University at Buffalo
College of Arts and Sciences

Undergraduate Research Showcase 2026

Undergraduate Research Presentation Abstracts

University at Buffalo
College of Arts and Sciences

Content

Organization of Abstracts: *Abstracts are grouped by the department in which the research was conducted.*
When a student's research mentor is affiliated with a unit outside the College of Arts and Sciences, the abstract is listed under the student's major department

AI and Society

Lifestyle as Data: Unpacking YouTube "Day in the Life" Videos Through Large-Scale Analysis

Presenter: Daniel Nyamollo | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Kenneth Joseph (AI and Society, Department of Computer Science and Engineering, SEAS)

"Day in the Life" (DITL) videos are a form of documentary-style content that purport to provide a behind-the-scenes, everyday look at a person's daily routine, showcasing a stylized view of particular lifestyles, occupations, and/or locations. These videos, popular on multiple social media platforms including YouTube and TikTok, are responsible for billions of views, and thus have the potential to (re)shape perspectives on what "real life" looks like. However, little is understood about the messages conveyed in DITL videos for particular social identities, nor what factors are associated with a particular DITL video going viral. To this end, my work presents an initial investigation into the universe of DITL videos, assessing what exactly they tend to focus on, and what factors are associated with video popularity. Specifically, using computational methods, I analyze around 20,000 DITL videos on YouTube to study factors associated with view counts and prevalent themes in video titles and descriptions. The results show the variety of ways these videos are produced and presented, and how they may impact perceptions of critical career paths and locations around the globe.

Synchronization in networks of networks with applications to epilepsy

Presenter: Rani Patel | **Presentation Format:** Oral Presentation
Faculty Mentor: Dr. Sarah F. Muldoon

Epilepsy is considered to be a disorder linked to the imbalance of excitation and inhibition in the brain that results in a disruption to normal synchronization patterns of neurons. In focal epilepsy, seizures arise from a localized region of the brain, implicating that this region might have a heightened state of excitation, resulting in increased activity that drives the initiation and spread of a seizure. However, how increased regional excitation, combined with network structure within and between brain regions impacts seizure spread remains unknown.

Coupled oscillator models provide a method to explore the relationship between modification to network structure and dynamics and synchronization properties of a network. Previous work has used integrate-and-fire neurons to explore the effects of imbalanced excitation between two coupled networks of neurons in the context of seizure prediction, showing a decrease and subsequent increase in phase synchrony as the populations transition between resonance and driving behaviors.

In this project, we explore the relationship between neuron excitation, network structure, and synchronization, using networks of spiking Izhikevich neurons. Unlike simple integrate-and-fire neurons, this oscillator model retains the more realistic dynamics of neurons while still being computationally efficient enough to use in large-scale structures (unlike the complicated Hodgkin-Huxley model). We find that similar to previous results, networks of Izhikevich neurons can drive synchronization in other coupled networks when excitation properties are altered locally.

Anthropology

Morphological Limb Variation Within and Between Three Slow Loris Species.

Presenter: Caiden Class | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Stephanie Poindexter

Morphological variation is often correlated with genetic variation. In the slow and pygmy slow loris, phenotypic variation, including pelage coloration and body size, are prominent considerations for delineated species within both genera. To determine if the geographic range and the suggested genetic distinctions for each species are related to one another, we considered six size-adjusted postcranial measurements in three species (Nycticebus bengalensis, N. javanicus, Xyanthonycticebus spp.). Our wild-born sample included 13 Bengal slow lorises, 34 pygmy slow lorises, and 28 Javan slow lorises. We calculated the within-species variance accounting for the sample size for each species. We found that for N. javanicus the intermembral index was higher (92.33 + 11.0) than N. bengalensis (86.37 + 24.6) and X. spp. (88.12 + 14.1) and the within-species variance suggests that species with a broader geographic range displayed more variation. Based on these results, we can offer support for the idea that N. javanicus, which is limited to the island of Java, likely experiences the least amount of gene flow, limiting their morphological variation. In addition, our results highlight the need

to study skeletal integration patterns in strepsirrhines, given that our postcranial results mirror the results from other studies that only included the cranium.

Behavior Patterns and Space Use of a Captive Breeding Pair of Pygmy Loris (Xanthonycticebus)

Presenter: Jasmi Ruponte | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Stephanie Poindexter

Historically, slow lorises (Nycticebus and Xanthonycticebus) have been housed alone based on the misconception that they were solitary in the wild and rarely engaged in social behaviors. Following an expansion of field and captive studies, we now know that slow lorises thrive when housed socially, but our understanding of the breadth of their social and reproductive behaviors remains limited. In this study, we sought to document the behavioral repertoire of a breeding pair of pygmy lorises at the Cleveland Metropark Zoo. We collected data on behavior, posture, and substrate use at 5-minute intervals using an instantaneous scan sampling method. The most observed behavior was travel (70%), and the most observed social behavior was follow (64%). The most frequent substrate type was a branch (45%), and the most frequently used locomotion pattern was climbing down (19%). The results of our study offer a baseline for the types of social behaviors and space use a successful breeding pair may display. This work can also inform enclosure design and welfare standards.

Art

Imprint: The Role of Dutch Print Culture in Northeast American Immigration Propaganda and an Expanding Multicultural Society of New Netherland During the Seventeenth Century

Presenter: David John Jones III | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Julia Lillie

This project argues that Dutch print culture played a significant role in propagating foreign curiosity and advertising multicultural immigration to Northeast America in European societies during the seventeenth century. Revolutionary developments in global cartographic depictions, along with the glorification of New Netherland through widely spread pamphlets, captivated an audience susceptible to their own fascination. Strong visual elements and strategic rhetoric within these prints provided ample opportunity to immerse the often poor and refugee audience in the exaggerated fantasy of opportunity and the surreal beauty of the New World. An analysis of publications reveals blatant incentives to emigrate, which attracted groups of all religious and national denominations. Their behaviors, attitudes, and overall ways of life permeated in the growing multicultural society of New Netherland, which would later define the prosperity and global significance of modern-day New York. We will see how the tolerant, capitalist, and heavily diverse reality of the most famous city on the planet can trace its roots to the radically liberal Dutch culture emerging in early modern Europe, along with the booming print market that aided in its overseas expansion. This project utilizes several primary sources deriving from Lowland prints through the sixteenth and seventeenth centuries, incorporating careful analysis, examination, and contextualization of international conflict to develop a proper interpretation of historic and cultural events. Understanding the impact that migrant propaganda had on early colonial America can aid our comprehension of modern cultural identities and the origins of the elusive “American Dream.”

Vecinos: Designing a Research-Driven Brand Bringing Spanish Food Culture to a Buffalo Audience

Presenter: Katie Pohlman | **Presentation Format:** Poster Presentation
Faculty Mentor: Domenic Licata

Vecinos is a restaurant concept built from the ground up through extensive cultural, spatial, and branding research. The project began with a series of guiding questions: How can a new idea be introduced in a way that feels less foreign to its audience? What does it look like to design a restaurant as a gathering space rather than a transactional dining experience? How can Spanish tapas culture be made accessible in Buffalo while preserving its cultural roots?

While Buffalo has a strong and celebrated food culture, the sentiment in the western world prioritizes efficiency and turnover. Vecinos identifies an opportunity to create a space intentionally designed for lingering, shared experiences, and social connection. Informed by research on Basque tapas traditions and Malcolm Gladwell’s The Tipping Point, the

concept uses cultural translation, heritage-driven storytelling, and intentional experiential design to bridge Bilbao and Buffalo – connecting Spain's communal dining rituals with the identity of the "City of Good Neighbors."

More than a tapas concept, Vecinos proposes a new social rhythm for dining in Buffalo. Through thoughtful branding, menu structure, messaging, and environmental design, tapas become a shared cultural experience rather than a passing trend. The result is a welcoming third place where neighbors and strangers alike gather to slow down, connect, and build meaningful community.

Biological Sciences

Epigenetics and Photobiomodulation Synergistically Regulate Odontoblast Mitochondrial Dynamics

Presenter: Mahmud Amin | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Praveen Arany (Department of Oral Biology, SDM)

Objectives: Epigenetic role of extracellular matrix (ECM) mechanics remains a poorly investigated area where regenerative dentistry mainly focuses on genetic modification. This project aims to dissect the mechano-transduction of odontoblasts by replicating a wound-like soft environment and assessing the role of Photobiomodulation (PBM) treatments for dentin regeneration.

Methods: Polydimethylsiloxane matrices composed of 10:1 ratio (base:curing agent) was cured for 24 hours at 95° C and were assessed for topography and mechanical stiffness using Atomic Force Microscopy. An odontoblast cell line was seeded (100,000 cells/well) in hypoxic (1 µg/mL Cobalt chloride) and low serum (0.2% FBS) conditions to simulate wound-like environments. PBM was performed. Cell viability was assessed on the wound-like surface at 24 hours with AlamarBlue assay. To examine the mechanistic pathways involved, Seahorse analysis and bulk RNA sequencing were performed.

Results: The PDMS substrate exhibited a lower stiffness (1.1 ± 1.6 MPa) than plastic. Reduced cell viability were observed on the softer matrix ($n = 3$, $p < 0.05$), which were rescued by PBM treatment. Notably, TGF-β1 and FAK inhibition enhanced cell viability, and non-uniform morphology was observed. Seahorse analysis demonstrated that PBM significantly enhanced respiration in cells cultured on plastic, while reduced respiration on PDMS. Consistent trends were observed for mitochondrial ATP production. Transcriptomic analysis further revealed activation of cell survival and mitochondrial regulatory pathways following PBM and TGF-?1 treatment.

Conclusions: The outcomes suggest that deliberate modulation of biomaterial mechanical cues can orchestrate regenerative pathways to improve healing outcomes.

Donor-Derived Cell-Free DNA in a Kidney Transplant Recipient with Recurrent Rejection and Graft Failure: A Pediatric Case

Presenter: Angelo Bargnesi | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Xiaoyan Wu (Department of Pediatrics, JSMBS)

This case examines whether donor-derived cell-free DNA (dd-cfDNA), a blood test used to detect kidney transplant rejection, accurately predicts recovery of kidney function after severe rejection. We describe a 19-year-old woman with IgA nephropathy who received a kidney transplant and later developed multiple episodes of biopsy-proven rejection due to medication nonadherence. Twenty-seven months after transplant, she presented with severe hypertension, metabolic imbalance, and markedly elevated creatinine, indicating acute graft failure. Laboratory testing showed dd-cfDNA levels of 11%, consistent with active rejection.

She was treated with dialysis and intensive immunosuppressive therapy. Over three months, dd-cfDNA levels declined to near normal (0.56%), suggesting reduced rejection activity. However, despite this biochemical improvement, her kidney function did not recover and she required permanent hemodialysis.

This case demonstrates that while dd-cfDNA is a sensitive marker for detecting and monitoring rejection, normalization of the test does not necessarily indicate restoration of graft function. These findings highlight the need for further research to better understand how dd-cfDNA trends relate to irreversible graft injury and long-term outcomes, particularly in pediatric and young adult transplant recipients.

Regulation of riboflavin production in the filamentous fungi Ashbya gossypii via Sum1/Sir2 complex

Presenter: Lauren Benson | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Laura Rusche

One of the industrial sources of the vitamin riboflavin is the filamentous fungus Ashbya gossypii. Previous studies revealed that riboflavin production is enhanced in strains lacking the transcriptional repressor SUM1C. Components of the SUM1C include Sum1, a DNA-binding protein, and Sir2, a histone deacetylase that reduces transcription of genes. Our hypothesis is that SUM1C targets promoter regions of genes impacting riboflavin production, leading to a decrease in riboflavin production. To test this hypothesis, Chromatin Immunoprecipitation (ChIP) is being conducted to determine if there is a binding site for SUM1C within promoters of riboflavin production genes. In preparation for ChIP, an epitope tag was added to Sir2 and work is underway to add an epitope tag to Sum1. Preparation also included adapting the yeast ChIP protocol for use in A. gossypii. At this time ChIP results for Sir2 tagged strain are pending. This work could reveal a regulatory pathway that could be modulated to boost riboflavin production.

The evolutionary and functional impact of the human-specific acyl-CoA thioesterase (ACOT1) gene duplication

Presenter: Carsyn Bonesteel | **Presentation Format:** Oral Presentation
Faculty Mentor: Dr. Omer Gokcumen

ACOT1 plays an important role in lipid metabolism and has been associated with physiological traits including liver function, fat mass, diabetes, and breast milk composition. Although previous studies have reported signatures of selection in ACOT1 in Melanesians, the evolutionary origin and genomic complexity of ACOT1 have not been fully characterized. Here, we investigate the genomic, evolutionary, and functional impact of the ACOT1 gene. Using long-read sequencing from 326 individuals together with short-read sequencing data from unrelated individuals in the 1000 Genomes Project, we confirm that cytosolic ACOT1 is a human-specific gene that arose from duplication of the mitochondrially localized paralog ACOT2. We observe extensive copy number variation and reconstruct eight distinct structural haplotypes at the ACOT locus, with pronounced population-specific distributions, including a significant reduction in ACOT1 frequency in Southeast Asian populations. Analysis of all available high-coverage archaic genomes reveals that the ACOT1 duplication is absent in Neanderthals and Denisovans, indicating that it arose in anatomically modern humans. Leveraging over 500 ancient genomes, we further reconstruct the spatiotemporal history of the locus and show that the ACOT1 duplication predates the major out-of-Africa dispersal, placing its origin earlier than 50,000 years ago. We also identify complex haplotypes involving subsequent duplications and deletions of ACOT1 and ACOT2, including tandem duplications spanning both genes. By the conclusion of this ongoing project, we hope to provide a framework for understanding gene-environment interactions in recent human evolution and may inform more personalized approaches to studying metabolic disease.

Inhaled Isopropyl Alcohol for the Treatment of Nausea/vomiting in a Pediatric Emergency Department.

Presenter: Edward Botchway | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Haiping Qiao & Dr. Susana Ruano, (Department of Pediatrics, JSMBS)

Nausea and vomiting are common complaints among pediatric patients presenting to the emergency department and are often treated with pharmacologic antiemetics such as ondansetron aka Zofran. While effective, these medications may be associated with delayed onset, side effects, or increased healthcare costs. Inhaled isopropyl alcohol has emerged as a potential low-cost, rapid-acting, nonpharmacologic alternative for nausea treatment, though limited data exist regarding its efficacy in pediatric emergency settings.

This study evaluates the effectiveness of inhaled isopropyl alcohol for the treatment of nausea and vomiting in pediatric patients presenting to the Oishei Children's Hospital emergency department. We conducted an open-label, randomized controlled trial enrolling children aged 7–17 years who presented with nausea or vomiting and met predefined eligibility criteria. Participants were randomly assigned to one of three treatment groups: inhaled isopropyl alcohol, oral ondansetron, or inhaled placebo. Nausea severity was measured using standardized rating scales prior to treatment, at 10 and 30 minutes post-intervention, and prior to discharge.

We aim to determine whether inhaled isopropyl alcohol provides comparable or superior symptom relief relative to standard pharmacologic treatment. Results from this study may support the use of a safe, inexpensive, and easily administered intervention for pediatric nausea management in emergency care settings.

Traits of native fish species and susceptibility to competition with an invader

Presenter: Alissa Bowers | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Corey Krabbenhoft

The round goby (Neogobius melanostomus) is an invasive fish species that has altered native freshwater fish assemblages in the Great Lakes region, including those throughout western New York. Goby are native to central Eurasia and were introduced to North America in the 1990s. To better understand the impact of this invasion on native fish assemblages, we explored how traits of native species relate to their abundance patterns in sites with and without round goby populations. We compared multi-year fish survey data from 14 sites across the western New York area to identify trends among sites with and without an established round goby population. Characteristics of native species were compiled using FishBase and the Fish Traits database, and included habitat preference, diet, body size, fecundity, and longevity. Abundance patterns were then evaluated to determine the suite of traits that was most impacted by the presence and density of round goby. By evaluating assemblage change, this analysis provides broader insight into how invasive fishes may differentially influence native species in freshwater ecosystems. Identifying trait-based patterns contributes to a clearer understanding of characteristics that may result in impaired resilience to invasion and provides guidance for appropriate management strategies in the face of future invasions.

Distinct oral microbial states in APECED associate with inflammation and mucosal immune dysfunction.

Presenter: Kevin Brydalski | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Patricia Diaz (Department of Oral Biology, SDM)

Objectives: Autoimmune Polyendocrinopathy-Candidiasis-Ectodermal Dystrophy (APECED) is a rare autoimmune disease caused by mutations in the AIRE gene, leading to systemic immune dysregulation including autoantibodies against IL-17 and IL-22, key cytokines in mucosal immunity. Patients frequently develop oral candidiasis and mucosal barrier dysfunction, but it remains unclear whether these abnormalities are associated with a distinct oral microbiome. Methods: Oral swabs were collected from 37 APECED patients and 25 healthy controls. The oral microbiome was characterized via 16S rRNA gene and ITS-1 amplicon sequencing. Data were processed with Mothur to generate taxon abundance tables. Alpha and beta diversity were evaluated, along with differentially abundant taxa identified using LEfSe. Associations between microbial taxa and clinical variables were assessed using sPLS analysis. Results: Tongue bacterial and fungal communities in APECED patients exhibited reduced diversity and distinct community structure compared with controls. Taxa enriched in APECED included Candida albicans and bacterial genera such as Leptotrichia, Fusobacterium, and Prevotella, which are commonly associated with oral inflammation. sPLS analysis performed within APECED samples further linked microbial taxa with clinical phenotypes. C. albicans was associated with intestinal dysfunction and vitamin B12 deficiency. Several inflammation-associated bacteria, including F. nucleatum subsp. animalis and L. wadei, were associated with gastritis and enamel hypoplasia. In contrast, periodontal-associated genera such as Porphyromonas and Tannerella were positively associated with IL-17A levels and alopecia. Conclusion: APECED patients harbor a distinct oral microbiome with reduced diversity and enrichment of inflammation-associated taxa. Distinct microbial signatures were linked to different clinical manifestations, suggesting that oral dysbiosis reflects heterogeneous immune dysfunction in APECED.

Differences in Patient Satisfaction in School-Based Health Centers by Spanish versus English Language Preference and Hispanic Ethnicity

Presenter: Gabriela Caceres | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Lucy Holmes (Department of Pediatrics, JSMBS)

Patient satisfaction questionnaires are an important measure of patient satisfaction and quality of healthcare. Language and cultural differences can influence how families experience healthcare. This study examines if caregiver satisfaction of services at school-based health centers (SBHCs), using the Patient Satisfaction Questionnaire Short Form (PSQ-18), is different based on Spanish- or English-speaking, and Hispanic ethnicity.

The PSQ-18, an 18-item validated tool that measures satisfaction across seven subcategories; higher scores showing greater satisfaction. Minor modifications were made to reflect the care in SBHCs. Participants were categorized into three groups, Spanish-Speaking, English-Speaking Hispanic, and English-Speaking non-Hispanic. Group differences were

assessed using Kruskal–Wallis (three groups) or Wilcoxon rank-sum tests (two groups) with Holm adjustment for multiple testing; significant results were followed by DSCF pairwise comparisons.

Patient satisfaction scores showed no significant differences between language and ethnicity for all PSQ-18 subgroups except Interpersonal Manor (IM). In IM, the means for Spanish-Speaking (n=6), English-Speaking Hispanic (n=23), and English-Speaking non-Hispanic (n=106) were 2.92, 3.93, and 4.15 respectively. Pairwise comparisons showed a significant difference between Spanish-Speaking and English-speaking non-Hispanic (p=0.0020); between Spanish-Speaking and English-Speaking Hispanic (p=0.0071). There was no significant difference between English-speaking Hispanic and non-Hispanic.

Differences among the Spanish speaking caregivers in Interpersonal Manner may be a result of different provider interactions, such as having to conversate through a translator. Conclusions are limited by the small Spanish speaking sample size. These results show that Spanish speaking families may experience provider communications differently, leading to a communication lapse that can be improved.

Does the deletion of casein kinase alpha subunits affect expression of Hst1-repressed virulence genes in the pathogenic yeast Candida glabrata?

Presenter: Jocey Celeste | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Laura Rusche

Candida glabrata is an opportunistic fungal pathogen found in humans. With increasing virulence and number of lethal cases in recent years, research on virulence has taken center stage. C. glabrata's pathogenicity originates from virulence genes, which confer resistance to antifungal drugs, starvation, reactive oxygen species (ROS), and promote adhesion to mucosal surfaces. These genes are repressed by the deacetylase Hst1. This repression can be overcome in low NAD+ conditions, but it is not clear if additional mechanisms allow these virulence genes to be expressed when needed. Hst1 is a homolog of Sir2, a deacetylase that also represses transcription. Phosphorylation of Sir2 by casein kinase (CK2) reduces deacetylase activity and leads to the de-repression of the genes Sir2 represses. We are investigating whether casein kinase also phosphorylates Hst1 in C. glabrata, and how this impacts virulence gene expression. We designed and constructed DNA sequences for replacing CKA1 and CKA2 with a selectable marker to eliminate the hypothesized phosphorylation pathway. This deletion cassette was transformed into a clinical isolate strain, and, we have preliminarily evaluated resistance to oxidative stress and antifungal drugs using growth assays. We intend to determine if the virulence genes regulated by Hst1 are impacted by the loss of casein kinase, which would be consistent with casein kinase phosphorylating Hst1. With this, a better understanding of pathogenicity regulation and new avenues for treatments of antifungal resistant yeast infections may be uncovered.

Oxygen Enhanced Growth in Soil and Hydroponic Grown Lettuce

Presenter: Justin Crandall | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Heather Williams

Introduction: I independently investigated the effect of increased dissolved oxygen (DO) concentration in both soil-based and soil-less hydroponically grown lettuce (*Lactuca sativa*) on harvest yield and root length. Methodology: I designed and built custom recirculating hydroponics systems for five experimental groups, varying by DO concentration (mg/L); A 6.8, B 7.3, C 7.5, D 8.0, and E 8.5. I set up a climate-controlled room with shelving to hold LED grow lighting, using vertical farming to maximize space efficiency. Results: Under high DO in group E, the mass (g) yield of lettuce heads harvested was significantly lower than that of control group A ($p = 0.016$). Under high DO levels in group E, the root length (cm) of lettuce was significantly shorter than the root length of control group C ($p = 0.0009$). In the comparison of mass yield between the soil-based groups A+B and the soil-less hydroponic groups C, D, and E, the soil-based groups had significantly higher yields ($p = 0.003$). Conclusion: Increased DO is not advantageous in a hydroponics system and produced evidence of significant harm to both mass yield and root length. Understanding the role of DO in hydroponics can improve yields of the highly nutritious vegetable crop *Lactuca sativa* while removing the need for expensive aeration equipment.

Impact of Inclusive and Human-Centered Learning Materials in an Undergraduate Genetics Classroom

Presenter: Dee Dolce | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Robin Costello

Biology is frequently taught in ways that feel disconnected from students' personal lives and identities. Current research highlights the potential of inclusive curriculum design to increase student belonging by making science more human-centered and socially relevant. This study builds on prior work by developing inclusive teaching tools and responds to calls for evidence-based interventions that promote equity in STEM education. We distributed a series of three surveys to students in an undergraduate genetics course at an RI institution in the U.S. Two of the surveys assessed student sense of belonging, connection with course material, and perceptions of socially relevant biology curriculum before and after completing the course. The third survey experimentally evaluated a teaching module aimed at connecting course content to social impacts. Students engaged with a video module on X-chromosome inactivation that provided (i) examples of calico cat coat color and human autoimmune disease or (ii) additionally discussed the negative social and medical impacts of exclusionary research practices in science. The student responses showed that the implementation of socially-relevant curriculum increased student sense of belonging and engagement with the course, providing a foundation for future socially-relevant education in biology classrooms.

Plant and fungal cell-wall-degrading oral bacteria

Presenter: Noam Ernan | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Ashu Sharma (Department of Oral Biology, SDM)

Tannerella forsythia is an anaerobic oral gram-negative bacterium implicated in the inflammation of the gums and the tooth socket. Despite being an asaccharolytic bacterium depending on non-catabolic sources for energy, it produced a plethora of polysaccharide-degrading enzymes and carbohydrate uptake transporters. One such complex polysaccharide-degrading enzyme it produces is β-glucanase. β-glucanases are enzymes that break down β-glucan polysaccharides made of glucose units linked via β-1,3, β-1,4, or β-1,6 glycosidic bonds. β-glucanases fall under different subclasses based on the linkages they cleave, with each subclass of β-glucanase specific to the type of linkage(s) it can cleave. The objective of this project is to fully characterize the substrate specificity and kinetics of the β-glucanase enzyme produced by T. forsythia.

A pET plasmid-based expression system was used to produce a recombinant 6xHis-tagged T. forsythia β-glucanase protein in E. coli host. The recombinant TfGlcA protein was then purified from E. coli extracts by Nickel-affinity chromatography, and the purified protein was subjected to enzyme activity characterization against different β-glucan substrates. This involved determining the Km and Kcat values of the enzyme for β-glucan substrates.

Our data showed that the enzyme is highly specific for b-1, 3 linkages in β-glucans, which are abundant in plant and fungal (yeast) cell wall β-glucans. We plan to test whether purified TgGlcA could cause fungal killing by lysing fungal cell walls. The overarching goal of this research is to advance these findings toward the development of a therapeutic topical formulation for oral application, designed to reduce inflammation in the oral mucosa, with particular emphasis on gingival and periodontal tissues by implementing the findings of the β-glucanase enzyme produced by T. forsythia.

Pyk1-Pdc1 Fusion Protein

Presenter: Megan Heigl | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Zhen Wang

Plant natural products are crucial for creating medicines for human diseases. Due to plant natural products such as terpenoids being difficult to extract from host plants, microbes such as Saccharomyces cerevisiae have been biologically engineered as a host to produce terpenoids for terpene-derived drugs. Metabolically engineering S. cerevisiae can increase the products of terpenoid precursors. A fusion protein, created by joining genes that code for different proteins, would increase spatial proximity for channeling key intermediates. If the pyruvate kinase (Pyk1) and pyruvate decarboxylase (Pdc1) proteins were fused, spatial proximity would increase, and more terpenoids would be produced due to inhibition of competing metabolic pathways and reduced loss of intermediates. I created a fusion protein of Pyk1 and Pdc1in S. cerevisiae by cloning the corresponding genes into a plasmid. A pYTK001_PYK1-PDC1 construct was designed, containing PYK1 and PDC1 fused with a linker. The genomic DNA was isolated from S. cerevisiae. The PYK1 and PDC1 genes were amplified by polymerase chain reaction (PCR). The two genes were cloned as one fused gene into pYTK001 plasmid using Golden Gate cloning. Three positive colonies were inoculated in LB medium with chloramphenicol. Restriction digestion was used to digest the plasmid with restriction enzymes Xba1 and EcoRI. Gel

electrophoresis was used to check for three expected bands indicating correct gene integration. Results showed that expected bands were found for two out of three plasmids. The two correct plasmids were sent out for sequencing and confirmed to contain the correct fused genes.

Non-inherited variations and FAD in a Sri Lankan population

Presenter: Keith Hunt | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Shermali Gunawardena

Familial Alzheimer's Disease (FAD) is caused by mutations in the Amyloid Precursor Protein (APP) and/ or Presenilin genes (PSEN1/PSEN2) that are dominantly inherited. However, it is unknown if spontaneous, non-inherited mutations at these locations also result in the same disease progression. Here we test the hypothesis that non-inherited variations will produce the same pathological outcomes as inherited versions of FAD.

To test this hypothesis, we analyzed a dataset of 124 Single Nucleotide Polymorphisms (SNPs) from a young Sri Lankan cohort with no known family history of FAD. These variants were processed using the Variant Effect Predictor (VEP) under a 4-step filtering criterion: (1) excluding any general population polymorphisms by comparing a Sri Lankan database and GnomAD (2) Pathogenicity Screening to rank SNPs by predicted impact (using scores such as SIFT/PolyPhen) (3) Isoforms Standardization via MANE select transcripts to ensure biological relevance and (4) Spatial mapping against known FAD loci to identify overlap with inherited mutations.

From this analysis two SNPs were identified with high interest that closely met these criteria. These were rs201479601 on APP and rs63750249 on PSEN1. These SNPs were significant due to their high pathogenicity scores and their location on MANE select transcripts within FAD loci. Analysis of the literature indicated that rs63750249 could increase the production of AB42 but the significance was unclear. While further analysis is required to determine if these patients who are now adults show FAD phenotypes, Other high-ranking SNPs identified in this study also warrant further investigation via Genome-Wide Association studies (GWAS).

Structural Deficits of the forebrain in old mice with Foxg1 G161Gfs mutation

Presenter: Dennis Kogos | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Jae Lee

Introduction: FOXG1 syndrome(FS) is a neurodevelopmental disorder that occurs due to a mutation on the FOXG1 gene. Patients with FS experience impacted motor, cognitive, and social abilities and have a significant decrease in quality of life. Some anatomical landmarks found in FOXG1 patients include microcephaly, corpus callosum agenesis, and cortex structural deficit. Clinical symptoms include movement disorders, epilepsy, and impaired social contact, which are observed with the changes in brain structure. The phenotypic expression of the G161Gfs truncation mutation of the Foxg1 gene in the mouse brain closely mimics the mutation of FOXG1 in a human patient. The objective of this experiment is to identify structures that may be significantly affected by the G161Gfs truncation mutation in the mouse brain. Experiment Methods and Results: G161Gfs heterozygous mice, along with wild-type littermate controls, underwent different behavioral tests to assess behavioral differences. These tests include Open Field Test, Rotarod Test, and 3-chamber Sociability and Novelty. The brains from the mice were harvested and fixed in 4% PFA overnight, treated with a 30% sucrose solution, and then embedded in a freezing medium for cryosection. Embedded brains were sectioned at the coronal plane at a thickness of 18 µm and stained using the Nissl method. Images were captured using a Zeiss Axioscan 8 microscope slide scanner and analyzed via ImageJ to quantify structural differences between heterozygous and wild-type controls. We measured the corpus callosum length and thickness, and the Cortex anterior to posterior length. We found that in heterozygous mice, the brain and body weight were significantly less than Wild-type, and the cortex and corpus callosum were smaller in size. Conclusion and future directions: The G161fs mutant mice showed structural differences in the forebrain, specifically the cortex and corpus callosum. These differences showed in the mouse model of FOXG1 syndrome mimics the symptoms that are commonly found in FOXG1 syndrome patients. The G161Gfs mice also showed behavioral differences in motor function, social ability, and anxiety. This experiment will be replicated with an increased sample size for increased reliability. Further studies will be conducted to explore the relationship between differences in brain structure and behavioral differences by investigating cellular and molecular changes in the brain that would have led to abnormal behaviors.

Placement of the freshwater mussel Lampsilis siliquoidea (family Unionidae) in an Urban Stream for reduction of Escherichia coli

Presenter: Siobhan Lanich | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Corey Krabbenhoft

Urban waterways are prone to poor water quality, including high concentrations of the bacteria Escherichia coli, largely due to wastewater effluent and runoff. Freshwater mussels of the family Unionidae have been shown to remove E. coli from water via filter feeding. We assessed the feasibility of using the unionid Lampsilis siliquoidea (Fatmucket) as a biocontrol agent to reduce E. coli in urban streams. Six hundred mussels were placed in containment at two sites in Blasdell Creek (Hamburg, NY), just upstream of Woodlawn Beach, a popular recreational area on Lake Erie. E. coli concentrations were measured using R-CARDs (Roth Biosciences, LLC.) at multiple locations upstream and downstream of the mussel containment array to determine the effect of the placed mussels on E. coli concentrations in the stream water over the course of 13 weeks. Lengths of mussels were also measured before and after placement to determine growth of mussels while in the stream. While there was no apparent reduction in E. coli concentrations attributable to mussels, high survival of mussels (99.3%) indicates promise for this approach. Future research is needed to determine the density and number of mussels necessary to cause a meaningful reduction of E. coli concentrations in this stream.

Structural Genomic Evolution across Lamiales Inferred from Novel Lamioid Mint Genomes

Presenter: Christopher Page | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Charlotte Lindqvist

The evolution of flowering plants is shaped not only by nucleotide-level substitutions but also by chromosome-scale architectural changes such as whole-genome duplication (WGD) events, chromosomal rearrangements, and biased fractionation leading to gene loss. Thus, phylogenetic inference based solely on genomic sequences may miss evolutionary signals encoded only in genome structure. The mint order (Lamiales) represents a diverse and economically significant lineage of flowering plants, yet recurrent WGD events and lineage-specific rearrangements complicate traditional sequence-based phylogenetic approaches. Here, we describe a framework for detecting structural genomic signals and transforming them into metrics that enable more comprehensive phylogenetic inference. We leverage five novel high-quality genome assemblies from the subfamily Lamioideae and the existing grapevine reference (Vitis vinifera) to partition Lamiales genomes into chromosomal blocks and define block-level character states that capture variation in genome architecture. The resulting Lamiales structural phylogeny highlights extensive architectural divergence that is independent of, and undetected by, sequence-based phylogenetic signals. Thus, this framework can be valuable to investigating the evolutionary dynamics of other flowering plants lineages with complex genomic histories.

Analysis of Rubisco Assembly and Cell-Specific Expression in Leaves of Transgenic Nicotiana tabacum

Presenter: Lily Plympton | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. James Berry

Ribulose-1,5-bisphosphate carboxylase/oxygenase (Rubisco) is the most abundant enzyme on Earth, playing a fundamental role in photosynthesis. C4 plants evolved to increase photosynthetic efficiency in arid climates by specifically localizing the Rubisco enzyme in leaf Bundle Sheath (BS) cells. Alternatively, C3 plants, such as tobacco (Nicotiana tabacum), are better suited for temperate climates since the Rubisco enzyme is not specific to BS cells. Many genes regulate the production of Rubisco and associated proteins, including the Rubisco Large Subunit RNA Binding Protein (RLSB). Our research goal is to transgenically modify the expression of RLSB, making a C3 plant, like N. tabacum, mimic the photosynthetic efficiency of C4 plants. These modifications should increase productivity of C3 agricultural plants used for food and biofuel. We hypothesize co-expression of RLSB and other Rubisco-related genes in transgenic N. tabacum will lead to new regulatory interactions, increasing expression of Rubisco Large and Small (LSU and SSU) subunits, RLSB, and photosynthetic efficiency in N. tabacum. Two gene promoters were tested for production in transgenic N. tabacum: one causes BS cell-specific expression of the introduced transgenes, and another increases levels of expression in all cell types. Two groups of transgenes were associated with each promoter: one with Rubisco-associated genes engineered into the genome, and the other with the RLSB gene alone. Levels of mRNA encoded from the constructs were analyzed via quantitative real-time PCR and protein analysis with immunoblotting. So far, current findings show higher Rubisco production in strains expressing all the Rubisco-associated genes, aligning with our hypothesis.

Alginate Enhanced Nanocalcium Scaffolds for Bone Regeneration

Presenter: Devan Renjen | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Rosemary Dziak (Department of Oral Biology, SDM)

Bone graft materials that support osteogenesis are important for improving bone regeneration in dental applications. Nano-calcium sulfate, a derivative of the dental material plaster of Paris, has been used as a bone graph substitute due to its ability to support bone healing, and its biocompatibility. However, the effectiveness of nano-calcium sulfate depends on the structure of the scaffold and its ability to support cell attachment. This project looks at incorporating alginate into a nano-calcium sulfate complex determining whether it impacts cell viability. The nano-calcium sulfate is prepared using a freeze-drying method to create a porous scaffold. In this process, calcium sulfate dihydrate was prepared in a 2% solution, then frozen via liquid nitrogen. This creates a thin shell of the solution around the flask. It is quickly attached to a vacuum, removing all possible moisture. This allows the ice to sublimate from solid to vapor. When the ice is removed, empty spaces remain in the structure where the ice crystals were located, creating a porous scaffold. After freeze drying, the material was baked to remove any remaining moisture and convert the calcium sulfate into a more stable form. Next, alginate was added to enhance porosity and give a three-dimensional structure suitable for cell attachment. Additionally, this is done to replicate in-vivo conditions. Human osteoblastic cells were incorporated into the scaffold under standard cell conditions. Cell viability was measured over time using Prestoblue, a non-toxic metabolic reagent. Spectrophotometric analysis was used to quantify cell activity. It is expected that the NCS/alginate scaffold will better support osteoblastic viability than just the NCS alone by increasing surface area.

Hydrogel delivery system for 1,4-dihydrophenonthrolin-4-one- 3-carboxylic acid (1,4-DPCA) in Osteoblastic and Fibroblastic Cells

Presenter: Michelle Shaposhnik | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Rosemary Dziak (Department of Oral Biology, SDM)

Complexities in anatomical structure have hindered expected regeneration of craniofacial bone defects. 1,4-dihydrophenanthrolin-4-one-3-carboxylic acid (1,4-DPCA) is a prolyl hydroxylase (PHD) inhibitor that stabilizes expression of the HIF-1? protein, resulting in growth factor gene expression and enhanced regeneration. This inhibitor has been shown to support wound healing in vivo studies with mice. In the past, our laboratory used nano-calcium sulfate as a delivery system for 1,4-DPCA. We would now like to explore the feasibility of utilizing hydrogels for ease of transfer into a bony location surrounded by soft tissue components around an implant site. Our osteoblastic and gingival fibroblastic cells were commercially obtained from human donors. Hydrogels consist of alginate, distilled water or alcohol, and calcium carbonate. To determine the biological effectiveness of drug released from the hydrogels, an MTT assay was conducted to analyze cell metabolism. Assays were held under standard state conditions with a 48-hour incubation at 37C. MEM medium and 5% CO2 levels for optimum pH (7.4) was utilized with the cells seeded at a density of approximately 100,000 cells per well in a standard 24 well dish culture plate. Both assays showed favorable data through increases in MTT activity, suggesting that the hydrogel delivery system may be a reasonable alternative to nano-calcium sulfate.

Is phosphorylation of the deacetylase Hst1 impacting virulence in Candida glabrata?

Presenter: Liana Sicroff | **Presentation Format:** Oral Presentation
Faculty Mentor: Dr. Laura Rusche

Candida glabrata is an opportunistic human fungal pathogen. Its success as a pathogen derives in part from virulence genes that confer resistance to reactive oxygen species (ROS), antifungal drugs, and starvation and allow cells to adhere to mucosal surfaces. These virulence genes are repressed by a deacetylase, Hst1. However, if Hst1 is inactivated, the repression on those genes is removed and they can be expressed. Previously, it has been shown that phosphorylation of a conserved serine in an Hst1 homolog in Saccharomyces cerevisiae, ScSir2, reduces protein activity. We are investigating if this mechanism is conserved in C. glabrata, representing a mechanism by which virulence genes are regulated. Alignment of ScSir2 to CgHst1 identified S422 as the conserved serine. Genome editing was used to replace S422 with an aspartate or an alanine, to imitate a phosphorylated or unphosphorylatable serine. The goal is to see if making changes to S422 will allow for expression of virulence genes controlling ROS stress, antifungal resistance, starvation, and adhesion. Plasmids containing the S422D/S422A mutations have been made, and the modified cassette has been transformed into C. glabrata using a CRISPR plasmid. We will next expose the strains to stressors, such as antifungals or oxidative stress, and note whether the change in phosphorylation of S422 is allowing for increased resistance/expression of virulence genes. Ultimately, we may be able to identify a new regulator of pathogenicity which could aid in the creation drugs to treat antifungal resistant yeast infections.

Influence of Detergent Type and Concentration on Bleaching Phenotype Caused by Virus-Induced Gene Silencing in Digitalis lanata.

Presenter: Pedro Silva | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Zhen Q. Wang

Virus Induced Gene Silencing (VIGS) is a functional genomic analysis tool that temporarily silences targeted plant genes' expression, allowing researchers to identify their functions and study associated phenotypes. VIGS, a post transcriptional gene silencing method, uses a plant's RNA interference (RNAi) pathway to silence a specific gene. Silencing begins when a viral vector introduces double-stranded RNA (dsRNA) derived from the gene of interest into the plant, triggering the plant's RNA interference pathway. The goal of this project is to develop an RNA knockdown method to genetically manipulate Digitalis lanata, a plant for commercial production of heart medicine: digoxin. The target gene for this research is the phytoene desaturase (PDS) gene, and when silenced the plant loses its green pigmentation. This discoloration upon infection, known as bleaching, serves as an indicator of successful gene silencing. This tool can be useful for understanding the relationship between DNA sequences that encode enzymes and their functions; when these genes are silenced, changes in metabolite production can be used to infer enzyme activity. By harnessing VIGS, the digoxin production pathway in D. lanata could be more easily studied. Though this technique has high research value, the bleaching rate is often low, which is why different parameters must be used to maximize bleaching phenotype. The use of detergents and vacuum conditions were shown to boost the infection rates for D. lanata at the cotyledon stage. Future work will focus the effects of the GV3101 Agrobacterium strain on the bleaching phenotype, comparing it to the AGL1 strain.

Evaluation of AI assistance in Ecological Literature Reviews

Presenter: Aidan Sumrall | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Corey Krabbenhoft

More scientific research papers are available today than ever before, but the rapid growth of scientific literature presents major time constraint problems for engaging in efficient literature review. To address this limitation, we investigated whether artificial intelligence (AI) and large language models (LLMs) can be implemented to help optimize and expedite the review process. As part of a review on freshwater system susceptibility to invasive species, I created a custom Python algorithm incorporating an OpenAI API and processed over 1300 peer-reviewed papers. The algorithm was designed to determine (1) each paper's relevance to the review topic, and (2) create a table of structured data extraction for specific fields within each manuscript. To check relevance and extraction accuracy of this novel approach, all papers were manually reviewed by coauthors. Final performance metrics included relevance false positives, false negatives, extracted field-level data accuracy, and overall system performance. Preliminary prompt optimization yielded a relevance accuracy rate of 60–65%, with 93–95% of errors classified as Type I false positives (irrelevant papers labeled as relevant). Data extraction accuracy ranged from 92% to 97%, with the weakest accuracy in determining whether a relationship was positive or negative and the specific methodology used to assess these relationships. By assessing classification and extraction reliability, this work evaluates whether AI-assisted screening can be used to enable faster, more efficient research as traditional methods continue to become overwhelmed by new information.

Macroinvertebrate Responses to Insecticides in Intermittent Stream Ecosystems

Presenter: Hal Svetanics | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Corey Krabbenhoft

Intermittent streams, which periodically dry up and comprise a large proportion of river systems globally, exhibit unique hydrological dynamics that may influence the transport and ecological effects of insecticides. During low-flow periods, isolated pools can accumulate solutes, which are released downstream as high-concentration pulses once flow resumes. We investigated the distribution and ecological effects of imidacloprid, a neonicotinoid insecticide widely used to treat Eastern Hemlock (Tsuga canadensis) for the invasive Hemlock Woolly Adelgid (Adelges tsugae) in intermittent stream systems. We studied these trends in forestry lots in Western New York using a three-fold approach. First, we tracked continuous hydrological conditions in three stream systems, including two treatment sites and one untreated control, using continuous in-stream sensors. Second, we quantified concentrations of imidacloprid in surface water using liquid chromatography tandem mass spectrometry (LC-MS/MS), comparing among sites differing in flow regime and location relative to treatment sites (upstream vs. downstream). Finally, we assessed the biodiversity of the macroinvertebrate community to evaluate the combined effects of insecticide concentration and flow intermittency on non-target aquatic invertebrates. Preliminary results suggest imidacloprid application has little impact on invertebrate community composition

in intermittent streams. This may be related to relatively low concentrations in winter surface water samples, though spring water samples are still in progress. This study will provide insight into the sustainability of current integrated pest management practices for Hemlock Woolly Adelgid by evaluating whether existing stream management zone definitions effectively protect aquatic habitats and their non-target macroinvertebrate communities from insecticide accumulation and transport.

Chemistry

Using vibrational spectroscopy to probe the interaction of glyphosate at goethite surfaces

Presenter: Joseph Clark | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Luis Velarde

Glyphosate is the most widely used herbicide, and its fate in the environment is strongly influenced by its adsorption to minerals in soil. Iron hydroxides such as goethite (α-FeOOH) are abundant in soils and can control the movement of contaminants through surface complexation. In this project, vibrational spectroscopy is used to investigate how glyphosate interacts with goethite surfaces by the analysis of signatures in spectra that change with different bonding interactions. The techniques used include Attenuated total reflectance – Fourier transform infrared (ATR-FTIR) and Raman spectroscopy. As an initial step in the project, goethite was synthesized following the procedure by Orcelli et al., 2018, with slight modifications. Our product was characterized using ATR-FTIR and Raman spectroscopy. Distinct features like Fe-O-H bending at ~790 & 890 cm^{-1}, and the vibration of the FeO crystal lattice at ~630 cm^{-1} were observed in the ATR-FTIR spectra, which matches the literature spectra of goethite. The next steps to take in this work are to expose goethite to glyphosate under controlled conditions and monitor the changes in vibrational modes using above-mentioned techniques. By studying these changes, insight can be gained into the binding interactions involved with the phosphate and carboxylate functional groups in glyphosate. Ultimately, this work aims to link reproducible spectroscopic analyses to environmentally relevant surface interactions, improving the ability to interpret how mineral adsorption influences glyphosate mobility and its fate in soils.

Rational Design of Terfenadine Derivatives Targeting Oncogenic TFE3 Fusions in Translocation Renal Cell Carcinoma

Presenter: Ignat Fomin | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. David Heppner

Translocation Renal Cell Carcinoma (tRCC) is a rare and aggressive cancer that is most common in children. Gene translocations involving the MiT/TFE family are responsible for the development of this cancer. Multiple gene fusion partners are known to be linked with tRCC, which further complicates the development of effective therapeutic approaches. We recently identified Terfenadine, an antihistamine previously available on the market as Seldane, to inhibit cell growth in tRCC cells. Multiple methods were used to determine Terfenadines inhibitory effects, such as transcriptomic analyses, viability assays, and xenograft studies. It was determined that Terfenadine selectively inhibits the fusion of a normal TFE3 gene and a rogue TFE3 gene. Terfenadine is also known to have cardiotoxic properties, which limits its potential to be used as a treatment. With this information, we performed structural optimization and synthesized novel compounds to arrest tRCC cell lines. Multiple novel compounds have shown to be more effective than Terfenadine in inhibiting uncontrolled cell growth in tRCC compromised cells. Further research will result in continued optimization and understanding of these therapeutic mechanisms.

Microwave-enhanced Trypsin Digestion for Bottom-Up Proteomics Mapping

Presenter: Matthew Machelor | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Troy Wood

Dielectric heating provided by microwave irradiation accelerates rates of chemical and biochemical reactions, including enzymatic digestion. These microwave-assisted digestion approaches involve the typical steps of denaturation, disulfide-bond reduction, and alkylation as individual events that precede trypsin digestion (which is the only reaction conducted under microwave irradiation). Rivera-Alberran and Ray (J. Am. Soc. Mass Spectrom. 2020, 31, 1684-1696) showed directed microwave irradiation to small volumes by using an in-line microstrip cavity for programmed microwave heating. This not only enhances digestion rate and decreases digestion time, but the design is advantageous for direct-infusion

MS because of reduced sample loss. Here, we examine whether combining the proteomics steps in a single microwave reaction is feasible and whether there is any analytical advantage.

In conventional proteomics workflows, protein solutions are denatured, their disulfide bonds are reduced and are alkylated in separate steps prior to digestion. For microwave-enhanced digestions, there are two different workflows: 1) Denaturant, dithiothreitol, and iodoacetamide are admixed together with trypsin and all processes occur simultaneously with microwave exposure (time can be varied), or 2) denaturation is performed at ambient conditions, and then each step (reduction, alkylation, digestion) is performed separately under microwave irradiation conditions. Samples are exposed to 1.0 kW microwave radiation in a General Electric microwave oven (Model J E43 001) at the High setting. The digest mixture is subsequently analyzed by an Orbitrap mass analyzer in direct infusion mode or LC-MS/MS mode.

Initial experiments compared digestion coverage using the conventional trypsin digestion approach (18 h at 37 °C) in comparison to admixture of denaturant, dithiothreitol, iodoacetamide, and trypsin for 10 minutes under microwave irradiation. In both cases, digestions were conducted in polypropylene Eppendorf tubes. For bovine beta-casein, an 18 h trypsin digest produced a tryptic peptide map which covered 200 of 209 amino acids (95.7% coverage). Yet in only 10 minutes of microwave irradiation, all 209 amino acids are mapped for full sequence coverage. In addition, the quartet of phosphoserine residues near the N-terminus are all detected after microwave irradiation, indicating preservation of post-translational modifications. For horse hemoglobin, the 10 min microwave-enhanced digestion had almost identical trypsin digestion maps for hemoglobin alpha (1 extra residue mapped with application of microwaves) and identical trypsin digestion maps for hemoglobin beta. However, only with the microwave-enhanced digestion was the phosphoserine-44 residue in hemoglobin beta detected. This “brute-force” microwave-enhanced digestion showed that the steps of denaturation, disulfide reduction, alkylation, and digestion do not necessarily need to be carried out in individual steps. However, it may still be advantageous to conduct these experiments sequentially involving microwave assistance; additional experiments which examine fixed times for disulfide reduction and alkylation, but variable digestion times under microwave irradiation, will be reported. In addition, there is the potential that with extended microwave heating, polypropylene may become soft, thereby enabling leachable materials to interfere. Also, lengthy irradiation times could lead to solvent evaporation which could hinder digestion performance and/or require solvent reconstitution. Though we have not observed this to date, we do postulate that different container materials used with microwave irradiation may influence rates and extent of digestion. Thus, we will also present our latest data comparing microwave irradiation using either polypropylene or glass tubes.

Synthesis of a Manganese (III) N-Oxide Coordination Complex

Presenter: Luca Pasceri | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. David Lacy

Manganese (III) is biology’s strongest one-electron oxidant. This high-potential reactivity makes Mn(III) ideal for use in energy storage applications such as natural photosynthesis. However, its reactivity makes it difficult to characterize as few high-potential Mn(III) coordination complexes are known. In the Lacy Lab, we have discovered that the high-potential properties of Mn(III) can be maintained by coordination of a special class of ligands called pnictogen-oxide ylides, which include common molecules like Ph3PO, PyO, and Me3NO. In this study, we sought to test the properties of a MnCl3 complex with trimethylamine N-oxide (TMAO) as a ligand. In this study, we synthesized MnCl3(Me3NO)2, referred to as Photosynthesis Model Compound (PMC). PMC is an insoluble purple crystalline solid that is stable under inert atmosphere, but rapidly degrades into an insoluble brown solid when exposed to atmospheric moisture. Over the course of this project, the crystal structure of PMC was obtained using Micro-electron diffraction (MicroED), and its reactivity with water is being explored. The data shows that PMC is a trigonal bipyramidal molecule with two Me3NO ligands in the axial positions and three chloride ligands in the equatorial positions.

Occurrence, Removal, and Screening-Level Ecological Risk of Antidepressants in Municipal Wastewater Treatment Plants

Presenter: Xander Seguin | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Diana S. Aga

Antidepressants are among the most frequently prescribed pharmaceuticals worldwide and are continuously introduced into aquatic environments through municipal wastewater treatment plants (WWTPs). This study evaluated the temporal occurrence, removal efficiency, and screening-level ecological risk of selected antidepressants and their metabolites across three WWTPs in New York State over a one-year monitoring campaign. Target compounds included bupropion, venlafaxine, sertraline, desvenlafaxine, and hydroxybupropion. Antidepressants were consistently detected in influent samples at concentrations ranging from ng/L to µg/L levels, with hydroxybupropion and desvenlafaxine exhibiting the

highest median abundances. Principal component analysis revealed clear differences among facilities, indicating distinct catchment-specific chemical signatures.

Removal efficiencies were highly compound-specific, ranging from near-complete attenuation to occasional negative removal. Bupropion showed comparatively higher removal under a two-stage aerobic–nitrifying configuration, whereas venlafaxine and desvenlafaxine exhibited moderate persistence across treatment systems. These differences were associated with physicochemical properties such as ionization state and partitioning behavior. Screening-level ecological risk assessment using ECOSAR indicated generally low-to-moderate risk under typical effluent conditions; however, sertraline displayed elevated predicted bioaccumulation potential. These findings highlight the persistence and mechanistic complexity of antidepressants in wastewater systems and underscore the importance of integrating occurrence, removal, and risk evaluation in contaminant prioritization.

Development of a multidimensional 19F-NMR database in methanol and water for the identification of emerging organofluorinated contaminants in the environment

Presenter: Jonathan Stasi-Welsh | **Presentation Format:** Oral Presentation
Faculty Mentor: Dr. Alexander Hoepker (The RENEW Institute)

There is a growing body of evidence showing that tandem liquid chromatography-mass spectrometry (LC-MS/MS) methods do not detect and often significantly underestimate the concentration of per- and polyfluoroalkyl substances (PFAS) and other fluorinated compounds in environmental samples. Alternatively, 19F NMR (FNMR) is an inherently nontargeted spectroscopic method that non-destructively detects all fluorinated nuclei in a mixture; however, current FNMR libraries lack standardized, high-quality reference data across different solvents and the statistical search tools necessary for confident identification of fluorinated substructures or whole compounds. We have developed an FNMR spectral library and database comprising >160 compounds, recorded under three solvent conditions, annotated with chemical shifts, spectral splittings, and longitudinal relaxation times for each fluorine nucleus. We introduce solvent-induced shift vectors (SISV) as an additional identifier of fluorinated substructures that measures solvent-dependent chemical shift changes, enabling more confident identification of substructures than chemical shifts alone. To identify suspect compounds, we map chemical shifts, spectral splitting, and SISV onto substructure HOSE codes, then rank candidates using Bayesian search and combinatorial scoring. This workflow was applied to biosolids and sludge extracts to identify fluorinated analytes not previously detected with targeted LC-MS/MS methods (EPA method 1633). Our newly developed FNMR library method identifies fluorinated substructures and parent compounds without analytical standards or prior knowledge of the identity of environmental analytes. By employing a novel FNMR-based non-targeted framework for the comprehensive capture and identification of fluorinated compounds, this methodology significantly reduces the risk of missing critical analytes that often bypass traditional screening.

Classics

Intoxication or Divine Connection?: Drug and Alcohol Use in Ancient Greek Cults

Presenter: Ash Ferguson | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Jackie Murray

Intoxication in ancient Greece was commonplace in society; however, overindulgence, reckless behavior, and madness were all features of intoxication that were heavily frowned upon. The innate drinking culture also fed heavily into religion, with wine being a major focus in a variety of religious rituals, both public and private, including the City Dionysia, Saturnalia, and the Panathenaic Festival. A particular area of religious activity in ancient Greece, where intoxication was commonplace, was cults, or land-based religious practices. The use of intoxicants beyond wine in ancient Greek ritual was not only widespread but in service of a particular goal: a personal connection with the divine. Intoxication for the purpose of connecting with the divine is seen throughout all different time periods and cultures across the world. This innate interest and connection with mind-altering experiences, and their potential connection to the divine, seems to be almost human nature. Drugs were not thought to be acting independently on an individual, but rather in connection with or controlled by a divine source, which also allows them to connect the divine with the individual consuming the intoxicant in a more personal way compared to other ways of connection, including prayer or sacrifice. Using three case studies, the Oracle at Delphi, the Eleusinian Mysteries, and the Cult of Dionysus, it will become clear that these rituals included the use of additional mind-altering intoxicants to achieve a personal, embodied connection with the divine.

Communication

Beyond the Numbers: Career Tips for Mathematics Students

Presenter: Jiawen Gu | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Lance Rintamaki

The demand for a solid mathematical foundation is increasingly evident in career opportunities in the current century, especially with the ongoing advancements in artificial intelligence. However, the job market presents challenges and limitations for mathematics majors who depend solely on their general mathematical skills without acquiring additional complementary competencies. It is important to recognize that a diverse skill set enhances employability and allows for more effective engagement with various professional opportunities. To better understand how mathematics degrees translate into diverse career paths, this study aims to extract insights and identify career trends by conducting interviews with 25 alumni. This project will include Zoom interviews with professionals who hold degrees in mathematics, allowing for a thorough evaluation of their diverse professional experiences. After the interview, it utilizes AI tools — such as ChatGPT and Google AI — to analyze and synthesize the most common and practical advice from the data. The findings will offer applicable guidance for undergraduate mathematics majors, helping them navigate career options and position themselves effectively in a competitive job market.

Interaction Between Selfie Exposure and Contingencies of Self-Worth, and Psychological Well-Being: A Policy Proposal for Transparent Algorithm

Presenter: Aisha Makama | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Michael A. Stefanone

The rise of social media has shifted individuals' self-presentation to digital form. Studies show that frequent exposure to idealized content, particularly selfies, has an impact on individuals' well-being through social comparison and external validation from others. This study employs a cross-sectional survey to examine social media behavior, selfie posting, selfie exposure, and their impact on psychological well-being. We aim to examine how different forms of selfie exposure—whether from peers, influencers, or self-posted content—affect well-being as a function of self-worth. In this study, self-worth is operationalized based on appearance, competition, and social approval. Additionally, this study seeks to determine whether social media engagement moderates these effects, investigating whether higher levels of interaction (e.g., liking, commenting, or receiving engagement on posts) intensify the relationship between selfie exposure and psychological outcomes. These research findings will provide insight into the psychological implications of social media engagement, contributing to broader policy-level discussions on the consequences of digital self-presentation.

Does Repeated Viewing Resolve Narrative Uncertainty?

Presenter: Saana Mankotia | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Lindsay Hahn

Suspense is a popular technique used to engage audiences in narrative entertainment. Given that suspense is characterized by concepts that hinge on audiences' lack of knowledge about the narrative's ending, we might expect that knowledge of the narrative's resolution would minimize feelings of suspense during exposure. Yet despite this expectation, previous work has shown that audiences' self-reported suspense remains stable on repeated viewings even when they know how the narrative ends (Zillmann, 2013). To understand the cognitive mechanisms behind it (e.g., Carroll, 2013, we investigate audiences' (N=29) responses to repeated viewings of a suspenseful Alfred Hitchcock film. We predicted that participants' (1) suspense will remain stable after both viewings and, (2) uncertainty will decrease between the first and the second instance of viewing the stimulus. Results of paired-sample t tests revealed that uncertainty decreased from the first ($Mt1=5.28$, $SDt1=0.94$) to the second viewing ($Mt2=3.86$, $SDt2=1.28$; 5.10, $p < .001$), as did overall suspense ($Mt1=5.05$, $SDt1=1.30$; $Mt2=3.61$, $SDt2=1.75$; 4.39, $p < .001$). These preliminary results do not show evidence of the suspense paradox. Data collection is ongoing, and we are also planning to add measures of heart rate and skin conductance.

Cognitive and Communicative Dynamics Between Correctional Officers and Incarcerated Individuals: A Field Study on Institutional Interaction in New York State Correctional Facilities

Presenter: Marissa Taylor | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Zach Carr

This paper examines the communicative implications found within the bounds of correctional facilities throughout New York State. Through this field study, it is clear that the communication structures found within facilities foster an environment where authoritative hierarchy and vulnerability shape the daily lives of both correctional officers and incarcerated individuals. Drawing from forty-four reports of incarcerated individuals across twenty different New York State correctional facilities, as well as two former New York State correctional officers, this field study argues that the communicative failures from both sides of the aisle lead to the tensions embedded in the system of corrections. From suppressed emotions and dialogue, correctional officers and incarcerated individuals have complex cognitive processes for survival that translate into their communicative instincts in facilities. Taking these accounts as a whole, these perspectives indicate that the hierarchical structures of correctional facilities in New York State impact the communicative process for both correctional officers and incarcerated individuals.

Communicative Disorders and Sciences

Aging Effects on Listening Effort with Cochlear Implant Simulation Practice

Presenter: Julia DiPasquale | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Kristina DeRoy Milvae

Listening in noisy environments requires substantial cognitive resources or listening effort. This is especially true for individuals using cochlear implants, which are auditory prostheses that provide a degraded auditory signal for those who do not functionally benefit from hearing aids. Auditory training is one way to improve speech-understanding-in-noise abilities, but training can lead to increased listening effort in older adults. It is not yet clear if training benefits for listening effort depend on age. Younger and older adult participants with normal hearing will listen to cochlear implant simulations of a noisy environment, identifying a target color and number in a sentence. Feedback is provided after each sentence identifying the correct color and number. Pupillometry was used as an index of listening effort during this training. Cognitive testing was also completed to examine individual differences in distractor inhibition, working memory, and auditory verbal learning abilities. We hypothesized that listening effort changes with training would depend on age. Additionally, we expect that individuals with greater cognitive abilities will utilize less listening effort. The results of this study have potential clinical implications regarding aural rehabilitation strategies in adults with hearing loss.?

Multi-Channel Auditory Cortical Responses to Spatialized Speech

Presenter: Zachary Jock | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Mishaela DiNino

Auditory brainstem responses (ABRs) and cortical auditory evoked potentials (CAEPs) are widely used to examine auditory neural function and are traditionally recorded in response to a click sound. Previous studies have found that ABRs and CAEPs can be collected in response to continuous speech, and in combination with spatial separation between talkers, may represent real-world listening more accurately. Neural responses to sound are typically examined from one single electrode near the cranial vertex; however, cortical responses to spatialized speech may be best captured at multiple electrode sites. This study examined whether the recording electrode location influences the cortical responses obtained to spatialized versus non-spatialized speech. Thirty young adults with normal hearing listened to continuous speech samples while cortical responses were recorded under three conditions: 1) two samples presented at center (non-spatialized), 2) a target sample at center while another sample was spatialized to the left or right, or 3) a sample was played at center while the target sample was spatialized. The late latency cortical response, which contains the P1 and N1 event-related potentials, was compared between conditions at “frontal” or “central” locations. Analysis revealed that the strength of the P1 and N1 responses differed depending on the speech condition and the location of the recorded electrode. P1 activity varied similarly across speech conditions and electrode location, whereas N1 activity was dependent on both speech condition and electrode location. These results suggest that neural activity evoked by spatialized speech conditions is better represented by multiple electrodes rather than just one.

Effects of SpeechVive and Expiratory Muscle Strength Training (EMST) on Speech in Individuals with Parkinson's Disease

Presenter: Grace Markey | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Jessica Huber

This study investigated the combined effects of the SpeechVive device and Expiratory Muscle Strength Training (EMST) on speech production in individuals with Parkinson's disease (PD). Parkinson's disease is a progressive neurodegenerative disorder commonly associated with hypokinetic dysarthria, characterized by reduced vocal loudness (sound pressure level; SPL), accelerated speech rate, imprecise articulation, and disrupted speech breathing. The primary objective was to determine whether an eight-week combined intervention would improve SPL and modify pause frequency and duration during connected speech. Eight individuals diagnosed with PD completed the treatment protocol. The SpeechVive device is a wearable instrument designed to elicit increased SPL in individuals with PD through an auditory cueing mechanism, though it has not consistently demonstrated changes in speech breathing patterns. EMST involves a pressure-threshold device that strengthens the expiratory muscles and has been shown to improve respiratory support for speech, but not SPL consistently. Speech samples were collected before and after treatment under device-on and device-off conditions. Acoustic analyses were conducted using Praat to quantify SPL, pause frequency, and pause duration. Linear mixed-effects models were used to evaluate treatment effects. Results revealed a statistically significant increase in SPL from pre- to post-treatment and across device conditions, indicating improved vocal intensity. No significant changes were observed in pause frequency or duration. Increased SPL without additional pausing suggests enhanced expiratory muscle support, likely attributable to EMST. These findings support a combined therapeutic approach to improve functional communication and quality of life in individuals with PD.

Filled Pausing in Parkinson's Disease

Presenter: Kendra Richardson | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Jessica Huber

Introduction: Parkinson's disease (PD) is a neurodegenerative disease that affects an individual's ability to speak. There are also changes to how they control their body for walking and breathing. Prior literature has shown that people with PD have longer pauses and produce fewer filled pauses ("um"), which may impact their communication exchanges. However, it is unclear why these patterns exist. The current study aimed to examine respiratory physiologic mechanisms associated with FP production in older adults with and without PD. Methods: Two-minute-long extemporaneous speech samples were collected from 14 people with PD and 14 age-and-sex matched older adult controls (OC). Duration and frequency of filled pauses (FP) along with respiratory movements at the start and end of each FP were analyzed using MATLAB and Praat. Results: People with PD produced significantly fewer filled pauses during the monologue task compared with their OC counterparts. Both groups produced FP at the mid-lung volume range and their durations were similar. Conclusions: The decreased number of FPs in people with PD could be explained by physiology or cognition. Initiation of speech is more difficult for people with PD, so they may choose not to initiate the extra filled pauses. However, the literature has also shown that PD reduces responses to internal cues. Thus, this may be an cognitive-linguistic difference in PD wherein patients do not respond to conversational cues like they did before their disease onset.

Auditory System Function and Self-reported Listening Ability in Individuals with Anxiety Disorders

Presenter: Angel Wang | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Mishaela DiNino

Anxiety disorders have been associated with abnormal altered sensory perception within the visual domain. However, much less is known about how anxiety disorders may disrupt auditory perception and attention in socially complex environments. This study aimed to examine the relationship between anxiety disorder symptoms and auditory perception. Participants included young adults with self-reported symptoms of anxiety. We measured hearing thresholds (a measure of cochlear function), and auditory brain stem responses (ABRs; a measure of subcortical auditory processing). Listening abilities were measured using the Speech, Spatial, and Qualities of Hearing scale (SSQ), a validated self-report task. Additionally, participants additionally completed the GAD-7 to assess the severity of generalized anxiety and the Social Interaction Anxiety Scale (SIAS) to measure anxiety symptom associated with social anxiety. Statistical analyses revealed no significant relationships between GAD-7 or SIAS scores and the measures of auditory system function. However, individuals with greater symptoms of social anxiety reported significantly greater difficulty hearing in noisy environments, localizing sound sources, and perceiving sound clearly in the SSQ. Our findings suggest that while anxiety symptoms

may influence an individual's hearing experiences, these experiences are not related to auditory physiology. The significant association observed between SIAS and SSQ scores may stem from negative bias in individuals with anxiety, or because the SSQ consists of many questions about listening in social situations. Further research is underway to examine the relationship between anxiety disorder symptoms and performance on auditory tasks.

Earth Sciences

Finding Crevasses on the Greenland Ice Sheet

Presenter: Alexandra Avellaneda | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Kristin Poinar

Crevasse fields on the Greenland Ice Sheet may provide pathways for meltwater to reach the glacier bed, affecting ice flow and contributing to sea level rise. Remote sensing provides an effective means of monitoring crevasses due to its frequent, wide-area coverage. However, not all satellite imagery is equally suited for this task. Optical satellites are limited by snow, cloud-coverages and nighttime, whereas synthetic aperture radar (SAR) penetrates snow layers, clouds, and operates in all lighting conditions. Crevasse fields are rough surfaces on the ice sheet that produce high backscatter, appearing bright on SAR imagery, while smooth ice surrounding them produces low backscatter, appearing darker. Here, I digitized crevasse fields on western Greenland using Sentinel-1 SAR satellite constellation to support the development of MimiNet, a neural-network for automated crevasse detection. I identified crevasse fields across a 629 km^2area. Using a map scale of 1:7000 in QGIS, I analyzed 40 Sentinel-1 images acquired from January 2014 to January 2026. I used Sentinel-2 and World View optical imagery as a reference to improve my interpretation of crevasses. I found an average crevasse field size of 3.3 km^2 and found that crevasses cover about 80% of my study area. My dataset provides ground-truth labels needed for training and validating MimiNet, enabling crevasse detection across larger areas of the ice sheet than can be feasibly studied by a single scientist. This work contributes to improving deep learning-based feature detection methods and supports ongoing research on the role of crevasse fields and sea level rise.

Holocene hydrological and ecological changes in Bonnie Lake, Southeast Greenland

Presenter: Andrew Cuzzacrea | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Elizabeth Thomas

Arctic amplification is accelerating hydrological and aquatic ecosystem changes, warranting paleoenvironmental studies. To understand Arctic hydrology and ecosystems, we analyzed a 95 cm-long sediment core from a lake in southeast Greenland using radiocarbon dating, X-ray fluorescence (XRF), color reflectance, and n-alkanoic acids. The bottom 35 cm of the core is characterized by sediments with high Ti and K and low Incoherence/Coherence ratios, suggesting glacial sediment deposits. At 62 cm, the sediment abruptly transitioned to organic-rich material, revealing the glacier retreated from the catchment at 8.3 ± 0.1 ka. For the past 8.3 ka, Ti and K decreased, suggesting reduced erosion due to vegetation development in the catchment. Concurrently, chlorophyll-a preserved in the sediments steadily increased, with an abrupt increase in the past 1 ka, suggesting an increasing primary productivity. During the past 7.6 ka, we infer from plant waxes a shift in the summer hydroclimate, while winter precipitation decreased. Except for the past 1ka, this difference covaries with post-glacial Ti values, suggesting a strong decrease of snowmelt runoff, whereas evapotranspiration likely dominated and increased strongly in the past 1 ka. The hydrological and ecological changes at the lake emphasize Arctic sensitivity to climate forcing, allowing us to make better predictions.

Modeling Stream Temperature in Response to Climate and Hydrologic Change in Mountain West River Basins

Presenter: Harrison Van Lone | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Yifan Cheng

Trout in the Mountain West depend on cold stream temperatures, yet river systems are increasingly influenced by shifts in hydrologic regimes under climate change. This project investigates how projected climate and hydrologic changes may influence river water temperature in major river basins in the States of Wyoming and Colorado, including the Platte River, Yellowstone River, Henry's Fork, Roaring River, and Gallatin River basins. We propose to use the River Basin Model (RBM), a computationally efficient stream temperature model suitable for large river basins, to simulate stream temperatures for the proposed river basins. To account for the impacts of human activities, especially dam operations, we used RBM-2L, i.e., RBM dynamically coupled with a two-layer reservoir temperature model (on-going effort, not present in this poster). To evaluate the model performance, we compiled and filtered streamflow and temperature records

from the United States Geological Survey (USGS) streamgage sites and assessed data availability within each basin (1980-2025). Understanding how river and reservoir temperatures respond to changing climate and hydrologic conditions is important for protecting trout habitat, sustaining recreational fisheries, and informing water management policy in the Mountain West. This work contributes to an ongoing research project funded by the National Sciences Foundation, i.e., DISES-EX project, Rainbows on the Horizon: Understanding the Dynamics of Integrated Climate, River, Trout, Tourism, and Policy Systems in the Mountain West, which explores connections among climate, river systems, ecology, tourism, and policy in the Mountain West.

Assessing Late-Glacial Varve Presence and Environmental Controls in Western New York Lake Sediments

Presenter: Grace Maxson | **Presentation Format:** Poster Presentation
Faculty Mentor: Jason Briner

Paleoenvironmental data from lake sediment records can be used to contextualize modern climate and environmental changes. One lake that can provide such information is Red Pond (42.133°N, 78.913°W), a meromictic kettle lake on the Last Glacial Maximum terminal moraine of the Laurentide Ice Sheet in western New York. We collected sediment cores using a Nesje-style percussion-piston coring system for the soft upper sediments and a manual GeoProbe percussion coring system for the stiff lower sediments. The sediment cores contain a unit of finely laminated (sub-millimeter) tan clayey sand at the base, with a transition to a unit of dark brown organic-rich sediment that persists to the top. An age-depth model based on 10 radiocarbon ages from terrestrial macrofossils indicates that the basin formed before 14.0 ± 0.2 cal ka BP and the transition from tan sand to dark brown silt occurred approximately 10.6 ± 0.4 cal ka BP. Petrographic sediment thin sections show microscopic alternating layers of coarse silt and finer material in both the upper and lower sediments. In the upper sediment unit, the finer layers are opaque organic material, while in the lower sediment unit they are composed of finer clastic material with orange siderite (FeCO3). In the lower sediment unit, we aim to count the couplets of coarse silt and fine clay with siderite to compare with the age range predicted by our age-depth model for the counted interval. Our interpretation of the mechanisms by which these layers may have been deposited will be informed by X-ray diffraction analyses of sediment composition at 10 different locations in the sediment core. We aim to assess whether these alternating layers were deposited annually, which could provide a precise chronology for other paleoenvironmental data and offer insight on the paleolimnologic processes in Red Pond in the early Holocene. This work will help elucidate paleoenvironmental conditions in western New York, with potential for comparison to other iron-rich anoxic lake environments in the modern day.

Method Development for Root Exudate Collection in Drought Conditions

Presenter: Kris Ogilvie | **Presentation Format:** Poster Presentation
Faculty Mentor: Richard Marinos

Carbon containing root exudates secreted into the rhizosphere facilitate several plant processes such as communication and nutrient uptake. Collection of these exudates is typically done in aqueous conditions, which is suboptimal for examining exudates released during drought. With this new method, which uses inexpensive materials such as diatomite, it is possible to collect these exudates without disturbing soil conditions. With climate change altering precipitation patterns, applying this methodology will allow a deeper insight into the impact on soil chemistry and carbon cycling.

Do lake-effect precipitation events have unique isotope signatures?

Presenter: Samantha Striemer | **Presentation Format:** Poster Presentation
Faculty Mentor: Elizabeth Thomas

Lake-effect (LE) precipitation is relatively unstudied even though it significantly affects people in Western New York. Learning about LE precipitation can help predict how its intensity and frequency could change in the future, while also helping us learn about the past. LE precipitation occurs when cold air moves over a warmer lake, absorbs heat and moisture, and rises and cools, producing heavy snow downwind of the lake. Prior research suggests that LE precipitation has different stable isotope values compared to non-LE precipitation. However, no one has determined whether there is a unique LE signature found within ?2H values, which describes the ratio of 2H to 1H. To investigate isotope signatures in LE precipitation, we are analyzing 10-year-long event-based precipitation isotope datasets collected from two sites in upstate New York. First, we use the wind direction, air temperature, and lake water temperature prior to the precipitation to categorize the data as either a LE event from Lake Ontario or Lake Erie, or not LE. We then compare ?2H values of the LE and non-LE data to identify if there are significant differences. The goal of this research is to determine if ?2H can be a tracer for LE events and to develop a record of LE events for both collection sites. This research can help answer

outstanding questions in many fields, like meteorology and paleoclimatology. Our findings will determine if lake effect events can be tracked in paleoclimate data, and can inform policymakers to help plan for future climate change.

Economics

Medicaid Expansion and Insurance Coverage for Young Single Mothers

Presenter: Janeeta Ashimi | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Joanne McLaughlin

This study examines how Medicaid expansion under the Affordable Care Act is associated with health insurance coverage among young single mothers in the United States, and whether the effects differed for Black single mothers relative to other women. Using data from the American Community Survey, I analyze insurance coverage among women aged 18-35 and estimate linear probability models that compare insurance coverage across states and over time, incorporating demographic controls and state and year fixed effects to account for differences across locations and national trends.

The results indicate that, after controlling for observable characteristics and fixed effects, Medicaid expansion is associated with small changes in insurance coverage among young single mothers. Additionally, the estimated relationship varies by race: the interaction suggests that the association between expansion and insurance coverage is slightly more negative for Black single mothers relative to non-black single mothers.

These findings highlight the importance of examining heterogeneous policy effects across demographic groups and suggest that the relationship between public health insurance expansions and coverage outcomes may differ across populations. While the analysis identifies important patterns, results should be interpreted as associations, rather than causal effects.

Utility Shocks and Asset Valuation: Evidence from a Synthetic Economy

Presenter: Faheem Khawar | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Justin Downs

Synthetic economies are economic systems existing within video games that feature their own currencies, markets, and institutional rules. Under suitable conditions, these economies can exhibit behavior closely resembling that of real-world markets, allowing them to function as laboratories for economic theory and policy, as well as for studying economic mechanisms that are difficult to isolate in traditional settings. This study examines such a synthetic economy within SkyBlock, a massively multiplayer online role-playing game hosted on the Hypixel Minecraft server.

We investigate how markets reprice an asset when explicit utility is introduced to an item that previously had constant and zero functionality. Prior to July 2024, the item Stock of Stonks was initially tradable on SkyBlock's centralized in-game marketplace, where players buy and sell goods using currency, despite having no functional use. Its valuation was driven largely by speculative demand and trend-based appeal, as ownership conveyed novelty and status rather than utility. A game update introduced concrete functionality for Stock of Stonks, creating a precisely timed and exogenous shock to its fundamental value.

Using price and volume data before and after the update, we document a sharp and persistent shift in asset valuation consistent with a transition from trend-driven pricing to utility-backed valuation. This setting provides a clean natural experiment illustrating how markets incorporate newly introduced use-value. The findings offer insight into analogous real-world phenomena, such as the repricing of speculative or trend-based assets following regulatory recognition or the introduction of functional use cases.

A Benefit-Cost Approach to Rain Barrels in Syracuse, New York.

Presenter: Aidan Maturo | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Michael Coury

How much are you willing to pay for a clean environment? It's a tricky question. For the majority of the twentieth century Onondaga Lake was considered the most polluted lake in the United States. In response to this, many cleanup efforts and sustainability programs were put in place to mitigate the pollution that was detrimental to the region's biodiversity and ecosystem. As of late, more preventative measures have been of increasing use in the surrounding area of Syracuse. This includes a program supported by many local non-profits called Save the Rain with their rain barrel project. This project uses rain barrels scattered around the city to prevent polluted runoff from entering Onondaga Lake. This study will

be an in-depth cost benefit analysis of this project using advanced econometric tools such as the Hedonic Price Method to put an accurate monetary value on the perceived benefits of a clean ecosystem and environment for Onondaga Lake.

Day of the Week Effect on the Stock Market

Presenter: Neetu Nijjar | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Joanne McLaughlin

This project studies whether stock market returns differ depending on the day of the week. Using daily data from the S&P 500 index from January 2022 through December 2025, I calculate daily returns and compare the average return for each weekday. I use statistical analysis to test whether returns on certain days tend to be higher or lower than others, while also accounting for factors like market movement during the day, trading activity, and the previous day's returns. The results show that average returns are very similar across weekdays, with only small differences between them. This suggests that clear day-of-the-week patterns are not present in recent data. This matters because financial markets are expected to be efficient, meaning predictable patterns should not exist. Overall, the findings suggest that simple timing patterns in stock returns are weak or no longer present in modern markets.

Industry Resilience after the 2008 Financial Crisis

Presenter: Bennett Schaefer | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Joanne McLaughlin

The primary motivation of this project is to study how regional industrial makeup affects areas rebound after a major economic shock. I will be doing a case study on the 2008 financial crisis, looking at labor market outcomes by industry pre- and post- shock. Using Industry Labor Shares at the county level, I will estimate the effect each industry has on their county's economic growth rate. Following a 2019 paper by Silvia Rocchetta and Andrea Mina measuring the economic resilience of growth based on an areas technological profile in the United Kingdom, I will perform a difference-in-differences experiment regressing GDP growth on a county's labor share lagged one year, with interaction terms representing the effect of the industry shares post 2008. The coefficients on the interaction terms will represent the economic growth post a recession, measuring the resilience of an industry when a shock occurs. I hope to show which sectoral labor market allocations are more resilient to a macroeconomic shock, and how each specific industry allocation affected the rebound of an area post-shock.

Power, Culture, and Participation: Rethinking Digital Infrastructure and Female Labor in South Asia

Presenter: Suhayma Suha | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Joanne McLaughlin

This paper provides evidence that digital infrastructure affects the female labor force participation rate (LFPR) in South Asian countries. Prior studies have shown that seemingly unrelated infrastructure, such as access to electricity, has increased the LFPR in developed and developing countries. However, since South Asian countries have distinct histories and cultural norms around gender, it is important to examine these economies separately, rather than generalizing from studies from other regions, such as Middle East and North Africa, Latin America, or the United States. I use panel data from eight South Asian countries from the years 1999 to 2019 to estimate the effects of digital infrastructure, measured through electricity consumption, internet usage, and mobile cellular subscriptions, on the female labor supply. I used a fixed effects model to estimate the causal effects of digital infrastructure on female labor supply. My preliminary results find evidence of a nonlinear relationship between the female LFPR and electric power consumption, but internet usage and mobile subscriptions do not have significant impacts on the female labor supply. These results suggest that, unlike in other parts of the world, digital infrastructure does not necessarily push women into the workforce in these regions. Instead, it suggests that female labor supply is responsive to digital infrastructure changes only when it is culturally acceptable for South Asian women to use household appliances, allowing them to reduce their time spent at home.

Complements or Substitutes? AI Exposure and the Evolving Returns to Social Skills

Presenter: Kaiyi Wang | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Joanne McLaughlin

This paper examines how the wage premium associated with social skills — relative to routine cognitive skills — has evolved in the post-2022 period, coinciding with the widespread adoption of generative AI. Using individual-level data from the CPS-ASEC and ACS, merged with occupational task content from O*NET and AI-exposure indices (AIOE and

GPT-exposure scores), I estimate log-wage regressions that identify the social skill premium across varying levels of AI exposure. The central hypothesis is that AI disproportionately substitutes for routine cognitive tasks while complementing interpersonal and social skills, thereby widening the wage premium for social-skill-intensive occupations — and that this effect is most pronounced in highly AI-exposed occupations. I further explore heterogeneous effects by race and ethnicity to assess whether AI-driven labor market restructuring exacerbates or moderates existing wage gaps. To address comparability concerns across intrinsically different occupations, the empirical strategy employs continuous AI-exposure scores, occupation-group fixed effects, and rich individual and occupational controls. The findings contribute to a growing literature on AI's distributional labor market impacts by providing updated evidence on skill complementarity and wage inequality.

English

Representing Displacement: A Critical Discourse Analysis of U.S. Media Narratives on Refugees and Forced Migrants in 2025

Presenter: Ciah Courtney | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Dimitrios Anastasopoulos

This paper examines how the language and rhetoric used by media outlets in the United States in early 2025 construct the “refugee” and “migrant,” as well as the ethical and political implications of this construction. The first six months of 2025 marked the early days of Donald Trump’s second presidency; during this period there was a shift in media sentiment towards all foreign-born individuals. The signing of executive orders that halted refugee admissions and instated travel bans sparked increase in media discourse around the topic of migration. Through a critical discourse analysis, the way in which language constructs power, identities, and ideologies in nine articles from across the political spectrum about refugees and forced migrants were thoroughly analyzed. This paper concludes that media discourses from the beginning of Trump's second term in office construct the “refugee” and “migrant” less as autonomous individuals and more as a passive subject of need, economic pawns, or security threats. This kind of construction encourages violence and hatred, politicizes forced migration, and makes humanitarianism out as a transactional, nationalist project rather than a moral obligation.

Narratives of Freedom and Belonging from Pauli Murray

Presenter: Basil Thomas | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Miriam Thaggert

I have developed an undergraduate research project concerning the use of narrative in Black and queer identity formation in the work of African American poet, novelist, lawyer, and activist Pauli Murray. Taking an interdisciplinary approach, I analyzed Murray’s poetic, autobiographical, and legal work together to understand how Murray’s work renders or obscures their identities and what rhetorical tools Murray utilizes to articulate their identity under normative constructions of national belonging and citizenship. Utilizing conceptual frameworks from African American literature and queer theory, I argue that Murray’s narratives reveals how Murray takes up normative constructions of citizenship to render their identity legible. This project responds to the limits of current research on Murray which eschew an interdisciplinary analysis and do not apply conceptual frameworks of the queered subject. This research adds to the growing body of work on how narration articulates transgender identities and understandings of generic conventions in American autobiography.

Environment and Sustainability

Screening Cu(I)-based Electrochemical Carbon Capture Sorbents for Stability

Presenter: Nicole Gerdes | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Jonathan Boualavong (Dept of Civil, Structural, and Environmental Engineering, SEAS)

Excessive carbon dioxide (CO_2) in the atmosphere continues to drive severe climate challenges of great concern to human and environmental well-being. This calls for further development of energy- and cost-efficient technologies to capture CO_2 out of the atmosphere for long-term sequestration in, for instance, deep saline aquifers. Electrochemical

carbon capture, which uses electricity to drive the CO_2 capture reactions, has low energy and cost, but current electrochemical approaches are often unstable in the presence of oxygen gas in the air. One promising but air-unstable electrochemical approach uses the Cu(II)/Cu(I) redox couple to control a CO_2 capture absorbent, the substance binding to CO_2. This research explores how effective different CO? absorbents are at increasing the Cu(II)/Cu(I) reduction potential, a measure of how unstable the Cu(I) state is to oxygen. The findings presented in this research provide insight into which absorbents (histidine, histamine, or imidazole-acetic acid) and buffer combination(s) will stabilize the Cu(I) system most effectively.

Geography

Visualization of Bicycle Crashes, Biking Level of Traffic Stress, and Bicycle Equity Index in New York City

Presenter: Mia Maines | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Irina Benedyk (Dept of Civil, Structural, and Environmental Engineering, SEAS)

Tools based on Geographic Information Systems (GIS) greatly facilitate visualization of differences between geographic regions, and thus are supplemental in the field of transportation studies. This study aims to examine the ongoing issue of bicycle crashes in New York City and compare it to factors potentially influencing bicycle equity. Previous methods of quantifying bicycle equity are reviewed, with a bicycle equity index and biking level of traffic stress (BLTS) calculated to compare to crash distribution.

Results indicated that the BLTS was highest in peripheral tracts of New York, contrasting with the Manhattan-weighted distribution of crashes. There was no significant Pearson correlation between variables, but Lee's L was statistically significant in many areas for all three interrelations. High positive correlations among all interrelations were found in areas of Northern Manhattan and Central Brooklyn.

Routes of Removal: Statistical Analysis of U.S. Deportation Flights

Presenter: Lauren Phung | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Sara Metcalf

The United States increasingly utilizes third-country deportations, which refers to the removal of non-citizens of the U.S. to countries other than their country of origin. This research examines the international cooperation required for deporting individuals, particularly to third countries. The use of third countries is significant, as the current U.S. deportation system involves geopolitical dependencies that underscore a broad power asymmetry between the U.S. and other countries. While previous research has addressed deportation as a legal process, the geopolitics behind the transportation, logistics, and carceral infrastructure of deportation flights remain understudied. This research aims to identify the economic and social factors that influence the likelihood of a country being asked to allow U.S. deportation flights to land there, and the likelihood that they agree to such an arrangement. This study uses logistic regression models to assess the importance of economic and social factors that reflect the relationship between the U.S. and other countries. The results of the economic analysis suggest that the lowest-income countries were more likely to be asked to accept deportation flights. Of the countries asked, those with the greatest income inequality were more likely to accept deportation flights. The analysis of social factors revealed that countries with a lower human development index were more likely to be asked to accept deportation flights. Of the countries asked, those with a higher rate of violence towards civilians were more likely to accept such flights. Details and implications of the results from this statistical analysis will be discussed.

History

The Life of Lady Jane Grey and the Relationship Between Women and Religion in Modern US Politics

Presenter: Paige Bedell | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Claire Schen

The project that I am working on this semester is a History Honors Thesis Paper. The topic of my thesis paper is the life of Lady Jane Grey and the relationship between women and religion in modern US politics. How can the life of Lady Jane Grey showcase what has changed and what has stayed the same when involving women and religion in positions of

political power in the United States? I have been reading, watching, listening, and examining primary and secondary sources that have helped me to understand more about the life of Jane Grey and the religious and gender aspects of politics. The main thing I have found so far was how the way women and religion are treated in positions of political power have changed after the time that Jane was alive but many values and ideals stay the same. This matters because in the past as well as present day, women are overlooked for positions of political power because they were not born a man. Even if they have a better education and are more qualified than a man is, many of the women who run for an elected office position aren't voted in because people don't see them as being qualified because of their gender. As well in politics we see that the religion of the people running is also important even though in this country we should be separating church and state to make things less biased towards one group of people over another.

Dark Entries: Patient Experiences of Madness in the 19th Century American Asylum

Presenter: Luke Carey | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Michael A. Rembis

This thesis examines the written work of people in 19th Century America that were categorized as Mad, Insane, or Lunatics, or otherwise placed into Asylums. Through a more thorough analysis of patient written work and lived experience, which has historically been ignored by historians of madness, I attempt to reveal a history which has remained largely covered by emphasis on physicians, doctors and institutions. Although these are important stories, my focus is on the inmates of asylums themselves – the hundreds of thousands of people committed to psychiatric institutions, often against their will or knowledge. What I find is that patients often recognize the reality of their surroundings. Asylums were not only places of rest or treatment, but could quickly become fixated on containment and control. Moreover, this research shows that asylum patients were not merely victims of an oppressive system, but through their writing, became active opponents and critics of the institutions, and using their voices, we can speak for the thousands more that were, and have been, silenced. This contributes to the growing Historical interest in smaller scale histories, and moving away from grand narratives about Great Men, opting to focus closer on the individual, while simultaneously prescribing agency to people who have been neglected, both in the historical record, and during their own lives.

A Continent Aflame: British and French Foreign Policy during the American and Mexican Civil Wars

Presenter: Max Chernetsky | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Sarah Handley-Cousins

This project aims to investigate the foreign policy aims of the British and French Empires in the Americas, and how they were impacted by the advent of the American Civil War (1861-1865). The seeming collapse of the U.S. made it so that it was unable to project significant power outwards, creating a unique opportunity which these powers could easily exploit - yet only the French did (seeking regime change in Mexico). The goal is to demonstrate how the American diplomatic 'ecosystem' changed, causing French regional policy to shift towards interventionism while British policy (ensuring stability and ease of commerce) remained relatively intact; this is accomplished through original archival analysis of both important public media of the period (such as newspapers, treaties, and speeches) alongside more private diplomatic correspondence gathered from both sides of the Atlantic. On a broader scale, the Civil War in American diplomatic history is relatively understudied - traditionally, Civil War scholarship treats the war as an isolated 'island', separate from both broader histories of the 19th Century and from diplomacy in other parts of the globe. This project seeks to put the Civil War back within those contexts, expanding historical knowledge of the conflict by putting it within a broader region (North America) in which multiple powers beyond the U.S. had significant interests.

The Spread of Séance: How and Why the Story of the Fox Sisters Spread

Presenter: Liam Riter | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Claire Schen

This project focuses upon the Fox Sisters of Rochester, New York, who were mediums that used a variety of techniques to trick the people of the mid-19th century into thinking that they were communing with the dead. The main goal of my research is looking into how news of the Fox Sisters' exploits traveled America. How far did stories reach and how quickly? I also research why people at the time believed in the sisters and how that belief in the séances spawned a religious movement. I analyze historic newspapers from across America during the 19th century. I then use ArcGIS mapping to show the geographical range of the Sisters' séances and stories on the Sisters and bring in chronological visualizations to show the pace at which those stories spread. For instance, news of the Fox Sisters spread as far west as Nevada as early as 1888, which means that word of the Fox Sisters spread nearly 2,000 miles in the span of just over 40 years. My

research also utilizes conflicting accounts at the time, from both believers and skeptics to discern how people came to believe in the Fox Sisters and their reasons for doing so. Reasons for belief varied, but the predominant view was that their séances were seen as the start of an entire religious movement. My research helps to dispel myths of the Fox Sisters being simple charlatans, re-contextualizing them as the catalyst for an entire spiritual movement and demonstrating their historical significance.

History of the Cold Spring Fire Department

Presenter: Brennan Spruck | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Cari Casteel

My research focuses on telling the story of the Cold Spring Fire Company. It is a story about rejecting complacency, highlighting critical thinking in the face of adversity, and their unwavering support and dedication to others. The project discusses various historical, geographic, and technical challenges that the small fire department has faced in its continuing fight to protect the residents of Cold Spring, New York. The story begins by observing early obstacles the founders of the department were forced to navigate. It weaves its way through time, with discussions of economic hardship, low recruitment numbers, and struggles of a diverse set of missions based around an incredibly unique geographic location. The project finds a multitude of different responses to these problems and displays the ingenuity of the members of the fire department throughout its history. It displays the commitment of its members who are constantly training, modernizing, and who all demonstrate a stubborn refusal to remain complacent, all themes common throughout the department's history. The project is significant in the fact that it displays, through time, regardless of cost or severity of a situation, the constant commitment to the health and safety of a small town's residents, while highlighting the tremendous effort that goes into its mission, even for a town of less than two thousand residents.

The 80's political consequences of LA Punk vs The LAPD

Presenter: Jake Wojtowicz | **Presentation Format:** Oral Presentation
Faculty Mentor: Dr. David Herzberg

In the early 1980s, something explosive was happening in Los Angeles. While Ronald Reagan preached law, order, and a return to "traditional values," a generation of kids were screaming back from basements, and grimy clubs across the city. My project dives into that collision between youth rebellion and state power, and it centers on the volatile relationship between the punk scene and the Los Angeles Police Department. The struggle comes down to being less about music and more about who gets labeled "criminal." It's about how the looks and sounds of a music genre became political under constant influence from opposing forces. Under Chief Daryl Gates, the LAPD treated punk shows like battlegrounds. Raids, batons, mass arrests, all while the media narratives painting kids as violent threats to the American family. Punk wasn't random chaos, but more of a lightning in a bottle reaction to Reaganomics. To police militarization. To a culture that told young people to shut up and conform. I argue that punk in Reagan's America was political resistance that inspired generations of protest through song while at the same time demonstrating the earlier versions of LA Police brutality. The mosh pit became a site of protest. The stage became a platform. And the LAPD response reveals how power reacts when youth refuse to be quiet. This project asks a simple, uncomfortable question: when the state says "order," whose voices get crushed to achieve it?

Cold War Television and American National Identity

Presenter: Juliana Yanik | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Victoria Wolcott

My Honors Thesis Paper is focused on popular culture in Cold War America, specifically, television shows from the 1950s and early 60s. I've always been interested in the Long Fifties period in American history, and how popular culture (TV, music, movies, comic books) shaped national identity. As I delved deeper into Cold War media, I found there were discrepancies between the most popular shows. Father Knows Best epitomized the classic 1950s gender roles and norms, I Love Lucy both conformed to and went against them, and The Twilight Zone actively critiqued them. These differences demonstrate the post-war push and pull in American media. On one end, production companies were following a strict, traditional, and conservative narrative and on the other, they were actively going against it, critiquing the country. Leading up to this revelation in the media, I will be explaining the post-war debate on the morality and censorship of comic books in America. The outcome of legal hearings in the early fifties demonstrated the government's knowledge that popular culture was at the center of Cold War politics on the home front. For conservative Americans, the messages and themes in written media and television needed to aid in shaping the ideal American which would help bring the country to

victory over the Soviets. With television popularity exploding across America, the juxtaposition between conforming and critiquing Cold War values and censorship became the head of social politics.

Jewish Thought

A Conceptual History of Idolatry

Presenter: Ori Edgar | **Presentation Format:** Oral Presentation
Faculty Mentor: Dr. Sergey Dolgopolski

Idolatry is a concept that is native to the Bible. The prohibition on the worship of idols originates in the Bible and comes from its concerns around the worship of the one God. It is enshrined in the Ten Commandments as “You shall have no other gods besides Me,” and “You shall not make for yourself a sculptured image,” (Exodus 20:3-4). These commands show the multifaceted nature of Idolatry as it is at once the worship of a physical idol, the worship of a false God, and the incorrect worship of the right God. What is strange, then, is that the word Idolatry does not appear once in the entire Hebrew Bible, neither does the term עבודה זרה or foreign worship appear. Rather, idolatry is coined in 1 Corinthians, a Pauline Epistle. The word in Greek is ειδωλολατρειας which combines the Greek words for that which is seen and worship. Using a close textual and conceptual reading of conical and non-canonical sources this project argues that idolatry is not a neutral or natural term, rather it is one that grows out of the Biblical religion and Paul’s response to it. This project aims to contribute a conceptual history of idolatry and the intellectual environment that makes it not only possible, but prohibited.

Mathematics

Modulation Equations for Multi-Component Nonlinear Wave Equations and Applications

Presenter: Amrita Ganapathy | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Gino Biondini

In many natural systems, nonlinearity and dispersion are the dominant physical effects. In such cases, the dynamics is described by nonlinear wave equations. In particular, the propagation of coherent light pulses in optical fibers is governed by the Manakov system, which comprises two coupled nonlinear Schrodinger-type equations. The Manakov system is completely integrable, and as such possesses a rich mathematical structure. However, a comprehensive understanding of its solutions remains elusive.

The present study focuses on the analysis and applications of Whitham modulation equations for the Manakov system, a system of nonlinear first-order partial differential equations that govern the evolution of the amplitudes and velocities of the interacting waves. Whitham theory has been used with great success for a wide variety of systems. Unfortunately, the modulation equations for the Manakov system were previously too complicated to solve.

Our work leverages the integrability of the Manakov system, and in particular its Lax pair. We elucidate the geometry of the spectral curve associated with the solutions of interest, and we identify its branch points. We then show that these branch points are the Riemann invariants of the Whitham equations, i.e., the set of dependent variables that diagonalize the modulation system. The resulting, streamlined system of equations makes it possible to study a variety of concrete physical problems, such as the stability of the underlying solutions, Riemann problems, and a characterization of what solutions lead to the generation of dispersive shock waves.

Cubulation of groups

Presenter: Caden Holland | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Johanna Mangahas-Kutluhan

The way we better understand geometric objects in mathematics is through their symmetries. For example, given a cube, if you were asked what all the symmetries are of the object and we don't arrive at an answer, we don’t fully understand the cube! We define free groups, which are groups that have a set of elements, denoted as letters such that their multiplication is by concatenation of letters, followed by reduction through an element and their inverse. The identity is denoted e. We can add relations that dictate these word composition, and we can then describe these groups with relations as geometric objects. Cubulating involves gluing these geometric representations in a "legal" way according to

specified rules. The action of this is called cubulating, which can be a long task by hand, and the goal was to compute this through code in SageMath instead.

Media Study

The Present

Presenter: Natalie Bucki | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Sama Waham

The project I am submitting is a short experimental fiction film that serves as a reminder to remain present. The story follows a young woman who receives a mysterious gift: a camera that transports her to different places each time she takes a photograph. What begins as wonder gradually transforms into introspection, as she is led to a strange and symbolic space where she is confronted with a haunting question.

Through surreal imagery and metaphor, the film explores timeless philosophical questions about fate, control, and the human tendency to obsess over planning the future. As the protagonist navigates increasingly symbolic encounters, she is forced to reckon with uncertainty and the limits of what she can truly shape. Ultimately, the film suggests that while the future remains unknowable, the present moment is the only space we can meaningfully inhabit and influence. Today.

Exploring the Works of Margaret Dolinsky and the CAVE Network

Presenter: Zuzu Guilfoyle | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Dave Pape

I am studying the work of artist Margaret Dolinsky. She helped shape digital art programs into what they are today, by guiding students to explore the intersection of creativity and technology. Dolinsky was a painter who became a pioneering virtual reality artist at Indiana University, working with the CAVE beginning in the mid 1990s. The CAVE is a projection-based VR system, an alternative to familiar head-mounted displays like the Meta Quest. My research involves tracking down the scattered documentation of CAVE art work and creating a thorough, unified summary of Dolinsky's career that can be reflected on, explored, and act as a basis for those who are interested in learning more about the digital art space. Margaret's own professional growth was marked by a spirit of experimentation, and it would be an honor to bring to light her legacy as well as raise awareness of women in the digital arts.

Music

Live Performance In Musical Theater Is More Than Just Entertainment

Presenter: Kendric Warrick | **Presentation Format:** Oral Presentation
Faculty Mentor: Tamika Hanley (EOP)

This Theatrical Synchrony Hypothesis project argues that musical theater facilitates engagement with difficult conversations by reducing defensiveness and strengthening collective empathy. Specifically, it examines how live theater creates a communal space in which audiences confront complex themes such as American identity, justice, racial inequality, and grief through embodied storytelling through music and language. Drawing on sociological theories of collective experience alongside psychological research on emotional contagion, narrative transportation, and synchronized sensorimotor integration, this study positions musical theater as a powerful site of social processing. When people observe music theater, it breaks down a border where academic argument might not, seen through emotional contagion.

By analyzing productions like: Dreamgirls, Hairspray, Parade, and Mean Girls/Heathers, the paper argues that ensemble singing and coordinated performance generate measurable social bonding effects, while heightened musical emotion amplifies affective transmission between performers and audiences. When these systems work together they create an environment where individuals are more receptive to complex discussion. This hypothesis is relevant and important culturally due to the possibilities of the levels of communication we can achieve and bridging communities. This is more than just a way to pass the time or a job but a means to dive deeper into human understanding, emotional intelligence, and collective effervescence. Musical theater and live performance is not simply entertainment, but a tool to communicate emotionally to optimize social connection through dialogue.

Philosophy

Local Democracy in Action ~ Buffalo City Charter

Presenter: Na'Dia Carter | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Micaela Lipman

How does the timeline and governance procedures of Buffalo's 1999 Charter Revision compare to the 2026 revision process, and what do these differences reveal about how the city manages charter reform across the two periods? This research aims to inform people of efforts to strengthen the clarity and effectiveness of the Buffalo City Charter. A charter directly shapes how the city governs and delivers policy to residents. This study will use a descriptive research approach focused on document analysis, analyzing patterns between two time periods, focusing on themes of transparency, intensity of public engagement and potential implications of these themes on the charter revisions proposed, by reviewing the historical 1999 Buffalo City Charter to assess how the 2026 Charter Revision process compares to what happened in 1999. This research will highlight how the different procedures for the charter review process support or hinder policy continuity. If time allows, this research will also include interviews with a small number of key community stakeholders to shed light on how transparency and public engagement influence charter revision implementation. The need for transparency in the Buffalo community is increasing with current community engagement initiatives facing struggles of a non-responsive governance. The hope of this research is to advance openness, transparency, and consistency in the city government towards the community in Buffalo, New York. It is time for the Buffalo City Council to advocate for the needs of their residents and to bring solutions to immediate community demands.

Segregation, Complex Identity, and Social Learning

Presenter: Dylan Kleehammer | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Ryan Muldoon

Thomas Schelling developed the seminal agent-based model of emergent, de facto segregation. The Schelling model outlines how even minor individual preferences can lead to segregated communities. Further modifications of Schelling's model describe more complex social systems, such as those which include agents with multiple attributes to consider in their movement decisions. This reflects the heterogeneity and intersectionality of human identity. However, another important attribute of human identity is its capacity to change given the influence of an individual's social environment. By integrating this process into the Schelling segregation model, we evaluate how social learning may influence the composition of communities. The original Schelling model concluded that, even in the absence of discriminatory policy, minor and benign preferences for similarity leads to intense segregation. However, this model evaluates whether the diversity and adaptiveness of individuals in complex society changes those conclusions.

The Ontology of Criminal Psychology and Its Current Representation in the Law

Presenter: Rachel Mavrovich | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Barry Smith

This project is meant to provide a more solid foundation of the applied work done on the ontology of crime using the Basic Formal Ontology. This project is sticking to a philosophical approach to develop an ontological foundation for criminal psychology by clarifying its status within legal reality.

Manufacturing Identity: A Model of Emergent Segregation With Social Learning and Complex Identity

Presenter: Owen Penhollow | **Presentation Format:** Oral Presentation
Faculty Mentor: Dr. Ryan Muldoon

Thomas Schelling's seminal agent-based model (ABM) of segregation demonstrates how even weak preferences for similarity can lead to segregated communities. Later modifications added multifaceted identities. However, another important aspect of identity is its capacity to change given one's social environment. By integrating social learning into the Schelling model, I evaluate how social learning and segregation mechanisms impact diversity, identity, and polarization.

My ABM was developed with NetLogo software. I ran millions of simulated experiments across parameter combinations using high-performance computing at the UB Center for Computational Research. I determined that without preference for similarity and with strong social learning communities remain highly segregated due to clusters of identity polarization.

With preferences for similarity, social learning lowers segregation because communities coalesce around a primary shared identity. When applied individually, both the Schelling segregation mechanism and social learning lead to segregation. However, when combined, they lead to greater integration and stable communities without sacrificing the range of diverse characteristics supplied by pluralistic society.

Physics

Structural Characterization of Safranin-O Binding to Chicken Egg White Lysozyme for Future Anisotropic Terahertz Spectroscopy Studies

Presenter: Rachel Hayek | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Andrea Markelz

This project aims to obtain the first experimental crystal structure of chicken egg white lysozyme (CEWL) bound to Safranin-O (SO), a phenazinium dye, to inform terahertz (THz) spectroscopy studies of ligand-induced changes in protein dynamics. Protein function depends on collective, long-range vibrations on picosecond timescales that can be probed using anisotropic THz spectroscopy. Ligand binding modulates these dynamics, but predicting how a ligand alters vibrational modes requires knowledge of where it binds. While computational docking studies propose SO as a lysozyme ligand, no experimental CEWL-SO structure exists. Crystallization conditions were optimized using hanging drop vapor diffusion, varying NaCl concentration (1.2–1.7 M) and buffer pH (4.7–5.4). After soaking attempts caused crystal degradation, co-crystallization successfully incorporated the dye during growth. High-quality co-crystals were obtained and X-ray diffraction data collected. Structural analysis will determine the SO binding site, providing the foundation for future THz spectroscopy measurements characterizing how ligand binding modulates collective protein motions.

Reprogramming the disordered prion-like domain of FUS protein to regulate its pathological aggregation

Presenter: Rebecca Korsh | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Priya Banerjee

FUS protein aggregation, or fiber formation, is associated with neurodegenerative diseases, including ALS and FTD. The intrinsically disordered prion-like domain of FUS (FUSPLD) mediates self-interactions that can drive both solid aggregate formation and phase separation into dynamic condensates essential for cellular processes. The sequence features governing these distinct assemblies, and whether they are coupled, remain unclear. Fiber formation has been linked to short segments, called steric zippers, within the disordered region. Using the ZipperDB database, we identified two alternative sequences with higher predicted zipper propensity than the native FUSPLD zippers. Substituting these variants enhanced fiber formation without significantly affecting phase separation, indicating a decoupling of the underlying sequence determinants. The variants also cross-seeded each other and formed co-aggregates but did not seed native FUSPLD. Together, these results highlight how subtle changes in IDR sequence grammar can shift FUS assemblies from functional condensates toward pathological aggregates.

Thermorheology Illuminates the Energetic Basis of Viscoelastic Networks in Biomolecular Condensates

Presenter: Shafqat Mahmud | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Priya Banerjee

In living systems, proteins and nucleic acids can co-phase separate via multivalent interactions to form biomolecular condensates. Previous work by the Banerjee group and others have shown that these condensed biomolecular phases are viscoelastic network fluids having both viscous and elastic contributions to their material properties that can change over time. The primary sequence and secondary structure of the scaffolding protein and RNA chains encode collective interactions that control the fluid dynamics of these condensates. Aberrations in condensate fluid dynamical properties have implications in several human diseases including neurological disorder and cancer. Thus, uncovering the physical rules of protein and RNA interactions that govern the condensate dynamical properties and developing quantitative biophysical approaches to probe them are needed. In this project, we have developed temperature-controlled video particle tracking nanorheology to quantify how the energetics of sequence-encoded protein-RNA interactions contribute to condensate dynamics. Our thermorheological analysis reveal that condensates formed by disordered protein and RNA chains obey the Arrhenius law of flow activation energy, which defines the collective energetic contributions of molecular interactions to the condensate viscoelasticity. We further demonstrate that electrostatic screening serves as a direct knob

for tuning the intermolecular interactions between the protein and RNA chains, thereby modulating the properties of the viscoelastic network. Alterations in these interactions correlate strongly with the condensate's material response and flow activation energy: increased electrostatic screening reduces both condensate viscosity and the activation energy required for network flow. Taken together, our analysis provides a quantitative framework for dissecting how intermolecular interactions govern the material properties and energetic landscape of biomolecular condensates.

Polyphosphate as a Prebiotic Scaffold: Ion-Dependent Condensate Phase Behavior and Macromolecular Assembly

Presenter: Jared Rowland | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Priya Banerjee

Within cells polyphosphate chains contribute to energy homeostasis, stress adaptation, metal ion sequestration, and protein quality control. In many biological contexts, polyphosphate is compartmentalized via spontaneous density transitions called phase separation. These transitions are modulated by multivalent counterions, which promote chain desolvation leading to lower and/or upper critical solution temperature (LCST/UCST) behavior upon heat and metabolic stress. While multivalent ions are known to drive polyphosphate condensation, evidence suggests that even monovalent ions (e.g., Na?, Li?) can induce phase separation at extreme (molar) concentrations. We hypothesize that this behavior follows Hofmeister series dependent ion–water structuring, wherein cation- dependent solvation thermodynamics regulate the effective release of bound water upon ion association with the phosphate backbone. Using temperature-controlled microscopy, we observe a systematic shift across the cation series Na? < Li? < Ca^{2}? < Mg^{2}?, where UCST-type behavior, cold shock-induced condensation, transitions to LCST-type behavior. This correlates with increasing counterion charge density and hydration strength, which enhances ion-mediated dehydration of polyphosphate promoting entropy-driven collapse at high temperatures. Furthermore, we test the hypothesis that mixed-cation environments generate complex phase behavior showing a duality of UCST and LCST transitions arising from stoichiometric competition between counterion species with distinct hydration entropies and binding affinities. Such behavior provides a physicochemical framework for understanding how intracellular polyphosphate granules assemble under stress conditions. These observations support a model in which polyphosphate phase behavior is intrinsically tunable by the ionic environment. This sensitivity may be exploited by extremophilic archaeal bacteria as a scaffold to maintain intracellular homeostasis under extreme conditions.

Political Science

The Presence of U.S Military in the Middle East and North Africa Region in Relation to a Decreased Frequency of Coups

Presenter: Tahanie Ahmed | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Carla Martinez Machain

This paper examines the possible casualty between U.S troop deployments to the Middle East and North Africa (MENA) region and a decreased frequency of coups, with a focus on how these deployments shape coup dynamics within the MENA. I argue that U.S troop deployments to significant military bases in the MENA with a high concentration in the Arabian Gulf states exacerbates prior regional tensions and instability, conditioning the coup dynamics to behave distinctly from other regions in the world. I hypothesize that high concentration of U.S military personnel to the MENA is correlated to a decrease in coups (attempts, conspiracy, and successful). I use the liberal democracy levels within each MENA state to discern its tendency towards corruption in relation to its amount of U.S military personnel to understand its coup history if present. I trace the history of U.S military presence in the MENA following WWII (1945) to present day, analyzing the construction of major U.S military bases like the Dhahran Air Base and Al Udeid Air Base. I follow the alliance patterns of the U.S with the Arabian Gulf states in contrast to its adversary states in MENA such as Yemen, Iran, and Iraq to understand how regional instability has a high focus in U.S. adversary MENA states contrasted to U.S ally states.

The Role of Gender in Judicial Decision-Making in New York State Family Law

Presenter: Sophia Furlong | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Abigail Matthews

This project examines whether gender influences judicial decision-making in New York family law cases, focusing on custody and child support cases. While these cases are guided by statutory principles such as "best interests of the child" and the Child Support Standards Act judges retain significant discretion, allowing room for personal bias to shape

outcomes. This study asks whether such discretion results in gender-based patterns, specifically, whether female judges are more or likely than male judges to rule in favor of mothers in custody or child support cases, and whether male judges are more likely to rule in favor of fathers in cases of the same nature.

Psychology

The Masculine Identity: Competitiveness as the Barrier to Male Empathy

Presenter: Brando Diaz | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Michael J. Poulin

This research examines whether norms of masculine competitiveness suppress men's willingness to engage in empathy, and whether reframing empathy as a competitive asset can reduce this barrier. Previous research demonstrates a reliable gender gap in empathy that favors women. Other work suggests that men's empathy is sensitive to threats to their masculine identity and to contexts that prioritize winning and toughness. This study tests whether empathizing feels incompatible with performing a competitive masculine identity. Men will be recruited from an undergraduate Psychology 101 class at the University at Buffalo. Men will be randomly assigned in a 2 (empathy framing: anti-competitive vs. competitive asset) x 2 (masculinity awareness: threat vs. affirmed) between-subjects design. Masculinity awareness will be manipulated with bogus feedback about performance on a gender knowledge test, and empathy will be framed either as interfering with competitive success or as a tool that can enhance performance. Empathy engagement will be assessed with the Interpersonal Reactivity Index (IRI), which measures multiple facets of dispositional empathy, and with choices to engage in additional empathy-focused tasks. I predict that masculinity threat will reduce empathy engagement relative to affirmation, that competitive framing will increase empathy engagement relative to anti-competitive framing, and that competitive framing will eliminate the negative effect of masculinity threat. Anticipated findings would clarify how competitiveness functions as a barrier to male empathy.

First- and Later-Born Infant Joint Attention and Language Development

Presenter: Gabriella Filipski | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Federica Bulgarelli

Joint attention (JA), shared attention of two social partners on a third object, is linked to larger infant vocabularies. While most research examines JA in infant-caregiver dyads, many infants interact with siblings, which may alter JA experiences. We examined JA in two contexts: first-born infant and parent, and later-born infant, parent, and older sibling. Parents, 9-15-month-old infants, and 3-5-year-old siblings participated in 15-minute free-play sessions with provided toys and books. We coded each individual's locus of attention and defined JA as moments when the infant attended to the same person or object as another partner. Measures included total time spent in JA and average bout length. Preliminary results indicate that infants with older siblings spend more time in JA overall, and that longer bouts predict concurrent vocabulary size, particularly for older infants. Ongoing analyses examine group differences and properties of language input during JA. This study highlights the importance of considering multi-partner interactions in real-world language learning.

Joint Impact of Executive Function and Emotion Regulation on Aggression Subtypes in Early Childhood

Presenter: Katie Kremer | **Presentation Format:** Oral Presentation
Faculty Mentor: Dr. Jamie Ostrov

Aggression is a common issue in early childhood with the potential for lasting negative consequences. Previous literature has suggested that lower levels of executive function (EF) and emotion regulation (ER) are independently associated with increases in aggressive behavior during early childhood (Helmsen et al., 2013; Schoemaker et al., 2013). The present study examined the joint roles of EF and ER in aggression during early childhood. Additionally, the study expanded upon previous literature by examining relational aggression (i.e., social exclusion) in addition to physical aggression. Participants (N = 319, 52.0% male, 75.5% White, 4.1% Hispanic/Latinx) were 3 to 5 years old (M age = 4.31 ± 0.31 years). Data was collected in the fall (T1) and spring (T2) of preschool. EF was measured using child performance on the Head-Toes-Knees-Shoulders observational measure. ER was parent-reported, and preschool teachers reported on physical and relational aggression. Main effects and two-way interactions were tested with regression models, using separate models for physical and relational aggression. A significant interaction was found between EF and ER for physical aggression (β= -0.26, p = .047, SE = 0.13). Greater T1 EF was associated with decreased T2 physical aggression among children with high, but not low, T1 ER (β = -.41, p = .02, SE = 0.17). This suggests that children with both high ER and

high EF show less physical aggression than children with just one of these skills. Identifying potential precursors to aggression is essential for identifying children most at risk for aggressive behavior.

Does tempo provide sufficient evidence to elicit a transition from song to speech in perception and production?

Presenter: Ryan Lane and Caden Giardino | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Peter Pfordresher

Language and music are essential modes of communication which have distinct acoustic features which allow a listener to discern the two (Ozaki et al., 2024), including pitch stability (more stable for song than speech) and tempo (slower for song than speech). Recent research in our lab suggests that manipulations of pitch stability, independent of other acoustic cues, may be sufficient to elicit changes in perception of song versus speech as well as changes to vocal imitation accuracy that resemble differences between song and speech. In this study, we address whether manipulations of tempo yield a similar effect. Participants listened to 4-tone sequences that varied with respect to both the stability of pitch (ranging from stable to a glide of 200 cents), as well as their tempo (ranging from approximately 66 bpm to 241 bpm). After listening, participants rated whether each sequence was more song-like or more speech-like, and then vocally imitated the sequence. Data collection is ongoing, and we will present final results at the conference. We hypothesize that faster stimuli and slower stimuli will be perceived as more speech-like and song-like, respectively, given temporal differences typical of both domains, and that vocal imitation effects likewise will resemble effects seen across speech and song.

From Auditory Stress to Behavioral Decline: Noise, Social Context, and Enrichment in an Alzheimer's Mouse Model

Presenter: Grace LeVea | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Micheal Dent

Alzheimer's disease (AD) is the most common form of dementia and is characterized by progressive cognitive decline and neurodegeneration. In addition to memory impairment, AD is increasingly associated with sensory dysfunction, particularly hearing loss, which may serve as both an early biomarker and a modifiable risk factor for disease progression. Chronic noise exposure accelerates age-related hearing loss and induces physiological stress responses in rodents, yet its interaction with social context and environmental enrichment (EE) remains poorly understood. Social isolation is a recognized risk factor for dementia, while EE, including cognitive stimulation and social interaction, has been shown to mitigate behavioral decline in animal models. This longitudinal mixed-factor study will examine how noise exposure and EE interact to influence behavioral health outcomes in female CBA/CaJ mice. Animals will be housed in isolation and exposed for 14 days to either continuous low-level white noise or relative silence. During this period, mice will complete ten 1-2-hour sessions of one of four enrichment conditions: none, social-only, cognitive-only, or combined enrichment. Behavioral health will be assessed at baseline and post-exposure using nest construction quality, a clinical frailty index, and open field measures of locomotion, exploration, and anxiety-like behaviors. Noise exposure is expected to increase frailty, anxiety-like behavior, and reduced exploration, while enrichment, particularly combined cognitive and social stimulation, is predicted to buffer these effects.

How can organizations support gender minority employees? A qualitative examination

Presenter: Ivan Mui | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Kim Chaney

Identity safety cues, like inclusive posters, may signal support of marginalized groups in settings they may anticipate identity-devaluation. We explore gender minority people's perspectives on their desired forms of organizational support. Gender minority participants (i.e. transgender, nonbinary, agender, etc., N = 294) evaluated a transgender identity safety cue of an inclusive poster (i.e., "trans rights are human rights") placed in a workspace breakroom. We then collected qualitative data on how companies and organizations can show support for transgender, nonbinary, and gender non-conforming people. Responses include that although identity safety cues like posters are a good first step, further action like inclusive policies and anti-discrimination enforcement were necessary to feel adequately supported in the workplace. Some suggested that organizations should have more gender-inclusive policies and facilities, such as gender-neutral bathrooms, gender-affirming healthcare coverage, gender-neutral language, respecting chosen names and pronouns, and diversity training. Some responses echoed a desire for more equitable treatment compared to their cisgender coworkers, while others also proposed donating to LGBTQ+ focused charities and nonprofits. Our qualitative coding suggests that while identity safety cues are generally appreciated, they are not sufficient on their own for transgender, nonbinary, and gender non-conforming staff to feel safe and reassured from any threats of prejudice and discrimination

in the workplace. We outline actionable inclusive practices for organizations to better support their transgender, nonbinary, and gender non-conforming, and other gender-minority staff.

Mobilizing School Community Partnerships to Promote Mental Health among Elementary Students in Buffalo

Presenter: Julia Shavuo | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Nathaniel Woodard and Dr. Jacoby Loury (SPHHP)

Background: Research on mental health among elementary school students remains limited. Buffalo, NY, student reports of poor mental health, including persistent feelings of sadness and hopelessness, continue to rise. Early mental health challenges are associated with adverse long-term outcomes, including reduced quality of life and increased risk of negative health behaviors. Positive school climates characterized by strong peer and teacher relationships, supportive leadership, and meaningful involvement opportunities are linked to lower rates of social-emotional and behavioral difficulties. Objectives: The School Mental Health Project (SMH) aims to assess existing mental health resources and identify barriers within Buffalo public elementary schools, while determining key components necessary for a school-based mental health intervention. Through collaboration with students, parents, teachers, and administrators, SMH seeks to develop a pilot intervention that addresses stakeholder-identified priorities to strengthen student mental health promotion. Methods: An interdisciplinary research team of health and education professionals has partnered with school stakeholders to establish a Community Advisory Board to guide the project. Focus groups are being conducted across participating schools and community events to explore perceptions of school mental health environments, available supports, and unmet needs. After reaching data saturation, transcripts will be analyzed using thematic qualitative analysis to identify central themes that will inform intervention development. Anticipated Outcomes/ Next Steps: Findings are expected to provide diverse stakeholder perspectives on school mental health strengths, gaps, feasibility, and resource needs. Results will directly guide the design and implementation of a pilot, school-based intervention leveraging existing community partnerships to improve student mental health outcomes.

Assessing the Validity of Two Video-Based Scenarios for Bystander Research

Presenter: Micah Sinclair | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Kathleen Parks

The present study evaluates the validity of video-based scenarios as tools for assessing bystander intervention intentions. Participants will include 100 undergraduate students (50 men and 50 women) aged 18–24 recruited from a Psychology Department research participant pool at a large university in New York State. Participants will view two video-based scenarios depicting college social interactions embedded with risk cues for sexual aggression. Following each video, participants will be asked to report their likelihood of intervening in the scenario and complete the Five-Step Bystander Intervention Scale, which assesses bystander decision-making. Participants also will complete the Bystander Efficacy, Bystander Attitude, and Marlow-Crowne Social Desirability scales. Three hypotheses will be tested. First, greater intent to intervene is expected to be positively associated with higher overall Five-Step Bystander Intervention scores, supporting construct validity. Second, Five-Step Bystander Intervention scores are expected to be positively correlated with bystander efficacy and bystander attitudes, supporting criterion validity. Third, female participants are expected to score higher than male participants on the “noticing the event” and “interpreting the event as an emergency” subscales of the Five-Step Bystander Intervention Scale. Data collection will occur during the Spring 2026 semester and will examine correlations among all scale scores. Findings will provide preliminary evidence regarding the validity of the video-based scenarios, informing their potential use in future bystander intervention research.

Gender Minority’s Perspectives of a Transgender-Inclusive Poster in Organizational Settings

Presenter: Kelsey Solomon | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Kimberly Chaney

In times of rampant anti-transgender legislation (ACLU, 2025), inclusive features of one’s identity (i.e., identity-safety cues, ISCs) may be utilized to indicate support of the transgender community. We qualitatively examined open-ended responses from transgender, non-binary, and other gender minority participants (N=294) about an organizational ISC, a “trans rights are human rights” poster in an office workspace. Participants’ responses on the meaning of the cue (e.g., company is a safe space) included who the cue was targeting support for (e.g., transgender employees vs. transgender people in general) and the possibility of virtue signaling (e.g., performative allyship). Such responses reflected that the organizational ISC conveys that the company is egalitarian, a safe space, and a meaningful advocate for the transgender

community, given the current political climate. Other participants expressed suspicion toward the organization and its leaders due to the identity-safety cue. These suspicions encompassed notable lack of resources, information, and inclusive transgender-polices provided beyond the presented cue. This tension reflects that while gender-minority individuals value and appreciate visible ISCs, they may simultaneously question the authenticity and inclusive practices of the organization. We contextualize these findings within diversity dishonesty (e.g., Wilton et al., 2020), where marginalized individuals may feel distrustful towards organizations when they display expression-based ISCs without accompanying inclusive policies or actions.

Measuring anxiety-like behaviors in rats using machine learning-based phenotyping

Presenter: Samantha Treadway | **Presentation Format:** Oral Presentation
Faculty Mentor: Dr. Paul J Meyer

The Light-Dark Box (LDB) test is a widely used laboratory assay for measuring anxiety-like behavior in rodents. Traditional scoring relies on manual video annotation, which is time-intensive and susceptible to observer bias. Although commercial tracking systems and software offer partial automation, they are often expensive and fail to accurately score diverse datasets because of variation in coat color and size. In addition, many studies focus only on simple measures and frequently overlook subtle and complex behaviors that may reflect fear or risk assessment. To address these limitations, this project investigates whether machine learning (ML) can provide a more accurate, scalable, and comprehensive method for analyzing rodent behavior in the LDB. Using SLEAP.ai, an open-source deep-learning pose estimation framework, we trained a model to extract body position data from video recordings of heterogeneous stock rats. Frames were systematically sampled to capture diverse behavioral states, and custom analysis scripts were used to analyze data and quantify behaviors, including exploration, freezing, and risk assessment. Initial results show that our ML model can robustly track rodent poses under variable lighting, coat color, and cage geometry, while achieving frame-level accuracy comparable to that of a human annotator, supporting its use in large genetically diverse datasets. Ongoing work aims to validate ML behavioral metric outputs against manual scoring and to determine whether these metrics correlate with biological and pharmacological variables. By increasing precision, reducing bias, and enabling large-scale analysis, this approach can be used for deep phenotypic analysis while maintaining high-throughput testing. Thus, improved measurement of anxiety-like behavior supports more reliable studies of genetics, addiction, and drug effects, ultimately advancing translational neuroscience research.

Romance Languages and Literature

Linking AI-Enhanced LDCT and AI-Based Environmental Modeling to Address Lung Cancer Disparities in China

Presenter: Anna Zheng | **Presentation Format:** Oral Presentation
Faculty Mentor: Dr. Colleen Culleton

Lung cancer remains the leading cause of cancer mortality in China, yet screening in marginalized communities and high-risk populations remains low due to geographic barriers, limited awareness, and the exclusion of environmental risks from traditional screening criteria. This study conducts a systematic review of 30 peer-reviewed publications, including 10 clinical AI-enhanced Low-Dose Computed Tomography (AI-LDCT) diagnostic studies, 10 cohort or population-based environmental studies, and 10 AI-enabled spatiotemporal modeling papers to evaluate how Artificial Intelligence (AI) can improve early detection and reveal overlooked environmental contributors such as PM2.5 and indoor solid-fuel combustion. Evidence from clinical studies shows that AI-assisted LDCT improves early-stage nodule detection by up to 70%, though widespread adoption is hindered by opaque model design, heterogeneous datasets, and elevated false-positive rates in the complex lung area. Environmental studies show a strong correlation between long-term air pollution exposure and lung cancer cases, with AI-based geospatial models outperforming conventional epidemiology in mapping high-risk zones. Combining these findings, this review argues that linking AI-driven diagnostics with environmental risk modeling can create more equitable screening systems, particularly in underserved rural regions of China where pollution is high and medical access is limited. The study's primary limitation is the geographic imbalance of available data, as most clinical imaging datasets and environmental monitoring networks are concentrated in Chinese provinces, constraining nationwide generalizability.

Sociology and Criminology

Childhood Abuse and Health in Midlife: What Role Do Adult Offspring and Romantic Partners Play

Presenter: Gavin Glaser | **Presentation Format:** Oral Presentation
Faculty Mentor: Dr. Ashley Barr

Using the National Longitudinal Survey of Adolescent to Adult Health Parent Study, this paper examines the association between childhood abuse and four measures of maternal health (depression, self-rated health, physical limitations, and stress-related diseases) at midlife. After replicating longstanding findings that childhood abuse is associated with worse health in adulthood, we ask what role family relationships, including those with romantic partners and those with adult offspring, play in this link? That is, to what extent do they mediate the association between childhood abuse and midlife health, serving as a key link in a chain of disadvantage? Or, to what extent might they moderate the association between childhood abuse and parental health, serving to buffer mothers from the health consequences of childhood abuse? Findings show that the quality of relationships with adult offspring play a more central role than those with romantic partners in explaining the long arm of childhood abuse on maternal health. Evidence is also provided that high-quality relationships with both offspring and romantic partners can buffer mothers from the health consequences of childhood abuse. Taking these questions together, we contribute to a more holistic understanding of the role family relationships have on the long arm of childhood and on disrupting chains of disadvantage. Findings suggest that relationships with adult offspring should be better integrated into the literature on the life course consequences of childhood adversity.

The Effects of Adult Offspring Emotional Distress on Maternal Health in Midlife: Bringing the Social Foreground into Focus

Presenter: Elizabeth O'Boyle | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Kristen Lee

Over the past decade, sharp rises in depression, anxiety, and loneliness among adolescents and young adults have culminated in a mental health crisis. Coupled with an increasingly difficult transition to adulthood, these trends are likely to have far-reaching effects for young people's futures. While prior work has offered much insight into the effects of both poor mental health and difficulty transitioning to stable adult roles for future life chances, far less is known about what these challenges mean in the context of linked lives. Drawing on a life course framework, this study examines how young adults' mental health challenges affect their mothers' health. Using data from the National Longitudinal Survey of Youth 1979 (NLSY79) and accompanying NLSY79 Child and Young Adult Survey, results suggest that higher levels of emotional distress among adult offspring negatively impact mothers' mental wellbeing and subjective health in midlife. In particular, mothers with depressed adult offspring experience steeper declines in their own mental health across midlife. These results suggest that the consequences of the mental health crisis may extend beyond the lives of young people to that of their parents. Thus, policies and programs aimed at addressing the mental health crisis are not only important for the wellbeing of young people, but that of their parents as well.

Thinking Inside the Box

Presenter: Kasity Peffer | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Veronica Horowitz

"Little Scandinavia" is a prison wing in the SCI Prison in Chester, Pennsylvania that has adopted a model of incarceration similar to that practiced in Scandinavia. Whereas the American carceral system is notoriously punitive, the Scandinavian model takes a more rehabilitative approach, including but not limited to: development of positive correction officer/inmate relationships, more humane living conditions, greater food access, and development of feelings of community between incarcerated individuals. The men living within this unit offer a unique insight into what it is like to experience both of these respective models. In qualitative interviews, a commonly expressed sentiment among the men is that of disbelief- that Little Scandinavia is too good to be true. However, when asked the question, "I want you to imagine a scenario in which you must be incarcerated, but you can design your own prison. What would your prison be like?" the answers men give largely indicate the current model could not be improved. With few exceptions, the imaginary prisons of the men mimic Little Scandinavia, with suggestions for improvement being limited to things such as minor repairs, larger rooms, and extended time allowances for the yard. This research asks the question: How do incarcerated men describe their ideal confinement scenarios, and how does the process of institutionalization impact their ability to "think outside the box?"

Attitudes toward Sexually Diverse Partnerships: Evidence from an Experimental Study

Presenter: Arivana Russell | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Kristen Lee

This study uses experimental survey design to understand individual and relational biases related to the romantic relationships of individuals who identify as bisexual. Respondents answered questions on randomly assigned story of a date-night scenario. Primary analysis involves independent mean comparisons and linear multiple regression. Three hypotheses are proposed: 1) A partner who identifies as bisexual in the couple will lead to negative perceptions of relationship quality, 2) Negative perceptions of relationship quality will be greater for couples with a man who identifies as bisexual than couples with a woman who identifies as bisexual, and 3) Negative perceptions of relationship quality will be greater for couples where each partner has a distinct sexual identity than couples who share sexual identities.

Preliminary results support Hypothesis 1. A majority of the sample reported it was “very unlikely” that partners in a couple with at least one individual who identifies as bisexual were only having sex with each other. Evidence also supports Hypothesis 2, with 57.14% of respondents said couples with a man who identifies as bisexual “definitely should not” have children in the future, compared to 42.86% for couples without a man who identifies as bisexual. Hypothesis 3 is supported as well. Respondents were more likely to report that sexually diverse couples should not have children in the future (85.71%) compared to couples who share a sexual identity (14.29%). Alongside continued respondent recruitment, these findings can help inform policies and interventions to reduce prejudice and promote inclusivity.

Theatre and Dance

Urinetown Costume Design

Presenter: Faith Marsala | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Max Levitt

The costume design for UB Theatre and Dance’s production of Urinetown in the Fall of 2025 was designed to be extravagant and messy within the bounds of a dystopian society. Urinetown is a musical about modern injustice in society, boiled down into a satirical reality where everyone has to pay to pee. The story follows a young man named Bobby Strong who begins as the assistant custodian of Public Amenity #9 and leads a rebellion against the tyrannical Urine Good Company (UGC) run by Caldwell B. Cladwell. My goal was to showcase the divide between the higher and lower classes that exist within this world. The upper class has access to these elaborately designed clothes, fashion one would see at an event such as The Met Gala or a couture runway. The Rebels are inspired by the 80s punk and grunge movement, brought to life by designer Vivienne Westwood. The costumes are truly meant to visualize the battle between elegance and punk grunge protest culture. The Rich Folks have the cash while the Rebels count their pennies, for it is a privilege to pee.

Campus to Community (C2C): Moving Beyond the Stage

Presenter: Selena Pereyra | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. Jeanne Fornarola

The purpose of the program is to have University at Buffalo Theatre and Dance students bring student-choreographed dances and student-performed songs to the community. After recognizing that Fox Run at Orchard Park was a major supporter of departmental performances, I was inspired to give back to their residents and others who are not always able to attend live theatre. Drawing from my experience running a similar outreach initiative in high school, I developed a program that connects UB student artists with local nursing homes, assisted living facilities, rehabilitation centers, and hospitals.

I coordinate participating dancers and singers through interest forms, create cast lists based on choreographers’ visions, and facilitate rehearsals in departmental studios. The choreographed works, often set to music from the 1950s and 1960s, are designed to resonate with older audiences. Performances are staged on portable marley flooring funded by the CAS Experiential Learning Fund, allowing us to create a clear performance space wherever we travel.

This project explores dance as a tool for joy, memory, and human connection. It asks how performance can go beyond traditional theatre spaces and serve as meaningful community engagement. Artistically and culturally, the program increases access to live art while reinforcing the role of young artists as active contributors to intergenerational dialogue and care.

2026 Senior Showcase- Working as a Line Producer and Assistant Director

Presenter: Danielle Walker | **Presentation Format:** Poster Presentation
Faculty Mentor: Dr. James Beaudry

Under the mentorship of James Beaudry, I am learning the experience of a line producer an assistant director working on a new project that reflects the theatre professional world. This senior showcase is new in our current theatre season, and will become a yearly event for graduating acting and music theatre BFA students to present roughly 3 minutes of their material of choice. This project will be recording in a 3 camera setup with working producers and directors from Buffalo and elsewhere planning to be in attendance during the live performance on Saturday, March 28th. As a line producer and assistant director I schedule all rehearsals, send out informational emails, oversee all the chosen materials, give my own feedback to the performers, and work to discover how I can be a producer and director in the professional theatre world after my undergrad.