Lopez, Jessica, Undergraduate, Communication Sciences & Disorders

Mentor: Dr. Lidia Huerta

Authorship: Jessica Lopez, Lidia Huerta

Numerous studies encourage preservice training on culturally and linguistically responsive care (CLRC) to enhance future speech-language pathologists' self-efficacy in serving individuals from diverse backgrounds with communication disorders. Early exposure to CLRC during preservice training is crucial, as it not only equips future clinicians with essential skills but may also spark interest in areas of the field they might not have previously explored.

Moreover, journal clubs have been recognized for enhancing knowledge in specific areas outside of conventional academic settings (e.g., classroom; Ebbert et al., 2001). These gatherings provide opportunities for individuals to engage in discussions centered around selected professional literature. Thus, journal clubs create a platform for social and intellectual exchange to share ideas, thoughts, feelings, and reactions. By reading and discussing professional literature in the community, journal clubs may expand existing conceptual frameworks related to bilingual speech-language pathology (SLP).

The Communication Sciences & Disorders (CSD) journal club began with the interest of students wanting to learn more about bilingual SLP. Discussions on various topics about bilingual SLP, such as cultural and linguistic considerations when serving bilingual children (Hoff & Core, 2015), clinicians' self-efficacy in serving culturally and linguistically diverse communities (Santhanam & Parveen, 2018), and strategies SLPs may consider when serving individuals from diverse communities (Johnson & Hall, 2020), promoted a deeper understanding and interest in bilingual SLP. As a result, the CSD journal club may broaden students' knowledge and interest in this specialty area, foster the advancement of competency in CLRC, and advance students' exposure to culturally responsive research in the field. As such, this study aimed to assess the journal club's impact on participants' understanding of bilingual speech-language pathology and explore changes in students' interest in bilingual SLP after attending the journal club sessions.

During the Fall 2023 term, the CSD journal club met three times to discuss selected peer-reviewed research on bilingual SLP. At the end of each journal club meeting, participants of this study completed a survey using a 5-point Likert-type scale to measure agreement. The items asked participants to provide their insight on how the journal club meeting impacted their interest and understanding in bilingual SLP. The results of this study will be shared at the presentation.

## CREATIVE TECHNOLOGIES

### PLAYER DECISION AND DOWNTIME IN COMPETITIVE GAMES

Presenter(s): Kim, Dohyun, Graduate, Creative Technologies

Mentor: Dr. Kristin Carlson

Co-Mentor: Dr. Greg Corness

Authorship: Dohyun Kim, Kristin Carlson, Greg Corness

This paper investigates the complexity of the decision-making process by competitive video game players from the perspective of game theory, specifically Nash Equilibrium. The study analyzes how players tend to avoid higher-risk strategies, leading to the issue of downtime. We propose a game design guideline that addresses this issue by examining successful processes in mainstream competitive game titles. With these findings, we present a prototype game with mechanics designed to mitigate these lulls. A preliminary test of the game reveals persistent challenges in decision-making, indicating that game designers must consider this pitfall to enhance the engagement and longevity of their game.

## This Poster Has Been Canceled

## DEVELOPING A VIRTUAL REALITY DRIVING SIMULATOR FOR TEEN DRIVERS

Presenter(s): Nagy, Zeteny, Graduate, Creative Technologies  
Howley, Miles, Graduate, Creative Technologies  
Mentor: Dr. Roy D. Magnuson, Music

Learning to drive, especially for teen drivers, could be a daunting, yet highly sought-after experience. While their muscle memory associated with maneuvering a vehicle might be developed quickly, teen drivers' situation awareness and decision-making ability for safe driving take longer to develop as the on-the-road scenarios vary. Teen drivers can be prone to making mistakes and causing traffic incidents without prior exposure to these situations.

We have developed a virtual reality (VR) driving simulator to train teen drivers to handle potentially dangerous scenarios. This simulator will allow the user to react to hazardous situations within an immersive environment, providing reactive sensory feedback from a moving rig platform with two degrees of freedom. During the session, the user interacts with the virtual environment through a steering wheel and pedals corresponding to their counterparts in virtual reality, as well as seeing a real-time representation of their hands. Automotive experts have helped fine-tune the driving dynamics of the vehicle to feel as realistic as possible.

The software has two distinct settings, rural and city, with toggleable distraction and environmental elements and scenarios, such as non-player vehicles, animal crossings, incoming phone calls, weather elements, and adjustable time of day. This VR simulator allows for safe, repeatable learning that would otherwise not be possible in the real world. It also enables further development for the augmentation of driver safety applications.

# This Poster Has Been Canceled

## LONELINESS AND ITS EFFECTS ON EDUCATION AND EMPLOYMENT

Presenter(s): Riffle, Samuel, Graduate, Applied Economics

Mentor: Dr. Dimitrios Nikolaou

Authorship: Samuel Riffle

In this paper, I examine loneliness and its relationship with education and employment using panel data from the 1999-2021 waves of the Swiss Household Panel. I develop a theoretical model for the production of loneliness and its role in the production of outcomes. I estimate this as a structural model using education and employment as outcomes. The results support the theoretical production function for loneliness with non-cognitive skills, relational investment, and periodic shocks as inputs. However, results do not support the role of loneliness as a significant factor of production for education, or employment beyond a small indirect effect. This disagrees with the predicted negative effects in each production function. My results provide the groundwork for the factors of production for loneliness and its effects on various outcomes. Additionally, they have implications for future policies aimed at mitigating the effects of loneliness.

## EDUCATIONAL ADMINISTRATION

### THE TALE OF TWO LIVES: GRADUATE STUDENTS WORKING PART-TIME TO SURVIVE

Presenter(s): Flores-Lerch, Tatum, Graduate, Educational Administration  
Botts, Maddy, Graduate, Educational Administration

Mentor: Dr. Gavin Weiser

Being a Graduate Student in any instance is not easy. Our focus is on experiences of being a full-time graduate student, working a 20-hour assistantship, and working part-time while balancing life. Our research is a representation of not only who we are, but the resilience and dedication we possess within ourselves. Our photovoice research highlights the highs and lows of the graduate student experience and starts a conversation about the authentic struggles of graduate students.



## ENGLISH

### EPISTEMIC VIOLENCE, INTELLECTUAL CLEANSING, AND JUSTICE IN BANGLADESH

Presenter: Mizan, Ridita, Graduate, English

Mentor: Prof. Rebecca Saunders

Co-mentor: Dr. Ela Przybylo

The Shahbag Movement of 2013 in Bangladesh initially arose to seek justice for war crimes committed during the 1971 liberation war. However, the trajectory of this movement, which initially advocated political accountability and judicial independence, took an unexpected turn as it was co-opted by political leadership. This poster shows that the Shahbag Movement and its aftermath represent another chapter in the ongoing intellectual cleansing of Bangladesh. The intellectual cleansing, as presented in this poster, is intricately linked to the political economy of epistemic violence. The poster provides an understanding of the positionality of intellectuals within the secularist civil society of Bangladesh, whose advocacy for so-called Western ideals gets obstructed due to strategic and systematic cleansing aiming to erase plural histories and thwart the pursuit of justice in the country. The poster shows how geopolitical power struggles manifest in this intellectual cleansing, deliberately hindering the progression of pluralism in Bangladesh. Drawing from Nishat and Hossain's research analyzing the killing of Bengali intellectuals during the country's Liberation War through the 1948 Genocide Convention, this poster urges a reinterpretation of the convention to recognize intellectuals as a distinct protected group. However, this poster opts for the term 'intellectual cleansing' instead, to precisely describe the calculated elimination of the intellectual group, if not class. Based on these ideas, the poster argues that the epistemic violence the country has been experiencing is perpetuated through cultural imperialism and neocolonialism by various internal and external influences. It shows how dealing with multiple elite hierarchies has resulted in conflicting and contradictory currents among the mass people of Bangladesh, which has manifested in tunnel vision and mob mentality in them. By discussing these issues, the poster brings to light the political economy of epistemic violence in the country. It connects the cultural and psychological warfare with the ongoing intellectual cleansing of Bangladesh and raises questions about Bangladesh's identity as a sovereign nation capable of democratic evolution. As its citizens continue to be compelled to self-censor, lead diasporic lives, or even seek asylum, the poster emphasizes the urgent need to address the country's struggles with intellectual freedom and democratic values. Thus, the poster contributes to the understanding of Bangladesh's socio-political landscape, exploring the connections between the Shahbag Movement, intellectual cleansing, and the political economy of epistemic violence and their implications in the pursuit of justice in Bangladesh.

## VOCABULARY TEACHING & LEARNING STRATEGIES IN GHANAIAN SENIOR HIGH SCHOOLS

Presenter: Neequaye, Ishmael, Graduate, English

Mentor: Prof. Kristina Lewis

Ghafir and Mohamedamin's (2022) research indicates that learners regard vocabulary acquisition as the most pivotal aspect of language acquisition. While there exists a plethora of studies on Teaching English as a Second Language, within the Ghanaian context, there remains a lot to be done. Reports from the West African Examination Council in Ghana indicate that the performance of students in English as a compulsory subject of study has been on the decline since 2018. This situation has limited the chances of many high school graduates who wish to enroll in tertiary institutions. Among the factors that influenced this performance include recurrent spelling errors, dearth of students' vocabulary, poor comprehension of questions asked, poor interpretation of feedback on the part of the student (Agyei, 2019). Lanfeng and Anokye (2018) indicate that many ESL and EFL teachers are unclear about how to teach vocabulary. According to Mohammed (2023) teachers and students have neglected vocabulary acquisition strategies, despite their proven usefulness. Given the dearth of research in the Ghanaian context pertaining to vocabulary instruction, the primary objective of this study was to provide an initial overview of the vocabulary acquisition methodologies employed by educational institutions in Ghana at the secondary level. The study was guided by Vygotsky's 1978 social constructivism theory. Being a pilot study, semi-structured interviews, and Focused Group Discussion (FGD) were used to collect data from 20 participants: 10 English Language teachers 10 Students. The interview as well as the FGD explored the aim of vocabulary teaching, the teaching and learning strategies of vocabulary acquisition as well as challenges behind the practice and suggested solutions. With the participants' consent, data was recorded, transcribed and themes were generated together with their supporting claims. The responses concerning the 6 research questions were analyzed thematically. The study revealed that the goal of vocabulary instruction is to develop the proficiency skills of learners. Again, the study revealed that 90% of the participants used incidental approaches to vocabulary acquisition. These strategies which affirm Parviz Ajideh study in 2013 included guessing, reading, using dictionaries and vocabulary journals. Given that English is both the official language and the prerequisite for tertiary education in Ghana, I recommend that, in addition to the incidental approach, both English teachers and second language learners approach the study of vocabulary intentionally with consideration for its practical application and relevance beyond the classroom as opined by vocabulary learning researchers (De la Fuente, 2006; Laufer, 2005).

## **AN-OTHER 'POVERTY PORN' OR PERHAPS AN-OTHER NARRATIVE IN NEED OF A NEW NAME?: RE-IMAGINING UTOPIA IN NOVIOLET BULAWAYO'S 'WE NEED NEW NAMES'**

Presenter(s): Nelson, Sheilla, Graduate, English

Mentor: Dr. Ela Przybylo

Co-Mentor: Prof. Rebecca Saunders

Authorship: Sheilla Nelson

About a decade after its inception, the now AKO Caine Prize for African Writing (nicknamed the 'African [Man] Booker' Prize) came under critical attack for a pattern of awarding the prize to African writers whose short stories allegedly made for the perfect 'African Poverty Porn' (APP), a literary trope born from a curious mix of many African writers' anxiety to repeat and perpetuate stereotyped narratives about Africa, and to be validated and anointed by white gaze and glory. Chimamanda Ngozi Adichie (2002 finalist) and Binyavanga Wainana (2002 winner) were some of the most vocal critics, with Wainana writing his famous satirical article, *How to Write About Africa*. The perfect APP is a story about war, hunger, HIV AIDS, corruption, economic regression, lack of social amenities and infrastructure, breakdown of democracy and political leadership – and ultimately, utter material poverty. In 2011, when said critical attacks were rife, NoViolet Bulawayo won the prize, with her short story, *Hitting Budapest*, which later turned out to be the first chapter of her novel, *We Need New Names*. Like many African writers who were adjudged finalists and or winners of the prize, Bulawayo was quickly propelled into visibility and further re-/awards, most of which remain outside of and or not exactly Africa(n), just like the Caine Prize itself. Despite having followed this part of the pattern, the case of Bulawayo and her *We Need New Names* is quite delicate, at the very least, if not an arguably exceptional case. With explicit details and graphic images of Robert Mugabe's regime in the 2000s' Zimbabwe, and with the story largely told with the simple and innocent truth and wisdom of a set of children's Point of View, *We Need New Names* easily fits the APP trope. Further deepening Bulawayo's novel committing the sin of this trope is how numerous academic papers always and readily name America as the utopia in the novel – America being where Darling, a/the major character in the story, migrates to, and where the second half of the story is set. This paper, however, argues that before and transcending the albeit readily obvious America(n) utopia in the novel, and mainly through the relatively obscure MotherLove character, there is a utopia in the story, and specifically, right in the rather ironically-named Paradise setting in the novel. Altogether, this paper proposes not only a re-imagination of what existential realities utopia consists of, but also, of the said perfect African Poverty Porn literary trope.

# CONCEPTUALIZING THE SPATIO-CULTURAL PLASTICITY OF AFRICAN LITERATURE IN THE GENDER AND QUEER DISCUSSIONS

Presenter: Tetteh, Kelvin, Graduate, English

Mentor: Dr. Ela Przybylo

In this study, using a Ghanaian play text, I argue that to create literary works in Africa that champion LGBTQI rights, the cultural setting must be engaged in negotiations of its thoughts/borders towards genderism. African society is conservative and prides itself in values traditionally buried in a constructed morality. The challenge lies in the plasticity of these values and norms, which must be negotiated with.

The LGBTQI community in Africa faces challenges in navigating social contracts, societal norms, values, self-categorization, and the plasticity of factors such as legal factors. The history of the public acceptance of LGBTQI in the United States will reveal inclusions from subtle to bold statements of pro-LGBTQI characters, subjects, and themes in literary arts. It takes gradual absorption, time, notional and national negotiations, and renegotiations for a practice that is not common within a cultural space to become a norm.

Catherine Malabou, a French philosopher, emphasizes the concept of plasticity as a thought process that can either change shape or destroy shape. In the African cultural space, introducing new identities can disrupt pre-existing social contracts that guide self-identification and self-categorization. This disruption can lead to cultural turbulence and the shifting of borders to accommodate these new identities. The plasticity of psychological and social identities argues that once the brain is capable of being shaped and altered, it challenges deterministic beliefs on human nature. It allows for both individual and collective activity, as well as responsibility for constructing one's own identity and the societal institutions that influence it (Malabou, 91).

I propose that in the contemporary age of digitally influenced sexual, biological, and political self-creation, African literature has the potential to reform or explode social norms. The spatio-cultural climate of Africa is different from the Western cultural climate, and the legal and legislative approach to getting the culture to open to LGBTQI in Africa is ineffective and counterproductive. African writers must push for and test this social plasticity because it is evident that literary arts movements such as the Harlem Renaissance, American Renaissance, and English Renaissance points to the efficacy of literature in cultural changes and definitions.

# **FAMILY AND CONSUMER SCIENCES**

## **GEN-Z'S TOP CLOTHING BRANDS IMPACT ON SUSTAINABILITY**

Presenter(s): Monino, Janelle, Undergraduate, Family and Consumer Sciences

Mentor: Dr. Yoon Jin Ma

Authorship: Janelle Monino, Yoon Jin Ma

The fashion industry has been progressively harming the environment by increasing carbon emissions, using abundant water and energy sources, and growing waste. Brands are now implementing sustainability measures by creating products made from raw materials, administering zero carbon and waste campaigns, and using sustainable manufacturing techniques as solutions to improve these conditions. Fast fashion is inexpensive clothing that is mass-produced with the entire production process taking just weeks to complete. It is a contributor to the state of the environment because companies are using intense practices to get their products finished in a short amount of time. Fast fashion began in the late 1990s and early 2000s while continuing to rapidly increase with the growth of online retailers. One of its causes is the overproduction of apparel which has led to a trend of customers overconsuming. Consumers are now becoming aware of these harms and desire to purchase from companies that are taking sustainable measures. The purpose of this research was to analyze Gen-Z's top five clothing brands' impact on sustainability to confirm if they are being truthful in their work to reduce harmful methods. The five clothing brands that were investigated are Nike, Lululemon, American Eagle Outfitters, Pacsun, and Shein. Using content analysis, the data were collected from the brand's website as well as scholarly sources to verify the company's sustainability efforts. This topic is important to inform people of the problems fast fashion has created and why it is necessary to support brands that are taking sustainable actions. The findings will help educate consumers on how to make more conscious and responsible decisions when deciding what companies they should purchase from.

# GEOGRAPHY, GEOLOGY, AND THE ENVIRONMENT

## **INFLUENCE OF TILE WATER ON NITRATE CONCENTRATIONS IN THE GROUNDWATER: A CASE STUDY OF A SATURATED RIPARIAN BUFFER, MCLEAN COUNTY, CENTRAL ILLINOIS**

Presenter: Abdulsalam, Aminat, Graduate, Geography, Geology, and the Environment

Mentor: Dr. Eric Peterson

Authorship: Aminat Abdulsalam, Eric Peterson, Jonathan Thayn

In the U.S. Midwest, where fertile soils with high water retention are prevalent, the installation of tile drainage networks have become a common practice to drain excess soil water, which enhances plant growth and increases crop productivity. However, tile drainage networks coupled with the use of inorganic fertilizers have significant implications on water quality, contributing to eutrophication, leading to harmful algal blooms, and resulting in hypoxic conditions in surface water bodies. To mitigate excess nutrient exports to surface water bodies, edge-of-field practices have been introduced. One such practice is the saturated riparian buffer (SRB), which utilizes a diversion system to redirect tile drainage water from an agricultural field into a riparian buffer rather than directly discharging into a stream. As a best management practice, SRBs have been shown to reduce nitrate loads delivered to surface water by increasing the travel time of nutrient- rich waters through soils and exposing the nutrients to soil processes. Examining six years (2015-2021) of data from a SRB, this research investigated trends in the nitrate as nitrogen ( $\text{NO}_3\text{-N}$ ) concentrations of the groundwater upgradient (independent) of the diversion system as compared to waters downgradient (dependent) of the diversion system during tile flow and examined the duration of time the tile water influences the SRB. A mixed effect model analysis of the data identified a positive relationship between  $\text{NO}_3\text{-N}$  concentrations in the downgradient groundwater and the volume of diverted tile flow. However, the  $\text{NO}_3\text{-N}$  concentrations in the upgradient groundwater decreased as the tile discharge increased. The difference in the response between the upgradient and downgradient waters highlighted the influence of the diverted tile water on the SRB. In the absence of flow, the concentration of  $\text{NO}_3\text{-N}$  in the downgradient groundwater continued to increase up to two weeks before declining after three weeks. After five weeks, the concentration of  $\text{NO}_3\text{-N}$  in the downgradient groundwater returned to its initial concentration before tile flow. On a year-to-year basis,  $\text{NO}_3\text{-N}$  concentrations within the SRB remained stable, indicating that there was not a long-term accumulation within SRB.

## **THE INFLUENCE OF TILE FLOW AND THE TRANSPORT -FATE OF NITRATE IN A SATURATED RIPARIAN BUFFER: A CASE STUDY IN CENTRAL ILLINOIS**

Presenter(s): Akrofi, Benedicta, Graduate, Geography, Geology, and the Environment

Mentor: Dr. Eric W. Peterson

Illinois has fertile but poorly drained soils, resulting in the installation of tile drainage systems. Tiles drain soil water from agricultural fields directly into streams, short-circuiting the soil's role in nutrient cycling and contributing to elevated nitrate as nitrogen ( $\text{NO}_3\text{-N}$ ) concentrations in surface waters. Most  $\text{NO}_3\text{-N}$  exports from tile-drained watersheds in the Midwest occur from January to June, corresponding to periods of tile flow. The diversion of tile-drained water into a saturated riparian buffer (SRB) has been shown to reduce  $\text{NO}_3\text{-N}$  concentrations, but what happens in the vadose zone near the tile in terms of water flow and nitrate transport - fate is unknown. The vadose zone is a critical nitrogen storage location and foci for biogeochemical processes utilizing nitrate. This study examined the influence of tile flow on water movement in the vadose zone and the transport and fate of nitrate in an SRB. Nitrate sampling began in April 2023 and ended in December 2023, representing conditions when the tiles are running versus periods when the tiles are not running. During the period of tile flow, mean  $\text{NO}_3\text{-N}$  concentrations in the vadose zone waters at depths 0.3 m and 0.60 m below the surface were 0.68 mg/L and 0.50 mg/L, respectively. The tile water had a mean of 10.44 mg/L, while in the groundwater, drawn from wells screened 1.5 m below land surface, concentrations were 0.80 mg/L upgradient of the diversion tile and 6.97 mg/L downgradient of the tile. A one-way ANOVA indicated that the  $\text{NO}_3\text{-N}$  concentrations within the waters of the vadose zone and upgradient of the tile were significantly different from the downgradient and tile waters. The data suggest the tile has an influence on the downgradient of the tile compared to the vadose zone waters and upgradient of the diversion tile. By the end of May, tile flow had ceased corresponding with a lowering of the groundwater table. During the drier conditions, no tile flow, the lysimeters did not yield water even after heavy rains. The inability to draw water from the vadose zone suggest any available water is being withdrawn by the plants.

# **INVESTIGATING HETEROGENEITY AND ITS INFLUENCE ON GROUNDWATER DYNAMICS WITHIN A SATURATED RIPARIAN BUFFER IN CENTRAL ILLINOIS USING HYDRAULIC CONDUCTIVITY**

Presenter: Awuku, Joseph, Graduate, Geography, Geology, & the Environment

Mentor: Dr. Eric Peterson

Authorship: Joseph Awuku, Eric Peterson

The use of Saturated Riparian Buffers (SRBs) as a means of reducing contamination of surface and groundwater resources has gained popularity due to their ability to retain water and remove solutes through physicochemical processes such as plant uptake, denitrification, and microbial breakdown. Studies on the effectiveness of SRBs in floodplain water resource management have increased in areas of high agricultural activities where there is extensive use of various plant fertilizers to increase crop yield. However, a greater percentage of these studies have mainly targeted the biological and chemical activities within SRBs that contribute to improved solute removal with a minimal focus on how the physical properties of SRBs such as the heterogeneity of hydraulic conductivity ( $K$ ) which directly controls the fluxes of water and solutes removal efficiency within SRBs. Therefore, the objective of this study is to investigate the spatial heterogeneity in  $K$  and its contributions to groundwater dynamics within an SRB adjacent to an agricultural farm field drained with tile in central Illinois (T3 Site). Geometrically averaged hydraulic conductivities obtained from slug tests on wells installed in the study area will be used for this study. In addition to the slug test data, hydraulic head measurements obtained from water level measurements will be used to determine the hydraulic gradient distribution within the study area. The quantity of groundwater discharge between different geologic units in the study area would then be computed using Darcy's equation from the hydraulic conductivity and hydraulic gradient measurements. ESRI's ArcGIS Pro would be used to generate a spatial heterogeneity map of  $K$  at a specified depth of 2.3 m for the study area using the kriging interpolation tool. It is expected that hydraulic conductivity would vary at least by an order of magnitude in response to the differences in weathering within the subsurface materials resulting in the presence of preferential flow paths and differences in groundwater-specific discharge. The expected direction of water flow is lateral, from the east to the west, with some areas in the study areas experiencing upward flow in response to the reversal of hydraulic head gradient. The ultimate effect of the heterogeneity in hydraulic conductivity is then expected to result in different volumes of water exchanged at different locations within the study area, where areas of lower hydraulic conductivity would dissipate the least amount of water and vice versa.



## **APPLICATION OF FLOATING WETLANDS TO IMPROVE URBAN STREAM QUALITY**

Presenter: Chukwudi, Daniel, Graduate, Geography, Geology, and the Environment

Mentor: Dr. Eric Peterson

Authorship: Daniel Chukwudi, Eric Peterson

Urbanization has significantly altered natural landscapes, leading to the development of urban stream syndrome characterized by degraded ecological health and water quality issues. One major source of nutrients in urban streams is stormwater runoff as a result of impervious surfaces within the urban catchment. To address nutrient pollution in urban streams, floating wetlands have emerged as an in-situ phytoremediation of urbanization on stream ecosystems. Using a floating wetland system constructed within a portion of the Chicago River as a case study, this work aims to answer the following questions: 1) Do floating wetlands lower nitrate and phosphate concentrations of the river? 2) Are there seasonal differences in the effectiveness of floating wetlands in lowering nutrient concentration within the water column? To address this first question, two hypotheses were proposed: I) Nitrate concentrations of the waters upstream from the floating wetlands will be higher than the concentrations downstream of the waters. II) Phosphate concentrations of the waters upstream from the floating wetlands will be higher than the concentrations downstream of the waters. To address this second question, one hypothesis is proposed: I) The floating wetland will exhibit seasonal variation (during the growing and dormant season) in lowering nutrient concentration downstream the floating wetland. To test these hypotheses, water samples will be collected upstream and downstream of the floating garden at two depths during each sampling event: at the water surface and at 0.3 m below the water surface during both the growing (April-September) and dormant seasons (October – December). The water samples will be analyzed for nitrate, phosphate, and other major anions (chloride, bromide and sulfate) using ion chromatography (IC). The concentrations of nitrate and phosphate will be analyzed statistically. We expect the result of the study to show that floating wetlands remove nitrates and phosphate and are more effective during the growing season. This research aims to demonstrate the potential of floating wetlands as a sustainable and effective solution for improving water quality in urban streams impacted by urbanization.

## **SPECTRUM OF THE LAKES: UNVEILING WATER COLOR OF MINNESOTA'S SENTINEL LAKES WITH SATELLITE REMOTE SENSING FOR WATER QUALITY MONITORING**

Presenter: Dooley, Andrew, Graduate, Geography, Geology, and the Environment

Mentor: Dr. Wondy Seyoum

Authorship: Andrew Dooley, Wondy Seyoum

Surface waters are precious natural resources requiring costly time and labor for effective water quality monitoring. New applications of water color analysis by satellite remote sensing are a promising approach to water quality monitoring for scientific, industrial, recreational, and cultural benefit. This research expands previous applications of lake water color analysis and pioneers water color chromaticity analysis for midcontinent lakes in Minnesota, USA. The results of this project are the first accounts of Minnesota's Sentinel Lake water color, variability of water color by ecoregion, and temporal consistency of water color within major ecoregions. Minnesota state research initiative, Sustaining Lakes In a Changing Environment (SLICE), ordains "Sentinel Lakes" as representative of lake populations within major ecoregions of Minnesota.

Following launch in 2013, NASA's Landsat 8 OLI satellite services a growing public record of Earth's surface reflectance in the visible spectrum. Generational improvements of the Landsat 8 OLI sensor introduced capabilities for remote sensing of smaller terrestrial surface waters.

Chromaticity analysis interprets dominant visible wavelength from water surface reflectance, quantifying water color. Visible light reflectance from the deepest area within each Sentinel Lakes was gathered during the late summer of 2013 – 2022. The late summer months represent peak insolation and bolstered trophic activity. A decade analysis of Sentinel Lake water color was documented. Ecoregional differences show varying color prominence, more red colors in the Northeastern and Southern parts of the state. Statistical analysis of water color demonstrates a preferential water color for lakes in an ecoregion. However, uniqueness of color was not statistically definable. Majority of Sentinel Lakes demonstrate a historically decreasing wavelength trend. Decadal patterns operate as instructive bounds to implement further investment to a hydrologic anomaly. Noticeable natural variation in the Canadian Shield ecoregion water color is attributed to forested catchment and undisturbed hydrology. Land use and climatic factors are of important consideration in continuing to develop a predictive water color model to improve existing water quality monitoring networks.

## **UNDERSTANDING NITRATE REDUCTION IN A SATURATED RIPARIAN BUFFER USING A THREE-DIMENSIONAL REACTIVE CONTAMINANT TRANSPORT MODEL**

Presenter: Ijigade, Franklin, Graduate, Geography, Geology, and the Environment

Mentor: Dr. Wondessen Seyoum

Authorship: Franklin Ijigade, Wondessen Seyoum

The exponential rate of nitrogen fertilizer applied to agricultural farmland, aimed at increasing crop productivity, has led to the leaching of nitrate beyond the root zone. This leaching occurs through the discharge of subsurface tile flow, leading to nitrate contamination in water bodies. The State of Illinois applies around 7.7 billion kilograms of nitrogen fertilizer to corn fields annually. This has become a major regional concern, as it threatens the terrestrial environment and aquatic ecosystems, causing dead zones due to eutrophication. To mitigate this problem, various management practices, such as the Saturated Riparian Buffer (SRB), were implemented. Natural and anthropogenic inputs of nitrate load under certain hydrogeological conditions, such as hydraulic conductivity and subsurface thickness, play a pivotal role in controlling nitrate reduction in SRB. The objectives of the study are to (1) assess how the variability of subsurface thickness affects nitrate reduction in the SRB; (2) evaluate how various inputs of nitrate load (mass) affect nitrate reduction within the (SRB); and (3) quantify the mass of  $\text{NO}_3\text{—N}$  transported out of the SRB. Hence, this study will employ a 3D reactive contaminant transport model that will be used as tool for understanding nitrate transport and fate within an agricultural area. The model will be developed in Groundwater Modeling System software and will consist of three geologic layers ranging from the dark rich organic topsoil, mix of silty-clay thin sand unit, and diamicton, that will used to build the hydro-stratigraphy of the model. No flow boundaries will be assigned at the north and southern boundaries of the model, specified head at the east, the head-dependent boundary at the west, and recharge and no flow boundary at the top and bottom of the boundary, respectively. Water samples will be collected during Spring, Fall, and Winter for nitrate sampling and water level from 38 wells as well as from the stream adjacent to the study area, which will be used in calibrating the reactive transport model. The mass budget calculation from the model scenario analysis will be used to estimate the mass of nitrate out of SRB. It is expected that nitrate reduction should be highest during the Spring compared to nitrate reduction in the Fall and Winter due to the influence of tile flow. This study will help implement effective SRB designs and enhance our understanding on the efficiency of the Saturated Riparian Buffer in reducing nitrate pollution from agricultural runoff.

## **DELINEATING SULFATE SOURCES IN WATERS WITHIN AN AGRICULTURAL AREA< MCLEAN COUNTY, CENTRAL ILLNOIS**

Presenter: Obi, Christabel, Graduate, Geography, Geology, and the Environment

Mentor: Dr. Eric Peterson

Authorship: Christabel Obi, Eric Peterson

Increasing sulfate ( $\text{SO}_4^{2-}$ ) concentrations in the water environment, corresponding with increases in urbanization and industrialization, are rising global concerns. This threatens human health and the ecosystem and geological processes, such as the weathering of carbonate rocks, which contributes to the evolution of the global carbon cycle. Identifying sources of sulfates, natural or anthropogenic, in the water environment is essential in understanding the transport and fate of sulfate. This study focuses on understanding the origin and transport of  $\text{SO}_4^{2-}$  in groundwater in a saturated riparian buffer (SRB) zone adjacent to an agricultural field in McLean County. Water samples will be collected in addition to pre-existing data that spans eight years (2015-2023) collected from thirty-seven observation wells at the study site to analyze the major contributors of  $\text{SO}_4^{2-}$  at the study site and observe trends that exist between the  $\text{SO}_4^{2-}$  concentrations in the water samples with seasonal changes within water types from the study site. To assess seasonal changes, seasons will be subdivided according to equinoxes and solstices, corresponding with agricultural practices: spring/planting (April - June), summer/growing (July - September), fall/harvest (October - December), and winter/fallow (January - March). The water samples will be analyzed for  $\text{SO}_4^{2-}$  concentrations. Results from these analyses will be used to (1) identify the number (s) of contributory population of  $\text{SO}_4^{2-}$  using cumulative probability plots calculated with  $\text{SO}_4^{2-}$  concentration values and (2) assess variations in sulfate concentrations under the conditions of seasonal changes and tile conditions among the different subgroups using a two-way ANOVA test. It is expected that there will be two contributing sources of sulfate in the study area, with agriculture contributing the larger percentage. Also, sulfate concentrations are expected to be higher in the fall and winter than in the spring and summer seasons. A full understanding of sulfate dynamics in the study area would be important for future decisions on environmental management in the area.

## **PROVENACE ANALYSIS OF THE PALEOGENE STRATA AT PUMPKIN BUTTES, POWDER RIVER BASIN, WYOMING**

Presenter(s): Saul, Celeste, Undergraduate, Geography, Geology, and the Environment

Mentor: Dr. David H. Malone

Authorship: John Craddock, Adam Trzinski, Josh R. Malone

The Powder River basin is among several yoked inter-montane basins that occur within the Laramide foreland. More than 2000 m of Paleogene synorogenic strata fill the basin, which consists of the Fort Union and Wasatch Formations. Pumpkin Buttes are in the southwestern area of the Powder River basin; ten to twenty meters of conglomeratic sandstone and mudstone of the post-Laramide Oligocene White River Formation caps the buttes. Our broad goal is to characterize the provenance of White River Group strata of the Rocky Mountains and Great Plains and the late Paleogene burial of this region. Here we present detrital zircon data (LA-ICPMS at the Arizona Laserchron Center) for the matrix of the basal conglomeratic sandstone at Pumpkin Buttes ( $n=104$ ). The youngest zircon fraction is middle Eocene in age, indicating a maximum age of deposition of ~46 Ma. These zircons were likely sourced by the Absaroka volcanic field 250 km to the west. The principal age peak is ~1460 Ma, which was likely sourced from basement-cored Laramide uplifts in central Colorado more than 500 km to the southwest. The age spectrum also includes smaller Yavapai (geon 17) and Archean (geon 27 and >geon 30) age peaks. The Yavapai zircons were likely derived from central Colorado, whereas the Archean zircons were likely sourced from the Beartooth and Tobacco Root Mountains of southwest Montana more than 350 km to the northwest. Thus, the zircon age spectrum reveals a variety of distal sediment source areas, mainly from the tops prominent mountain ranges. Our data set supports the hypothesis that the Laramide ranges in this area were buried by the early Oligocene, with regional high topography supplying the bulk of the sediment to the Powder River basin at this time.

# **MODELING CHLOROPHYLL-A CONCENTRATIONS USING MACHINE LEARNING ALGORITHMS AND THE HARMONIZED LANDSAT AND SENTINEL-2 CONSTELLATION: A CASE STUDY OF LAKE ERIE**

Presenter: Schwarz, Alex J., Graduate, Geography, Geology, and the Environment  
Mentor: Wondessen Seyoum  
Authorship: Alex Schwarz, Wondessen Seyoum, Jonathan Thayne, Catherine O'Reilly,  
Eric Peterson

Harmful algal blooms (HABs), once considered only a natural phenomenon, have emerged as a growing ecological concern with far-reaching consequences for aquatic ecosystems and human populations. In inland lakes, HABs are recognized as a public health threat due to the risk of exposure to cyanobacterial toxins (various congeners of microcystin). The cyanobacteria, along with other diatoms and dinoflagellates in the HAB, release the toxins as secondary metabolites throughout their lifecycle that, in high concentrations, can cause liver and kidney toxicity and neurotoxicity in both humans and animals. As lakes represent a significant freshwater resource for the human population and provide various aquatic ecosystems for many animals, forecasting high levels of toxins is essential.

Cyanobacterial toxins and microcystin have been shown to be associated with other, more commonly measured and well understood, water quality parameters. Chlorophyll-a, which is a very commonly measured water quality parameter, has been shown to be positively associated with microcystin concentrations. This positive relationship allows Chlorophyll-a concentrations to be used as a proxy for determining elevated levels of Microcystin toxins within inland lakes.

This research will utilize various Machine Learning Algorithms (MLAs) and the relatively new Harmonized Landsat and Sentinel-2 (HLS) Constellation (Version 2.0), released in 2021, to model Chlorophyll-a concentrations within the western basin of Lake Erie. The western basin of Lake Erie has been extensively researched since the late 2000s due to the concern HABs have for public health and safety. Starting in 2012, researchers at the Great Lakes Environmental Research Laboratory (GLERL), with support from the Great Lakes Restoration Initiative (GLRI), formalized a sampling routine to monitor the spatial and temporal variability of seasonal HABs in the western basin of Lake Erie, which provides sufficient historical data for this project.

The overall goal of this study is to assess whether varying machine learning algorithms can reliably estimate chlorophyll-a concentrations, using high temporal and spatial resolution surface reflectance data products from the HLS Constellation, after being trained with known, site specific, retrieved chlorophyll-a concentrations and surface reflectance values for the satellite image pixel the retrieval took place in. The HLS constellation, composed of Landsat-8/9 and Sentinel-2A/B satellites, will supply high temporal and spectral resolution imagery to supplement MLA training. The various MLAs will be trained using multiple data points in the machine learning program, Python. The results will provide valuable insights for effectively monitoring and managing harmful algal blooms in inland lakes.

# **IMPACT OF CHLORIDE CONCENTRATION ON DENITRIFICATION EFFICIENCY: A CASE STUDY OF AN AGRICULTURAL FIELD (T3 SITE), MCLEAN COUNTY, CENTRAL ILLINOIS**

Presenter: Suleiman, Zainab, Graduate, Geography, Geology, and the Environment

Mentor: Dr. Eric Peterson

Authorship: Sainab Suleiman, Eric Peterson

The widespread use of nitrogen-based fertilizers in agricultural fields has led to a significant increase in nitrate concentrations in soil and water, posing a significant threat to human health and aquatic ecosystems. This raises interest in understanding the factors influencing denitrification processes. One factor is the concentration of chloride, which is believed to inhibit denitrification. This study focuses on understanding the impact of chloride on denitrification through column studies. The research employs laboratory analysis using soil columns from the study area (T3 site) to assess the interactions between varying chloride levels and nitrate loss. It is expected that increasing the chloride concentration reduces the rate of nitrate loss. This is attributed to the inhibitory effect of chloride on microorganism activity. This research contributes to the broader efforts towards sustainable water quality management and environmental conservation. The findings may highlight the need for a better understanding of the impact of chloride on nitrogen reduction and in developing effective strategies for mitigating nitrate contamination in water ecosystems. It will provide practical implications for managing nitrate pollution in agricultural settings. Furthermore, the study underscores the importance of considering microbial communities in future models and environmental management practices aimed at optimizing denitrification processes in contaminated surface and subsurface environments.

## HEALTH SCIENCES

### **AN ANALYSIS OF HEALTHCARE SYSTEMS IN SIX NORTH AMERICAN AND EUROPEAN COUNTRIES: A COMPARISON BETWEEN OUTCOMES AND ECONOMIC VARIABLES**

Presenter(s): Drankhan, Bryce, Undergraduate, Health Sciences  
Ferber, Natalie, Undergraduate, Health Sciences  
Mentor: Prof. Quen VanDerMay-Kirkham  
Authorship: Bryce Drankhan, Natalie Ferber

Healthcare is an industry flooded with different ideologies and payer sources, but which has the optimal balance between cost and quality? The purpose of this study was to compare five healthcare quality metrics across North America and Europe and compare them by individual country and payer type. The research team selected only developed countries including the United States, Canada, Mexico, Germany, France, and Spain. The healthcare metrics analyzed were selected because they are among the most deterministic of a successful healthcare system and include life expectancy, maternal death rate, infant mortality rate, obesity rate, and smoking rate. The metrics cover a wide range of services and outcomes in healthcare and were selected to be an overall indicator of the success of the healthcare systems analyzed. The data sets were collected from various global databases that contain country level healthcare and economic data. The data were compared to benchmarks and correlations between economic indicators and healthcare outcomes were analyzed. The findings were recorded in tables and presented graphically. Limitations of this study included a lack of consistent inclusion criteria between countries, how they reported specific metrics, and non-universal data collection methods, such as annual censuses. This resulted in some of the data sets representing different time periods, but all were the most current data available for the individual countries. The results of the study can help guide the determination of what the best type of healthcare system is to balance population health and healthcare expenditures.



# INFORMATION TECHNOLOGY

## AI CHATBOT FOR UNIVERSITY FITNESS CENTER

Presenter(s): Suryadevara, Sowmya, Graduate, Information Technology

Amisha, Amisha, Graduate, Information Technology

Mentor: Professor Elahe Javadi

Navigating the services and resources of university fitness centers can give challenges to both students and staff. This project introduces a creative solution: *an AI-driven chatbot designed specifically for the Redbird Recreation Center at Illinois State University*. By using one of the commonly used Python libraries for working with large language models (Lang chain), known for its efficiency in constructing intelligent chatbots, we aim to develop a prototype capable of delivering coherent, context-aware interactions.

Our approach involves gathering information from various sources including documents, staff and student interviews, and user feedback. Through this comprehensive approach, we plan to address usual questions about fitness programs, schedules, and personal recommendations.

Along with this, we prioritize privacy and security measures, ensuring compliance with university policies to safeguard user data.

While this project serves as a proof of concept, future deployment of such a chatbot system will enhance user engagement within the fitness center. It will also increase efficiency and accessibility by providing a user-friendly interface for accessing information and automating routine inquiries. Staff will not be answering repetitive inquiries, but will have time to attend to unique, more complicated services and activities that the student may need assistance with.

The project also includes a user experience test to assure information usability. Although our project will be a prototype and will not be alive, we compile a list of methods with which a live version can safeguard user data and assure privacy and security.

In the symposium, we will explain the process for making a chatbot using available large language models. We will also have the system available for interacting with visitors chatbot with sample inputs and collect user feedback during testing phases to identify areas for improvement and iterate on the chatbot's functionality, and will provide a do-it-yourself documentation for anyone who may be interested in exploring this topic further.

# KINESIOLOGY AND RECREATION

## BIOPHILIC DESIGN AND PROGRAMMING

Presenter(s): Collins, Amber, Graduate, Kinesiology and Recreation

Mentor: Dr. Mike Mulvaney

Authorship: Amber Collins, Mike Mulvaney

Biophilia refers to the human tendency to seek out connections with nature and other forms of life. Since biophilia's introduction almost forty years ago, there has been a significant amount of research dedicated to discovering the ways in which nature can be utilized as a potential remedy for improving mood, state of mind, and physical health. Despite the prominence of biophilia research, the amount of biophilia research within the field of parks and recreation is surprisingly limited. As a field that regularly utilizes nature-based spaces to deliver its programs and services, it could be argued that the parks and recreation field should be a leader in the development of recreation experiences that are grounded in a biophilic framework. The tenets of biophilia would suggest biophilic design and programming offers the opportunity for recreation professionals to leverage the benefits of nature-based experiences to create long-lasting impact amongst participants and their communities. Drawing from these findings, the purpose of this project was to propose a biophilic framework to be considered when designing recreation programming and facilities. Biophilic elements and factors to consider when designing and developing these recreation experiences are presented and potential implementation barriers are identified.

## **EVALUATING A RESILIENCE PROGRAM TO SUPPORT STUDENT-ATHLETES DURING THE TRANSITION FROM HIGH SCHOOL TO COLLEGE**

Presenter(s): Deer, Nina, Graduate, Kinesiology and Recreation  
Haffner, Brett, Graduate, Kinesiology and Recreation  
Sangalang, Melvin, Graduate, Kinesiology and Recreation  
Cain, Ellie, Graduate, Kinesiology and Recreation  
Jackson, Kennedy, Graduate, Kinesiology and Recreation  
Ramos, Megan, Graduate, Kinesiology and Recreation  
Kisvari, Lilla, Graduate, Psychology

Mentor: Dr. Scott Pierce

Authorship: Ellie Cain, Nina Deer, Brett Haffner, Kennedy Jackson, Lilla Kisvari, Megan Ramos, Melvin Sangalang, Lindsay Maxson, Scott Pierce

The “Resilience for the Rocky Road” program is a strengths-based resilience program to support student-athletes during the transition from high school into their first year of college. The program was designed using guidelines from Fletcher and Sarkar’s (2016) mental fortitude training framework alongside contextually relevant recommendations from college athletics stakeholders (Pierce et al., 2020). The program features evidence-based content and activities on four topics to support student-athletes in their transition into college sport and life: (1) “Starting the Journey with a Balanced Student-Athlete Identity”; (2) “Coping with Bumps Along the Road”; (3) “Who’s got my Back?”; and (4) “Focus on the Road Ahead”. The purpose of this presentation is to provide evaluate the impact of the resilience program on student-athlete transition experiences and outcomes. In 2023, the program was delivered to 75 first year student- athletes at a Division I university, with a total of 24 workshops presented by nine mental performance coaches. Participants completed surveys at pre- and post-program, to assess changes in Athletic Identity Measurement Scale (AIMS; Brewer et al., 1993) and Connor- Davidson Resilience Scale (CD-RISC2; Connor & Davidson, 2003) and to evaluative participants perceived enjoyment and the personal impact of the program. Evaluation findings have established that participants experienced optimal shifts in athletic identity (i.e., increase in social identity and decrease in exclusivity), maintenance in psychological resilience, and a belief that they utilize coping skills and support. Furthermore, gamifying learning in workshops was found to be valuable in actively engaging student-athletes in reflection, learning, and application of skills. In an ever-changing collegiate athletic environment, practitioners should seek to provide psychological support during the student-athlete transition into college and provide continuity in this support throughout careers and transitions.

## RESTING METABOLIC RATE AND PHYSICAL ACTIVITY IN COLLEGE STUDENTS

Presenter(s): Dosemagen, Rori, Graduate, Kinesiology and Recreation  
Agudelo, Jerecho, Undergraduate, Kinesiology and Recreation  
Mentor: Dr. Kristen Lagally

The transition to University is associated with decreases in physical activity levels and increases in body mass. The purpose of this descriptive study is to evaluate university students' resting metabolic rates and physical activity levels.

Participants are college student volunteers who self-report physical activity levels and undergo resting metabolic rate measurements using open-circuit spirometry. Resting metabolic rate is measured following a minimum of a four-hour fast, with no caffeine or physical activity within 12 hours prior to the measurement.

Participants recline for a minimum of 20 minutes while wearing a respiratory mask over the nose and mouth to capture oxygen consumption and carbon dioxide production. Physical activity levels are reported as number of days/week and number of minutes/day. These values are multiplied to determine an overall value for minutes of weekly physical activity. The results provide useful information for participants on health and for maintenance of body mass. Low levels of physical activity can be addressed by participation in campus physical activity opportunities such as those provided by Exercise is Medicine on Campus, Campus Recreation, and Health Promotion and Wellness. Knowledge of resting metabolic rate is useful for managing caloric intake and can be increased through physical activity and addition of muscle mass.

# DETERMINING THE BEST PREDICTOR VARIABLES FOR CMJ PERFORMANCE IN NCAA DIVISION 1 FOOTBALL PLAYERS

Presenter(s): Konkell, Jadon, Graduate, Kinesiology and Recreation

Mentor: Dr. Marcel Lopes dos Santos

Co-Mentor: Dr. Michael Torry

Authorship: Jadon Konkell<sup>1</sup>, Michael Torry<sup>1</sup>, Samantha McDonald<sup>1</sup>, Chris Carter<sup>1</sup>, Marcel Lopes dos Santos<sup>1</sup>

1 - Illinois State University, Normal, IL

**INTRODUCTION:** Countermovement jumps (CMJ) are among the most implemented tests for assessing the performance capacity of the lower body, specifically in the context of sports. The simplicity of both the movement and testing protocol, as well as the broad spectrum of kinematic, kinetic, and performance variables that are measurable during the test with the implementation of force plates make this modality a broadly advantageous and utilized tool in assessing athletes. The metrics calculated from CMJs are particularly valuable to sports such as football given lower-extremity power and force development translate to success many facets of the game. While the objective of the test is to achieve the greatest vertical displacement (jump height), it is equally important to understand which of the many subsequent variables are the best predictors of performance. Understanding the correlations between test variables and jump height can provide athletes and strength coaches insight into designing training protocols that will enhance athletic capabilities. **PURPOSE:** To evaluate which countermovement jump (CMJ) metrics were the strongest predictors of performance (jump height). **METHODS:** Sixteen NCAA Division 1 football players (height:  $190.18 \pm 5.32$  cm, weight:  $106.43 \pm 16.59$  kg) participated in this study. Following a 5min low-intensity warmup protocol, subjects performed three bi-lateral CMJs with hands placed on hips to control for advantages due to arm swing. All variables were calculated in a custom Excel spreadsheet and exported to SPSS for statistical analysis. Ten variables were selected based on a review of literature to predict jump height: takeoff velocity; peak propulsive, braking force; braking, propulsive impulse; peak propulsive, braking power; modified reactive strength index (mRSI), and propulsive, braking asymmetry. Power, force, and impulse variables were all normalized to subject weight. Alpha value was set at 0.05. **RESULTS:** Jump height:  $0.42 \pm 0.08$  m appeared to be normally distributed. Of the ten variables studied, six of them were significant. Takeoff velocity:  $R = 0.99$   $p = <0.001$  was the best predictor of jump height, followed by peak propulsive power  $R = 0.953$   $p = <0.001$ , propulsive impulse  $R = 0.755$   $p <0.001$ , and peak propulsive force  $R = 0.755$   $p <0.001$ . **CONCLUSION:** All variables that were statistically significant occurred during the propulsive phase. Optimizing takeoff velocity may lead to improving CMJ height, and therefore performance in football players.

## **AN EXPLORATION OF TEAM COHESION IN COLLEGIATE ESPORTS CONTEXTS**

Presenter(s): Kresina, Kenneth, Graduate, Kinesiology and Recreation

Mentor: Dr. Liz Sattler

As the esports industry approaches adolescence, research on esports environments is only beginning. Despite the plethora of work done on team cohesion and coaching in traditional sports, current esports coaches are ill-equipped to lead and mentor a team of young adults. The present study aims to lay the groundwork for developing the coach-player relationship in esports through a team cohesion and leadership personality perspective. A qualitative approach featuring semi-structured interviews from individual collegiate esports players across a variety of university-affiliated teams was adopted to explore players' perceptions regarding their team environment experiences. The study aims to verify the plausible validity in applying previous team cohesion models to esports contexts, despite differences to traditional sports and the breadth of experiences possible given the current state of collegiate esports.

## MATHEMATICS

### MYTH OR FACT? AN ANALYSIS OF COVID-19 DEATHS IN RED VERSUS BLUE STATES OF AMERICA

Presenter(s): Mozid, Nishat Ara, Graduate, Mathematics  
Duku, Kwabena S., Graduate, Mathematics  
Mentor: Dr. Olcay Akman  
Authorship: Nishat Ara Mozid, Kwabena S. Duku, Olcay Akman

This study examines the correlation between political leanings and COVID-19 mortality across Republican and Democratic states. Employing Emergent Self-Organizing Map (ESOM), Cluster Analysis, and the Logistic Algorithm, we group states based on COVID-19 properties, identify risk patterns, and assess risk levels. Factors considered include poverty rate, education rate, vaccination rate, and demographics. The Logistic Algorithm succinctly summarizes findings, integrating ESOM, Cluster Analysis, and Logistic Regression results. This multi-method approach aims to offer a concise, yet comprehensive understanding of the COVID-19 risk landscape in politically diverse states, shedding light on potential associations between political affiliations and pandemic outcomes.

# **A MATHEMATICAL APPROACH TO MOTION TRACKING USING LIE ALGEBRA AND COMPUTER VISION**

Presenter: Skudnig, Bob, Undergraduate, Mathematics  
Soltermann, Christian, Undergraduate, Mathematics  
Mentor: Dr. Gaywalee Yamskulna

Computer vision is the field of computer science concerned with extracting meaningful information from videos and images. An important sub-field of computer vision is motion tracking, where the position and orientation of moving objects are tracked over time. Tracking techniques have found application in areas such as sports, self-driving vehicles, and security systems. In this project, we approach the problem from a mathematical standpoint and utilize the structure of Lie algebras. A Lie algebra describes the transformation of an object in terms of the structure of infinitely small transformations. In this project, we created a model for tracking faces using affine transformations to approximate three dimensional motion. An affine transformation (described by an affine matrix) is a distortion of an image that preserves parallel lines. We randomly transformed a dataset of face images using affine matrices and created several models to predict the transformation given the transformed image. Instead of directly predicting the affine matrices, our models work inside of the affine Lie algebra. Working inside of a Lie algebra should provide better predictions as a Lie algebra provides a flat and linear space, unlike the original space of transformations. The models were able to predict transformations with relatively high accuracy. This concept is investigated further with various models, alternative data, and other potential applications.



## EXPLORATION AND ANALYSIS OF FAKE REVIEWS

Presenter(s): Swaggerty, Gracy, Undergraduate, Mathematics

Mentor: Dr. Olcay Akman

Recently, for consumer shopping, Amazon has become the central place for customers to purchase everything and reviews are now more important than ever for sellers as they can quickly sway customers away or toward a product. Reviews hold this influential weight because they are authentic, coming from real customers with real experiences with the product. Fake review detection has been a growing interest of Amazon and they have implemented Amazon Vine to verify reviewers. In this project we collected 40 Amazon reviews ranging from good, bad, and mixed, for Apple AirPods 2nd Generation. Putting them into a text analyzer, we found strings up to length 8 being repeated up to 4 times throughout all the reviews, which is quite an unusual case. By using hypothesis testing, comparing these findings graphically, plotting repeated string length versus frequency, with the review findings, we found that the reviews are not being generated authentically. Our hypothesis testing shows there is a statistically significant difference between the expected frequency of 7-word strings using the English Brown Corpus and the actual frequency found in the collected reviews. This outcome solidifies our assumption that these reviews are being manipulated and phrases reused to create fake reviews.

# MUSIC

## DIVERSITY REPRESENTATION IN ILMEA ALL-STATE BAND PROGRAMMING, 1990-2023

Presenter: Boucher, Lucy, Graduate, Music

Mentor: Dr. Phillip Hash

Authorship: Lucy Boucher

The purpose of this study was to examine the diversity of ILMEA All-State band programming from 1990 to 2023. This study compiled information regarding the composers and arrangers of the pieces selected, and the conductor for each ensemble. The study showed that 2.13% of all composers and arrangers ( $N = 329$ ) were female ( $n = 7$ ). Composers and arrangers of color ( $n = 9$ ) was slightly higher at 2.74% ( $N = 329$ ). An increase in diverse (females and people of color) composers and arrangers ( $n = 8$ ) was shown between 2020 and 2023, with diverse composers making up 29.63% of all composers and arrangers selected ( $N = 27$ ). This drastic difference is a welcome change from the previous decades. Out of all the ensembles in the past 33 years ( $N = 66$ ), 15.15% conductors were diverse ( $n = 10$ ). While ILMEA is statistically showing an increase in diversity, there is still room for growth and improvement in representation.

## DIET'S IMPACT ON ORAL MICROBIOMES IN CHILDREN

Presenter(s): Block, Mary, Undergraduate, Biological Sciences  
Charlton, Samantha, Undergraduate, Nursing  
Mentor: Dr. Susana Calderon  
Authorship: Mary Block, Samantha Charlton, Susana Calderon

The oral microbiome is the ecological community of microorganisms living in our oral cavity. The diverse group of microorganisms play an important role in maintaining both oral and systematic health. The composition of these microorganisms can be impacted by environmental factors such as: diet, oral hygiene, smoking, disease, and more. The composition of our oral microbiome can also impact and be indicative of our overall health and well-being. Therefore, researchers are increasingly using oral microbiomes to better understand human health and wellness.

Our study aims to better understand factors impacting the oral microbiome compositions in children ages 5-6 years old. We believe that early dietary interventions can help maintain homeostasis in the oral microbiomes of children, improving their oral health and weight management.

To test this, we created a survey for people with children ages 5-6 years old to gather information on their child's demographics, lifestyle, and oral health history. Next, we plan to collect, sequence, and analyze the oral microbiome compositions of children ages 5-6 years old before and after eating yogurt two-times a day for three weeks. We will collect saliva samples from the children, extract microbial DNA from the saliva, and send the DNA to be sequenced. Using genomic data and bioinformatic techniques, we can determine the compositions of microorganisms before and after the 3-week period. We plan to report preliminary data. The data will help us better understand the impact yogurt has on the oral microbiome composition of children. In the future, we plan to continue researching the oral microbiome to better understand human health and disease.

## THE IMPACT OF COVID-19 ON CARDIAC REHABILITATION OUTCOMES

Presenter(s): Krebs, Harrison, Graduate, Nursing

Mentor: Dr. Marilyn Prasun

Authorship: Harrison Krebs, Marilyn Prasun, Yan Su, Kimberly Crutcher

**Background:** Cardiac rehabilitation is an essential resource for patients with cardiovascular disease. It has been shown to help improve quality of life, exercise tolerance, and depression. The COVID-19 Pandemic limited access to many cardiac rehabilitation programs for patients with cardiovascular disease. This study aimed to evaluate the outcomes of patients participating in cardiac rehabilitation phase II before and during the COVID-19 Pandemic.

**Methods:** This study was a single-site retrospective chart review of patients who completed at least 12 cardiac rehabilitation phase II visits during 2019-2020. Patients were divided into two groups: pre-COVID and COVID era. Those who received cardiac rehabilitation in 2019 were placed in the pre-COVID group, and those who received cardiac rehabilitation in 2020 were placed in the COVID-era group. Quality of life, six-minute walk test distance, METs, and depression were evaluated in each group.

**Results:** 212 patients were included in this study. The pre-COVID group had 140, and COVID era had 72 patients. Baseline walking distance (mean walking distance: 1194 [SD=369] vs. 1191 [SD=370],  $P = .96$ ) and METs (mean baseline METs: 2.77 [SD=0.55] vs. 2.82 [SD=0.57],  $P = .55$ ) were similar between the two groups. Patients in the pre-COVID group had a significantly better baseline QOL (mean QOL score: 24.47 [SD=3.86] vs. 22.86 [SD=4.15],  $P = .01$ ) and baseline depression (26% vs. 43%  $P=0.04$ ) than those in the COVID era group. Cardiac rehabilitation significantly improved quality of life ( $b = 1.46$ , 95% CI: 0.81 ~ 2.12) six-minute walk test distance ( $b = 331.45$ , 95% CI: 295.62 ~ 367.36), and METs ( $b = 1.79$ , 95% CI: 1.55 ~ 2.03).

**Conclusion:** The COVID-era group was more depressed and had lower levels of quality of life at baseline. However, even with the alterations to cardiac rehabilitation during the COVID-19 Pandemic, it demonstrated to be an essential resource for patients recovering from cardiovascular disease.

# This Poster Has Been Canceled

## PLATO AND TIME – CAN TIME EXIST WITHOUT THE MATERIAL WORLD?

Presenter: Reckamp, Robert, Undergraduate, Philosophy

Mentor: Prof. Daniel Breyer

This poster compares the views of two different modern scholars, Thomas Seissl and David Guetter, on Plato's view of time as discussed in the *Timaeus*. Seissl examines the views of the ancient philosophers Plotinus, Simplicius, and Aristotle who held different views on what Plato says in the *Timaeus*, whether he (Plato) refers to time or number as the "image of eternity" (Plato, Ti. 37d). As Seissl explains in his paper, Plotinus thinks that time *per se* exists separately apart from change and motion of bodies, because time is always active. Simplicius, on the other hand, thinks that number rather than time is the moving image of eternity. Aristotle, famously, takes Plato's statement that time began with the universe literally. He thinks that motion and time are inseparable and that time is the number of motion; therefore, both time and motion are eternal. Seissl effectively compares all these ancient philosophers and agrees with Aristotle's interpretation, arguing that if Aristotle disagreed with Plato he would have said so, as evidenced by his other critiques of Plato.

Guetter, who has a different interpretation, argues that time rather than number is the mirror of eternity referred to in the *Timaeus*. He looks at eternity's relationship to time and how time and eternity relate to the present, past, and future. This presentation shows why Seissl's argument of why number is the "image of eternity" (Plato, Ti. 37d) also implies that Plato thought that the universe and time a simultaneous beginning literally. It also shows how Guetter's research indicates that the present and eternity are the only forms of time that "are". This is because the past and future cannot be in a state of "are", only in states of "was" or "will be", respectively. The past and future are only memory or anticipation to our perception. Guetter shows how the universe and time were created simultaneously and how understanding of number is necessary for all other understanding, since we cannot know anything without a numerical basis.

## PHYSICS

### **AN ANALYSIS OF RESULTS REGARDING HOW COMPUTATIONAL EXERCISES CAN IMPROVE ACTIVE LEARNING IN A GENERAL EDUCATION ASTRONOMY COURSE**

Presenter(s): Marquez, Jose, Undergraduate, Teaching and Learning  
Nevin, Miranda, Undergraduate, Teaching and Learning

Mentor: Mr. Raymond Zich, Physics

Authorship: Jose Marquez, Miranda Nevin, Katherine Moser

This study investigated the effectiveness of computational exercises in a general education astronomy class to determine if students' learning gains increased over the course of six semesters. We are interested in how computations can offer more classroom engagement in a cross-disciplinary STEM-related course, as well as how computations can improve student solutions to conceptual and contextual problems. In order to test this, each cohort of students were given at least twelve computational-related exercises to complete using online spreadsheets to incorporate active learning with STEM practices. This was done to improve students' ability to collaboratively make predictions based on models, as well as connect mathematical concepts with scientific phenomena. By conducting our research through a long-term assessment, we were able to make a claim more conclusively about the effectiveness of computations through extensive data collected over a variety of students and different learning modalities. Students' learning gains were compared in a pre and post TOAST (Test of Astronomy Standards) and LPCI (Lunar Phases Concept Inventory) to test their knowledge before and after the course. Each cohort was also given a survey to learn about their pre and post attitudes to mathematics, science, and their overall expectations/feelings toward the general education astronomy classroom. These assessments revealed that there were TOAST correctness gains of up to 20%, an LCPI correctness gains of up to 29%, and overall attitudes towards working collaboratively on computational exercises in science were positive and there was evidence learned more conceptually.

## POLITICS AND GOVERNMENT

### **DISTRIBUTIONAL VIOLENCE IN THE FACE OF ECOLOGICAL CRISES: A STUDY OF APOCALYPTIC NARRATIVES, CLIMATE REFUGEES, AND RIGHT-WING POPULISM**

Presenter: Giles, Porter, Undergraduate, Politics and Government

Mentor: Dr. Kam Shapiro

Authorship: Porter Giles, Kam Shapiro

The objective of this paper is to examine the linkages between representation of zombies in apocalyptic media and dehumanizing rhetoric employed by right-wing populists to describe migrants. In particular, AMC's *Fear the Walking Dead* (2015) is examined for its modeling of far-right responses to resource scarcity in fictional media. Previous studies have found that apocalyptic thinking and "zombie experts" have been incorporated into policymaking, influencing institutional responses to crises associated with climate change. As climate change is projected to fuel mass migration, resource scarcity, and conflict, it is necessary to investigate where (or on whom) the consequences of crises are unleashed. In digital media and political rhetoric, refugee and migrant bodies are frequently dehumanized when referred to as "swarms" or "hordes". This dehumanizing rhetoric is reflected through the apocalyptic metaphor of the zombie. Climate refugees are positioned to be the scapegoats of resource scarcity due to the discursive frames present in apocalyptic media, driving support for far-right populists and their chauvinist platforms. I use the phrase "distributional violence" to capture this combination of physical and discursive violence, particularly in the contexts of visible resource distribution.

## EVALUATING STUDENT ENGAGEMENT IN STEM SUMMER CAMPS

Presenter(s): High, Allie, Undergraduate, Politics and Government

Mentor: Dr. Rachel Waring-Sparks, Center for Civic Engagement

Co-Mentors: Dr. Ashley Waring-Sparks, Center for Mathematics, Science, and Technology  
Dr. Will Lewis, Information Technology

Science, technology, engineering, and mathematics (STEM) education encourages creativity, problem-solving skills, and critical thinking among students. However, there remains a significant gap in representation within STEM. This disparity highlights the need for programs that attract diverse STEM learners at early ages. Research indicates that informal educational programs such as summer camps have shown promise in capturing interests in STEM. In 2023, a team from Illinois State University and local community partners organized several STEM camps in Bloomington-Normal to engage students in interdisciplinary STEM activities.

This study evaluates the impacts of these STEM camps on students' feelings of identity, efficacy, and belonging within STEM. This research is informed by survey data from campers and caregivers, including insights regarding STEM accessibility in the community. The surveys were adapted from existing literature and focused on measuring changes in campers' affective outcomes relating to STEM engagement and perceptions of STEM.

Our findings indicate positive impacts on efficacy and belonging among campers. Data from caregiver surveys also highlight the importance of community-based STEM programming. Caregivers recognize the significance of early exposure to STEM and express positive attitudes towards the camps' contributions to their camper's STEM learning. Collaborative efforts with community partners are also essential in providing inclusive and engaging STEM opportunities. Our poster will summarize the survey results across multiple camps and further explore improvements for future programming.



## **OPIOID MORTALITY AND CORRUPTION IN THE UNITED STATES**

Presenter(s): Khurshid, Saqlain, Graduate, Politics and Government

Mentor: Dr. Oguzhan Dincer, Economics

Authorship: Saqlain Khurshid

The US faces a severe rise in opioid-related overdose deaths, prompting a shift in perception towards an epidemiological crisis. Extensive research links this crisis to complex interactions between public health, economic conditions, and corruption. Corruption manifested through socio-economic and political channels exacerbates opioid prescription rates and mortality.

Regulatory failures, notably by the FDA, worsen the situation. This paper aims to explore the link between corruption and opioid mortality rates across US states, shedding light on this multifaceted issue at the intersection of public health, economics, and governance.

# HOW DO INTERNATIONAL ORGANIZATIONS INFLUENCE THE ADAPTATION OF SOCIAL PROTECTION NORMS IN LOW-INCOME COUNTRIES

Presenter: Ziem, Cindy Wawiema, Graduate, Politics and Government

Mentor: Dr. Mike Hendricks

Co-Mentor: Dr. Noha Shawki

This research investigates the influence of international organizations on the adoption of social protection norms in low-income nations. With a focus on addressing extreme poverty, increasing inequality, and various risks, the study explores the role of organizations in fostering and contributing to the implementation of social protection programs and norms. In this context, social protection norms can be defined as the accepted standards and actions that address risks, vulnerabilities, inequalities, and poverty among individuals. The paper argues that accessibility to socialization, facilitated through dialogue, capacity-building, and knowledge transfer, enhances the likelihood of adapting to social protection norms. Emphasizing intangible methods employed by international organizations, the study utilizes a comparative case study approach, focusing on the United Nations (UN) and the International Monetary Fund (IMF). The chosen qualitative research methodology involves in-depth interviews with representatives from these organizations, providing insights into their perspectives and approaches. Document analysis of legal documents, reports, and agreements from the UN, IMF, and national governments complements the data collection. The research aims to enhance understanding of the correlation between international organizations, socialization, and the adaptation of social protection norms. By uncovering strategies employed by these organizations, the study offers valuable insights for scholars and policymakers working on social protection initiatives in low-income countries.

## PSYCHOLOGY

### EMPOWERING RECOVERY: FEMINIST APPROACH TO CPTSD TREATMENT FOR WOMEN

Presenter(s): Bychowski, Jaylen, Graduate, Psychology

Mentor: Dr. Caitlin Mercier

There has been a growing recognition of the significant impact of complex traumatic experiences on mental health outcomes, with research indicating an overall prevalence rate of 3.8% in the United States and women experiencing rates twice as high as men (Cloitre et al., 2019; Knefel et al., 2015). Complex Post-Traumatic Stress Disorder (CPTSD), or disturbances in self-organization (DSO) attributable to exposure to extreme or multiple forms of trauma, has been associated with severe impairment, relational functioning, and poor quality of life (Simon et al., 2019; Brewin, 2020), yet with little research on psychological therapies for treatment. Despite CPTSD stressors (e.g., prolonged domestic violence, repeated childhood sexual or physical abuse) being interpersonal in nature, traditional therapies often utilize an individualistic approach to trauma with the role of sociocultural factors in women's psychological well-being and development of DSO symptoms (e.g., affect regulation, negative self-concept, disturbances in relationships) rarely mentioned. Women are placed at risk of victimization, underscoring the importance of utilizing a feminist lens to conceptualize their trauma. Feminist therapy challenges patriarchal forces and practices that are oppressive and psychologically damaging to women (Enns, 2004; Brown, 2010). By externalizing distress and fostering a sense of empowerment, feminist therapy can help women with CPTSD feel validated and supported. Guided by relevant literature and feminist theory, I offer strategies for CPTSD treatment among women, particularly DSO symptoms.

## EMOJIS IN DISCOURSE: LINKED / UNLIKED EMOJIS AND BACKCHANNELING

Presenter(s): Ervin, Will, Graduate, Psychology

Mentor: Dr. Allison Nguyen

Authorship: Will Ervin, Allison Nguyen, Andrew J. Guydish, Jean E. Fox Tree

Backchannels, which are verbal and non-verbal cues of understanding given in conversation, are essential to reaching a mutual understanding between speech partners. Backchannels provide cues in spontaneous communication as to whether the listener has understood the speaker and can help guide the speaker in forming common ground with the listener (Clark & Brennan, 1991). Visual backchannels, such as nods or smiles, are also particularly good at demonstrating emotions and all other backchanneling functions (Bavelas, et al., 2000). Like visual backchannels, emojis can be used to demonstrate emotional states and facial expressions that do not occur in online, text-based communication. (Kaye, et al., 2017; Dresner & Herring, 2010; Walther & D’Addario, 2001). Emojis have many similarities with backchanneling, and thus, it is assumed that emojis operate like backchannels. One problem in this research area is the difficulty in eliciting backchannels in the lab. We developed five different methods for emoji backchannel elicitation. Firstly, when subjects interact with the experimenter, they will be exposed to the usage of emojis by the experimenter, such as saying “hello 🤝” when they enter the Zoom room. Once the study begins, subjects will be given briefing instructions containing emojis. Subjects will then engage either with exemplary images demonstrating emoji usage in text-based conversations or will be asked to fill out a basic questionnaire while using select emojis to answer each question. Lastly, subjects will be put in a chat room with a confederate that will use emojis frequently. We expect these conditions to increase emoji usage. Being able to elicit emoji in the lab will allow for creation of an emoji corpus, as well as provide opportunities for future research on emoji usage.

## STRUGGLE IN THE STACKS: INVESTIGATING IMPOSTER PHENOMENON AMONG ARCHIVISTS

Presenter(s): Flinn, Taylor, Graduate, Psychology

Mentor: Mrs. April Anderson-Zorn, Interdisciplinary Studies

Authorship: Taylor Flinn, April Anderson-Zorn, Tiffany Cole, Jane LaBarbara

Have you ever had a moment in your professional life where you felt fraudulent? Perhaps you've feared being discovered as a fake in your field. Often triggered by a negative professional experience such as bullying in the workplace, lack of administrative leadership, or being the target of a racial microaggression, this feeling of inadequacy can lead to poor workplace performance, low workforce retention, and mental health concerns for employees (Bravata, 2020; Clance & Imes, 1978). The purpose of the present study is to examine a recent survey conducted to identify trends of impostor phenomenon from an understudied profession, archivists. Based on previous research conducted in the larger librarian profession, survey authors expected results to concur with those findings. However, our results showed far different results, suggesting the impostor phenomenon may be prevalent in all demographics and career levels (Kimble-Hill et al., 2020; Simmons, 2016). The poster will discuss the results and suggest ways to combat impostor phenomenon in the workplace. The sample included 325 archivists recruited from the membership of the Society of American Archivists (SAA). *Imposter Phenomenon* was measured using the Clance IP Scale, a 20-item questionnaire (Clance, 1985). A mean score of the questionnaire was computed for each participant. Based on their mean, each participant was separated into one of four imposter experience categories: few, moderate, frequent, and intense. The 29 participants who were placed in the few category had an average scale result of 33.44 (SD = 3.77), the 84 participants in the moderate category obtained an average of 50.67 (SD = 5.96), 149 participants in the frequent category obtained an average of 70.67 (SD = 5.74), and the 63 participants in the intense category had a mean of 88.33 (SD = 5.50). The imposter phenomenon levels were significantly different,  $F(3,321) = 901.501$ ,  $p < .001$ . The present study provides evidence that imposter phenomenon may occur at high rates within the archives industry and partially supports previous literature that imposter phenomenon does not adhere to specific demographic characteristics. Over 65% percent of our sample experience frequent to intense feelings of imposter phenomenon. Practical implications include that organizations should consider adding training to help employees recognize feelings of imposter phenomenon and equip them with strategies to overcome them.

## UNDERSTANDIGN THE ROLE OF RESPONSE EXPECTANCY ON PELVIC FLOOR PAIN DURING SEX

Presenter(s): Fontes, Camila, Undergraduate, Psychology

Mentor: Dr. Kelly Clemens

Authorship: Camila Fontes, Joy Jeronimus, Kelly S. Clemens

According to the American Congress of Obstetricians and Gynecologists (ACOG; 2023) 75% of people who were assigned female at birth (AFAB) suffer from pain during sex at some point during their lifetimes. While this pain may have gynecologic or physiological causes, it may also occur or be worsened or complicated by psychological factors. Much of the literature regarding psychological correlates of pelvic and gynecologic pain focuses on the role of psychological distress, including depression, anxiety, and catastrophizing (e.g., Till et al, 2020). One potentially important, but understudied, psychological construct that may contribute to gynecologic pain is response expectancies. Response expectancies refer to an individual's expectancies for internal, automatic, non-volitional responses (e.g., sensations of pain). Response expectancies have been demonstrated as an important predictor of self-reported pain across a variety of studies and pain types (see Peerderman et al., 2016). Few sources, however have studied the influence of response expectancy on gynecologic pain.. The present study aims to further the literature on psychological factors that may influence gynecologic pain during sex by determining the relationship between response expectancies and painful sex experiences. Participants (N = 150) who were assigned female at birth will be recruited from Prolific, an online participant recruitment platform. Participants will respond to measures of response expectancy for pain during sexual activity (Clemens, 2022), experiences of pelvic pain during sexual activity, and control variables including depression, anxiety, and stress (Henry & Crawford, 2005), pain catastrophizing (Sullivan et al., 1995), pain anxiety (McCraken & Dhingra, 2002), descriptive and prescriptive social norms around sexual activity, sexual health awareness, and pelvic sexual pain history and diagnoses. Data will be submitted to a multiple regression including the predictor variable, response expectancy, and covariates which correlate with dependent variable, self-reported experiences of sexual pain. It is expected that response expectancy will predict painful sex experiences, even in the presence of control variables. Understanding the role that response expectancy plays in sexual pain may present new ways to intervene and reduce pain experiences.

## EDUCATOR WELLBEING AND TURNOVER INTENTIONS

Presenter(s): Goebel, Derek, Graduate, Psychology

Mentor: Dr. Adena Meyers

Authorship: Derek Goebel, Katie Hindman, Adena Meyers, Emily Jones

Since the COVID-19 pandemic, educator attrition is on the rise with over half of teachers surveyed by National Education Association (NEA) stating the pandemic influenced their likelihood to remain in education (2022). Educator stress was increasing before the pandemic, and evidence shows the situation is not improving (Farley & Chamberlain, 2021). In addressing educators' wellbeing to prevent turnover, school districts need to understand how staff feel about their work experiences. The National Teacher and Principal Survey (NTPS) is a nationally representative survey created for teachers and administrators of K-12 schools that includes many items related to wellbeing (Taie & Lewis, 2022). This study compares responses to NTPS survey items among educators in a Midwestern district to national norms (NTPS, 2021), and examines correlations between survey items and educator turnover intentions. University researchers collaborated with district administrators to select items from the NTPS to include in a districtwide staff workforce wellbeing survey, which included 25 items focusing on teacher wellbeing, perceptions regarding administration, and feelings about the profession. There were 254 responses from 10 schools. Items were measured on a four-point likert scale from strongly disagree to strongly agree. Chi-squared tests compared district responses to the NTPS national norms, and correlations were used to examine associations between work-related wellbeing items and turnover intentions. Chi-squared tests revealed more than half of the district level responses reflected significantly more unfavorable experiences and attitudes compared to national norms, meaning either higher agreement with negatively worded items or higher disagreement with positively worded items. There were, however, four items for which the district responses were more favorable than national norms, and seven items with no statistically significant difference between the two. Correlations indicated that work-related wellbeing significantly predicted turnover intentions. Teacher responses at the district level were generally less favorable than national norms, especially regarding student behavior negatively affecting teaching, though salary satisfaction and job security were rated favorably compared to national norms. Importantly, the most recently published norms were collected pre-pandemic so differences between the current sample and national norms may reflect historical trends in educator wellbeing rather than differences between this district and the rest of the country. Correlations revealed associations between educators' work-related wellbeing and turnover. Overall, the results indicate possible problem areas that district administrators can focus on in an effort to improve educator wellbeing and decrease attrition.

## **THEY SAY I'M TOO SENSITIVE: SUPERVISORS' RESPONSES TO MICROAGGRESSIONS ENACTED TOWARDS GRADUATE STUDENTS OF COLOR**

Presenter(s): Goins, Rochelle, Graduate, Psychology  
Concepción Cabán, Lourdes D., Graduate, Psychology  
Flint, Arielle N., Graduate, Psychology  
Mentor: Dr. Brea M. Banks

Racial microaggressions are interpersonal instances of racism enacted against individuals holding minoritized identities that are at times unintentional and subtle. Research suggests that graduate students who hold racially marginalized identities in mental health service programs experience microaggressions in classes or as part of their practicum experiences. No research to date has explored how faculty, supervisors, or advisors respond to these experiences (e.g., support, validate, minimize) when students disclose these occurrences. As part of the current study, we (a) explore students' experiences with microaggressions in graduate school, (b) examine the degree to which they report these occurrences to faculty, supervisors, and advisors, and (c) explore faculty, supervisors, and advisors' responses to these transgressions.

We recruited Graduate students of Color from mental health service fields such as school, counseling, and clinical psychology. Participants engaged in 30 min interviews with our research team, during which time they discussed their experiences with disclosing microaggressions to supervisors in their program. Using thematic analysis, we transcribed recorded interviews. Two members of our research team who did not engage in data collection coded about 25% of the interviews to develop a codebook that includes definitions. They coded independently before working together to discuss and agree on developed codes. Other members of our team are soon going to audit the codebook to ensure that codes are consistent and well-represent content discussed in interviews. We will then apply the codes to all transcripts and will identify themes with definitions among codes. We will discuss and agree on their independent work and the current authors will audit developed codes and themes throughout the process. We will report ICR data as part of the results.



## #BICULTURAL: SOCIAL MEDIA USE, NEEDS SATISFACTION, AND WELL-BEING OF IMMIGRANTS

Presenter(s): Hecke, Raquel, Graduate, Psychology

Mentor: Dr. Suejung Han

Authorship: Raquel Hecke, Suejung Han

**Purpose.** This study examines the associations between immigrant's bicultural social media use, satisfaction of psychological needs, and well-being outcomes (i.e., bicultural identity integration & life satisfaction) applying Self-Determination Theory (Ryan & Deci, 2000).

Immigrants and their decedents experience increased acculturative stress (i.e., difficulties from adjusting to a new culture; Sanchez et al., 2015) and bicultural stress (i.e., difficulties from navigating two different cultures; Huynh et al., 2011). This additional stress has been linked to negative outcomes (Nguyen & Benet-Martínez, 2012) and to difficulty with fulfilling their basic psychological needs (i.e., needs for relatedness, competence, autonomy; (Kunyu et al., 2021). More research is needed to address ways to reduce this stress, fulfill their needs, and increase well-being of immigrants. Building an integrated bicultural identity has been linked to positive adjustment outcomes (Nguyen & Benet-Martinez, 2012), suggesting bicultural identity integration (BII) is an immigrant-specific well-being outcome. In the increasingly connected global society like ours, social media use may be particularly relevant for immigrants who need to be connected to two cultures, one of which can be geographically distant from them. We propose that social media use within both cultural contexts may be useful for immigrants by allowing for connections to both cultures, thereby fulfilling their psychological needs, subsequently promoting their well-being (i.e., BII & life satisfaction). We hypothesize that bicultural social media use will be associated with BII and life satisfaction, which will be mediated by both general psychological needs satisfaction and bicultural psychological needs satisfaction among immigrants.

**Procedure.** This study will be conducted via online surveys. Participants will be self-identified bicultural immigrants and recruited through the university SONA system, the snowball method, the platform Prolific. The survey will include demographics, bicultural social media use measure developed for this study, Bicultural Identity Integration Scale-II (Huynh et al., 2018), Basic Psychological Need Satisfaction Scale (Deci & Ryan, 2000), Bicultural Needs Satisfaction Scale (adapted from Deci & Ryan, 2000), and the Satisfaction with Life Scale (Diener et al., 1985). Upon IRB approval, data collection will occur from December 2023 to February 2024. A structural equation modeling analysis will be conducted using the SPSS AMOS to test the hypothetical mediation model of the study in March 2024. Results and discussion will be ready to present in April 2024.

**Expected Implications.** The results could inform of a potential intervention target (i.e., effective bicultural use of social media) as a way to promote well-being of immigrants.

## EFFECTS OF CHILDREN'S INTERNET KNOWLEDGE ON ONLINE CRITICAL THINKING

Presenter(s): Hicks, Travis, Graduate, Psychology  
Cripe, Jada, Undergraduate, Psychology  
Brandon, Jaina, Undergraduate, Psychology  
Mentor: Dr. Alycia Hund  
Co-mentor: Dr. Laura Finan  
Authorship: Travis Hicks, Jada Cripe, Jaina Brandon

The internet is becoming an increasingly common source of information for school-age children. Children take many factors into consideration when deciding to trust or mistrust an informant, several of which are applicable to online information as well. For example, children are more trusting of people and things with which they have abundant experience. As children grow older and gain more experience using the internet, they tend to be more trusting of online information than they are at younger ages. Children also take informants' intentions and benevolence into account. No research has been dedicated to studying if children's understanding of the internet's social complexity (capacity to house a variety of good and bad intentions) affects the amount of trust they place in online information.

It is hypothesized that children's age will positively predict the amount of trust they have in the internet. It is also hypothesized that the relationship between age and internet trust will be weakened as children's understanding of the internet's social complexity increases.

At least 92 children ages 5 to 11 years will be recruited to examine the relationship between age and trust in the internet, as well the influence of social complexity understanding on said relationship. Participating parents provide children's age and the time they spend online. Participating children are interviewed about their internet experience, understanding of the internet's social complexity, and their trust in the internet. Data collection is projected to be complete by March 15<sup>th</sup>. Completed interviews are being coded numerically and will be analyzed using simple linear regression with moderation.

Findings from this study have implications for how internet education and interventions are designed. Interventions for children could benefit from a focus on the internet's social complexity if it is found to be a major influence on children's trust in online information.

## THE EFFECT OF INSTRUCTION MODE ON LEARNING RETENTION

Presenter(s): Ingold, Madison, Undergraduate, Psychology

Mentor: Dr. Dawn McBride

Authorship: Madison Ingold, Dawn McBride

The different instructional modes used in classrooms have been connected to a significant difference in student outcomes. The aim of the current study is to examine the differences in lecture-based learning and discussion-based learning and how it applies to overall knowledge retention in the classroom. Specifically, this study is a quasi-experiment where research methods in psychology students at Illinois State University either experienced a lecture or discussion in a review of course concepts. They were instructed to fill out a multiple-choice pre-test and post-test regarding their knowledge of the material. The results of this research may benefit student learning as well as instructor teaching choices.

## PERSONALITY AND JOB PERFORMANCE ACROSS DIFFERENT CONTEXTS

Presenter(s): Jacobsen, Sarah, Graduate, Psychology

Mentor: Dr. Dan Ispas

Co-Mentor: Dr. Alexandra Ilie

Authorship: Sarah Jacobsen, Taylor Flinn, Dan Ispas, Alexandra Ilie, Dragos Iliescu

### A. Purpose:

Most of the research on the relationship between personality and job performance used participants measured in low-stakes samples, usually as job incumbents already employed by the organization. When assessed in high-stakes contexts, there is the possibility of response-distortion which can impact the relationship between personality and job performance (Mueller-Hanson et al., 2003). The purpose of this study is to directly compare job applicants and job incumbents using both a broad (conscientiousness) and a narrow (achievement motivation) measure of personality. We will explore the criterion and incremental validity (over cognitive ability) in both contexts.

### B. Procedure:

The participants were 159 job applicants and 184 incumbents of an organization who participated in a validation study. Cognitive Ability was measured using the GAMA (Naglieri & Bardos, 1997) a 66-item non-verbal cognitive ability test. Achievement Motivation was measured using the 170-item Achievement Motivation Inventory (Byrne et al., 2004).

Personality – Big Five traits were measured with the 60-item NEO-FFI (Costa & McCrae, 1992). Job Performance was measured one year later using supervisor ratings from organizational records.

### C. Results:

Cognitive ability had predictive power in both applicants and incumbents ( $r = .40$  and  $.43$ ). Both conscientiousness (C) and achievement motivation (AMI) showed a decrease in their predictive power in the applicant sample, with C dropping below the significance level. C

showed incremental validity over cognitive ability in the incumbents sample:  $\Delta R^2 = .08$ ,  $p < .001$ ; as did AMI:  $\Delta R^2 = .11$ ,  $p < .001$ . In the applicants sample, AMI showed incremental validity:  $\Delta R^2 = .04$ ,  $p < .01$  but C did not  $\Delta R^2 = .02$ ,  $p = .08$ .

### D. Conclusions:

It appears that the validity of personality measures is impacted by their use in a high-stakes context. However, the narrow measure (AMI) showed a stronger relationship with job performance than C and it was still predictive in the applicant sample while C was not.

Further research is needed especially using participants assessed in high-stakes contexts.

# **THE IMPACT OF RACE ON EXPERIENCES OF RACISM AT A PREDOMINANTLY WHITE INSTITUTION**

Presenter(s): Johnson, CJ, Undergraduate, Psychology

Mentor: Dr. Dawn McBride

Authorship: CJ Johnson

Predominantly institutions (PWIs) unfortunately tend to turn a blind eye to certain instances of racism. White supremacy tends to be in the framework in many PWIs, which means beneficial change often is not implemented until it is beneficial to the powers that be. The current study is a mixed methods study which looks at the experiences of racism, as microaggressions or more direct forms of racism, towards students of color at Illinois State University. Beyond direct experiences of racism, this study also looks at witnessed acts of racism from any student demographic, as well as how welcomed and included students at ISU feel. Using an anonymous self-report survey will allow students to share their experiences of racism and feelings of alienation or disillusionment, without fear of repercussion.

## **DOES WORKING MEMORY PREDICT PRECRASTINATION?**

Presenter(s): Liew, Ryan, Graduate, Psychology

Mentor: Dr. Dawn McBride

Authorship: Sanaii Masih

Precrastination is the tendency to complete a task earlier than needed even when it will cost extra effort, (Rosenbaum et al., 2014). One possible explanation of precrastination is the reduction of cognitive load needed to remember future tasks – completing the task early reduced one's mental to-do list (i.e. the CLEA hypothesis, VonderHaar et al., 2019). The current study investigated aspects of working memory in relation to precrastination. In two studies, we measured inhibition and updating aspects of working memory and precrastination rates in cognitive tasks. Despite the expectation that working memory would predict precrastination rates in a conscious effort to reduce cognitive load, no correlation between working memory scores and precrastination rates was evident in the results. One possible explanation of the results is that precrastination is a default, automatic response in most individuals when facing tasks that tax cognitive abilities that are not affected by one's working memory abilities.

## EXPLORING SHAME AND GUILT IN THE OSTRACISM–SELF-ISOLATION LINK

Presenter(s): Lim, Zhi Quan, Graduate, Psychology

Mentor: Dr. Eric Wesselmann

Co-Mentor: Dr. Matthew Hesson-McInnis

Authorship: Zhi Quan Lim, Eric Wesselmann, Matthew Hesson-McInnis

Previous studies that examine behavior responses to ostracism (i.e., being ignored and excluded; Williams, 2009) typically focus on either antisocial or prosocial responses. However, recent studies (Ren et al., 2016; 2021) have found a third behavioral response: an increased tendency to self-isolate or desire solitude. These findings are still relatively new compared to their counterparts. Our study replicates and extends these previous findings using a different method of inducing ostracism. The previous study manipulated ostracism in real-time social interactions (both in-person and virtually). These manipulations are powerful but intensive in terms of resources and involve complex stories or deception. We will use the less intensive autobiographical recall tasks, which ask participants to recall a past ostracism event. We further extend this research by examining the potential mediating role that shame and guilt may have in the ostracism-self isolation link. Past research demonstrates that shame motivates avoidance behaviors which should include self-isolation. We choose guilt as a comparison emotion because though it often correlates positively with shame, it typically promotes approach behaviors, which run counter to self-isolation. By accounting for both emotions concurrently, we can tease apart the effect of any potential emotional ambivalence on participants' desire to self-isolate. Our power analysis (anticipating a medium size for a path and our b path with .8 power) suggests that 116 participants should be sufficient. The study is currently in progress with an anticipated completion date of March 15, 2024. We will assign the participants randomly to either the ostracism memory group or the control group (i.e., recalling the last time they ate a meal). Participants then will answer items indicating their current emotional state, including shame and guilt. Finally, participants will indicate their preference for solitude-seeking using a measure from our replicated studies. We hypothesize that individuals who recall being ostracized will indicate a higher desire to self-isolate than individuals who recall a control event. We also hypothesize that recalling ostracism memories should increase feelings of both shame and guilt, with shame then predicting an increased desire to self-isolate. We will explore the potential mediating role that guilt may have on self-isolation. This study will replicate and expand on research examining the ostracism-self-isolation link. It will provide evidence using a different paradigm, as well as providing an initial exploration of potential psychological mechanisms.

## **SELF-OBJECTIFICATION AND DISORDERED EATING: THE ROLE OF FATHERS**

Presenter(s): Mangold, Aleena, Graduate, Psychology

Mentor: Dr. Suejung Han

Authorship: Aleena Mangold, Suejung Han

The purpose of this study is to examine the links between disordered eating and body/weight related comments and messages from fathers through the lens of objectification theory (Fredrickson & Roberts, 1997). Chronic dieting and restrictive eating behaviors are highly prevalent for women and young girls, and these behaviors tend to be encouraged by parents' direct comments on the girl's body and weight and indirect messages that overvalue thinness and appearance (Rodgers & Chabrol, 2009). In a patriarchal society, fathers may be a critical messenger of such objectifying messages about women's bodies to their daughters. However, previous studies have focused on mothers extensively or examined parents/parental figures. The specific role of fathers in shaping their daughter's disordered eating behaviors has not been extensively examined together. We hypothesize that self-objectification will be associated with messages from fathers about dieting and appearance. We also hypothesize that the relationship between fathers' messages and their daughter's disordered eating habits would be mediated by self-objectification.



## **THE ROLE OF TEAM SUPPORT AND SELF-EFFICACY ON PERFORMANCE ANXIETY IN COLLEGE ATHLETES**

Presenter(s): McLarty, Allie, Undergraduate, Psychology

Mentor: Dr. Suejung Han

Authorship: Allie McLarty, Dr. Suejung Han

Self-efficacy, defined as one's confidence in their ability to succeed in a specific task, has previously been shown to decrease performance anxiety in athletes (DePero et. al, 2013). This study examines how team support may influence an athlete's self-efficacy in performing their sports and how this may subsequently decrease state anxiety and improve overall performance. We hypothesize that the more support an athlete receives from their teammates, the higher self-efficacy, and the less performance anxiety they will experience. Team sport athletes from a Midwestern university having been recruited to participate in an online survey of this study that includes the Athletic Self-Efficacy Scale (ASES) (Kocak, 2020), the Sport Competitive Anxiety Test (SCAT) (Badruzaman et. al, 2022), the Sport Perceived Performance Scale (SPPS) (Almagro et. al, 2020), and the Perceived Athletic Support Questionnaire (PASS-Q) (Freeman et. al, 2021) that ranked levels of perceived team support, self-efficacy, performance anxiety, and overall athletic performance. Data collection is underway (current n= 21) and full results will be reported at the University Research Symposium in April. The results of the study may have implications for the importance of a supportive environment for the wellbeing and success of an athlete. We may further use the results of this study to support coaching and team bonding methods in college team sports.

## **ANIMALIZATION OF BLACK WOMEN: A BLACK FEMINIST APPROACH**

Presenter(s): Nalule, Sharitah, Graduate, Psychology  
Duong, Michelle, Graduate, Psychology  
Sharp, Trinity, Graduate, Psychology

Mentor: Dr. Caitlin Mercier

Authorship: Caitlin Mercier, Michelle Duong, Sharitah Nalule, Trinity Sharp

Black women face inimical consequences attributable to misogynoir, or discriminatory behavior and prejudicial attitudes towards Black womanhood and femininity (Bailey, 2010). Despite scholarship that documents animalistic dehumanization of Black women (Anderson et al., 2019; Turner, 2011), few theoretical frameworks link misogynoir to devaluation of nonhuman animals. As Black feminist thought (BFT) contends to the interlocking nature of systemic oppression and dialectical images that contour the lives of Black women (Collins, 2000; Evans-Winters, 2019), it is a cogent framework to address animalistic dehumanization of Black women. Guided by relevant literature and BFT, we offer conceptualizations and recommendations for methodologies aimed to further the knowledge of the enmeshment of misogynoir and speciesism.

## **WELCOME TO OTHERLAND! A GAMIFIED APPROACH TO UNDERSTANDING CHOICES, BORDERS, AND 'OTHERING'**

Presenter(s): Orthy, Maisha Tahsin, Graduate, Psychology  
Lim, Zhi Quan, Graduate, Psychology  
Dow, Michael, Graduate, Psychology

Mentor: Dr. Scott Jordan

Authorship: Scott Jordan, Maisha Tahsin Orthy, Zhi Quan Lim, Michael Dow

Otherland is an online course that teaches students the 'border-creating' nature of choices through the lens of Wild Systems Theory-WST; Jordan, 2013). WST conceptualizes living systems as energy-transformation systems (instead of as minds and bodies) that necessarily create and sustain borders at multiple levels, from the molecular to the biological, psychological, sociological, and cultural. We used a gamification approach to design Otherland to encourage the students to discover and understand the 'othering-like' nature of the multi-scale borders and their impact on people's lives. The students navigate Otherland by choosing and creating their path through a curriculum of quests (assignments) that involve culturally informed graphic novels. The process of having the choice of making their own curriculum and completing those assignments empowers students and requires self-regulation. The students complete bi-weekly papers on Graphic Novels, a term paper, a paper on Wild Systems Theory, and weekly strategy reports, which include their current points, target points, and assignment plans to get them to their target. Such repeated self-evaluation promotes the development of healthy habits for optimal learning. We also arrange weekly graphic novel discussions to discuss othering and WST using the frames from those graphic novels as tools. The Otherland has been offered as a senior seminar course for three semesters. After completing each semester, we qualitatively evaluated the graphic novel assignments using three dimensions- Application, Introspection, and Ubiquity. Our analysis of Spring 2023 data found a significant relationship between the scores on the dimensions with the Wild System Paper and there is a significant difference in Ubiquity scores as a function of Graphic Novel. Student scores on Wild System Paper better predicted the frequency of Dimensions scores for students who completed the first two graphic novel papers compared to those who completed later graphic novel papers. In addition, their Dimension scores are better predicted Term Paper scores. We did not find any of these results with our Summer 2023 data while our analysis of the Fall 2023 data is still underway.

## #BLACKINTHEIVORY TWEETS: SHARING RESOURCES AND COPING WITH EXCLUSION

Presenter(s): Peterson, Kierra, Graduate, Psychology  
Willaims, Sarah, Undergraduate, Psychology  
Prondzinski, Kaitlyn, Undergraduate, Psychology  
Earll, Olivia, Undergraduate, Psychology  
Tyler, Cory, Undergraduate, Psychology  
Pennington, Jasmine, Undergraduate, Psychology  
Reed, Lea, Undergraduate, Psychology  
Mentor: Dr. Kimberly T. Schneider  
Authorship: Kierra Peterson, Sarah Williams, Kaitlyn Prondzinski, Olivia Earll, Corey Tyler, Jasmine Pennington, Leah Reed

### Purpose:

#BlackInTheIvory trended on Twitter during June 2020 and highlighted discrimination faced by Black, Indigenous, and people of color (BIPOC) academics. Such experiences range from micro-aggressions to exclusion and ostracism, all of which are linked to negative consequences (e.g., job stress; Duffy et al., 2002). In the current study, we examined tweets reflecting the experiences of BIPOC academics who used #BlackInTheIvory to disclose discrimination. We aim to summarize and describe both the experiences and the coping strategies described in these tweets. We began by coding tweets using five dimensions specified by Sue et al. (2008) in describing race-based experiences: incident, perception, reaction, interpretation, and consequence. We extended our coding to include Settles et al.'s (2019) categories of tokenism, exclusion, and (in)visibility experiences (see Table 1). We expected BIPOC academics to report race-specific types of harassment (e.g., invasions of personal space, the experience of being perceived as 'feared'; see Inman et al., 2020). Finally, we coded coping strategies described in these tweets based on the problem-focused and emotion-focused strategies from Fitzgerald's (1990) Coping with Harassment Questionnaire.

### Project Methodology:

We gathered #BlackInTheIvory tweets (N = 13,057) using the Meltwater Outside Insight social media analytics application during the 4-week period after the hashtag first appeared in June 2020. We used sentiment extraction packages for R to analyze the mean sentiment of tweets. We content-coded a random 1,000 tweets using three BIPOC coders and obtained high internal consistency (> 95% agreement). We also coded coping strategies based on the Coping with Harassment Questionnaire (see Table 2).

### Results:

Most incidents described were microaggressions, with microinsults as the most frequent experience (22.4%). The second-most frequent use (14.2%) of #BlackInTheIvory was not to describe personal incidents but to publicize resources that might be helpful to BIPOC academics. Initial and ongoing coding focused on analyzing coping responses indicated that sharing resources and social support were the most common coping strategies (4.7% of all tweets), followed by amplifying colleagues and sharing their work and accomplishments (1.9% of all tweets). We will also present additional ongoing analyses focused on coping using analyses of bigrams (words that typically co-occur in tweets).

#### Implications:

BIPOC academics' experiences of discrimination in higher education are important to assess. Their descriptive responses of any coping strategies can also be insightful, particularly when linked to important work-related and well-being correlates. Such narratives are critical in developing best practices for inclusive workplaces.

## **PRECRASTINATION AS A FORM OF INTENTION OFFLOADING: A TEST OF THE CLEAR HYPOTHESIS**

Presenter(s): Studdard, Madison, Undergraduate, Psychology  
Kosiek, Megan, Undergraduate, Psychology  
Liew, Ryan, Graduate, Psychology  
Mentor: Dr. Dawn M. McBride  
Authorship: Ryan Liew, Megan Kosiek, Madison Studdard

In our study, we investigated the relation between precrastination and cognitive offloading. Precrastination is a behavior where people complete a task earlier than needed to reduce their mental load. Cognitive offloading is the reducing of mental load through writing down information or using some other kind of external reminder. We examined precrastination and cognitive offloading through several cognitive tasks. We predicted that there would be correlation between cognitive offloading and precrastination. This research provides insight into the importance of precrastination and cognitive offloading and why people precrastinate in cases where doing so involves extra effort.

## **WHAT'S AGE GOT TO DO WITH IT? THE COGNITIVE EFFECTS OF RACIAL AND GENDERED MICROAGGRESSIONS AMONG BLACK WOMEN AND THE ROLE OF AGE, COLORBLINDNESS, AND RACIAL IDENTITY**

Presenter(s): Towner, Jazmine, Graduate, Psychology  
Smith, Makayla, Graduate, Psychology

Mentor: Dr. Brea Banks

Racial microaggressions are brief, everyday derogatory interactions in the form of subtle insults, gestures, or slights (Sue et al., 2007). Microaggressions often are intentional or unintentional interactions that communicate denigrating messages to individuals holding marginalized identities. Previous research suggests that exposure to microaggressions directly results in cognitive depletion. Specifically, participants have displayed diminished functioning from pre- to post-test on the Stroop (1935) color-naming task after experimental exposure to microaggression as compared to those not exposed (Banks & Landau, 2021). The purpose of this study is to examine the impact of exposure to racial microaggressions on Black women's cognitive functioning. Using an experimental design, I will examine the impact of racial microaggressions on cognitive depletion. I hypothesize that condition assignment will predict changes in cognitive functioning for Black women. Also, racial centrality and age will moderate the relation between condition assignment and cognitive depletion. Last, I hypothesize that perceptions of colorblindness will mediate the relation between condition assignment and cognitive depletion.

## **THE MEDIATING OR MODERATING EFFECTS OF ADHD MEDICATION ON EFFECTIVE STUDY SKILLS AND GPA**

Presenter: Walsh, Matthew, Undergraduate, Psychology

Mentor: Dr. Suejung Han, Psychology

Authorship: Matthew Walsh

Prior research has established that college students with diagnosed ADHD show lower levels of academic achievement than those without an ADHD diagnosis (Jangmo et al, 2019). It is essential to identify ways to support those students to accomplish their academic potential. Research demonstrates that ADHD medication appears to improve academic performance among students (Jangmo et al, 2019), but it is not clear that pharmacological treatments alone are enough to bolster student learning outcomes (Advokat, Lane & Luo, 2011; Boland, DiSalvo & Fried, 2020). There is also research documenting the efficacy of effective study habits on academic performance in general (Smith & Weinstein, 2023). It is not clear whether ADHD medication improves the use of effective study skills, which then improves academic performance. It is also possible that ADHD medication can be particularly effective for academic achievement if and when students are knowledgeable and able to use effective study skills. To my knowledge, only one study examines the impact of both medication usage and study habits on academic performance of students with ADHD (Advokat et al, 2011). I aimed to explore the association between specific study skills use and academic performance among those with ADHD medication. Participants were college students who were 18 or older. Students were recruited through the Psychology Department SONA system for research participation credits and through online flier posting for various student clubs. Participants were 44 college students who were diagnosed with ADHD. Of those students, 30 students reported that they were taking ADHD medication. The online survey of the study includes the following measures: the Academic Self-Efficacy Scale (Pintrich & de Groot, 1990), Study Habits Scale (The Learning Scientists), GPA, and questions about ADHD diagnosis and medication. Among the ADHD-diagnosed students who were taking ADHD medication, the correlation between study skills use and GPA was not significant ( $r = .067$ ,  $p = 0.695$ ), but that between study skills use and academic self-efficacy was ( $r = .337$ ,  $p < 0.001$ ). The implications will be discussed.



## **EFFECTS OF DELAY ON SHORT- AND LONG-TERM FALSE MEMORIES FOR SEMANTIC AND PHONOLOGICAL LISTS**

Presenter(s): Yuksel, Ece, Graduate, Psychology

Mentor: Dr. Dawn M. McBride

Authorship: Ece Yuksel, Dawn M. McBride, Jennifer H. Coane

The Deese/Roediger-McDermott (DRM) paradigm was developed to investigate false memory using lists of words related to an associated, non-present lure. The purpose of the present study was to examine the differences in memory errors for semantic and phonological lists across delays using the DRM paradigm. Previous studies have shown that the higher rates of false memories for semantic than phonological lists typically seen at longer delays is reversed for very short delays (McBride et al., 2019). Delays, 750 ms, 30 s, 90 s, and 3 min, were included to examine the delay at when the cross-over from primarily phonological errors in the short-term to semantic errors in long-term memory takes place. We hypothesized that the change in errors from one list type to the other at about a 90 second delay between study of the lists and the test item and to increase for semantic errors for delays longer than 90 seconds. The results showed significant false memories across all delays with two exceptions: no false memories were found for semantic lists at the shortest delay (750 ms) or for phonological lists at the 90 s delay. These results suggest a crossover from short-term to long-term memory processes in this time frame

## SOCIAL WORK

### **JOB FLEXIBILITY, ACCESS TO PAID SICK LEAVE, AND ACCESS TO CHESTNUT'S MENTAL HEALTH SERVICES**

Presenter(s): Bianco, Alyssandra, Graduate, Social Work

Mentor: Dr. Christopher Gjesfjeld

Authorship: Alyssandra Bianco

Background Info: Studies have shown there is a positive correlation between an individual's perceived job flexibility, their access to paid sick leave, and their access to healthcare.

Additionally, an individual's perceived job flexibility and access to paid sick leave is largely dependent on a multitude of factors related to their socioeconomic status, age, and level of education (Cook et al., 2009; DeRigne et al., 2016; Hegland & Berdahl, 2022; Heymann et al., 2009; Moss et al., 2022; O'Connor et al., 2014; Panther, Gleason & Kneipp, 2004; U.S. Department of Labor, 2022; U.S. Bureau of Labor Statistics, 2023). Though little research exists measuring the relationship between these variables and access to mental health care, the correlations are likely similar.

Study Design: This will be an explanatory study that uses quantitative data to understand if there was a relationship between job flexibility, access to paid sick leave, and client access to Chestnut's mental health services.

Sample: The sample for this study will be a convenience sample of new and existing clients in Chestnut's outpatient behavioral health department, with various referral sources.

Methods: A Qualtrics survey has been developed for this study that asks participants to answer demographic questions, questions about their job's perceived flexibility using the Job Flexibility Instrument (Gallagher, 2004), whether they have access to paid sick leave, and whether they have experienced difficulty accessing Chestnut's mental health services as a result of their job's lack of flexibility or their lack of access to paid sick leave. Both electronic and paper copies of the survey will be distributed throughout Chestnut's Martin Luther King Jr. Drive location to encourage clients to participate. The survey will be active for two months.

Results: Based on the findings in the existing literature, it is anticipated that the results of this study will indicate there is a correlation between the flexibility of clients' jobs, their access to paid sick leave, and their access to Chestnut's mental health services. Discussion: If there is a positive correlation between these variables, it is advantageous for the organization to look into solutions such as altering business availability, providing career services, and partnering with local employers to develop agreements that allow employees to seek Chestnut services without jeopardizing their jobs.

## **WELLNESS DAYS: A PROGRAM'S IMPACT ON BURNOUT, WORK-LIFE BALANCE, AND TURNOVER INTENTION AMONG COMMUNITY BEHAVIOR HEALTH EMPLOYEES**

Presenter(s): Deetz, Marty, Graduate, Social Work

Mentor: Dr. Christopher Gjesfjeld

When working in behavioral healthcare it can be challenging to balance the stressors of work with the stressors of daily life. This often results in higher-than-average turnover rates for community behavioral health facilities and higher rates of burnout for the clinicians working there. It has been argued that these factors may lower the quality of care given to the individuals these facilities serve (Brabson et al., 2020; De Hert, 2020; Johnson-Kwochka et al., 2020). Considering the potential impact both personally and professionally, it is important to explore policies and programs that can ameliorate these effects.

The purpose of my research is to evaluate one such intervention, a pilot program implemented by Heritage Behavioral Health Center in Decatur, IL known as "Wellness Days." Wellness Days give every full-time Heritage employee every other Friday off, paid. My goal is to utilize qualitative survey questions to explore the effect Wellness Days has on feelings of burnout, quality of work-life balance, and turnover intention among mental health professionals employed at a community behavioral healthcare facility.

## THE EFFECTIVENESS OF A SOCIAL SKILLS GROUP TO TACKLE RELATIONAL AGGRESSION

Presenter(s): Engelmeyer, Alexandra, Graduate, Social Work

Mentor: Dr. Christopher Gjesfjeld

Authorship: Alexandra Engelmeyer, Christopher Gjesfjeld

Relational aggression, a subtle form of social manipulation and bullying, poses significant challenges in educational settings, particularly in middle school. This study investigates the effectiveness of a small social skills group intervention in easing relational aggression behaviors.

Literature highlights the nuanced nature of relational aggression, extending beyond stereotypical bullying behaviors. Research suggests that factors such as friendship insecurity, jealousy, and social dominance motivations contribute to relational aggression (Pronk & Zimmer-Gembeck, 2009). Furthermore, its detrimental effects on self-esteem, peer relationships, and academic performance highlight the urgency of intervention efforts (Demol et al., 2021).

Employing a pre- and post-test design with both control and experimental groups, this study assesses changes in relational aggression behaviors over eight weeks. Data collection utilizes the Loudin, Loukas, and Robinson Relational Aggression Subscale, along with the Multidimensional Peer-Victimization Scale. The intervention, based on "The Ophelia Project" curriculum, incorporates sessions on peer aggression awareness, bystander roles, social norms, leadership, and cyberbullying.

Participants, selected through convenience and voluntary response sampling, provided parental and student consent before data collection. The intervention, which includes five students in a five-week lunch group, targets relational aggression and social skills with an emphasis on peer dialogue.

Preliminary findings from previous studies support the potential efficacy of such interventions (Wright et al., 2012; Splett et al., 2014). By addressing root causes and equipping participants with conflict resolution tools, this study predicts this intervention will foster healthier peer interactions and mitigate the impacts of relational aggression.

# TEACHING AND LEARNING

## GLOBAL CITIZENSHIP ONE STEP AT A TIME: STARTING WITH YOUR CLASS

Presenter: Fisk, Ashlyn, Undergraduate, Teaching and Learning

Mentor: Prof. Miranda Lin

I am doing a content analysis of the book, "If Kids Ran the World," by Diane and Leo Dillon published in 2014, and creating a learning activity accompanying the book. My research questions around this topic are: 1). Why is creating a community important? 2) What does it mean to be a citizen? 3. Why does being a citizen matter? As a future elementary education teacher, I strive to emphasize developing a healthy class community, which should instill the ideals of citizenship and inclusivity in students. Multiple theories will be used to analyze the book, such as elements from Piaget's theory of Constructivism, the Critical Multicultural Education theory, and the Situated Learning Theory. The story chosen is appropriate for grades K to 3. It shows how children can have critical thoughts and ideas about homelessness, hunger, schooling, social-emotional awareness, inclusivity, money, the environment, religion, social hierarchy, and more. Along with the content analysis of the book, I will also provide an activity to incorporate into the class community lesson. This activity would partially take place before reading and then finish after reading. It will begin with students individually noting how they would positively change the class, the community, and the world. After this discussion, the whole class would physically create a project of their community with new incorporations of their ideas. The students and teacher would work together to explain the reason for the changes. The overall goal of this activity would be to get students thinking about what is important to them, to hear what is important to others, and to see how change can be effectively made through collaboration. This activity promotes a healthy class environment because everyone's ideas are heard and acknowledged, creating a new community together. This activity and book will help shift the students' perspective to a more "global citizenship" way of thinking. And when trying to create change, you need to start small. With the book and activity, I believe students could understand their place and value in the world and amongst the global citizens by beginning to understand their own class community and local community.

## **WHO CREATES THE CLT IMPLEMENTATION CHALLENGE? THE EFL CURRICULUM DESIGNERS OR THE EFL TEACHERS?**

Presenter: Somé, Kountiala Jean de Dieu, Graduate, Teaching and Learning

Mentor: Dr. Carolyn S. Hunt

An extended number of inquiries on the implementation of Communicative Language Teaching (CLT) curricula consistently conclude that English as a Foreign Language (EFL) teachers heavily rely on traditional teaching methods rather than communicative approaches (Some-Guiébré, 2020; Han, 2016; Lee, 2014). As for why they resist change, some articles conclude that CLT-based curricula lack pedagogical resources to facilitate implementation at the school level. Others point at teachers' lack of training or preference for traditional approaches. Those findings indicate different levels of challenges in implementing CLT-based curricula in foreign contexts. In this selective literature review, I questioned curriculum designers' efforts to domesticate CLT principles and facilitate their implementation in the classroom. From the articles reviewed, I found that curriculum designers sometimes fail to formulate contextual pedagogical recommendations for EFL teachers. In other cases, CLT-based curricula are provided with a call for considering local contexts in instruction practices while assessments of teaching and learning remain standard-based. Socio-reconstructionist and constructivist views are generally used to inform CLT curricula content without clear orientation on differentiated pedagogical approaches for implementation in urban and rural areas. I then recommend that CLT curriculum design follow a collaborative process of domestication of general CLT principles to give them national colors and flavors.

Keywords: CLT, Communicative Language Teaching, Constructivism, ESL, EFL

# TECHNOLOGY

## EXPERIENTIAL EDUCATION FOR SUSTAINABLE LEADERSHIP

Presenters: Bediaku, Mavis, Graduate, Technology

Mentor: Prof. Sundeep Inti

Authorship: Mavis Bediaku, Sundeep Inti

This study explores innovative instructional strategies in Construction Management programs, focusing on teaching sustainable construction. While traditional approaches emphasize understanding sustainability principles, the benefits of sustainable construction, and green building assessment systems, they often need to pay more attention to theoretical content. These activities have resulted in decreased classroom engagement and significant challenges in the long-term retention and practical application of the material, hindering students' transition to the professional world. This research seeks to revitalize the teaching of sustainable construction by designing and implementing a course that engages students and significantly enhances their learning experience. We introduced a variety of hands-on classroom activities that are both enjoyable and intellectually stimulating, encouraging students to interact and exchange ideas. These activities include solving tangram puzzles and playing concept- application games designed to bring theoretical concepts to life. Employing a mixed methods approach that integrates both qualitative and quantitative analyses, we evaluated the impact of these course activities. The findings are promising: students reported that the innovative activities facilitated a deeper understanding of sustainability concepts and fostered greater active participation in classes compared to traditional, theory-heavy lectures. This study underscores the potential of interactive and applied learning experiences in enhancing educational outcomes in sustainable construction.

# MULTIFACETED DATA ENGINEERING AND MACHINE LEARNING PIPELINE FOR DATA-DRIVEN UNDERSTANDING OF BRIDGE CONDITIONS

Presenter: Gandla, Sai Ram, Graduate, Information Technology

Mentor: Dr. H. Sally Xie

Enhancing the National Bridge Inventory (NBI) database to include detailed information on bridge ownership, traffic patterns, and structural details is crucial for advancing maintenance and safety protocols.

This approach involved a multifaceted data engineering and machine learning pipeline to identify the trends and patterns of bridge conditions. Initially, we conducted data acquisition from the NBI, followed by preprocessing steps including data cleaning, normalization, and deduplication to ensure data integrity. We then applied unsupervised learning techniques, specifically k-means clustering, to segment the bridges into homogenous groups based on characteristics such as geographic location, traffic volume, and structural attributes. For each cluster, we developed a custom Artificial Neural Network (ANN) model, optimizing its architecture for predictive accuracy through hyperparameter tuning and cross-validation. Feature engineering was also a critical component, allowing us to extract and select the most relevant features for predicting bridge conditions effectively.

The incorporation of granular data and machine learning models enabled a refined analysis of bridge conditions, integrating weather and traffic data for comprehensive insights. Our ANN models, trained on clustered data, achieved notable predictive accuracy, enhancing our ability to estimate the critical maintenance needs and safety vulnerabilities. The analysis highlighted the significant impact of traffic intensity and structural characteristics on bridge wear and tear, underscoring the importance of targeted maintenance strategies.

The project's application of advanced data analytics and machine learning techniques significantly improves the capability of the NBI database to inform infrastructure management decisions. By enabling a deeper, data-driven understanding of bridge conditions, these enhancements support more strategic maintenance planning, policy development, and contribute to ensuring public safety. Through this research, we demonstrate the capacity of machine learning to transform infrastructure assessment and management practices.



## **ADDRESSING IOT VULNERABILITIES: AN ANALYSIS OF RISKS FACING SMART HOMES**

Presenter(s): Peterson, Erik, Undergraduate, Technology

Mentor: Dr. Stephen Mujeye

The integration of Internet of Things (IoT) devices in smart homes has surged in recent years, accompanied by significant security vulnerabilities. This research project proposes a meticulous analysis of these vulnerabilities and the development of mitigation strategies. The attacks that can be executed are often dependent on the method of infiltration. By conducting a systematic literature review, we aim to explore the current landscape of IoT security, identifying prevalent vulnerabilities and emerging trends. We will attempt to discover the most common methods of attacks and what exploits are used. Subsequently, employing surveys and controlled experiments, we will quantitatively assess the prevalence of IoT devices among students and analyze their susceptibility to data attacks. The anticipated outcomes include the documentation of existing security issues, quantification of device prevalence, and evaluation of susceptibility to attacks. Furthermore, through analysis of our findings, we aim to raise awareness about IoT risks and empower users with actionable insights for safeguarding their smart homes. By bridging the gap between research and practice, this research holds implications for enhancing cybersecurity in everyday environments and promoting responsible IoT adoption.

## **LEARNING THROUGHT COMPETITION. POPULARIZE REINFORCEMENT LEARNING AT ISU THROUGH AWS DEEPRACER**

Presenters: Syed, Yaqoob Ayaan Ishaqui, Graduate, Information Technology  
Gupta, Dolly, Graduate, Technology  
Mentor: Dr. Isaac Chang  
Authorship: Yaqoob Ayaan Ishaqui Syed, Dolly Gupta

Reinforcement learning (RL) is a technique that trains software to make decisions for optimal results. It mimics human's trial-and-error process to achieve the set goals. While RL can be applied to various aspects of our lives, such as automation, transportation, business, and healthcare, the learning threshold seems high to the public.

We will discuss an ongoing project for fostering a competition-based learning environment for RL at ISU. This project intends to develop RL-related curricula and activities for ISU by utilizing AWS DeepRacer, a track-racing platform. With critical features like cloud-based simulation, reward systems, and adaptable RL algorithms, DeepRacer could provide an accessible venue for enthusiasts, both novices and professionals, to pick up RL essentials while sharing the excitement of competitions.

Our presentation will highlight this platform's versatility and potential applications in creating autonomous systems. Findings of experimentations on the effectiveness of different training strategies and hyperparameter tuning techniques for DeepRacer models will be reported. We will conclude with the outlook of future research, providing a road map for campus-wide implementation and community engagement.

**E-Poster Abstracts**

**CREATIVE TECHNOLOGIES**

**THE DEVELOPMENT OF A YOUNG ADULTS CANCER PATIENT PEER MATCH APPLICATION**

Presenter(s): Kalantari, Mojde, Graduate, Creative Technologies

Mentor: Dr. Kristin Carlson

Co-Mentor: Prof. Simone Downie

This research explores the challenges and needs of young adult cancer patients, along with potential online resources to aid them, that includes social media, public and private organizations, and mobile applications. The focus of this research narrows down to communication and social networking mobile applications, particularly those with peer matching features. The research aims to underscore the need for a dedicated mobile application that connects young adult cancer patients with the same diagnosis. In response to this need, a mobile app named "YA Peer Match" was developed. The app facilitates connections among young adult cancer patients, allowing them to share the hidden aspects of their cancer treatments and build stronger support networks.

## ECONOMICS

### **MORAL DILEMMAS IN GREY'S ANATOMY: ANALYZING THE STRATEGIC CHOICES OF DOCTORS ADAMS AND GRIFFITH IN SEASON 19 FINALE**

Presenter(s): Marsalla, Jack, Undergraduate, Economics

Mentor: Dr. Susan Chen

Authorship: Jack Marsalla

This paper examines the strategic moves of two main characters, the doctors who are Adams and Griffith, in the dramatic Season 19 finale of a well-liked medical drama Grey's Anatomy. A game theoretical model is presented as Adams and Griffith make the difficult decision, to revive a DNR patient or not. Individuals are tested to the limits of their personal values and professional ethos as they become trapped in a maze of moral difficulties.

## **EDMONTON OILERS POWERPLAY**

Presenter(s): Slavin, Julian, Undergraduate, Economics

Mentor: Dr. Susan Chen

This paper examines a critical move in a Hockey Powerplay between the Oilers and the Blackhawks in a regular season hockey game. Each team's strategies are presented in a zero-sum game. The best-response method will be used to identify the Nash equilibrium outcome. The implications of this model can be applied to various other sports.

### **THE MADWOMAN IN 21<sup>st</sup> CENTURY WRITING: A COMPARISON OF ALEXIS WRIGHT'S *THE SWAN BOOK* AND YAA GYASI'S *HOMEGOING***

Presenter(s): O'Leary, Heather, Graduate, English Studies

Mentor: Dr. Ela Przybyło

A great deal of scholarship has analyzed the “madwoman in the attic” of Charlotte Brontë’s *Jane Eyre* and Jean Rhys’s postcolonial response, *Wide Sargasso Sea*. In the twenty-first century, the conversation concerning women, madness, and the colonial subject has expanded: Alexis Wright takes on settler colonialism in Australia in *The Swan Book*, while Yaa Gyasi addresses the slave trade in *Homegoing*.

Where Bertha has been seen as Jane’s maddened double, and Antoinette as the sacrificed colonized other, Wright’s protagonist Oblivia and Gyasi’s Akua battle with trauma passed on through generations of colonization. Both Oblivia and Akua have been raised by white outsiders, experience the world in a different way from those around them, and are ostracized by their communities. Both see visions, which, based on narrative construction, seem to be a true part of each character’s reality. Both characters, like Bertha/Antoinette, face periods of containment and find themselves surrounded by fire.

This paper asks, “what does it mean to be mad in a mad world?” Building on existing scholarship of *Jane Eyre* and *Wide Sargasso Sea*, and using the lenses of postcolonialism and feminist disability studies, I investigate the different facets of Oblivia and Akua’s madness: as a reaction to colonial oppression, as a consequence of not fitting societal norms, but also as an embodied mental illness.

Gyasi offers her readers reconciliation, as Akua eventually comes to accept her visions, is accepted in turn by her granddaughter, and lives happily by the sea. Wright, however, leaves Oblivia’s ending uncertain, unresolved, the reader unsure whether she is alive or a ghost. Where Gyasi works to heal colonial trauma, Wright provides a cautionary tale of what may come for all of us.

## **GEOGRAPHY, GEOLOGY, AND THE ENVIRONMENT**

### **AMERICAN PHILANTHROPIC FOUNDATIONS AND WATER POLICY: GEOGRAPHIES AND PROBLEM FRAMING**

Presenter(s): Corray, Shannon, Undergraduate, Geography, Geology, and the Environment

Mentor: Prof. Melissa Heil

Authorship: Shannon Corray, Melissa Heil

This research project investigated how American philanthropic foundations are intervening on the issue of household water insecurity in the United States, which is consistently a nationally growing concern. To chronicle their influence, we developed a dataset of foundation grants related to household water insecurity, collecting information on the philanthropic foundation, grantee organization, grant amount, grantee location, and grant description. Using this dataset, we totaled the number of grants and their monetary value, as well as the amount of money being directed to particular cities, states, and regions. We performed content analysis on the grant descriptions, coding each of these descriptions using NVivo. We used NVivo's analysis functions to identify which problem framings and change-making strategies are most prominent, which received the most funding, and any related variation geographically across the United States. With these results, we have been able to draw conclusions to questions surrounding how philanthropies have played a role in household water insecurity across the United States.

## TEACHING AND LEARNING

### STUDENT EXPERIENCES AND PERCEPTIONS WITH NO GRADES ON HOMEWORK

Presenter(s): Abney, Amy, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

This school year, the district I teach in implemented a new expectation for academic practice. The expectation from the grade school handbook states, "The purpose of homework is to practice newly taught skills, review previously mastered skills, develop independent study habits, or extend/enrich the curriculum. Practice will not be used as a behavior management tool or as a form of punishment. Due to students' varying working rates and abilities, the time spent in completing a practice assignment may vary among pupils completing the same assignment. Practice may include unfinished work from daily exercises, or extra practice, rereading a selection, etc. Teachers will communicate practice assignments with students and parents." Homework can provide valuable insights into student learning, but its accuracy as an assessment tool depends on various factors. While homework allows students to practice and apply what they have learned in class, it may not always be a comprehensive measure of their understanding and accurate assessment of their learning. This study will explore student perceptions and experiences in not taking homework grades. Data will be gathered from a student survey and interview of sixth, seventh, and eighth grade students. The school is in a rural village outside of a larger area. Tentative findings are showing varied responses with some students embracing the concept of homework without grades and others are feeling uncertain about the change. Positive student perceptions include increased motivation, less stress and a deeper understanding of material. Negative student perceptions include the lack of responsibility and accountability, along with a decrease in study habits. Homework can provide valuable insights into student learning, but its accuracy as an assessment tool depends on various factors. While homework allows students to practice and apply what they have learned in class, it may not always be a comprehensive measure of their understanding and accurate assessment of their learning.



## HIGH SCHOOL HOME VISITS

Presenter(s): Baez, Kaitlyn, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

This research delves into the potential benefits of informal home visits as a strategy to enhance student and family engagement in a diverse, urban high school. Unlike structured programs like The Parent Teacher Home Visit Organization (PTHV), this study investigates whether voluntary, unpaid home visits by teachers can yield comparable results at the high school level. The research addresses challenges associated with implementing formalized programs, such as training, scheduling, and compensation. Adopting a mixed-methods case study design, the study involves 9th-grade students and their families from a highly diverse, central-Illinois high school. Selective sampling identifies participants with low initial feelings of engagement, allowing for a focused exploration of the intervention's effects. The study encompasses pre- and post-surveys, a home visit protocol, and an observation protocol to gather data on participants' experiences, perceptions, and behaviors. By exploring the impact of informal home visits on family-teacher relationships, the study provides insights for administrators and policymakers. It contributes to understanding the feasibility and potential benefits of incorporating home visits as part of teachers' roles in secondary education, offering an alternative to more structured and resource-intensive programs. The findings may guide decision-makers in shaping professional development goals for teachers and reconsidering the costs and benefits of formalized home visit programs. In a broader context, this study addresses the gap in research on effective strategies for engaging families at the high school level, aiming to pave the way for more nuanced approaches that can make a real difference for students.

## **PERCEPTIONS OF HIGH SCHOOL STUDENT SELF-EFFICACY AND SELF-REGULATED LEARNING**

Presenter(s): Biehl, Thomas, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

In recent years, teachers at the high school level have bemoaned a lack of student self-efficacy, a reluctance to fully engage with the material due to a perceived lack of their own ability. This study looks to explore the differences in student and teacher perceptions of student self-efficacy and self-regulatory skills, how those perceptions influence teacher practices and student performance, and the possible relationship between both views. Students and teachers from a majority white small rural high school in central Illinois were invited to participate in a survey, and a small number of each participated in interviews. The results were used to analyze overall student and teacher perceptions with possible relations. So far, students have demonstrated mostly positive views concerning their belief in their own achievement and goal setting when confronted with a difficult task; while teachers, for the most part, rated their views of students lower in those same abilities. Ironically, both have indicated students felt they had achieved academically; students reported valuing knowledge over grades, teachers disagreed. These tentative finds indicate a disconnect between the two groups regarding student self-efficacy and self-regulated learning, implying that the level of support they require when confronted with a challenging task versus how much the student struggles and problem solves is perceived differently.

## **ANALYZING THE IMPACT OF THE AVAILABILITY OF ASSESSMENT RETAKES ON STUDENT ATTITUDES AND EXPERIENCES OF TESTING**

Presenter(s): Corn, Bryan, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

Authorship: Bryan Corn, Anna Smith

Assessment of student learning has long been a focus of teacher education and educational research. The recent increase in the adoption of standards-based grading has continued this trend and has led many school districts to examine their assessing and grade-reporting practices. Providing the opportunity to retake or redo summative assessments is one way that some teachers and school districts attempt to allow motivate their students to strive for mastery and achieve a grade that more accurately communicates their level of mastery. This study aims to gather the insights of students regarding their experiences and attitudes towards testing in high school mathematics classes and how the availability of test retakes in these classes impacts their levels of anxiety and preparation. Students enrolled in two central Illinois high schools were surveyed and a smaller sample of students were interviewed.

Surveys were quantitatively analyzed and the interviews were coded and analyzed in a qualitative manner to provide nuance to the survey findings. Students report that the availability of a retake option allows them to feel less anxiety about testing, while also reporting that their level of preparation for tests is not impacted by the availability of a retake. Based on these tentative findings, it is recommended that high school mathematics teachers strongly consider establishing a policy that provides their students the opportunity to retake summative assessments, and do so without the fear that their students will forgo preparing for the test as a result of a retake option being available to them.

## **INCREASING READING ENGAGEMENT IN FOURTH GRADE STUDENTS**

Presenter(s): Derber, Kathleen, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

Studies show that “adolescents in the United States are among the least engaged readers in the world” (Lee et al., 2021). This study looks to increase students’ reading engagement. The research will be conducted in a fourth grade classroom in rural central Illinois. There are 16 students in the classroom. All students who choose to participate will complete reflection journals that will be used to collect data. Additionally, focus groups will be formed based on teacher observations to gather further insight into students’ feelings and engagement with various reading tasks and activities.

Students have shown an increased interest to read and discuss choice texts. Based on these tentative findings it is possible that students become intrinsically motivated and engaged with reading with appropriate lessons and activities. In turn encouraging intrinsic motivation and enjoyment of reading will translate to their academics.

## **HOW FAMILIES AND TEACHERS' COOPERATION CAN HELP IN PRE-SCREENING, INTERVENTIONS, AND CLASSROOM INSTRUCTIONS IN ASSISTING THOSE CHILDREN AT RISK OF DYSLLEXIA**

Presenter(s): Ettey, Monica Esinam, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

As a first-grade teacher, most of my emphasis on my curriculum was my students reading. There were instances where some students struggled with reading for their grade level. It was noticed some did not have knowledge of their previous skill of phonics at all which distorted their reading ability for grade one. My study aims to help children who might be at risk of dyslexia and how families and teachers' cooperation can help in pre-screening, interventions, and classroom instructions in assisting those children at risk. My participants would be some targeted grade one students, parents, and teachers of those students. Data will be collected through surveys and interviews of parents and teachers of those targeted students. It is going to be expedited research. A pretesting of the questionnaire in the survey and interview will be taken to ensure that the instruments can generate accurate data that will help the phenomenon under study. Descriptive statistics will be used to interpret the data obtained to meet the research. The interviews and survey will help find out parents' and teachers' perceptions in their own words and how they feel. Teachers and parents expressed the need to support students at risk of dyslexia. There should be cooperation from both sides for positive changes to occur. Based on tentative findings, By fostering a collaborative environment among families, educators, and schools, a unified front is established, allowing for a more comprehensive understanding of dyslexia's nuances and enabling proactive measures to address potential academic hurdles before they solidify. The synergy between teachers' expertise in recognizing early signs, parents' vigilant observations, and schools' responsive interventions forms a vital ecosystem wherein the needs of each child are met proactively.

## **TEACHER BURNOUT AND JOB SATISFACTION**

Presenter(s): Gallagher, Kristen, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

A major issue that exists within our education system today is teacher burnout. The present study aims to provide scholarly insight into the main causes of teacher burnout and explore potential solutions to decrease teacher burnout and improve job satisfaction. K-12 teachers across the United States were surveyed and the responses were analyzed. Teachers reported that the main causes of burnout include constant disrespect, low pay, unmanageable workload, lack of support from administration and parents, and insufficient school resources. When asked what schools could do to better support teachers and decrease burnout, some of the main suggestions reported by teachers include lightened workload, increased pay, increased classroom preparation time, increased support from administration, accountability for student behavior, and reduced class sizes. Based on these tentative findings, we recommend that school districts allocate funds to increase teacher pay, reduce teacher workloads by eliminating unnecessary obligations outside of the classroom, provide more time for lesson preparation during the school day, improve support from administration, and find a way to clearly demonstrate appreciation and respect for teachers.

## **LOOKING AT EDUCATION THROUGH A DIFFERENT LENS: WITNESSING AND ACTIVELY PARTICIPATING IN AN ALTERNATIVE STYLE OF EDUCATION AT THE REGIONAL ALTERNATIVE SCHOOL BLOOMINGTON**

Presenter(s): Gasinski, Zoey, Undergraduate, History  
Schafer, Megan, Undergraduate, English  
Hopkins, Kayman, Undergraduate, Mathematics  
Mentor: Prof. Jay Percell

As future educators, we are constantly evolving the way we approach teaching in the classroom, whether that be through creative lesson plans, new strategies shared by peers, or by implementing pedagogical staples taught to us by our mentors. But what about our approach to the education system as a whole? If providing a variety of means of delivering content and demonstrating skills helps teachers connect with a wider range of students, how does altering the foundational style of a classroom and school community impact students and teachers alike?

Through periods of observation in tandem with practical teaching experiences, students participating in the TCH 212 clinical sessions at the Bloomington Campus of the Regional Alternative School (RAS) are given the opportunity to witness the benefits of alternative education firsthand. This presentation is based around the insights of several past clinical students regarding their time at RAS and how their perspectives of the field of education have changed as a result.

## **WHERE HAVE ALL THE TEACHERS GONE: A STUDY OF TEACHER ATTRITION AND CONSIDERATIONS**

Presenter(s): Hammond, Tera, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

When teaching students, one of the keys to success is consistency and fluidity. Students require the support and guidance of well-educated, trained teachers to know the students, their needs, and the content well. While students are likely to cross paths with a new educator or two throughout their schooling, it is easy to see how detrimental it could be for students if they are consistently being guided by new or “unseasoned” teachers. A nationwide survey of former and current teachers could help stakeholders in identifying and/or understanding reasons why teachers may seek early retirement or resignation from work in the classroom. Some data suggests that compensation, levels of support, and challenging student behaviors may be indicators of the increase in teacher attrition. Based on these findings, along with others, I suggest that stakeholders work together to solve the problem of teacher attrition of seasoned teachers due to early retirement or resignation.



## **SMALL GROUP TEXT SELECTION**

Presenter(s): Haynes, Emily, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

As a first grade teacher, many of my students are just learning to decode words at the beginning of the year.

I often feel pressured to use decodable books during small group reading instruction to achieve this goal. While I believe decodable books are beneficial in targeting phonics skills and possibly in building students' reading confidence, they often lack depth, which leaves little room for comprehension instruction. There are many other text options available for use during small group instruction, such as leveled readers, printable books included with our reading curriculum, or trade books. I am often conflicted while trying to choose books for my first graders that enable them to both learn decoding skills and comprehension skills. The purpose of this study is to determine how I can select texts for small group reading instruction that target both decoding and comprehension development.

My class of 14 first grade students were invited to participate in this study, but only 10 provided their assent to participate. Throughout the study, I will utilize three different types of texts during small group reading instruction over the span of six weeks. I will use each text type two times. After reading each text type, my students will complete a self-assessment indicating whether they enjoyed the text, felt confident reading the words accurately, and felt confident understanding the story. I will have participants complete a graphic organizer for each text to show me how well they understood it. I will also take notes as I listen to students read to record their reading accuracy and their ability to comprehend the text.

I am two full weeks into my study and so far, my students' responses on the self-assessment have been all over the board. Some students seem to prefer and feel more confident with the decodable texts while others have preferred and read more accurately when using the leveled texts (which contain fewer phonetically decodable words and fewer phonics skills we've learned in class). It seems as though my students have been able to understand all text types equally well so far. As far as accuracy, I haven't noticed much of a difference between the different text types, although it seemed as if my less fluent readers were able to read more complex words than I was expecting when they read the leveled readers compared to when they read the decodable texts.

## **WRITING WORKSHOP & MOTIVATION: THE KEYS TO UNLOCKING WRITING IDENTITIES IN YOUNG LEARNERS**

Presenter(s): Hietpas, Dana, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

Authorship: Dana Hietpas

The purpose of this qualitative study explores the effects of the writer's workshop model on students' writing motivation and the formation of students' writing identities. Students are becoming less interested in writing and therefore forming writing identities and instilling motivation for writing in our youngest grade levels of learners is so important. This study will be conducted at an elementary school in a suburb of a large metropolitan area. All students participating in this study are in the second-grade class of Mrs. Dana Hietpas. Within this study, methods that will be used to obtain data will include student self-assessments, student self-reflections, and conferencing with students about their written pieces throughout the writing process. Student self-reflections were analyzed on the topic of writing motivation and identified that students view writing higher when they are provided the opportunity of choice in their writing. The writer's workshop model has displayed that students are developing strong interests in the subject of writing and are learning largely about themselves as writers and their overall writing identities. Students identified that the workshop model allows them to understand the types of writing and topics that interest them and they enjoy engaging in. Based on these tentative findings, we can conclude that through using the writer's workshop model, students are constantly revising their writing identities as they are learning new skills, strategies, and styles of writing that they are adding to their "writing toolbox" to make themselves the strongest writers they can be. Additional research will continue to provide scholarly insight into how the writing workshop model affects student motivation and student's overall development and formation of writing identities.

## **HOW STUDENTS WITH AUTISM SPECTRUM DISORDER RESPOND TO THE SYSTEMATIC USE OF WH- GRAPHIC ORGANIZERS TO SUPPORT THEIR READING COMPREHENSION**

Presenter(s): Holzwarth, Elissa, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

A large percentage of students with autism struggle with their reading comprehension. Research has been conducted on using a variety of graphic organizers (wh- graphic organizers, story maps, compare/contrast Venn diagrams) to support students with autism's reading comprehension. A functional relationship has been found between graphic organizers and reading comprehension for students with autism. The research found has limitations, such as small participant sizes, large age ranges, and limited student diversity. Research designs, tools, and data collection methods varied across studies. To support the analysis of the effectiveness of specific graphic organizer tools across participants, researchers, and environments, this study looked at the effects of a wh-question graphic organizer on middle school students with autism spectrum disorder (ASD) literal text comprehension. Weekly probe data was taken and analyzed on the percentage of words/phrases participants independently and correctly sorted on their graphic organizer and the percentage of literal text questions independently and correctly answered. Data was also collected on whether students were observed using their graphic organizer tool or given passages to support answering text questions. Students were observed to use their graphic organizer to support them in answering literal text questions. A functional relationship was found between the use of a wh-graphic organizer and reading comprehension for students with ASD. Based on these findings, I would recommend teaching and providing students with autism with a wh- graphic organizer to support their reading comprehension. Additional research is recommended to continue to assess the tool's effectiveness across additional participants, researchers, and environments.

## **BENEFITS AND LIMITATIONS OF SCRIPTED INSTRUCTION ON STUDENT LEARNING AND TEACHER AUTONOMY**

Presenter(s): Jaime, Sarah, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

The proposed study focuses on the benefits and limitations of scripted instruction and the impact that scripted instruction has on teacher autonomy. Scripted instruction does not always allow for accommodations and scaffolding. Often, there is not much deviation from the script that is allowed to be done, which makes it difficult for educators to adapt to fit student needs. To better understand the impact of scripted instruction, this study looks at the teachers' understanding and perceptions of scripted curricula at the pre-kindergarten, kindergarten, and first grade levels. Teachers at a pre-kindergarten through first grade school were surveyed, and a sample of teachers and members of administration were interviewed. Surveys and interviews will show how this form of instruction benefits different learners and whether it is beneficial to use in the younger grades. Based on these tentative findings, recommendations will be made to implement either scripted or non-scripted instruction.

## **IMPACT OF ORACY ON ENGLISH DEVELOPMENT**

Presenter(s): Johnston Carrasco, Ashley, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

Authorship: Ashley Johnston Carrasco, Anna Smith

Students, especially multilingual students developing English, do not have adequate opportunities to practice their speaking and listening skills within the classroom, on a regular basis. This concept of oracy, or speaking and listening, allows students to improve their language skills in a more authentic manner, within the classroom, communicating with their peers. Students who are new to the United States, newcomers, are in classes in which English is the main or only language. Understanding this, students must be able to quickly navigate their academic and social lives. This study investigates the impact of oracy (oral language communication) of multilingual students in their English language acquisition. Participants are sixth through eighth grade multilingual students who are identified as newcomers (have resided one year or less in the United States). They are selected for this study since they are all acquiring English and share a Newcomer class together. This qualitative study includes pre and post interviews with my participants of their personal perceptions of oracy for learning English, as well as documents and artifacts from oracy activities. Tentative findings of this study include students' positive feedback and reflection regarding their oral growth in English. Based on these tentative findings, it is recommended to incorporate oracy activities in English into the classroom in order to benefit the English oral language development of multilingual newcomer students.

## **PHONICS INSTRUCTION IN THE UPPER ELEMENTARY GRADES**

Presenter(s): Knauf, Tara, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

Due to the COVID-19 pandemic and procedures put in place on educational settings during that time, many students did not receive the reading instruction that they typically would in the early elementary grades to set them up for reading success in the later grade levels.

Because of the lack of explicit and systematic instruction in the early elementary grades, many third and fourth graders have difficulty decoding and encoding unfamiliar words. This research study explores how to support upper elementary students who lack foundational phonics skills. This study will give teachers ideas on how to best meet the needs of students who were not given the explicit and systematic instruction in foundational reading skills due to the COVID-19 pandemic. The participants in this study include third and fourth grade students, parents, and teachers at a rural elementary school in Illinois. Third and fourth grade students are taught daily phonics lessons and complete weekly assessments to progress monitor their understanding. Students participate in one-on-one reading conferences with the grade level teacher to discuss reading motivation and ability and will complete a pre- and post- assessment on phonics understanding and application. Parents of these students will complete a survey detailing their child's at home reading habits and motivation. This data will be analyzed to determine if the daily phonics lessons were successful in improving the students' ability to decode and encode unfamiliar words and to determine if students' reading motivation increases as a result of phonics instruction. The pre-test results overwhelmingly displayed a need for phonics instruction in these grade levels. After receiving the phonics instruction, the students improved their reading abilities to decode and encode, increasing reading motivation. Based on these tentative findings, it is recommended to implement daily phonics instruction to students who are lacking foundational reading skills and additional research should be conducted to determine how students learn these foundational skills best in the upper elementary grades.

## **IMPACT OF QUICK MINDFUL PRACTICES ON CLASSROOM BEHAVIOR**

Presenter(s): Liebentritt, Jennifer, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

Many teachers have noticed a dramatic increase in student disruptions and unexpected behaviors over the last few years. As educators are struggling to figure out a solution, schools continue to take away our time to teach students about their social-emotional health. To better understand the benefits of a brief mindfulness session, this study is going to focus on the impact it has on a kindergarten classroom, and the perceived benefits students and parents see. Student behaviors will be observed for 20-minute sessions following each mindful breathing session, complete a self-reflection once a week, and conference about the intervention at the end. Parents will also be surveyed at the beginning and end of the intervention period. While educators and schools continue to struggle with disruptive behaviors in classrooms, I believe that this study will provide valuable insight to administration and educators. Findings from this study will help educators justify time taken out of their days for mindfulness. Students will also greatly benefit from learning how to be mindful and how to use those skills in their daily lives.

## **TECHNOLOGY IN ELEMENTARY CLASSROOMS**

Presenter(s): Marx, Lexie, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

Technology has become more prevalent in classrooms across America. While technology has provided great resources for education, is there a point where it has become too much of a part of elementary classrooms? Within my third-grade classroom, students are provided with their own Chromebook device and there is a set of 12 iPads that are available to use daily. Along with these devices, we have many online programs and resources that we can use and are expected to use to help with students' academics. These online programs are a great addition into the classroom and are helping students with their learning, but what is the right amount of technology to be used within the elementary classroom? For this study, we will be looking at the perceptions third grade students and teachers at an elementary school have on having technology within the classroom. Teachers and students from a rural school within Illinois will be surveyed and asked to reflect on having technology in the classroom, while also interviewing some teachers. Students are showing that they enjoy having technology in the classroom, while teachers prefer to have a more balanced day. Based on these tentative findings, it is recommended that teacher's approach having a balanced day with technology in the classroom. Technology should not have the focus of the elementary classroom; it should be used more as a tool.



## **EFFECTS OF TEACHER MESSAGING ON STUDENT MOTIVATION AND PERCEPTIONS OF SELF**

Presenter(s): Miller, Julie, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

Numerous studies have described the importance of student-teacher relationships. However, few discussions exist about factors involved in the formations of these relationships. This study steps back to investigate the effects of teacher communication on student motivation and self-perceptions. Specifically, the study seeks to find whether a teacher with a “warm/caring” demeanor causes students to be more motivated and feel like a better student, and whether a teacher with a “mean/harsh” demeanor could cause decreased motivation and disillusionment among students. This study includes approximately 65 eighth-grade students from a single school in semi-rural Grundy County.

These are current students of the presenter, and they provide a unique opportunity for research, as the community is quite stable and many of these students have experienced the same teachers and school culture throughout their time in elementary school. Students were given an initial survey at the beginning of February to ask them about the two categories of teachers, their feelings about themselves and their work, and their observations of classmates’ behavior in each class. Early analysis indicates expected results: that students report improved self-esteem and engagement with their classwork, and report better student behavior in classes with “warm/caring” teachers. The opposite appears true as well, though with more nuance, such as students who report they take their work seriously regardless of the teacher. The initial student surveys were largely superficial, and a second survey will be given in late February to seek out more specific anecdotes or explanations of their experiences. Both sets of responses will be qualitatively analyzed to look for connections and trends between the student motivations and self-perceptions in these two differing classroom environments. The conclusions can help guide understanding into the developmental foundations of teacher relationships, and will potentially provide practical guidelines for teachers regarding the impact of their interactions on these relationships.

## **INTEGRATING GLOBAL CITIZENSHIP EDUCATION (GCED) INTO YOUR LANGUAGE LESSONS**

Presenter(s): Narongsaksakul, Watsachol, Graduate, Teaching and Learning

Mentor: Dr. Ellis Hurd

Authorship: Watsachol Narongsaksakul

GCED integration benefits educators of language in their multiliteracies course design. This process involves composing the learning outcomes and identifying redundancies and alignment issues in a particular area to plan effective instruction that achieves UNESCO's GCED learning objectives, along with incorporating the methods to build secondary students' identities and respond to diversity in local and global contexts. Learning English as a new language requires a cognitive load suitable for English Language Learners' (ELL) working memory. Simultaneously acquiring new concepts and languages is a challenge in most ELL classes. This presentation includes nine teacher guidelines for preparing learning objectives.

## **EXAMINING 19TH CENTURY MODERNIZATION IN THE UNITED STATES THROUGH SERIOUS GAMES: A CASE STUDY**

Presenter(s): Parnell, Traevon, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

My master thesis is collecting data on the effectiveness of Serious Games being used as educational tools during instructional time. The study will collect quantitative data based on a comparative study method using two sample populations to compare academic progress from a unit plan pre-assessment and post-assessment. The study collect qualitative and quantitative data on the experience of students learning curricula through games, including attitude scales, surveys, and exit interviews. The educator will also detail observations and experiences through daily recordings and exit interviews. This study will be conducted over a 5-day period and is designed to give further insight on the utility of serious games as educational tools and what educators can expect utilizing Serious games in the classroom. This study will be using students attending a large, diverse high school in an urban setting in the Midwest region of the United States. The researcher will categorize participants into two distinct groups: a group of students who are non-participants and will receive their instructional with traditional instructional materials such as readings, videos, and lectures, and the participants using the gamified educational tools who will need access to technology that allows for the use of serious games as their primary instructional tool. Tentative data indicates that gaming materials provide a high degree of engagement for most participants, and correlates with increased contextualization of 19th century modernization in the United States, as well as native American resistance to United States industrialization and colonization of North American land.

## **THE IMPACT OF TEACHER FEEDBACK ON FOURTH AND FIFTH GRADE BOYS' WRITING MOTIVATION**

Presenter(s): Phelan, Katie, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

Writing proficiency across the United States is becoming a growing issue. According to a 2011 study by the National Assessment of Educational Progress, 80% of eighth graders in the United States are not writing at a proficient level, and only 3% are writing at an advanced level. Even more concerning, female students are outperforming male students by 19 points. Motivation has been found to be a large factor in students' writing success. To better understand how teachers can motivate students to write, and thus boost their writing performance through their feedback, this study uses qualitative methods to look at 4th and 5th grade male students' perceptions of writing and writing feedback. These students, from a socioeconomically diverse middle school, are given surveys, interviews, and are observed reacting to writing feedback. This study also analyzes the perceptions of 4th and 5th grade teachers of their male students' writing motivation through surveys and interviews. It is hypothesized that students will have more motivation to write when the teacher uses a positive feedback approach. Corrective feedback focused on mistakes will promote less motivation among students to write. Based on tentative findings, teachers should be mindful of the type of feedback given to students and how it might impact their motivation to continue writing.

## **EFFECTS OF USING WORD MAPPING TO TEACH HIGH-FREQUENCY WORDS ON KINDERGARTEN SIGHT WORD ACQUISITION**

Presenter(s): Richardson, Heather, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

In kindergarten classrooms throughout the country, beginning readers are tasked with learning to read a list of high-frequency words also referred to as sight words. Most schools use various sight word/high frequency word lists with the intention of having students practice words as whole units by either repeated readings of word lists, recitation of spellings, or reading words on flashcards. The message being communicated to teachers by literacy curriculums and/or schools and then conveyed to students, is that sight words should not or cannot be decoded when learning to read. However, research related to the orthographic mapping process suggests that children learn to read words by sight by forming grapheme-phoneme connections to map the spellings, pronunciations, and meanings of specific words in memory. This study explores the effects of using an instructional method called word mapping to teach regularly and irregularly spelled high-frequency words to a group of kindergartners using a mixed methods research approach. A group of kindergartners at a racially, ethnically, and linguistically diverse private early childhood school in a large suburb was given a pre and post assessment of 15 high-frequency words to determine the number of words students could read in isolation. Observations were conducted of students reading decodable texts and writing sentences containing taught high-frequency words. These observations were then analyzed to gain insight into how word mapping influences the reading and writing of high-frequency words. Student writing samples were also collected and analyzed to expand on the information gathered from the other data sources. Tentative findings revealed when students encountered a newly taught high-frequency word in a text they most often read the word fluently or decoded the word accurately using grapheme-phoneme connections for both regularly and irregularly spelled high-frequency words. Students were also able to use encoding skills to accurately write taught high-frequency words during independent writing time as well as during dictation sentence writing. Based on these tentative findings, we recommend classrooms use instructional techniques which allow students to use phonics and phonemic awareness skills when learning high-frequency words. These instructional techniques should allow students to break words apart into phonemes and connect the phonemes (sounds) to graphemes (letters) using sound boxes or word mapping mats.

## THE INFLUENCE OF READING MOTIVATION STRATEGIES ON STUDENTS

Presenter(s): Singer, Addi, Graduate, Teaching and Learning  
Volker, Emily, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

Due to the national concern with reading scores and opportunity gaps, more attention is being put on reading motivation. While there is currently an abundance of research surrounding reading motivation, we have not observed research based strategies in classrooms. We are concerned that current practices are not reaching students of all groups, and may even be harming some. The purpose of our research is to examine the motivation strategies used in our elementary school settings and their influence on students' motivation in reading.

Both settings are Title I-funded public elementary schools in central Illinois. One is in a rural area, while the other is more suburban and has a high percentage of bilingual students. Teachers from both settings will receive a survey to identify what reading motivation strategies they are currently using in their classrooms.

We will be interviewing a smaller representative sample of teachers to get a contextualized understanding of the strategies they are currently using in their classrooms and how they feel these strategies are working for their students. We will interview a small sample of our teacher participants' students to understand how they feel about themselves as readers and what in their school experiences has made them feel that way. These students will represent various characteristics including grade levels, home language, and those receiving interventions.

Our preliminary findings show that teachers are using research-based strategies such as read alouds and student choice but are also using tangible rewards such as classroom parties, food, and prizes. During our interviews, we hope to dig deeper into the beliefs and thought processes that guide these decisions and their influence on their students. We will use this data to guide future conversations around research-based motivation strategies and their impact on our students' reading identities.

## **BRIDGING THE GAP BETWEEN GENERAL MUSIC AND BAND**

Presenter(s): Teater, Kaitlin, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

This study investigates the challenges faced in bridging the gap between general music education and band programs, focusing on enhancing collaboration and communication among teachers. The problem under investigation is the lack of a common language and effective collaboration strategies between general music and band educators, which one results in fragmented music education experiences for students.

Participants in this study include general music teachers and band directors from various school districts. Data collection methods include surveys and interviews to gather insights into current practices, challenges, and potential solutions. Data analysis involves qualitative methods to identify patterns and themes in teacher responses.

Tentative findings suggest that while there is a recognition of the importance of collaboration between general music and band teachers, practical barriers such as time constraints, differing pedagogical approaches, and departmental discord hinder collaboration. However, preliminary evidence also indicates a willingness among educators to overcome these barriers and develop shared practices that benefit student learning experiences.

In conclusion, this study highlights the need for intentional efforts to foster collaboration and communication between general music and band teachers. Implications include the development of professional development opportunities, shared resources, and ongoing dialogue to promote a cohesive music education curriculum that supports student growth and engagement across both general music and band programs. Addressing these challenges has the potential to enhance the overall quality and coherence of music education in schools.

## **TEACHING PRACTICES AND THEIR EFFECT ON STUDENT AGENCY**

Presenter(s): Terbush, Samantha, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

Teaching practices have continued to change dramatically over the past decade, to get farther away from traditional teacher-led instruction. It has been proven through research, that when students feel more in control of their learning and take ownership, they are more likely to succeed in and out of the classroom. This new type of teaching requires teachers to take more of a backseat to instruction and allow more student-led instruction and ownership. To better understand how various teaching practices and methods influence student agency in the classroom, this study looks at middle school classrooms, both students and teachers and how agency operates within this setting.

Teachers and students from a middle-class suburb school will be surveyed about their experiences in the classroom regarding agency. Teachers will be interviewed, and their classrooms observed on various occasions to highlight the methods and practices used, as well as student response to those chosen methods. A smaller subset of students will be more thoroughly interviewed.

These methods will demonstrate which teaching practices encourage and halt students' agency. Practices such as goal setting, effective feedback, and conferencing will most likely result in increased student agency, while rote learning and memorization will most likely hinder agency. Students may find that teachers who allow choice and provide support will give students more freedom to be in control of their own learning and therefore encourage agency.



## **MORNING MEETINGS: THE BRIDGE BETWEEN ACADEMICS AND SOCIAL SKILLS**

Presenter(s): Tool, Megan, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

At the start of each year, students join a new classroom full of new peers, new teachers, and new expectations for the year ahead. With all these new things, students may feel an increase of emotions and pressure to make this the best year yet. Every classroom and student is unique. Most classrooms start their day differently through a variety of activities such as morning work, discussions, calendar, or even jumping right into academic skills through various lessons. Many classrooms are now beginning to implement a responsive classroom strategy known as Morning Meetings to the start of their day. Morning Meetings give students an opportunity to engage and practice both academic and social skills at the start of their day, which will not only help them prepare for their day, but it will also help develop these skills even more. Teachers are expected more than ever to help students grow academically and socially. To better understand how to support students in their academic and social skill development, while also meeting their academic and social skill needs, this study looks at a classroom of kindergarten students and their learning and development of academic and social skills through Morning Meetings. Surveys, observations, interviews, assessment data, and artifact and data collection will be analyzed to support the importance of integrating Morning Meetings into the classroom. Based on these tentative findings, I recommend that teachers complete additional research on how to implement morning meetings into their classroom to support their students' academic and social needs, ultimately setting them, up for future success in and outside of the classroom.

## **STUDENTS WITH LEARNING DISABILITIES IN CAREER AND TECHNICAL EDUCATION COURSES**

Presenter(s): Tuning, Jackie, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

As enrollment of students with specific learning disabilities continues to grow within general elective courses, this research is intended to address how the placement of such students into Career and Technical Education (CTE) classes affects their academic and experiential success. Students with an (Individualized Educational Plan) IEP have a right to be placed within the least restrictive environment, meaning that IEP students should be included in general education courses as much as possible, when appropriate. Elective courses, like CTE classes, are a common placement for students with disabilities and/or IEP's. There are many benefits and challenges to inclusion in general education courses like Career and Technical Education. CTE teachers, case managers, and selected student participants will engage in semi-structured interviews in order to gain understanding of the students' IEP and accommodations being utilized in the classroom. Classroom observations of student participants with reflective and descriptive notes will be utilized as well. Results of this research study should assist administrators and case managers with decisions regarding placement of students with specific learning disabilities into elective courses that are appropriate for their level of maturity, reading comprehension, and other basic soft skills. Collected information will support CTE teachers to continue to properly support and include students with a wide range of abilities.

## **UNDERSTANDING THE INFLUENCE OF A UNIVERSITY-BASED READING AND LITERACY CENTER TUTORING PROGRAM ON STUDENTS' LITERACY BEHAVIORS, BELIEFS, AND OUTCOMES: STAKEHOLDER PERSPECTIVES**

Presenter(s): Turk, Wanda, Graduate, Teaching and Learning

Mentor: Dr. Deborah MacPhee

Authorship: Wanda Turk

The purpose of this convergent mixed methods study is to understand stakeholder perspectives of changes in students' literacy behaviors, beliefs, and outcomes following participation in a literacy tutoring program. Building on a pilot study, quantitative and qualitative data will be collected, analyzed, and integrated to understand multi-stakeholder perceptions – students, tutors, and parents/caregivers – of changes in students' literacy behaviors, beliefs, and outcomes. The summer semester pilot study provided valuable information for fall and spring studies to be conducted during the school year. Papers published from the study will add to the limited body of literature related to university-based reading and literacy centers, particularly addressing a gap in the literature with students as the focal individuals.

## **PRE-SERVICE EDUCATOR AWARENESS, ATTITUDES, AND PERCEPTIONS OF ISSUES LEADING TO EDUCATOR BURNOUT**

Presenter(s): Twaddle, Casandra, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

Authorship: Casandra Twaddle, Anna Smith

This study is designed to address the issue of burnout and attrition in the field of education that is prevalent within our nation by looking at the perceptions that pre-service educators hold before they enter the field. A Qualtrics survey will be sent out to undergraduate education majors at Illinois State University consisting of both open-ended prompts as well as more concrete items such as a likert scale and rating system. The survey asks candidates questions about their expectations in their future roles as educators and what goals they may have as their career progresses. The likert scale asks candidates to rate their confidence both their feelings about their preparation program and also their understanding of key education concepts such as student motivation. The final rating item asks candidates to rate ten priority items regarding the career of an educator from most to least important. Both prescriptive and descriptive analytic methods will be applied to the resulting data with a goal of continuing a dialogue on how best to avert teacher attrition rates and raise retention and interest in the profession. Other studies have shown that negative perceptions of the field can be correlated to an earlier instance of burnout and/or leaving the profession.

## **THE INFLUENCE OF AN EXPLICIT MULTISYLLABIC ROUTINE ON MIDDLE SCHOOL READERS' FLUENCY AND COMPREHENSION**

Presenter(s): Wainwright, Cindy, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

Many students fail to meet the basic levels of reading performance in upper elementary grade with word reading. Word reading instruction is hardly give to students in these grades. When students move from grade to grade, they encounter more complex words. Teachers are faced with the issue of finding ways to help their readers in the classroom. More practice and strategy work needs to be done to help students in decoding multisyllabic words. This study explores the explicit instruction of a multisyllabic routine with fluency and comprehension in struggling middle school readers. Sixth grade intervention students at a linguistically, ethnically, and diverse public middle school were given an explicit multisyllabic routine for the study. Conferences and observations were done, and students did not see themselves as fluent readers. A pre/post text was given of each syllable type and weekly progress monitoring was done in fluency and comprehension. Tentative findings showed that students improved their overall skills in decoding longer words and also improved in fluency and comprehension.

## **STUDENT EMOTIONAL REGULATION AND PERSEVERANCE THROUGH MINDFULNESS STRATEGIES**

Presenter(s): Weghorst, Mariah, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

Students, now more than ever, are struggling with managing their emotions when it comes to challenging work. When met with material students do not know, they tend to either shut down, or become overwhelmed with emotions they cannot regulate. To better understand how students persevere through challenges, this study looks at the behavior and attitude of fourth graders as they are given the opportunity to learn and practice mindfulness strategies in the classroom. Students at a school with a high percentage of low-income families were given self-reflections before and after being taught mindfulness strategies to help self-regulate emotions and persevere through challenges. These reflections, along with student interviews and teacher observations, were analyzed using mixed methods to gain insight into student emotional behavior and their ability to self-regulate. Students showed the ability to implement these strategies daily with teacher support. Specifically, breathing exercises were chosen by many students. Following the strategy, students could return to work and continue persevering. Based on these tentative findings, I recommend that teachers be given training on how to instruct and implement self-regulation and mindfulness strategies with students. In addition, students should be given the physical and digital tools to successfully implement these strategies to learn how to better manage emotions and work through challenging tasks.

## **FINDING STUDENTS' READING IDENTITY THROUGH CONNECTED TEXTS TO EXPAND THEIR FLUENCY**

Presenter(s): Weiler, Kara, Graduate, Teaching and Learning

Mentor: Dr. Anna Smith

The research plans to investigate the broad topic by using student interest surveys to collect what genres and topics students are showing of interest. One other concern within the research topic is connecting fluency to student interest while in small groups. There are concerns with participants showing opposing interests where the research has too many small groups. Another idea could be to group participants in general related categories.

The research study will work with about ten to fifteen third grade students. The study will take place in my K-4 school, Charter Oak Primary School. Charter Oak is a mid-size urban school in Peoria Public Schools district.

The research study plans to use mixed methods. At the beginning of the research study, participants will be given an interest inventory survey. This will show a general idea of where students' interest is when it comes to choosing literature. From the initial survey, I will begin observing what students' interests are. Alongside observations, student participants will be asked interview-type questions to gain more information. Next, the research will work to find connected texts of the students' interests. In this process of reading one of the goals is to show students increase their fluency and automaticity. When fluent reading is encouraged, it promotes comprehension. Research focuses on the alignment between theory and assessment. The research will highlight how fluency is a part of a student's reading identity and investigate diverse ways it can be taught and assessed. Additionally, a qualitative approach through observations and note taking. Notes that will be included will be, what books participants are selecting, do the selections change interest over time, and insight into why the selection was made. Additionally, the research will be collecting information on students too, such as name, age, gender, siblings, home environment.

The findings that are proceeding well is students love to share their thoughts, feelings, ideas, and are overall curious. It is easy to get off topic. I am excited to share trends about the genres the participants are selecting. I have started to regroup students based on the feedback shared on what they would enjoy.

In conclusion, research behind building a student's reading identity is mostly about who the student is and their interest. Knowing students' interest, it will be shared how connected texts support the learner. When connected text is used in intentional instruction it impacts the students' fluency and automaticity.

## **CELL PHONE REMOVAL IN THE CLASSROOM**

Presenter(s): Welsh, Peter, Graduate, Teaching and Learning

Mentor: Dr. Erin Quast

Authorship: Peter Welsh

Cell phones are becoming a greater distraction in our lives. As cell phone become even more entrenched within society, would removing cell phones from students produce a more productive and happier student? This study aims to look at high school students and their response to being away from their cell phones. One group of students are freshman level and the other are junior level. A mixed methods approach will be used for the research. The approach will utilize observations, surveys, and assessment analysis. The observations are currently showing that students are less motivated but spend more time on task and more are completing more of their work. Assessment show currently grades have improved over the early parts of the research. An early conclusion is that students are becoming more productive and overall happier without the ability to access their cell phones during class. Based on early research it is recommended that students do not have access to their cell phones during their time in the classroom.



## 2024 University Research Symposium

### Oral Presentation Abstracts

#### LANGUAGES, LITERATURES, AND CULTURES

##### **VOICES OF RESILIENCE: GWANGJU UPRISING AND TRAUMA IN HAN KANG'S "HUMAN ACTS" (2014)**

Presenter(s): Goitia, Alexandra, Graduate, Languages, Literatures, and Cultures

Mentor: Dr. Jonathan Druker

The study centers on Han Kang's 2014 novel "Human Acts," offering a diverse and nuanced perspective on the event that changed South Korean history. The book explores the intricacies of trauma, memory, and mourning, focusing on the societal impact of a massacre that profoundly shaped an entire society. By examining this non-European and non-American event, the following paper underscores the necessity of broadening the discourse on trauma theory. The objective is to underscore the significance of recognizing diverse cultural perspectives within a globally acknowledged field. As such, a crucial aspect of the analysis involves examining the various viewpoints of the Gwangju Uprising presented in the novel. Kang approaches the massacre from seven different perspectives: a boy who was murdered during the riot, his friend, an editor, a prisoner, a factory girl, the boy's mother, and herself. Thus, this paper not only functions as a means to counter Eurocentrism but also serves as a pathway to approach trauma from a multitude of perspectives.

Sick the day of presentations and did not present.

## **EXPRESSING TRAUMA THROUGH GRAPHIC NARRATIVE IN JOE SACCO'S PALESTINE**

Presenter(s): Prieto-Montero, Ángel, Graduate, Languages, Literatures, & Cultures

Mentor: Dr. Jonathan Druker

This paper discusses how Joe Sacco's *Palestine* represents the traumas of the Israeli-Palestinian conflict through the art of the graphic narrative. With his nuanced combination of journalism and comics, of words and images, Sacco provides a unique lens through which to engage Western audiences in the multifaceted and often overlooked aspects of trauma in this longstanding conflict. His graphic narrative visualizes the structural and historical traumas faced by Palestinians, especially in the aftermath of the Nakba, and is a powerful tool for shedding light on individual and collective experiences and conveying the realities of trauma in the Israeli-Palestinian context.

This analysis examines Sacco's visual strategies, including spatial representations, color usage, and framing, arguing that these elements contribute to the creation of a vivid and emotionally resonant portrayal of trauma. Furthermore, this paper underscores how Sacco challenges Western perceptions of the conflict by presenting a more comprehensive understanding of the Palestinian experience. It becomes evident that Sacco's immersive style transforms readers into observers of the disaster, fostering a humanizing perspective on the Palestinians.

## **REPRESENTATIONS OF TRAUMA IN PERUVIAN CINEMA: AN ANALYSIS OF THE MOVIE “THE MILK OF SORROW” BY CLAUDIA LLOSA**

Presenter(s): Serna Maldonado, Yaritza, Graduate, Languages, Literatures, and Cultures

Mentor: Dr. Jonathan Druker

My presentation will examine Claudia Llosa's film, *The Milk of Sorrow* (2009), within the framework of trauma theory. I will propose that the film, set in the 1980s, portrays historical, transgenerational, and insidious trauma, and aim to explore how these themes are represented in the movie and how they affect the characters. Through the analysis of the film's portrayal of trauma, I will provide insights around the impact of traumatic experiences on Peruvian indigenous communities affected during Peruvian civil war.

## PHYSICS

### MINIMA HOPING FOR REDUNDANTLY LARGE NEURAL NETWORKS

Presenter(s): Achammer, Chris, Undergraduate, Physics

Mentor: Dr. Rainer Grobe

Co-Mentor: Dr. Q. Charles Su

Authorship: Chris Achammer, Harrison Smith, R. Grobe, and Q. Charles Su

The minimization of the loss function in a highly dimensional search space is the central challenge in all neural network applications. Here, the space of the unknown parameters is typically very large, which can lead to multiple minima associated with the same value of the loss function. This problem of non-uniqueness is especially challenging if the neural network has a higher number of neurons than is actually required. We will discuss the resulting phenomenon of minimum hoping and illustrate it for simple function matching based on the binary sigmoid activation function. We acknowledge NSF support.

## **SOLVING DIFFERENTIAL EQUATIONS WITH NEURAL NETWORKS**

Presenter(s): Achammer, Chris, Undergraduate, Physics

Mentor: Dr. Rainer Grobe

Co-Mentor: Dr. Q. Charles Su

The conventional methods of solving ordinary differential equations (ODEs) and partial differential equations (PDEs) are usually limited in spatial and CPU time due to the increase in dimensionality. However, such difficulties might be overcome with the help of neural network algorithms. In this presentation, we illustrate how simple ODEs and PDEs can be solved with this new technique. We acknowledge NSF support.

## EFFECTS OF SPECTRAL PHASE PULSE SHAPING ON ATTOSECOND PROCESSES

Presenter(s): Aygun, James, Undergraduate, Physics

Mentor: Dr. Allison Harris

The recent development of attosecond pulses has allowed for the ability to probe the dynamics of electrons in the atom. Two important processes in Attosecond science are high-order harmonic generation (HHG) and attosecond energy streaking. During the HHG process, an intense laser pulse tunnel ionizes an electron, after which the electron moves in the laser field, and eventually recombines with the atom. Recombination results in light of harmonic frequencies of the laser field being emitted. Better control of attosecond processes is desirable and one such possibility for this control is through the use of structured laser pulses, such as Airy pulses.

During the streaking process, an atom in a low intensity, low frequency laser field (the streaking field) is ionized by a high frequency attosecond pulse. Following ionization, the photoelectron moves in the presence of the streaking field with its momentum is determined by the streaking field's vector potential at the time of ionization. By changing the relative delay between the attosecond ionizing pulse and the streaking field, the time required for the photoionization process can be determined.

Both HHG and attosecond energy streaking are important processes in attosecond physics. HHG is used to produce ultrashort XUV pulses that can be used to study electron dynamics through processes such as streaking. Better control of the HHG process is desirable and one such possibility for this control is through the use of structured laser pulses, such as Airy pulses. We present numerical results for solving the 1D time-dependent Schrödinger equation for HHG from hydrogen using Airy and Gaussian pulses and show that differences in the harmonic spectrum, emission times, and state populations are observed for Airy pulses compared to Gaussian pulses. We then use attosecond energy streaking to determine if the ionization time for structured Airy pulses is different than for Gaussian pulses. Combined, our results demonstrate that structured pulses alter the electron dynamics of attosecond processes and that they offer an additional means of control not attainable with traditional pulse profiles.

## **INHERITED LEARNING NEURAL NETWORK FOR QUANTUM FIELD THEORY**

Presenter(s): Czajka, Brendan, Undergraduate, Physics

Mentor: Dr. Rainer Grobe

Co-Mentor: Dr. Q. Charles Su

We introduce a neural network-based computational technique to study the strong-field-induced electron-positron pair creation process from the quantum vacuum state. In computational quantum field theory (CQFT), the fermionic vacuum is represented by the set of all negative energy eigenstates of the Dirac equation. To calculate the dynamical evolution of various positronic and electronic observables, each of these Dirac sea states needs to be evolved in time. In CQFT, these states are usually obtained independently as solutions to the time-dependent Dirac equation. We suggest that neural networks can be employed to learn from the time evolution of a single state and then use this gained information consecutively to accelerate the calculation speed of the other states. We acknowledge NSF support.

## **EFFICIENT DETERMINATION OF DIRAC SEA STATES**

Presenter(s): James, Eyan, Undergraduate, Physics

Mentor: Dr. Rainer Grobe

Co-Mentor: Dr. Q. Charles Su

Supercritical field-induced vacuum breakdown is a process that has attracted increasing interest due to advances in high-power laser technologies. The vacuum may be described as the occupied Dirac Sea states, serving as the initial state of quantum field theoretical calculations. The speedy and accurate determination of these states is obviously very desirable. Usually, this involves the diagonalization of a Hamiltonian, and with the Dirac Sea, the computation multiplies accordingly. In this work, we determine these states using neural networks. Additionally, we take advantage of the resemblance of nearby states to recover many Dirac states efficiently. We acknowledge NSF support.



## COMPUTING 5-POINT CONSTRUCTIVE AMPLITUDES

Presenter(s): Minney, Gabe, Undergraduate, Physics

Mentor: Dr. Neil Christensen

Recently, a complete set of 4-point amplitudes has been constructed and validated for the Standard Model. With this advancement, it is time to construct the 5-point amplitudes. In order to do this, we will create an algorithm for constructing the diagrams and expressing them mathematically. We will then output these diagrams to numerical code and compare with Feynman diagrams for the same amplitude. This will allow us to work out the currently unknown parts of the algorithm, generate novel amplitudes and compare the efficiency of constructive amplitudes with Feynman diagrams.

## THEATRE

### **MUSICAL THEATER PRO-SHOTS: QUESTIONING AN ENTERTAINMENT INDUSTRY TREND**

Presenter(s)     Dutra Guedes, Gustavo Nery, Graduate, Theatre and Dance

Mentor:             Dr. Kee-Yoon Nahm

Authorship:        Gustavo Nery Dutra Guedes

Since the early stages of the digital era, the theater industry has been concerned about how to document and broadcast its most popular shows. Professional recordings (known as “pro-shots”) started to gain popularity by the 1980s; however, since the 2010s, the number of live musical theater professional recordings has been growing exponentially. This research intends to analyze the root of this trend by considering factors discussed by theater scholars, such as the practice of sharing bootleg recordings online; the popularity of some theater shows on social media; and the embracing of streaming services as a form of media consumption.

## **CAMUS'S ABSURD REBELLION WITHIN TOM STOPPARD'S *DOGG'S HAMLET*, *CAHOOT'S MACBETH***

Presenter(s)     Nance, M., Graduate, Theatre and Dance

Mentor:             Dr. Derek Munson

Co-Mentor:        Dr. Kee-Yoon Nahm

Martin Esslin's discussion of the "Theatre of the Absurd" offers an incomplete representation of the absurd in both its underlying philosophy and its influence on humanity at a societal level. Esslin based his writings on Albert Camus's *The Myth of Sisyphus*, which offers a more complete representation of the philosophy of the absurd when compared to Esslin's cursory attempt. Camus starts by describing the absurd as a conflict between man and the world around him. This conflict is born from the human urge to look for an intrinsic meaning, or cosmic justice, in a world that is actively hostile to humanity and its endeavor due to being void of any such meaning. Camus then argues that the solution to this conflict is not to give up but to persist, to keep living in spite of that conflict, as a form of rebellion. Camus's *The Rebel* expands his idea of the absurd rebellion into a communal experience that occurs when people are subjected to an unjust society, and he argues for revolution based on philosophy as a form of rebellion rather than violence. To examine the effectiveness of such a revolution, I will analyze an example of the absurd rebellion—Tom Stoppard's plays *Dogg's Hamlet*, *Cahoot's Macbeth*, which he wrote in response to the state sponsored censorship in Czechoslovakia during the twentieth century. Most critical discussions about these plays focus on analyses of Stoppard's use of Shakespeare's works within the plays while overlooking the plays' absurdist nature and historical context. This essay seeks to examine how *Dogg's Hamlet*, *Cahoot's Macbeth* can be viewed as a form of societal rebellion as argued by Camus.

## THE RELATIONSHIP BETWEEN CLIMATE CHANGE AND MENTAL HEALTH IN DUNCAN MACMILLIAN'S LUNGS

Presenter(s): Phurahong, Phitsinee, Graduate, Theater and Dance

Mentor: Dr. Kee-Yoon Nahm

In this paper, I argue that in order to recognize the urgency of addressing climate change rather than perceive it as a distant issue, it is important to understand the relationship between climate change and mental health. Climate change is a pressing crisis of unparalleled urgency. Our planet is warming at an alarming rate, causing extreme weather events, melting ice caps, rising sea levels, and irreversible ecosystem damage. Climate change can also impact our mental health, causing problems such as eco-anxiety, Pre-Traumatic Stress Disorder, Solastalgia, and Ecosickness. Furthermore, people may become overwhelmed, anxious, stressed, hopeless, or even depressed about the uncertain future, which can lead to inaction and thus worsen the climate emergency. How can theatre address this crisis while also bringing awareness to the significant impact that climate change can have on our mental health? The genre of eco-drama offers one solution. I will discuss Duncan Macmillan's 2011 eco-drama *Lungs*, which depicts a couple that wrestles with the dreadful decision of bringing a child into a deteriorating world. The play makes a symbolic connection between ecology and pregnancy by, for example, comparing global carbon emissions to the womb of a smoking mother. By highlighting the issues of overconsumption and the trade-off between personal choices, environmental concerns, and economic conditions, the play also shows that these problematic conditions are primarily rooted in capitalism, which is a significant factor contributing to the degradation of our environment, or what we can call home. By examining the play's symbols, I will explore the profound impact of climate change on individuals. I will also demonstrate that eco-drama can present issues of climate change from a more personal and immediate perspective; theatre allows us to better appreciate its impact on our own individual well-being. Using critical methods and the theory of cultural materialism, I will delve into how climate change impacts us, affecting our physical and mental well-being.

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## DEPARTMENT OF LANGUAGES, LITERATURES, AND CULTURES

Research Symposium Panel

Organized by Prof. Jonathan Druker

**Friday, April 12, Stevenson Hall, Room 131  
10:00 - 11:00 a.m.**

### **State Violence and Communal Trauma in Non-Western Texts**

The three speakers in this panel will present revised seminar papers originally written for LAN 490: Literature and Collective Trauma. Each paper focuses on a single text that represents traumatic state violence or civil wars that took place in the 1980s and 1990s in non-Western countries. Collectively, the three papers cover multiple genres—a film, a graphic narrative, and a novel—and diverse geographies, from Peru to Palestine to South Korea.

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Presenters

**Yaritza Serna**  
(Masters in Spanish)

### **REPRESENTATIONS OF TRAUMA IN PERUVIAN CINEMA: AN ANALYSIS OF THE MOVIE *THE MILK OF SORROW* BY CLAUDIA LLOSA**

My presentation will examine Claudia Llosa's film, *The Milk of Sorrow* (2009), within the framework of trauma theory. I will propose that the film, set in the 1980s, portrays historical, transgenerational, and insidious trauma, and aim to explore how these themes are represented in the movie and how they affect the characters. Through the analysis of the film's portrayal of trauma, I will provide insights around the impact of traumatic experiences on Peruvian indigenous communities affected during Peruvian civil war.

(See additional presenters next pg.)

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**Presenters Cont.**

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**Ángel Prieto Montero**  
(Masters in Spanish)

**EXPRESSING TRAUMA THROUGH GRAPHIC NARRATIVE IN  
JOE SACCO'S *PALESTINE***

This paper discusses how Joe Sacco's *Palestine* represents the traumas of the Israeli-Palestinian conflict in the period 1991-1992 through the art of the graphic narrative. With his nuanced combination of journalism and comics, of words and images, Sacco provides a unique lens through which to engage Western audiences in the multifaceted and often overlooked aspects of trauma in this longstanding conflict. His graphic narrative visualizes the structural and historical traumas faced by Palestinians, especially in the aftermath of the Nakba, and is a powerful tool for shedding light on individual and collective experiences and conveying the realities of trauma in the Israeli-Palestinian context. My analysis examines Sacco's visual strategies, including spatial representations, color usage, and framing, arguing that these elements contribute to the creation of a vivid and emotionally resonant portrayal of trauma. Furthermore, I underscore how Sacco challenges Western perceptions of the conflict by presenting a more comprehensive understanding of the Palestinian experience. It becomes evident that Sacco's immersive style transforms readers into observers of the disaster, fostering a humanizing perspective on the Palestinians.

**Alexandra Goitia**  
(Masters in Spanish)

**VOICES OF RESILIENCE: GWANGJU UPRISING AND TRAUMA IN HAN KANG'S  
*HUMAN ACTS* (2014)  
[PRESENTED IN SPANISH]**

This study centers on Han Kang's 2014 novel *Human Acts*, offering a diverse and nuanced perspective on the event that changed South Korean history. The book explores the intricacies of trauma, memory, and mourning, focusing on the societal impact of a massacre that profoundly shaped an entire society. By examining this non-European and non-American event, the following paper underscores the necessity of broadening the discourse on trauma theory. The objective is to underscore the significance of recognizing diverse cultural perspectives within a globally acknowledged field. As such, a crucial aspect of the analysis involves examining the various viewpoints of the Gwangju Uprising (1980) presented in the novel. Kang approaches the massacre from seven different perspectives: a boy who was murdered during the riot, his friend, an editor, a prisoner, a factory girl, the boy's mother, and herself. Thus, this paper not only functions as a means multitude of perspectives.

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# **SCHOOL OF THEATRE & DANCE**

Oral Presentations

Organized by Drs. Kee-Yoon Nahm and Derek Munson

Friday, April 12, Centennial East???, Room  
1:30 - 3:00 p.m.

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## **Presenters**

(15 minutes for each presenter, 15 minutes of collective Q&A)

**Gustavo Nery Dutra Guedes**  
(Masters in Theatre Studies)

**MUSICAL THEATER PRO-SHOTS: QUESTIONING AN ENTERTAINMENT  
INDUSTRY TREND**

**M. Nance**

**CAMUS'S ABSURD REBELLION WITHIN TOM STOPPARD'S DOGG'S  
HAMLET, CAHOOT'S MACBETH**

**Jessie Denning**  
(Masters in Theatre Studies)

**THE RELATIONSHIP BETWEEN CLIMATE CHANGE AND MENTAL  
HEALTH IN DUNCAN MACMILLIAN'S LUNGS**

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## **DEPARTMENT OF PHYSICS**

Oral Presentations (April 13, 2024)

Moulton Hall 309

Faculty mentors: Dr. N. Christensen, Dr. A. Harris, Dr. R. Grobe, and  
Dr. Q. Su

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**9:30-9:45**

**Brendan Czajka**

INHERITED LEARNING NEURAL NETWORK FOR QUANTUM FIELD  
THEORY

**9:45-10:00**

**Eyan James**

EFFICIENT DETERMINATION OF DIRAC SEA STATES

**10:00-10:15**

**Chris Achammer**

SOLVING DIFFERENTIAL EQUATIONS WITH NEURAL NETWORKS

**10:15-10:30**

**James Aygun**

EFFECTS OF SPECTRAL PHASE PULSE SHAPING ON ATTOSECOND  
PROCESSES

**10:30-10:45**

**Gabe Minney**

COMPUTING 5-POINT CONSTRUCTIVE AMPLITUDES

**10:45-11:00**

**Chris Achammer**

MINIMA HOPING FOR REDUNDANTLY LARGE NEURAL NETWORKS



**ALPHABETICAL BY STUDENT LAST NAME  
MORNING SESSION**

<b>Presenter Last Name</b>	<b>Presenter First Name</b>	<b>Poster Number</b>	<b>Mentor's Department/School</b>	<b>Mentor</b>
<b>A - B</b>				
<b>Abdullah</b>	<b>Abu Habib Md</b>	<b>66</b>	<b>Biological Sciences</b>	<b>Viktor Kirik</b>
<b>Adams</b>	<b>Haley</b>	<b>21, 136</b>	<b>Psychology</b>	<b>Susan Sprecher</b>
<b>Ahmed</b>	<b>Gulzar</b>	<b>134</b>	<b>Mathematics</b>	<b>Xing Wang</b>
<b>Ahsan</b>	<b>Md Imran</b>	<b>141</b>	<b>Politics and Government</b>	<b>Noha Shawki</b>
<b>Akinosho</b>	<b>Aalimah</b>	<b>67</b>	<b>Biological Sciences</b>	<b>Andrés Vidal-Gadea</b>
<b>Aldrich</b>	<b>Colt</b>	<b>68</b>	<b>Biological Sciences</b>	<b>Rachel Bowden</b>
<b>Alexander</b>	<b>Joseph</b>	<b>69</b>	<b>Biological Sciences</b>	<b>Kyle Floyd</b>
<b>Alvarado</b>	<b>Giselle</b>	<b>1</b>	<b>Psychology</b>	<b>Dawn McBride</b>
<b>Anani</b>	<b>Janet Laadi</b>	<b>34</b>	<b>Communication</b>	<b>John Baldwin</b>
<b>Anderson</b>	<b>Madelynn</b>	<b>96</b>	<b>Chemistry</b>	<b>Christopher Mulligan</b>
<b>Arndt</b>	<b>Thomas</b>	<b>97</b>	<b>Chemistry</b>	<b>Richard Nagorski</b>
<b>Barnes</b>	<b>Desiree</b>	<b>40</b>	<b>Social Work</b>	<b>Christopher Gjesfjeld</b>
<b>Barua</b>	<b>Proma</b>	<b>142</b>	<b>Politics and Government</b>	<b>Noha Shawki</b>
<b>Baxter</b>	<b>Alyssa</b>	<b>132</b>	<b>Nursing</b>	<b>Denise Hammer</b>
<b>Beckman</b>	<b>Kaley</b>	<b>21, 136</b>	<b>Sociology/Anthropology</b>	<b>Susan Sprecher</b>
<b>Bennis</b>	<b>Mehdi</b>	<b>70</b>	<b>Biological Sciences</b>	<b>Jan Dahl</b>
<b>Berg</b>	<b>Rachel</b>	<b>71</b>	<b>Biological Sciences</b>	<b>Pirmin Nietlisbach</b>
<b>Birditt</b>	<b>Bailey</b>	<b>41</b>	<b>Social Work</b>	<b>Kate Sheridan</b>
<b>Blankson</b>	<b>Kwesi</b>	<b>15</b>	<b>Psychology</b>	<b>Jeffrey Wagman</b>
<b>Block</b>	<b>Mary</b>	<b>75</b>	<b>Biological Sciences</b>	<b>Viktor Kirik</b>

**ALPHABETICAL BY STUDENT LAST NAME  
MORNING SESSION**

<b>B - C</b>				
<b>Bopp</b>	<b>Mallory</b>	<b>31</b>	<b>Psychology</b>	<b>Brea Banks</b>
<b>Bradley</b>	<b>Brittany</b>	<b>20</b>	<b>Psychology</b>	<b>Brea Banks</b>
<b>Brzezniak</b>	<b>Emilia</b>	<b>33</b>	<b>Psychology</b>	<b>Alycia M. Hund</b>
<b>Calhoun</b>	<b>Austin</b>	<b>72</b>	<b>Biological Sciences</b>	<b>Ben Sadd</b>
<b>Caruso</b>	<b>Dante</b>	<b>2</b>	<b>Psychology</b>	<b>Dawn McBride</b>
<b>Caserio</b>	<b>Caroline</b>	<b>127</b>	<b>Family and Consumer Sciences</b>	<b>Christina Soyoung Song</b>
<b>Casselman</b>	<b>Carly</b>	<b>42</b>	<b>Social Work</b>	<b>Christopher Gjesfjeld</b>
<b>Castor</b>	<b>Arely</b>	<b>33</b>	<b>Psychology</b>	<b>Alycia M. Hund</b>
<b>Charles</b>	<b>Mahika</b>	<b>33</b>	<b>Psychology</b>	<b>Alycia M. Hund</b>
<b>Chilaka</b>	<b>Jonathan</b>	<b>98</b>	<b>Chemistry</b>	<b>Christopher Mulligan</b>
<b>Cintron-Gonzalez</b>	<b>Edcel J.</b>	<b>118</b>	<b>English</b>	<b>Mary Moran</b>
<b>Clay</b>	<b>Taylor</b>	<b>64, 65</b>	<b>Communication Sciences and Disorders</b>	<b>Antony Joseph</b>
<b>Cole</b>	<b>Seth</b>	<b>105</b>	<b>Physics</b>	<b>David Marx</b>
<b>Concepción Cabán</b>	<b>Lourdes</b>	<b>29</b>	<b>Psychology</b>	<b>Brea Banks</b>
<b>Corrie</b>	<b>Seth</b>	<b>99</b>	<b>Chemistry</b>	<b>Andrew Mitchell</b>
<b>Cremer</b>	<b>Hannah</b>	<b>27</b>	<b>Psychology</b>	<b>Shengtian Wu</b>
<b>Cripe</b>	<b>Jada</b>	<b>3</b>	<b>Psychology</b>	<b>Alycia Hund</b>
<b>Crowder</b>	<b>Diamond</b>	<b>43</b>	<b>Social Work</b>	<b>Kate Sheridan</b>
<b>Crowe</b>	<b>Grace</b>	<b>73</b>	<b>Physics</b>	<b>Allison Harris</b>

**ALPHABETICAL BY STUDENT LAST NAME  
MORNING SESSION**

<b>C - F</b>				
<b>Curescu</b>	<b>Clarissa</b>	<b>2</b>	<b>Psychology</b>	<b>Dawn McBride</b>
<b>Curry</b>	<b>Alex</b>	<b>22</b>	<b>Psychology</b>	<b>Dan Lannin</b>
<b>Daly</b>	<b>Evan</b>	<b>4</b>	<b>Psychology</b>	<b>Gary Cates</b>
<b>Dart</b>	<b>Avery</b>	<b>74</b>	<b>Biological Sciences</b>	<b>Pirmin Nietlisbach</b>
<b>De Gante</b>	<b>Gabby</b>	<b>110</b>	<b>Physics</b>	<b>Mahua Biswas</b>
<b>De Gould</b>	<b>Sarah</b>	<b>33</b>	<b>Psychology</b>	<b>Alycia M. Hund</b>
<b>De Oliveira</b>	<b>Jonas</b>	<b>108</b>	<b>Physics</b>	<b>Epaminondas Rosa</b>
<b>Deer</b>	<b>Nina</b>	<b>58</b>	<b>Kinesiology &amp; Recreation</b>	<b>Karen Dennis</b>
<b>Del Valle</b>	<b>Ivellisse</b>	<b>5</b>	<b>Psychology</b>	<b>Dan Ispas</b>
<b>Del Valle</b>	<b>Ivellisse</b>	<b>6</b>	<b>Psychology</b>	<b>Kimberly Schneider</b>
<b>Dillman</b>	<b>Alexandra</b>	<b>44</b>	<b>Social Work</b>	<b>Kate Sheridan</b>
<b>Dow</b>	<b>Michael</b>	<b>7</b>	<b>Psychology</b>	<b>Dawn McBride</b>
<b>Draper</b>	<b>Katelyn Olivia</b>	<b>75</b>	<b>Biological Sciences</b>	<b>Viktor Kirik</b>
<b>Duong</b>	<b>Michelle</b>	<b>8</b>	<b>Psychology</b>	<b>Laura Finan</b>
<b>Edema</b>	<b>Clementina</b>	<b>35</b>	<b>Communication</b>	<b>John Baldwin</b>
<b>Ellaboina</b>	<b>Vishnu Vardhan</b>	<b>151</b>	<b>Information Technology</b>	<b>Nariman Ammar</b>
<b>Faamoe</b>	<b>Isaac</b>	<b>59</b>	<b>Kinesiology &amp; Recreation</b>	<b>Kelly Laurson</b>
<b>Fazyl</b>	<b>Adina</b>	<b>76</b>	<b>Biological Sciences</b>	<b>Andrés Vidal-Gadea</b>
<b>Fields</b>	<b>Allie</b>	<b>45</b>	<b>Social Work</b>	<b>Christopher Gjesfjeld</b>
<b>Fleming</b>	<b>Fiona</b>	<b>135</b>	<b>Sociology/Anthropology</b>	<b>Susan Sprecher</b>
<b>Flinn</b>	<b>Taylor</b>	<b>9</b>	<b>Psychology</b>	<b>Dan Ispas</b>
<b>Foley</b>	<b>Nick</b>	<b>147</b>	<b>Economics</b>	<b>Susan Chen</b>

**ALPHABETICAL BY STUDENT LAST NAME  
MORNING SESSION**

<b>F - H</b>				
<b>Fried</b>	<b>Amalie</b>	<b>155</b>	<b>History</b>	<b>Kathryn Jasper</b>
<b>Galvan</b>	<b>Pedro</b>	<b>82</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Gandla</b>	<b>Sai Ram</b>	<b>116</b>	<b>Technology</b>	<b>Sally Xie</b>
<b>Garcia</b>	<b>Andrea</b>	<b>10</b>	<b>Psychology</b>	<b>Adena Meyers</b>
<b>Gomez</b>	<b>Lylia</b>	<b>106</b>	<b>Physics</b>	<b>Epaminondas Rosa</b>
<b>Goodman</b>	<b>Trevor</b>	<b>11</b>	<b>Psychology</b>	<b>Suejung Han</b>
<b>Gulik</b>	<b>Stephanie</b>	<b>46</b>	<b>Social Work</b>	<b>Kate Sheridan</b>
<b>Guo</b>	<b>Stephanie</b>	<b>12</b>	<b>Psychology</b>	<b>Shengtian Wu</b>
<b>Gupta</b>	<b>Dolly</b>	<b>117</b>	<b>Technology</b>	<b>Isaac Chang</b>
<b>Hacaga</b>	<b>Theadora</b>	<b>47</b>	<b>Social Work</b>	<b>Kate Sheridan</b>
<b>Haislip</b>	<b>Nicole</b>	<b>21, 136</b>	<b>Sociology/Anthropology</b>	<b>Susan Sprecher</b>
<b>Hardaway</b>	<b>Alexander</b>	<b>107</b>	<b>Physics</b>	<b>Uttam Manna</b>
<b>Harrell</b>	<b>Ty</b>	<b>13, 19</b>	<b>Psychology</b>	<b>Suejung Han</b>
<b>Henrichsmeyer</b>	<b>Allison</b>	<b>143</b>	<b>Politics and Government</b>	<b>Noha Shawki</b>
<b>Herbert</b>	<b>Carter</b>	<b>108</b>	<b>Physics</b>	<b>Epaminondas Rosa</b>
<b>Herman</b>	<b>Nolan</b>	<b>21, 136</b>	<b>Sociology/Anthropology</b>	<b>Susan Sprecher</b>
<b>Hicks</b>	<b>Travis</b>	<b>18</b>	<b>Psychology</b>	<b>Eric Wesselmann</b>
<b>Ho</b>	<b>Linh</b>	<b>123</b>	<b>Family and Consumer Sciences</b>	<b>Yoon Jin Ma</b>
<b>Hoge</b>	<b>Maxine</b>	<b>13</b>	<b>Psychology</b>	<b>Suejung Han</b>
<b>Homan</b>	<b>Lilly</b>	<b>100</b>	<b>Chemistry</b>	<b>Richard Nagorski</b>

**ALPHABETICAL BY STUDENT LAST NAME  
MORNING SESSION**

<b>H - K</b>				
<b>Hoveke</b>	<b>Lily</b>	<b>21</b>	<b>Psychology</b>	<b>Susan Sprecher</b>
<b>Huang</b>	<b>Nai-Chun</b>	<b>124</b>	<b>Family and Consumer Sciences</b>	<b>Christina Soyoung Song</b>
<b>Igoe</b>	<b>Emily</b>	<b>22</b>	<b>Psychology</b>	<b>Dan Lannin</b>
<b>Jackson</b>	<b>Tyra</b>	<b>20</b>	<b>Psychology</b>	<b>Brea Banks</b>
<b>Jaswal</b>	<b>Twinkle</b>	<b>152</b>	<b>Information Technology</b>	<b>Rosangela Follmann</b>
<b>Jefferson</b>	<b>Val</b>	<b>48</b>	<b>Social Work</b>	<b>Christopher Gjesfjeld</b>
<b>Jeronimus</b>	<b>Joy</b>	<b>14</b>	<b>Psychology</b>	<b>Kelly Clemens</b>
<b>Ji</b>	<b>Nathan</b>	<b>117</b>	<b>Technology</b>	<b>Isaac Chang</b>
<b>Johnson</b>	<b>Zachary</b>	<b>144</b>	<b>Politics and Government</b>	<b>Kerri Milita</b>
<b>Jones</b>	<b>Layla</b>	<b>86</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Kashyap</b>	<b>Arghya</b>	<b>15</b>	<b>Psychology</b>	<b>Jeffrey Wagman</b>
<b>Kaur</b>	<b>Mankirat</b>	<b>125</b>	<b>Family and Consumer Sciences</b>	<b>Christina Soyoung Song</b>
<b>Kaur</b>	<b>Mankirat</b>	<b>126</b>	<b>Family and Consumer Sciences</b>	<b>Yoon Jin Ma</b>
<b>King</b>	<b>Lilly</b>	<b>77</b>	<b>Biological Sciences</b>	<b>Ryan Paitz</b>
<b>Klann</b>	<b>Makenna</b>	<b>78</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Kmieciak</b>	<b>Lorin</b>	<b>128</b>	<b>Family and Consumer Sciences</b>	<b>Reem Bagais</b>
<b>Knowles</b>	<b>Marley</b>	<b>113</b>	<b>Agriculture</b>	<b>Nicholas Heller</b>
<b>Koerwitz</b>	<b>Anna</b>	<b>16</b>	<b>Psychology</b>	<b>Laura Finan</b>
<b>Kooistra</b>	<b>Rachael</b>	<b>137</b>	<b>Sociology/Anthropology</b>	<b>Shelby Putt</b>
<b>Krivograd</b>	<b>Sophie</b>	<b>79</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Kuhn</b>	<b>Rory</b>	<b>16</b>	<b>Psychology</b>	<b>Laura Finan</b>

**ALPHABETICAL BY STUDENT LAST NAME  
MORNING SESSION**

<b>K - M</b>				
<b>Kuhn</b>	<b>Rory</b>	<b>21, 136</b>	<b>Psychology</b>	<b>Susan Sprecher</b>
<b>Kuhn</b>	<b>Rory</b>	<b>32</b>	<b>Psychology</b>	<b>Kimberly Schneider</b>
<b>Lamansky</b>	<b>Taelor</b>	<b>17</b>	<b>Psychology</b>	<b>Laura Finan</b>
<b>Laux</b>	<b>Sydney</b>	<b>21, 136</b>	<b>Sociology/Anthropology</b>	<b>Susan Sprecher</b>
<b>Leffers</b>	<b>Rebecca</b>	<b>133</b>	<b>Nursing</b>	<b>Denise Hammer</b>
<b>Leischner</b>	<b>Lauren</b>	<b>80</b>	<b>Biological Sciences</b>	<b>Pirmin Nietlisbach</b>
<b>Liew</b>	<b>Ryan</b>	<b>2</b>	<b>Psychology</b>	<b>Dawn McBride</b>
<b>Lim</b>	<b>Zhi Quan</b>	<b>18</b>	<b>Psychology</b>	<b>Eric Wesselmann</b>
<b>Loer</b>	<b>Jacob</b>	<b>13</b>	<b>Psychology</b>	<b>Suejung Han</b>
<b>Lubna</b>	<b>Tuba Yasmin</b>	<b>114</b>	<b>Health Sciences</b>	<b>Liangcheng Yang</b>
<b>Lynn</b>	<b>Madison</b>	<b>79</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Manoj</b>	<b>Mukta</b>	<b>62</b>	<b>Communication Sciences and Disorders</b>	<b>Shraddha Shende</b>
<b>Marquez</b>	<b>Jose</b>	<b>109</b>	<b>Physics</b>	<b>Raymond Zich</b>
<b>Mast</b>	<b>Daniel</b>	<b>64, 65</b>	<b>Communication Sciences and Disorders</b>	<b>Antony Joseph</b>
<b>Meyer</b>	<b>Derek</b>	<b>13, 19</b>	<b>Psychology</b>	<b>Suejung Han</b>
<b>Meyer</b>	<b>Ryan</b>	<b>81</b>	<b>Biological Sciences</b>	<b>Bill Perry</b>
<b>Monehin</b>	<b>Tony</b>	<b>148</b>	<b>Economics</b>	<b>Susan Sprecher</b>
<b>Moore</b>	<b>Raven</b>	<b>20</b>	<b>Psychology</b>	<b>Brea Banks</b>
<b>Morn-Toro</b>	<b>Carlos</b>	<b>21</b>	<b>Sociology/Anthropology</b>	<b>Susan Sprecher</b>
<b>Morse</b>	<b>Mady</b>	<b>58</b>	<b>Kinesiology &amp; Recreation</b>	<b>Karen Dennis</b>
<b>Mueller</b>	<b>Kate</b>	<b>36</b>	<b>Communication</b>	<b>John Baldwin</b>

**ALPHABETICAL BY STUDENT LAST NAME  
MORNING SESSION**

<b>M - P</b>				
<b>Munn</b>	<b>John</b>	<b>82</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Murray</b>	<b>Taylor</b>	<b>39</b>	<b>Communication</b>	<b>John Baldwin</b>
<b>Nandipati</b>	<b>Sai Kiran</b>	<b>151, 153</b>	<b>Information Technology</b>	<b>Nariman Ammar</b>
<b>Nelson</b>	<b>Ryan</b>	<b>22</b>	<b>Psychology</b>	<b>Dan Lannin</b>
<b>Nelson</b>	<b>Ryan</b>	<b>33</b>	<b>Psychology</b>	<b>Alycia M. Hund</b>
<b>Nelson</b>	<b>Ella</b>	<b>83</b>	<b>Biological Sciences</b>	<b>Wolfgang Stein</b>
<b>Nettnin</b>	<b>Ryan</b>	<b>23</b>	<b>Psychology</b>	<b>Suejung Han</b>
<b>Nevin</b>	<b>Miranda</b>	<b>109</b>	<b>Physics</b>	<b>Raymond Zich</b>
<b>Nichols</b>	<b>Lane</b>	<b>110</b>	<b>Physics</b>	<b>Mahua Biswas</b>
<b>Norman</b>	<b>Kaley</b>	<b>27</b>	<b>Psychology</b>	<b>Shengtian Wu</b>
<b>Oblinger-Hammond</b>	<b>Dayton</b>	<b>84</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Odeh</b>	<b>Yasmin</b>	<b>138</b>	<b>Sociology/Anthropology</b>	<b>Susan Sprecher</b>
<b>O'Dowd</b>	<b>Sara</b>	<b>145</b>	<b>Politics and Government</b>	<b>Calli Farrell</b>
<b>O'Gara</b>	<b>Kaysee</b>	<b>21</b>	<b>Sociology/Anthropology</b>	<b>Susan Sprecher</b>
<b>Okleiteris</b>	<b>Carolina</b>	<b>78</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Olsen</b>	<b>Mallory</b>	<b>63</b>	<b>Communication Sciences and Disorders</b>	<b>Jamie Smith</b>
<b>Omitoyin</b>	<b>Grace</b>	<b>149</b>	<b>Economics</b>	<b>Susan Chen</b>
<b>Oshaji</b>	<b>Esther</b>	<b>139</b>	<b>Sociology/Anthropology</b>	<b>Winfred Avogo</b>
<b>Osman</b>	<b>Farhia</b>	<b>24</b>	<b>Psychology</b>	<b>Adena Meyers</b>
<b>Pampuch</b>	<b>Kalya</b>	<b>25</b>	<b>Psychology</b>	<b>Karla Doepke</b>
<b>Parker</b>	<b>Sarah</b>	<b>64, 65</b>	<b>Communication Sciences and Disorders</b>	<b>Antony Joseph</b>

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<b>P - S</b>				
<b>Patel</b>	<b>Princy Ankitkumar</b>	<b>84</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Patel</b>	<b>Viraj</b>	<b>131</b>	<b>Teaching and Learning</b>	<b>Anna Smith</b>
<b>Patra</b>	<b>Sudarshana</b>	<b>111</b>	<b>Physics</b>	<b>Mahua Biswas</b>
<b>Paulikas</b>	<b>Paulina</b>	<b>78</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Pearson</b>	<b>Bree</b>	<b>127</b>	<b>Family and Consumer Sciences</b>	<b>Christina Soyoung Song</b>
<b>Pecoraro</b>	<b>Joie</b>	<b>49</b>	<b>Social Work</b>	<b>Christopher Gjesfjeld</b>
<b>Perez</b>	<b>Kimberly</b>	<b>33</b>	<b>Psychology</b>	<b>Alycia M. Hund</b>
<b>Petry</b>	<b>Nora</b>	<b>115</b>	<b>Agriculture</b>	<b>Michelle Kibler</b>
<b>Promise</b>	<b>Ifeanyichukwu</b>	<b>101</b>	<b>Chemistry</b>	<b>Andy Mitchell</b>
<b>Reynolds</b>	<b>Delaney</b>	<b>85</b>	<b>Biological Sciences</b>	<b>Ryan Paitz</b>
<b>Ridinger</b>	<b>Lillian</b>	<b>156</b>	<b>History</b>	<b>Kathryn Jasper</b>
<b>Rimer</b>	<b>Louane</b>	<b>119</b>	<b>English</b>	<b>David Hansen</b>
<b>Rivera</b>	<b>Ivan</b>	<b>150</b>	<b>Economics</b>	<b>Susan Chen</b>
<b>Rohrig</b>	<b>Isabella</b>	<b>86</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Ross</b>	<b>Olivia</b>	<b>128</b>	<b>Family and Consumer Sciences</b>	<b>Reem Bagais</b>
<b>Ruman</b>	<b>Faith</b>	<b>60</b>	<b>Kinesiology &amp; Recreation</b>	<b>Kelly Laurson</b>
<b>Russell</b>	<b>Gaby</b>	<b>121</b>	<b>Criminal Justice Sciences</b>	<b>Joanne Savage</b>
<b>Rutledge</b>	<b>Hailey</b>	<b>50</b>	<b>Social Work</b>	<b>Christopher Gjesfjeld</b>
<b>Saha</b>	<b>Anindita</b>	<b>87</b>	<b>Biological Sciences</b>	<b>Kyle Floyd</b>
<b>Sanford</b>	<b>Mason</b>	<b>88</b>	<b>Biological Sciences</b>	<b>Wolfgang Stein</b>
<b>Sarwara</b>	<b>Prachi</b>	<b>112</b>	<b>Physics</b>	<b>Uttam Manna</b>



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<b>S - T</b>				
<b>Scace</b>	<b>Ali</b>	<b>129</b>	<b>Family and Consumer Sciences</b>	<b>Christina Soyoung Song</b>
<b>Sellmyer</b>	<b>Hannah</b>	<b>51</b>	<b>Social Work</b>	<b>Kate Sheridan</b>
<b>Sevik</b>	<b>Robert</b>	<b>107</b>	<b>Physics</b>	<b>Uttam Manna</b>
<b>Shao</b>	<b>Yu Fang</b>	<b>61</b>	<b>Kinesiology &amp; Recreation</b>	<b>Kelly Laurson</b>
<b>Shaull</b>	<b>Marissa</b>	<b>26</b>	<b>Psychology</b>	<b>Shengtian Wu</b>
<b>Shields</b>	<b>Kathleen</b>	<b>27</b>	<b>Psychology</b>	<b>Shengtian Wu</b>
<b>Simpkins</b>	<b>Tyler</b>	<b>89</b>	<b>Biological Sciences</b>	<b>Jan-Ulrik Dahl</b>
<b>Smiley</b>	<b>Brendan</b>	<b>90</b>	<b>Biological Sciences</b>	<b>Ryan Paitz</b>
<b>Smith</b>	<b>Andrea</b>	<b>28</b>	<b>Psychology</b>	<b>Gary Cates</b>
<b>Snelling</b>	<b>Cassandra</b>	<b>37</b>	<b>Communication</b>	<b>John Baldwin</b>
<b>Spranger</b>	<b>Kinlee</b>	<b>21, 136</b>	<b>Sociology/Anthropology</b>	<b>Susan Sprecher</b>
<b>Stewart</b>	<b>Deanna</b>	<b>52</b>	<b>Social Work</b>	<b>Christopher Gjesfjeld</b>
<b>Stogsdill</b>	<b>Kara</b>	<b>120</b>	<b>English</b>	<b>Aaron Smith</b>
<b>Strader</b>	<b>Abbi</b>	<b>53</b>	<b>Social Work</b>	<b>Kate Sheridan</b>
<b>Strain</b>	<b>Audrey</b>	<b>21</b>	<b>Psychology</b>	<b>Susan Sprecher</b>
<b>Sugimoto</b>	<b>Kaylee</b>	<b>38</b>	<b>Communication</b>	<b>Byron Craig</b>
<b>Sullivan</b>	<b>Tyler</b>	<b>33</b>	<b>Psychology</b>	<b>Alycia M. Hund</b>
<b>Suthaharan</b>	<b>Sivanujan</b>	<b>102</b>	<b>Chemistry</b>	<b>Bhaskar Chilukuri</b>
<b>Szwed</b>	<b>Sydney</b>	<b>91</b>	<b>Biological Sciences</b>	<b>Ben Sadd</b>
<b>Tasdan</b>	<b>Kerem</b>	<b>146</b>	<b>Politics and Government</b>	<b>Ali Riaz</b>
<b>Tellez</b>	<b>Chantal</b>	<b>130</b>	<b>Family and Consumer Sciences</b>	<b>Christina Soyoung Song</b>

**ALPHABETICAL BY STUDENT LAST NAME  
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<b>T - W</b>				
<b>Thompson</b>	<b>Raegen</b>	<b>33</b>	<b>Psychology</b>	<b>Alycia M. Hund</b>
<b>Timsina</b>	<b>Ravi</b>	<b>92</b>	<b>Biological Sciences</b>	<b>Ben Sadd</b>
<b>Torres-González</b>	<b>Nitza</b>	<b>29</b>	<b>Psychology</b>	<b>Brea Banks</b>
<b>Torrise</b>	<b>Cassie</b>	<b>54</b>	<b>Social Work</b>	<b>Kate Sheridan</b>
<b>Towner</b>	<b>Jazmine</b>	<b>20</b>	<b>Psychology</b>	<b>Brea Banks</b>
<b>Verdeyen</b>	<b>Haileigh</b>	<b>30</b>	<b>Psychology</b>	<b>Suejung Han</b>
<b>Verticchio</b>	<b>Maggie</b>	<b>64</b>	<b>Communication Sciences and Disorders</b>	<b>Antony Joseph</b>
<b>Verticchio</b>	<b>Maggie</b>	<b>65</b>	<b>Communication Sciences and Disorders</b>	<b>Antony Joseph</b>
<b>Wade</b>	<b>India</b>	<b>122</b>	<b>Criminal Justice Sciences</b>	<b>Jessie Krienert</b>
<b>Walder</b>	<b>Jason</b>	<b>103</b>	<b>Chemistry</b>	<b>Jeremy Driskell</b>
<b>Walis</b>	<b>Emma</b>	<b>31</b>	<b>Psychology</b>	<b>Jef Kahn</b>
<b>Walsh</b>	<b>Matthew</b>	<b>13</b>	<b>Psychology</b>	<b>Suejung Han</b>
<b>Warren</b>	<b>Clinton</b>	<b>93</b>	<b>Biological Sciences</b>	<b>Rachel Bowden</b>
<b>Watson</b>	<b>Emma</b>	<b>127</b>	<b>Family and Consumer Sciences</b>	<b>Christina Soyoung Song</b>
<b>Weber</b>	<b>Caitlyn</b>	<b>33</b>	<b>Psychology</b>	<b>Alycia M. Hund</b>
<b>Welsh</b>	<b>Caitlyn</b>	<b>62</b>	<b>Communication Sciences and Disorders</b>	<b>Shraddha Shende</b>
<b>West</b>	<b>Carter</b>	<b>107</b>	<b>Physics</b>	<b>Uttam Manna</b>
<b>Whitcomb</b>	<b>Molly</b>	<b>64, 65</b>	<b>Communication Sciences and Disorders</b>	<b>Antony Joseph</b>
<b>White</b>	<b>Ashley</b>	<b>55</b>	<b>Social Work</b>	<b>Kate Sheridan</b>
<b>White</b>	<b>Destiny</b>	<b>56</b>	<b>Social Work</b>	<b>Kate Sheridan</b>
<b>Whitney</b>	<b>Nathan</b>	<b>154</b>	<b>Information Technology</b>	<b>Rosangela Follmann</b>

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<b>W - Z</b>				
<b>Whittington</b>	<b>Lily</b>	<b>94</b>	<b>Biological Sciences</b>	<b>Wolfgang Stein</b>
<b>Wiggins</b>	<b>Emily</b>	<b>104</b>	<b>Chemistry</b>	<b>Christopher Mulligan</b>
<b>Wilder</b>	<b>Bethany</b>	<b>86</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Wilken</b>	<b>Madison</b>	<b>95</b>	<b>Biological Sciences</b>	<b>Rachel Bowden</b>
<b>Williams</b>	<b>Sarah</b>	<b>32</b>	<b>Psychology</b>	<b>Kimberly Schneider</b>
<b>Wissler</b>	<b>Abby</b>	<b>33</b>	<b>Psychology</b>	<b>Alycia M. Hund</b>
<b>Wolff</b>	<b>Miriam</b>	<b>39</b>	<b>Communication</b>	<b>John Baldwin</b>
<b>Yawson</b>	<b>Vivian</b>	<b>140</b>	<b>Sociology/Anthropology</b>	<b>Winfred Avogo</b>
<b>Yeboah</b>	<b>Yaa Adubia</b>	<b>57</b>	<b>Social Work</b>	<b>Christopher Gjesfjeld</b>
<b>Youngman</b>	<b>Dela</b>	<b>21, 136</b>	<b>Sociology/Anthropology</b>	<b>Susan Sprecher</b>
<b>Yum</b>	<b>Seungok</b>	<b>33</b>	<b>Psychology</b>	<b>Alycia M. Hund</b>
<b>Zawadzka</b>	<b>Wiktoria</b>	<b>157</b>	<b>History</b>	<b>Katrin Paehler</b>

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AFTERNOON SESSION**

<b>Presenter Last Name</b>	<b>Presenter First Name</b>	<b>Poster Number</b>	<b>Mentor's Department/School</b>	<b>Mentor</b>
<b>A - B</b>				
<b>Abdulsalam</b>	<b>Aminat Tosin</b>	<b>43</b>	<b>Geography, Geology, and the Environment</b>	<b>Eric Peterson</b>
<b>Affram</b>	<b>Kweku Amaning</b>	<b>1</b>	<b>Chemistry</b>	<b>Shawn Hitchcock</b>
<b>Agudelo</b>	<b>Jerecho</b>	<b>95</b>	<b>Kinesiology &amp; Recreation</b>	<b>Kristen Lagally</b>
<b>Aidoo</b>	<b>Erinda</b>	<b>53</b>	<b>Biological Sciences</b>	<b>Andrés Vidal-Gadea</b>
<b>Akrofi</b>	<b>Benedicta</b>	<b>44</b>	<b>Geography, Geology, and the Environment</b>	<b>Eric Peterson</b>
<b>Alende</b>	<b>Joy</b>	<b>2</b>	<b>Chemistry</b>	<b>Andy Mitchell</b>
<b>Alongi</b>	<b>Gia</b>	<b>3</b>	<b>Chemistry</b>	<b>Shawn Hitchcock</b>
<b>Amisha</b>	<b>Amisha</b>	<b>92</b>	<b>Information Technology</b>	<b>Javadi Elahe</b>
<b>Asare Kwakye</b>	<b>Isaac</b>	<b>105</b>	<b>Communication</b>	<b>John Baldwin</b>
<b>Awa</b>	<b>Francis</b>	<b>4</b>	<b>Chemistry</b>	<b>Timothy Lash</b>
<b>Awe</b>	<b>'Tope</b>	<b>54</b>	<b>Biological Sciences</b>	<b>Andrés Vidal-Gadea</b>
<b>Awuku</b>	<b>Joseph</b>	<b>45</b>	<b>Geography, Geology, and the Environment</b>	<b>Eric Peterson</b>
<b>Bambalas</b>	<b>Lillian</b>	<b>5</b>	<b>Chemistry</b>	<b>Shawn Hitchcock</b>
<b>Basu</b>	<b>Debajyoti</b>	<b>55</b>	<b>Biological Sciences</b>	<b>Kyle Floyd</b>
<b>Bediaku</b>	<b>Mavis</b>	<b>122</b>	<b>Technology</b>	<b>Sundeeep Inti</b>
<b>Beilstein</b>	<b>Kathryn</b>	<b>98</b>	<b>Communication Sciences and Disorders</b>	<b>Shraddha Shende</b>
<b>Bianco</b>	<b>Alyx</b>	<b>138</b>	<b>Social Work</b>	<b>Christopher Gjesfeld</b>
<b>Block</b>	<b>Mary</b>	<b>87</b>	<b>Nursing</b>	<b>Susana Calderon</b>

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AFTERNOON SESSION**

<b>B - C</b>				
<b>Boland</b>	<b>Sarah</b>	<b>58</b>	<b>Biological Sciences</b>	<b>Pirmin Nietlisbach</b>
<b>Border</b>	<b>Shana</b>	<b>56</b>	<b>Biological Sciences</b>	<b>Matthew Dugas</b>
<b>Botts</b>	<b>Maddy</b>	<b>130</b>	<b>Administration &amp; Foundations</b>	<b>Gavin Weiser</b>
<b>Boucher</b>	<b>Lucy</b>	<b>116</b>	<b>Music</b>	<b>Phillip Hash</b>
<b>Bowen</b>	<b>Thera</b>	<b>57</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Braasch</b>	<b>Julia</b>	<b>99</b>	<b>Communication Sciences and Disorders</b>	<b>Antony Joseph</b>
<b>Braasch</b>	<b>Julia</b>	<b>101</b>	<b>Communication Sciences and Disorders</b>	<b>Antony Joseph</b>
<b>Brandon</b>	<b>Jaina</b>	<b>28</b>	<b>Psychology</b>	<b>Alycia Hund</b>
<b>Breausche</b>	<b>Faith</b>	<b>6</b>	<b>Chemistry</b>	<b>Jeremy Driskell</b>
<b>Bychowski</b>	<b>Jaylen</b>	<b>21</b>	<b>Psychology</b>	<b>Caitlin Mercier</b>
<b>Cain</b>	<b>Ellie</b>	<b>94</b>	<b>Kinesiology &amp; Recreation</b>	<b>Scott Pierce</b>
<b>Canon</b>	<b>Maria</b>	<b>58</b>	<b>Biological Sciences</b>	<b>Pirmin Nietlisbach</b>
<b>Carpenter</b>	<b>Brian</b>	<b>7</b>	<b>Chemistry</b>	<b>Timothy Lash</b>
<b>Carter</b>	<b>Austin</b>	<b>8</b>	<b>Chemistry</b>	<b>Shawn Hitchcock</b>
<b>Charlton</b>	<b>Samantha</b>	<b>87</b>	<b>Nursing</b>	<b>Susana Calderon</b>
<b>Chukwudi</b>	<b>Daniel</b>	<b>46</b>	<b>Geography, Geology, and the Environment</b>	<b>Eric Peterson</b>
<b>Clark</b>	<b>Kyle</b>	<b>59</b>	<b>Biological Sciences</b>	<b>Wolfgang Stein</b>
<b>Clay</b>	<b>Taylor</b>	<b>99</b>	<b>Communication Sciences and Disorders</b>	<b>Antony Joseph</b>

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C - E				
Clay	Taylor	101	Communication Sciences and Disorders	Antony Joseph
Collins	Amber	93	Kinesiology & Recreation	Mike Mulvaney
Concepción Cabán	Lourdes	26	Psychology	Brea Banks
Cripe	Jada	28	Psychology	Alycia Hund
Cunningham	Derian	98	Communication Sciences and Disorders	Shraddha Shende
Dart	Avery	58	Biological Sciences	Pirmin Nietlisbach
Deer	Nina	94	Kinesiology & Recreation	Scott Pierce
Deetz	Marty	139	Social Work	Christopher Gjesfjeld
Dooley	Andrew	47	Geography, Geology, and the Environment	Wondessen Seyoum
Dosemagen	Rori	95	Kinesiology & Recreation	Kristen Lagally
Dow	Michael	37	Psychology	J. Scott Jordan
Drankhan	Bryce	91	Health Sciences	Quen VanDermay-Kirkham
Duku	Kwabena	131	Mathematics	Olcay Akman
Duong	Michelle	36	Psychology	Caitlin Mercier
Earll	Olivia	38	Psychology	Kimberly Schneider
Eifert	Rex	9	Chemistry	Andy Mitchell
Elewosi	Millicent	106	Communication	Joseph Zompetti
Enevold	Alyssa	60	Biological Sciences	Fernanda Duque
Engelmeyer	Alexandra	140	Social Work	Christopher Gjesfjeld

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<b>E - G</b>				
<b>Ervin</b>	<b>Quentin</b>	<b>10</b>	<b>Chemistry</b>	<b>Andy Mitchell</b>
<b>Ervin</b>	<b>Will</b>	<b>22</b>	<b>Psychology</b>	<b>Allison Nguyen</b>
<b>Falk</b>	<b>Tyler</b>	<b>61</b>	<b>Biological Sciences</b>	<b>Viktor Kirik</b>
<b>Ferber</b>	<b>Natalie</b>	<b>91</b>	<b>Health Sciences</b>	<b>Quen VanDermay-Kirkham</b>
<b>Fisk</b>	<b>Ashlyn</b>	<b>127</b>	<b>Teaching and Learning</b>	<b>Miranda Lin</b>
<b>Flinn</b>	<b>Taylor</b>	<b>23</b>	<b>Interdisciplinary Studies</b>	<b>April Anderson-Zorn</b>
<b>Flint</b>	<b>Arielle</b>	<b>26</b>	<b>Psychology</b>	<b>Brea Banks</b>
<b>Flores-Lerch</b>	<b>Tatum</b>	<b>130</b>	<b>Administration &amp; Foundations</b>	<b>Gavin Weiser</b>
<b>Fontes Fialho</b>	<b>Camila</b>	<b>24</b>	<b>Psychology</b>	<b>Kelly Clemens</b>
<b>Gandla</b>	<b>Sai Ram</b>	<b>123</b>	<b>Technology</b>	<b>Sally Xie</b>
<b>Gautam</b>	<b>Liza</b>	<b>62</b>	<b>Biological Sciences</b>	<b>John Sedbrook</b>
<b>Gautam</b>	<b>Liza</b>	<b>63</b>	<b>Biological Sciences</b>	<b>John Sedbrook</b>
<b>Geyer</b>	<b>Tara</b>	<b>64</b>	<b>Biological Sciences</b>	<b>Carlos Rodriguez-Saltos</b>
<b>Giles</b>	<b>Porter</b>	<b>118</b>	<b>Politics and Government</b>	<b>Kam Shapiro</b>
<b>Giuffre</b>	<b>Caroline</b>	<b>100</b>	<b>Communication Sciences and Disorders</b>	<b>Ciera Lorio</b>
<b>Goebel</b>	<b>Derek</b>	<b>25</b>	<b>Psychology</b>	<b>Adena Meyers</b>
<b>Goins</b>	<b>Rochelle</b>	<b>26</b>	<b>Psychology</b>	<b>Brea Banks</b>
<b>Grampps</b>	<b>Lydia</b>	<b>70</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>

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<b>G - J</b>				
<b>Green</b>	<b>Brandon</b>	<b>65</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Griffin</b>	<b>Mackenzie</b>	<b>141</b>	<b>Agriculture</b>	<b>Justin Rickard</b>
<b>Gupta</b>	<b>Dolly</b>	<b>125</b>	<b>Technology</b>	<b>Isaac Chang</b>
<b>Haffner</b>	<b>Brett</b>	<b>94</b>	<b>Kinesiology &amp; Recreation</b>	<b>Scott Pierce</b>
<b>Hanger</b>	<b>Maggie</b>	<b>99</b>	<b>Communication Sciences and Disorders</b>	<b>Antony Joseph</b>
<b>Hanger</b>	<b>Maggie</b>	<b>101</b>	<b>Communication Sciences and Disorders</b>	<b>Antony Joseph</b>
<b>Hasan</b>	<b>Sumaiya</b>	<b>85</b>	<b>Biological Sciences</b>	<b>Kevin Edwards</b>
<b>Hecke</b>	<b>Raquel</b>	<b>27</b>	<b>Psychology</b>	<b>Suejung Han</b>
<b>Helmink</b>	<b>Katie</b>	<b>11</b>	<b>Chemistry</b>	<b>Lisa Szczepura</b>
<b>Hicks</b>	<b>Travis</b>	<b>28</b>	<b>Psychology</b>	<b>Alycia Hund</b>
<b>High</b>	<b>Allie</b>	<b>119</b>	<b>Biological Sciences</b>	<b>Rachel Waring-Sparks</b>
<b>Hindman</b>	<b>Katie</b>	<b>25</b>	<b>Psychology</b>	<b>Adena Meyers</b>
<b>Hohman</b>	<b>Grace</b>	<b>12</b>	<b>Chemistry</b>	<b>Marjorie Jones</b>
<b>Hostert</b>	<b>Jane</b>	<b>13</b>	<b>Chemistry</b>	<b>Timothy Lash</b>
<b>Howley</b>	<b>Miles</b>	<b>90</b>	<b>Music</b>	<b>Roy Magnuson</b>
<b>Ijigade</b>	<b>Franklin</b>	<b>48</b>	<b>Geography, Geology, and the Environment</b>	<b>Wondessen Seyoum</b>
<b>Ingold</b>	<b>Maddy</b>	<b>29</b>	<b>Psychology</b>	<b>Dawn McBride</b>
<b>Jackson</b>	<b>Charlie</b>	<b>66</b>	<b>Biological Sciences</b>	<b>Jan Dahl</b>
<b>Jackson</b>	<b>Kennedi</b>	<b>94</b>	<b>Kinesiology &amp; Recreation</b>	<b>Scott Pierce</b>



**ALPHABETICAL BY STUDENT LAST NAME  
AFTERNOON SESSION**

<b>J - L</b>				
Jacobsen	Sarah	30	Psychology	Dan Ispas
Jacobson	Grady	67	Biological Sciences	Jan Dahl
Johnson	Cj	31	Psychology	Dawn McBride
Kelly	Caitlin	102	Communication Sciences and Disorders	Ciera Lorio
Khurshid	Saqlain	120	Economics	Oguzhan Dincer
Kim	Dohyun	89	Creative Technologies	Kristin Carlson
Kisvari	Lilla	94	Kinesiology & Recreation	Scott Pierce
Kobulnicky	Trent	14	Chemistry	George Barnes
Koeplin	Madeline	68	Biological Sciences	Pirmin Nietlisbach
Kollbaum	Sabrina	69	Biological Sciences	Andrés Vidal-Gadea
Konkel	Jadon	96	Kinesiology & Recreation	Marcel Lopes dos Santos
Kosiek	Megan	39	Psychology	Dawn McBride
Kravik	Sheridan	103	Communication Sciences and Disorders	Taeok Park
Krebs	Harrison	88	Nursing	Marilyn Prasun
Kresina	Kenneth	97	Kinesiology & Recreation	Liz Sattler
Lane	Kristen	59	Biological Sciences	Wolfgang Stein
Lawrence	Jayden	142	Agriculture	Drew Lugar
Lee	Jalen	70	Biological Sciences	Tom Hammond
Liew	Ryan	32	Psychology	Dawn McBride

**ALPHABETICAL BY STUDENT LAST NAME  
AFTERNOON SESSION**

L - M				
Liew	Ryan	39	Psychology	Dawn McBride
Lim	Zhi Quan	37	Psychology	J. Scott Jordan
Lim	Zhi Quan	33	Psychology	Eric Wesselmann
Lima	Arjuman	71	Biological Sciences	John Sedbrook
Liu	David	57	Biological Sciences	Tom Hammond
Long	Brenna	72	Biological Sciences	Bill Perry
Lopez	Jessica	104	Communication Sciences and Disorders	Lidia Huerta
Maertens	Hayley	73	Biological Sciences	Matthew Dugas
Mahmud	Shahriar	74	Biological Sciences	Tom Hammond
Mangold	Aleena	34	Psychology	Suejung Han
Marinucci	Nicole	15	Chemistry	Timothy Lash
Marquez	Jose Marquez	129	Physics	Raymond Zich
Mast	Daniel	99	Communication Sciences and Disorders	Antony Joseph
Mast	Daniel	101	Communication Sciences and Disorders	Antony Joseph
McGinnis	Cassie	75	Biological Sciences	Victoria Borowicz
McLarty	Allie	35	Psychology	Suejung Han
Mizan	Ridita	134	English	Rebecca Saunders
Monino	Janelle	115	Family and Consumer Sciences	Yoon Ma

**ALPHABETICAL BY STUDENT LAST NAME  
AFTERNOON SESSION**

<b>M - P</b>				
<b>Montalbano</b>	<b>Caitlin</b>	<b>76</b>	<b>Biological Sciences</b>	<b>Ryan Paitz</b>
<b>Mozid</b>	<b>Nishat Ara</b>	<b>131</b>	<b>Mathematics</b>	<b>Olcay Akman</b>
<b>Mwilambwe</b>	<b>Amelie</b>	<b>77</b>	<b>Biological Sciences</b>	<b>Ben Sadd</b>
<b>Nagy</b>	<b>Zeteny</b>	<b>90</b>	<b>Music</b>	<b>Roy Magnuson</b>
<b>Nalule</b>	<b>Sharitah</b>	<b>36</b>	<b>Psychology</b>	<b>Caitlin Mercier</b>
<b>Neequaye</b>	<b>Ishmael</b>	<b>135</b>	<b>English</b>	<b>Kristina Lewis</b>
<b>Nelson</b>	<b>Sheilla</b>	<b>136</b>	<b>English</b>	<b>Ela Przybylo</b>
<b>Nevin</b>	<b>Miranda</b>	<b>129</b>	<b>Physics</b>	<b>Raymond Zich</b>
<b>Niftulaeva</b>	<b>Alina</b>	<b>107</b>	<b>Communication</b>	<b>John Baldwin</b>
<b>Niha</b>	<b>Shifat</b>	<b>78</b>	<b>Biological Sciences</b>	<b>Andrés Vidal-Gadea</b>
<b>Nkanta</b>	<b>Edikan</b>	<b>108</b>	<b>Communication</b>	<b>John Baldwin</b>
<b>Noel</b>	<b>Jadyn</b>	<b>79</b>	<b>Biological Sciences</b>	<b>Ryan Paitz</b>
<b>Obi</b>	<b>Christabel</b>	<b>49</b>	<b>Geography, Geology, and the Environment</b>	<b>Eric Peterson</b>
<b>Odeh</b>	<b>Joy</b>	<b>16</b>	<b>Chemistry</b>	<b>Shawn Hitchcock</b>
<b>Orthy</b>	<b>Maisha Tahsin</b>	<b>37</b>	<b>Psychology</b>	<b>J. Scott Jordan</b>
<b>Osei</b>	<b>Kwame</b>	<b>17</b>	<b>Chemistry</b>	<b>Jeremy Driskell</b>
<b>Pennington</b>	<b>Jasmine</b>	<b>38</b>	<b>Psychology</b>	<b>Kimberly Schneider</b>
<b>Peterson</b>	<b>Erik</b>	<b>124</b>	<b>Technology</b>	<b>Stephen Mujeye</b>
<b>Peterson</b>	<b>Kierra</b>	<b>38</b>	<b>Psychology</b>	<b>Kimberly Schneider</b>

**ALPHABETICAL BY STUDENT LAST NAME  
AFTERNOON SESSION**

<b>P - S</b>				
<b>Polion</b>	<b>Danielle</b>	<b>109</b>	<b>Communication</b>	<b>Cheri Simonds</b>
<b>Prondzinski</b>	<b>Kaitlyn</b>	<b>38</b>	<b>Psychology</b>	<b>Kimberly Schneider</b>
<b>Ramos</b>	<b>Megan</b>	<b>94</b>	<b>Kinesiology &amp; Recreation</b>	<b>Scott Pierce</b>
<b>Reckamp</b>	<b>Robert</b>	<b>117</b>	<b>Philosophy</b>	<b>Daniel Breyer</b>
<b>Reed</b>	<b>Leah</b>	<b>38</b>	<b>Psychology</b>	<b>Kimberly Schneider</b>
<b>Rey</b>	<b>Haley</b>	<b>110</b>	<b>Communication</b>	<b>Cheri Simonds</b>
<b>Riffle</b>	<b>Sam</b>	<b>126</b>	<b>Economics</b>	<b>Dimitrios Nikolaou</b>
<b>Rodriguez</b>	<b>Ashley</b>	<b>58</b>	<b>Biological Sciences</b>	<b>Pirmin Nietlisbach</b>
<b>Rohrig</b>	<b>Isabella</b>	<b>18</b>	<b>Chemistry</b>	<b>Gregory Ferrence</b>
<b>Roller</b>	<b>Makayla</b>	<b>114</b>	<b>Communication</b>	<b>Lindsey Thomas</b>
<b>Roseland</b>	<b>Anna</b>	<b>80</b>	<b>Biological Sciences</b>	<b>Ryan Paitz</b>
<b>Sands</b>	<b>Julia</b>	<b>70</b>	<b>Biological Sciences</b>	<b>Tom Hammond</b>
<b>Sangalang</b>	<b>Melvin</b>	<b>94</b>	<b>Kinesiology &amp; Recreation</b>	<b>Scott Pierce</b>
<b>Saul</b>	<b>Celeste</b>	<b>50</b>	<b>Geography, Geology, and the Environment</b>	<b>David Malone</b>
<b>Schinzler</b>	<b>Rachel</b>	<b>81</b>	<b>Biological Sciences</b>	<b>Carlos Rodriguez- Saltos</b>
<b>Schwarz</b>	<b>Alex</b>	<b>51</b>	<b>Geography, Geology, and the Environment</b>	<b>Wondessen Seyoum</b>
<b>Seymour</b>	<b>Mackenzie</b>	<b>82</b>	<b>Biological Sciences</b>	<b>Wolfgang Stein</b>

**ALPHABETICAL BY STUDENT LAST NAME  
AFTERNOON SESSION**

<b>S - T</b>				
<b>Sharp</b>	<b>Trinity</b>	<b>36</b>	<b>Psychology</b>	<b>Caitlin Mercier</b>
<b>Skudnig</b>	<b>Bob</b>	<b>132</b>	<b>Mathematics</b>	<b>Gaywalee Yamskulna</b>
<b>Smith</b>	<b>Makayla</b>	<b>40</b>	<b>Psychology</b>	<b>Brea Banks</b>
<b>Smith</b>	<b>Courtney</b>	<b>111</b>	<b>Communication</b>	<b>Andrew Ventimiglia</b>
<b>Soltermann</b>	<b>Christian</b>	<b>132</b>	<b>Mathematics</b>	<b>Gaywalee Yamskulna</b>
<b>Some</b>	<b>Kountiala</b>	<b>128</b>	<b>Teaching and Learning</b>	<b>Alycia Hund</b>
<b>Steiger</b>	<b>Charlotte</b>	<b>83</b>	<b>Biological Sciences</b>	<b>Wolfgang Stein</b>
<b>Steinberg</b>	<b>Kaitlyn</b>	<b>58</b>	<b>Biological Sciences</b>	<b>Pirmin Nietlisbach</b>
<b>Stiverson</b>	<b>Whitney</b>	<b>143</b>	<b>Agriculture</b>	<b>Michelle Kibler</b>
<b>Stockmaster</b>	<b>Ashley</b>	<b>144</b>	<b>Agriculture</b>	<b>Rob Rhykerd</b>
<b>Stoner</b>	<b>Shelby</b>	<b>145</b>	<b>Health Sciences</b>	<b>Liangcheng Yang</b>
<b>Studdard</b>	<b>Madison</b>	<b>39</b>	<b>Psychology</b>	<b>Dawn McBride</b>
<b>Suleiman</b>	<b>Zainab</b>	<b>52</b>	<b>Geography, Geology, and the Environment</b>	<b>Eric Peterson</b>
<b>Sultana</b>	<b>Sadia</b>	<b>84</b>	<b>Biological Sciences</b>	<b>Jan Dahl</b>
<b>Suryadevara</b>	<b>Sowmya</b>	<b>92</b>	<b>Information Technology</b>	<b>Javadi Elahe</b>
<b>Swaggerty</b>	<b>Gracy</b>	<b>133</b>	<b>Mathematics</b>	<b>Olcay Akman</b>
<b>Syed</b>	<b>Yaqoob Ayaan Ishaqui</b>	<b>125</b>	<b>Technology</b>	<b>Isaac Chang</b>
<b>Terry</b>	<b>Katelyn</b>	<b>19</b>	<b>Chemistry</b>	<b>Marjorie Jones</b>
<b>Tetteh</b>	<b>Kelvin</b>	<b>137</b>	<b>English</b>	<b>Ela Przybylo</b>

**ALPHABETICAL BY STUDENT LAST  
NAME AFTERNOON SESSION**

T - Z				
Tillman	Libby	86	Biological Sciences	Ryan Paitz
Towner	Jazmine	40	Psychology	Brea Banks
Tyler	Cory	38	Psychology	Kimberly Schneider
Walis	Sara	20	Chemistry	Jon Friesen
Walsh	Matthew	41	Psychology	Suejung Han
Whitcomb	Molly	99	Communication Sciences and Disorders	Antony Joseph
Whitcomb	Molly	101	Communication Sciences and Disorders	Antony Joseph
Williams	Sarah	38	Psychology	Kimberly Schneider
Witulski	Olivia	113	Communication	Andrew Ventimiglia
Wolff	Miriam	114	Communication	Lindsey Thomas
Yuksel	Ece	42	Psychology	Dawn McBride
Ziem	Cindy Wawiema	121	Politics and Government	Mike Hendricks

ALPHABETICAL BY STUDENT LAST NAME

E-POSTER OPTION

A - H			
<i>Presenter Last Name</i>	<i>Presenter First Name</i>	<i>Department/School</i>	<i>Faculty Mentor</i>
Abney	Amy	Teaching and Learning	Erin Quast
Awa	Francis	Chemistry	Timothy Lash
Baez	Kaitlyn	Teaching and Learning	Erin Quast
Biehl	Thomas	Teaching and Learning	Anna Smith
Corn	Bryan	Teaching and Learning	Anna Smith
Corray	Shannon	Geography, Geology, and the Environment	Melissa Heil
Derber	Katie	Teaching and Learning	Erin Quast
Ettey	Monica Esinam	Teaching and Learning	Anna Smith
Gallagher	Kristen	Teaching and Learning	Erin Quast
Gasinski	Zoey	Teaching and Learning	Jay Percell
Hammond	Tera	Teaching and Learning	Erin Quast
Haynes	Emily	Teaching and Learning	Anna Smith
Hietpas	Dana	Teaching and Learning	Anna Smith
Holzwarth	Elissa	Teaching and Learning	Anna Smith
Jaime	Sarah	Teaching and Learning	Anna Smith

J - T			
<i>Presenter Last Name</i>	<i>Presenter First Name</i>	<i>Department/School</i>	<i>Faculty Mentor</i>
Johnston Carrasco	Ashley	Teaching and Learning	Anna Smith
Kalantari	Mojde	Creative Technologies	Kristin Carlson
Knauf	Tara	Teaching and Learning	Anna Smith
Liebentritt	Jennifer	Teaching and Learning	Anna Smith
Marsalla	Jack	Economics	Susan Chen
Marx	Lexie	Teaching and Learning	Erin Quast
Miller	Julie	Teaching and Learning	Erin Quast
Narongsaksakul	Watsachol	Teaching and Learning	Ellis Hurd
O'Leary	Heather	English	Ela Przybylo
Parnell	Traevon	Teaching and Learning	Erin Quast
Phelan	Katie	Teaching and Learning	Anna Smith
Richardson	Heather	Teaching and Learning	Anna Smith
Slavin	Julian	Economics	Susan Chen
Teater	Kaitlin	Teaching and Learning	Erin Quast
TerBush	Sam	Teaching and Learning	Anna Smith
Tool	Megan	Teaching and Learning	Erin Quast
Tuning	Jackie	Teaching and Learning	Erin Quast



T - W			
<i>Presenter Last Name</i>	<i>Presenter First Name</i>	<i>Department/School</i>	<i>Faculty Mentor</i>
Turk	Wanda	Teaching and Learning	Deborah MacPhee
Twaddle	Casandra	Teaching and Learning	Anna Smith
Volker	Emily	Teaching and Learning	Anna Smith
Wainwright	Cindy	Teaching and Learning	Anna Smith
Weghorst	Mariah	Teaching and Learning	Erin Quast
Weiler	Kara	Teaching and Learning	Anna Smith
Welsh	Peter	Teaching and Learning	Erin Quast

**ALPHABETICAL BY STUDENT LAST NAME  
ORAL PRESENTERS**

<b>LANGUAGES, LITERATURES AND CULTURES</b>			
<i><b>Presenter Last Name</b></i>	<i><b>Presenter First Name</b></i>	<i><b>Department/School</b></i>	<i><b>Faculty Mentor Name</b></i>
<b>Goitia</b>	<b>Alexander</b>	<b>Languages, Literatures and Cultures</b>	<b>Jonathan Druker</b>
<b>Prieto-Montero</b>	<b>Angel</b>	<b>Languages, Literatures and Cultures</b>	<b>Jonathan Druker</b>
<b>Serna Maldonado</b>	<b>Yaritza</b>	<b>Languages, Literatures and Cultures</b>	<b>Jonathan Druker</b>
<b>PHYSICS</b>			
<b>Achammer</b>	<b>Chris</b>	<b>Physics</b>	<b>R. Grobe &amp; Q. Su</b>
<b>Aygun</b>	<b>James</b>	<b>Physics</b>	<b>A. Harris</b>
<b>Czajka</b>	<b>Brendan</b>	<b>Physics</b>	<b>R. Grobe &amp; Q. Su</b>
<b>James</b>	<b>Eyan</b>	<b>Physics</b>	<b>R. Grobe</b>
<b>Minney</b>	<b>Gabe</b>	<b>Physics</b>	<b>N. Christensen</b>
<b>THEATRE</b>			
<b>Dutra Guedes</b>	<b>Gustavo Nery</b>	<b>Theatre and Dance</b>	<b>Kee-Yoon Nahm</b>
<b>Nance</b>	<b>M</b>	<b>Theatre and Dance</b>	<b>Derek Munson</b>
<b>Phurahong</b>	<b>Phitsinee</b>	<b>Theatre and Dance</b>	<b>Kee-Yoon Nahm</b>

# Other Illinois State University Symposia



## MENNONITE COLLEGE OF NURSING VIRTUAL SCHOLARSHIP SYMPOSIUM

March 28<sup>th</sup>, 2024

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## SCHOOL OF TEACHING AND LEARNING SYMPOSIUM

April 19<sup>th</sup> 2024

5:30pm – 8:00pm

DeGarmo Hall 20A