Duke Colloquium Schedule | April 2026
Morning Sessions

Yates-Gill 221 & 222

9:00 Yates-Gill 221 & 222

A Forum on the Hill

Kandace-Rose Hill, Jacob Tetlow, Mason Sullivan

Advisor: Dr. Daniel Kotzin

We have created a documentary, constructed by student and faculty interviews, to explore the social environment of Midwestern liberal arts colleges. We share the experiences of students who enhance cultural and intellectual diversity on campus and seek an intersectional understanding of how the college can continue to improve its ability to be more diverse and inclusive. When interviewing students and faculty, we sought to understand their background, what draws them to William Jewell, and their impressions of the college's culture. The small number of interviewees is certainly not representative of William Jewell's entire student population, but a smaller pool enables deeper exploration that a broader survey would obscure. In compiling these interviews, we employed cinematic framing and artistic editing techniques to tell an open-ended story. We found that William Jewell College attracts students with excellent academics, scholarship opportunities, and a variety of campus activities, and offers many rich cultural communities. The institution has a generally tolerant student body, yet it remains extremely divided, preventing students from fully benefiting from the richness that is growing from increasing diversity. We hope to analyze structural barriers to community building, develop solidarity in the student body, and contribute to a broader campus movement for inclusion.

9:30 Yates-Gill 221 & 222

Black Freedom Struggle Symposium Documentary 2025

Mason Sullivan

Advisor: Dr. Ge Zhu

The purpose of this creative project is to uncover the thoughts and the feelings of those on campus who may have felt like their voices are not heard. The subject matter of this documentary stems from my deep personal connection to the experiences of black students on campus. This piece was first presented at the Black Freedom Struggle Symposium last year, and it details different students and faculties experience at Jewell, and answers questions of what makes this school great and what changes could be deemed necessary.

The data for this project was collected through recorded interviews that were conducted by myself and Liv Benoit II (2025 graduate), using questions that were compiled by the BFS Symposium committee. After filming, the project was edited together by me using Adobe Premiere Pro. The outcome of this project found that there is a connection between the stories that are shared in the Documentary and the stories that were held by the audience. Upon presenting the project, I was met with many conversations expressing how much the subject matter spoke to them.

This project overall speaks to the importance of our voices through visual storytelling and serves as a useful reminder that there are people here who love this school and want to see it flourish in every respect. This project means a lot to me for the experience it gave me as a filmmaker, and I will use this experience as I explore the art of film in the future.

Gano Assembly

9:00 Gano Assembly

Genocide in Gaza: A Legal Assessment of Isreal's Actions Under the 1948 Genocide Convention

Owen Kerrigan

Advisor: Dr. Alan Holiman

This paper analyses whether the conduct of the State of Israel in Gaza since October 7th, 2023, meets the legal definition of genocide under the United Nations Convention on the Prevention and Punishment of the Crime of Genocide. The paper analyses the five prohibited acts under Article II of the Convention: killing members of a group, serious bodily and mental harm, deliberate infliction of destructive living conditions, prevention of births, and forcible transfer of children. Through the research, the report identifies consistent and systemic patterns of conduct by Israel in Gaza, including (but not limited to) the large-scale targeting of civilians, the use of starvation, and the destruction of healthcare and reproductive infrastructure in Gaza. The evidence collectively suggests an intention to destroy the Palestinians in Gaza in part.

9:20 Gano Assembly

Beyond the Atrocities: Euthanasia, Compulsory Sterilization, Neglect, and "Othering" of Individuals with Disabilities

Zoe Ralston

Advisor: Dr. Megan Groninger

The treatment of individuals with physical and mental disabilities by the Nazi regime was horrific, inhumane, and outrageous. However, this notion was not new during the years of the Nazi regime and it didn't end with the conclusion of the war. Concepts of euthanasia and compulsory sterilization have been around since the time of Sir Thomas More in 1516, when he described "the ending of life of the incurably ill as an act of mercy" (Precursors, Policy Aftermath, 56). While this concept had been around globally for centuries, it became a pronounced and widespread issue in Germany, leading up to and during the Second World War. Individuals with disabilities of any kind were seen as a burden and embarrassment to families, communities, and society as a whole. Decades later, after the conclusion of the war and as euthanasia came to be not only less accepted in society but considered cruel and barbaric, the "othering" of individuals with disabilities is still profound in social and legal theaters of society. This is seen not only in long-established legal practices, but also in modern messages from government leaders, specifically in the United States of America. The goal of my research has been to uncover the atrocities committed against individuals with disabilities over time and how they are represented in modern social and legal practices. Furthermore, I plan to explore the impacts these practices had on society in the past to better understand how modern instances of them will affect today's world.

9:40 Gano Assembly

Deism in Early America: An Analysis of Thomas Paines, *The Age of Reason,* on Academic and Public Discourse

Dylan O'Donnell

Advisor: Dr. Daniel Kotzin

The Armenian Genocide remains one of the most contested events of the early twentieth century, leaving a lasting legacy for both the Armenian diaspora and the modern state of Turkey as it emerged from the former Ottoman Empire. Occurring during World War I, the systematic deportation and mass killings of Armenians between 1915 and 1917 reshaped the demographic and cultural landscape of Eastern Anatolia and the broader Ottoman state. This research examines the underlying causes of the Armenian Genocide focusing on Turkish nationalism, wartime paranoia, and Turkish Russian relations. In addition to exploring the historical context in which the genocide occurred, my research

also analyzes how historians' interpretations of the event have differed over the past century. Finally, this paper considers the genocide's broader impact, specifically its influence in the development of the term genocide in the twentieth century. By examining these historical and historiographical aspects, this study highlights how the Armenian Genocide has shaped both historical scholarship and international understandings
of mass violence.

PLC 112

9:00 PLC 112

Metformin and Dichloroacetate Cooperatively Induce Tumor-Preferential Suppression of Glioblastoma Viability via Dual Metabolic Targeting

Derrick Ampofo
Advisor: Dr. Tara Allen

Glioblastoma (GBM) is an aggressive primary brain tumor marked by metabolic plasticity and resistance to standard therapies. Because GBM cells depend on altered bioenergetic pathways to sustain proliferation, simultaneous disruption of complementary metabolic mechanisms may enhance therapeutic efficacy. Metformin (MET) inhibits mitochondrial complex I and suppresses mTOR signaling through AMPK activation, whereas dichloroacetate (DCA) inhibits pyruvate dehydrogenase kinase, restoring pyruvate dehydrogenase activity and promoting mitochondrial glucose oxidation. We hypothesized that dual targeting would impose energetic stress by limiting ATP production while forcing oxidative flux, producing greater suppression of GBM viability than either agent alone. Human U-87 MG glioblastoma cells were treated with increasing concentrations of MET (0-20 mM), DCA (0-20 mM), or combination therapy. Viability was measured using 72-hour MTT assays across two biological replicates with 16 technical measurements per condition. Both drugs independently reduced viability in a dose-dependent manner; at 5 mM, combination treatment reduced viability to ~52%, compared with ~65% for MET and ~70% for DCA alone. Linear modeling demonstrated a significant MET×DCA interaction ($p < 0.001$), indicating cooperative suppression beyond additive effects. Trypan Blue assays confirmed reduced live-cell percentages with combination treatment. Parallel experiments in healthy fibroblasts showed comparatively limited cytotoxicity at moderate doses, suggesting tumor-preferential metabolic vulnerability. Ongoing TMRE and lactate assays will evaluate mitochondrial membrane depolarization as a mechanistic marker of bioenergetic collapse. Together, these findings support cooperative metabolic targeting as a promising strategy to exploit metabolic dependencies in glioblastoma.

9:20 PLC 112

Effect of Glioblastoma-Conditioned Media on Fibroblast Activity in a Contact-Independent Model

Grace Allen
Advisor: Dr. Tara Allen

Fibroblasts in healthy tissue play a crucial role in wound healing and must transition from an inactive to an active state to perform this function. Once the wound has healed, these fibroblasts revert to their inactive state. Cancerous tissues mimic a chronic injury environment, inducing a sustained transition of fibroblasts from an inactive to an active state. This transition is advantageous for cancer cells as active fibroblasts secrete molecules that promote cancer cell growth. The resulting activated fibroblasts are dubbed Cancer-Associated Fibroblasts (CAF). Activation of CAFs is caused by molecules released from the cancer cells, such as growth factors, that exert their effect on the fibroblasts, rather than by direct contact between these cell types. This contact-independent model is what many cancer cells lines, including breast cancer, use to induce this transition. In contrast, Glioblastoma, a type of aggressive brain cancer, has a poorly defined CAF transition. The aim of my research project is to determine whether the contact-independent model used by other cancer cell lines also applies to the Glioblastoma-mediated CAF transition. My experiment exposes fibroblasts to varying concentrations of glioblastoma-conditioned media, containing glioblastoma-secreted molecules, to track changes in metabolic activity consistent with the CAF transition.

9:40 PLC 112

The Imaging of MDA-MB-231 (Triple Negative Breast Cancer) Cells Using Carbon Quantum Dots

Thaddeus Tucker

Advisor: Dr. Aaron Keller

My project focuses on conjugating carbon quantum dots and hyaluronic acid via bioorthogonal chemistry to image MDA-MB-231 (triple negative breast cancer) cells. Using an acid extraction (1% w/v) dots were synthesized from anthocyanins extracted from red cabbage and conjugated to hyaluronic acid using an azide-alkyne triazole reaction. The product was then characterized using UV Vis, fluorescence, and IR spectrometry. Preliminary results have thus far only focused on synthesis, as only one trial has been run, yielding blue/green dots. Future directions include working to shift emission to red emitting dots (possibly using alternative synthesis methods), conjugation, and in vitro imaging trials. If I'm able to make it through those hurdles the next step is using the complex as a drug delivery device.

Yates-Gill College Union Atrium

10:00 – 10:45 Poster Presentations

Addiction as a Neurochemical Disease: Nursing Implications for Relapse Prevention

Aaron Fennix

Advisor: Professor Melissa Timmons

Introduction: Substance use disorder affects millions of people each year. Traditionally, addiction has been viewed as a behavioral or moral problem; however, research shows addiction is strongly connected to neurochemical changes in the brain.

Purpose: The purpose of this literature review is to examine research on the neurobiological mechanisms of addiction and how this understanding may help nurses better prevent relapse and support recovery in patients with substance use disorders.

Methodology: A review was conducted using scholarly databases and search terms including addiction neurobiology, dopamine addiction, and substance use relapse. The initial search produced multiple research articles related to neurochemical mechanisms of addiction. Studies were selected based on relevance to relapse prevention and nursing implications.

Findings: Research shows that addiction alters brain reward pathways, particularly dopamine signaling, which can increase cravings and relapse risk. Changes in stress systems and impaired decision-making areas of the brain also contribute to continued substance use. These neurobiological changes may help explain why relapse is common even after treatment.

Discussion: Understanding the pathophysiology of addiction allows nurses to approach patients with more empathy and improved education strategies. Nursing interventions such as patient education, relapse prevention planning, and support for long term recovery may improve outcomes when informed by neurobiological research.

Conclusion: Viewing addiction through a neurochemical perspective may help reduce stigma and improve treatment approaches. Nurses play an important role in supporting recovery and preventing relapse through education, advocacy, and patient centered care.

Disclosures: None

Empowering Mothers: The Impact of Nurse-Led Breastfeeding Education

Allison McIntyre

Advisor: Dr. Patty Richter

Introduction: The benefits of breastfeeding infants are widely documented. Less known are the challenges of breastfeeding and how a lack of support can heavily influence a new mothers' decision to give up on their breastfeeding journey prematurely. Exploring the benefits of nurse-led breastfeeding education is critical to promoting better breastfeeding outcomes.

Purpose: To review the literature on nurse-led breastfeeding education's impact on breastfeeding and describe the benefits of implementing nurse-led breastfeeding education.

Methodology: A review of literature was conducted using EBSCOhost, CINAHL, and MEDLINE databases. The key terms were "breastfeeding or infant feeding or lactation," "education or health literacy," "nurse-led," and "self-efficacy." The search yielded 54 articles. Twelve articles were selected that met additional inclusion criteria of full text, written or available in English, peer reviewed, from academic journals, published within the last five years, and related to breastfeeding education and self-efficacy.

Findings: All studies conclude that there is a statistically significant correlation between nurse-led education and positive breastfeeding outcomes. Postpartum women in intervention groups were more confident in breastfeeding, were more likely to exclusively breastfeed, and continued to breastfeed several months longer than their control group counterparts.

Discussion: Research shows that nurse-led education has a significant impact on improving breastfeeding outcomes for mothers.

Conclusion: Nurses should be trained to educate mothers on the benefits and effective techniques for breastfeeding, along with how to overcome breastfeeding challenges to provide effective breastfeeding education. Providing nurse-led breastfeeding education will improve health outcomes of postpartum women and their infants.

Disclosures: None

Assessing the Role of Nitrous Oxide in Labor Pain Management: Implications for Maternal Satisfaction, Safety Outcomes, and Use as an Alternative to Epidural Anesthesia

Andrew Dumas
Advisor: Professor Debra Penrod

Introduction: Nitrous oxide is increasingly being offered in U.S. hospitals as a noninvasive option for labor pain management. While epidural anesthesia remains the most effective form of pain relief during childbirth, many patients seek alternatives that preserve mobility and autonomy during labor.

Purpose: To review current literature, evaluating the effectiveness, safety, and patient satisfaction associated with nitrous oxide for labor pain management and its role as an alternative to epidural anesthesia.

Methodology: A literature review was conducted using PubMed, CINAHL, and Medline. Search terms included "nitrous oxide," "labor analgesia," "maternal satisfaction," and "epidural alternatives." Articles published in English between 2016 and 2024 that examined the use of nitrous oxide for labor pain management were included. After applying the inclusion criteria, 12 relevant studies were selected for review.

Findings: Current research shows that nitrous oxide provides moderate pain relief and high maternal satisfaction due to patient control, rapid onset, and maintained mobility during labor. Studies also report minimal maternal or neonatal complications when used appropriately, though it is less effective for pain relief than epidural anesthesia.

Discussion: Nitrous oxide expands pain management options in obstetric care while maintaining safety when proper protocols are followed. Appropriate education for nurses and anesthesia providers is necessary to ensure correct administration, appropriate patient selection, and adequate monitoring.

Conclusion: Nitrous oxide is a safe labor analgesia option that increases maternal satisfaction and expands pain management choices. Future research should examine long-term outcomes and broader hospital implementation.

Disclosures: None

The Effects of Music Therapy on the Psychological Outcome of Pediatric Cancer Patients

Bailey Sauer
Advisor: Dr. Leesa McBroom

Introduction: Over 400,000 children are diagnosed with cancer each year. Not only does this diagnosis take a psychological toll on their families; cancer also takes a psychological toll on the patients. Childhood cancer is not an easy battle to fight. Finding interventions to decrease the already negative effects of their treatment is vital.

Purpose: To review the literature on the use of music therapy as an additional treatment for the psychological well-being of pediatric cancer patients.

Methodology: A literature review was completed within PubMed and Medline. The terms used were "music therapy," "childhood cancer" and "pediatric oncology." The initial search yielded 71 articles. A variety of articles including qualitative and quantitative studies were selected that met the criteria. Articles that were full-text article, written in English, human species, and children birth to 18 years of age were included.

Findings: Studies found that music therapy has a positive effect on patients battling childhood cancer. Anxiety, depression, pain, and stress were found to have a noticeable decrease when music therapy is coupled with regular treatments.

Discussion: The use of music therapy can provide an improved outlook on their treatment and decrease feelings of anxiety that often accompany cancer treatments.

Conclusion: Incorporating music therapy as an intervention for children with cancer may reduce anxiety, depression, and pain. Celebrating the little wins for these little fighters is important. Future studies should focus on the long-term psychological impact of music therapy inventions for patients with childhood cancer.

The Importance of Early Detection: Comparing Modern Mammograms to Traditional Physical Exams in Finding Invasive Ductal Carcinoma

Brenna Emerick
Advisor: Professor Debra Penrod

Introduction: Throughout the years of cancer treatment, early detection has remained the most critical factor when calculating survival rates. When specifically looking at Invasive Ductal Carcinoma (IDC), the difference between physical examinations or modern technology significantly influences rates of early detection, directly impacting long-term survival rates.

Purpose: To review literature on the effectiveness of modern screening technologies using artificial intelligence compared to traditional clinical physical examinations in detecting IDC.

Methodology: A literature review was completed within PubMed, The Lancet, and Google Scholar. The terms used were "Invasive Ductal Carcinoma," "AI mammography," and "early detection vs. physical exam." From 145 initial results, eight full-text, English-language articles from the last five years were selected based on their focus on U.S. and European comparative screening data.

Findings: Research demonstrates that physical examinations frequently failed to identify early stages of IDC. Studies found that the integration of modern screening technologies, including the integration of artificial intelligence, increased detection rates. These technological advancements allowed for Stage 1 detection, significantly improving surgical options, and long-term survival rates.

Discussion: Training healthcare providers in the benefits of utilizing advanced imaging to promote improved health outcomes. These diagnostic tools can identify cancer in earlier stages allowing for less aggressive treatments like lumpectomies rather than mastectomies.

Conclusion: Reducing advanced-stage IDC is multifaceted. Future research should focus on the long-term impact of using technological screening as an early detection intervention.

Disclosures: None

Investigating the Pathophysiology of Inflammation in Endometriosis

Chigozirim C.U. Nwoha
Advisor: Dr. Tiffany Condren

Introduction: Endometriosis is characterized as the presence of the endometrial-like tissue outside the uterine cavity, which leads to the formation of chronic lesions. The primary cause of this disease is retrograde menstruation which includes an upflow of blood through the fallopian tubes and through the pelvis instead of through the vagina. Investigating the pathophysiology of inflammation in endometriosis may help alleviate symptoms and improve patient outcomes.

Purpose: This purpose of this review of literature is to describe the current understanding of the inflammation process in endometriosis.

Methodology: The research was conducted using databases like Pubmed and Google Scholar. The terms “endometriosis,” "endometriosis inflammation process” and “chronic inflammatory process of endometriosis” were used. The initial search yielded about 13,702. Studies were then reduced to studies that had a primary focus on the inflammatory pathways of the disease. A total of six were used for this review.

Findings: Findings indicate that endometriosis causes lesions and inflammation. The ongoing inflammation and immune dysfunction contribute to the chronic nature of the condition and the severity of the symptoms.

Discussion: Endometriosis affects nearly 190 million women. Endometriosis is a long-term inflammatory condition that affects women’s health in a major way, causing pain, lesions, and even infertility. Therefore, the timely diagnosis, management, and education of the patient are very crucial for a better outcome and a better quality of life.

Conclusion: Endometriosis is an ongoing, complex inflammatory condition. With increased knowledge and appropriate management techniques, the quality of life for women with endometriosis can be improved.

Disclosures: None

Safe Childbirth: Positional Changes Analysis

Davina Mangongo
Advisor: Dr. Tiffany Condren

Introduction: Often women give birth in a supine position which may be a contributing factor to painful childbirth. First time mothers typically have longer childbirth experiences than mothers who have given birth previously. Longer birthing times may lead mothers to experience more pain or have a negative experience. Pre and post labor positional exercises aid in relief.

Purpose: The purpose of this literature review is to determine what birthing position may improve the birthing experience.

Methodology: A search was conducted using _PubMed and Medline databases. Search terms included “birthing position, “duration of childbirth,” “labor complications,” and “birth pain,” yielding 60 articles. Inclusion criteria included full-text, peer-reviewed, written in English, and research studies that related to women in the United States and related to safe childbirth positions. The criteria for exclusion were qualitative. Six of the articles were chosen.

Findings: Studies have shown the trends in which position in childbirth results in great outcomes which include controlled pain, shorter duration of childbirth, position that prevent occiput posterior position of fetal head, aiding in the safe childbirth.

Discussion: Performing positional changes during active labor may be difficult. Focusing on the position which brings the most benefits like a shorter duration and decreased amount of pain based on patient preference is highly advised.

Disclosures: None

The Role of Social Media in Vaccine Hesitancy

Dillon Thiele

Advisor: Professor Debra Penrod

Introduction: Social media is a powerful tool for the dissemination of healthcare information and public outreach, but it has also is an environment where misinformation can circulate widely and rapidly. Vaccines are one of the most effective public health interventions for prevention of infectious disease. However, exposure to inaccurate or misleading vaccine information online has been associated with increased vaccine hesitancy and declining vaccination rates. Social media platforms like Facebook, X (formerly known as Twitter), and TikTok play a significant role in shaping public perception of vaccines.

Purpose: The purpose of this literature review is to examine how social media misinformation influences vaccine hesitancy and public perceptions of vaccination.

Methodology: A literature review was conducted using PubMed and CINAHL databases. Search terms included "misinformation," "social media" and "vaccine hesitancy," yielding 352 results. Additional searches used "Facebook," and "TikTok," yielding 54 articles. Ten studies were included using peer-reviewed research articles written in English as criteria.

Findings: Research shows that misinformation on social media contributes to vaccine hesitancy by spreading of conspiracy theories, exaggeration of adverse effects, and fostering of mistrust in health authorities. Studies have found antivaccine narratives and misleading content circulate widely online and influence vaccination decisions, particularly in individuals who seek health information online.

Discussion: Healthcare professionals play an important role in promotion of vaccines and countering misinformation by providing evidence-based education and promotion of accurate vaccine information.

Conclusion: Addressing vaccine misinformation on social media is critical to improving vaccine confidence and protecting public health.

Disclosure: None

Electrocatalytic Detection of Ethanol and Acetaldehyde Using Aminoxyl Radicals in Fake Blood

Dominic Vincentini

Advisor: Dr. Mahsa Hosseini

Using breath to analyze ethanol and the metabolite acetaldehyde is a common form of forensic science in the 21st century. O'brien et al 2005 discovered that a high level of acetaldehyde in breath can show the diseases that come with high levels of acetaldehyde, which can be liver diseases and lung/upper digestive cancers. Most breathalyzers cannot show the difference between ethanol (which is measured for BAC) and acetaldehyde. The ones that can have a very slow rate of electron transfer and need constant calibration (Allan et al 2017 and Kim et al 2016). Rafiee and Mayer have detected ethanol and acetaldehyde using aminoxyl radicals by electrocatalytic detection for breath analysis (creating the model for a new breath sensor). Aminoxyls are great catalysts for alcohol oxidation and during electrochemical oxidation, have well-defined redox properties (Wertz and Struder 2013 and Nutting et al 2018). 4-hydroxyTEMPO benzoate (TMB) was chosen as the aminoxyl radical due to the oxidized form (oxoammonium) has high catalytic activity and is stable under mild and strong basic conditions (Rafiee et al 2015). Rafiee and Mayer used cyclic voltammetry to measure various pH solutions to show the reduction and oxidation of TMB/TMB+. Along with that, they did test to find that basic graphene oxide pastes on the screen-printed electrodes provided optimal reading with no selectivity and has no synergistic effect for ethanol and acetaldehyde. For my project I plan on replicating this experiment but using fake blood at 0.08% ethanol (the legal limit of BAC) and 0.004% acetaldehyde (content like legal BrAC limits). Hopefully getting the same results for my experiment.

The Effects of Music Therapy on Critical Care Patients

Evan Schoor

Advisor: Dr. Anna Kaaiakamanu

Introduction: Critical care units can be very foreign and feel surreal for patients. Offering a sense of familiarity through the implementation of music therapy may help calm patients and improve pain levels.

Purpose: To review literature related to music therapy use in critical care and patient outcomes.

Methodology: A review of literature was conducted using PubMed, Medline, and CINAHL. The terms used in the search were "critical care music therapy," "critical care patient emotions," and "treatment quality." The initial search yielded 35 full-text research articles that were in English. Twenty-five research articles were selected from the initial search.

Findings: The research articles report that patients experience anxiety, agitation, frustration, confusion, fear of dying, sleeplessness, and inability to relax while in critical care units. These responses reduce the desire to receive treatment in critical care units. Studies found that implementing music that patients enjoyed promoted relaxation, lowered heart rates, improved sleep, and lowered pain levels.

Discussion: Music therapy is a non-pharmacological approach to address the stress, depression, and anxiety that patients experience in critical care units. The use of music therapy provided a non-pharmacological distraction and relaxation method that reduced patient fears as they received treatment.

Conclusion: Critical care patients experience stress and anxiety due to their condition and the unfamiliar environment. Music therapy reduces the stress and anxiety of patients and brings a more humanizing feeling to critical care units while allowing an opportunity for patients, staff, and family to grow closer to one another.

Disclosure: None

Administration of Blood in the Prehospital Setting

Dylan Finkle
Advisor: Dr. Annette Behney

Introduction: Blood is a life-saving part of trauma care in hospital emergency rooms and blood products help in ways that just fluids cannot. Rapid transport to a trauma center is necessary for patient outcomes, but blood products offer a way to improve these outcomes further despite the challenges in implementation.

Purpose: To review the literature that evaluates the need and challenges related to blood products in the prehospital setting.

Methodology: A literature review of PubMed and Medline searching for prehospital blood products; A search was conducted using PubMed and Medline databases. Search terms included "prehospital" and "blood products" yielding 5,898 articles. Inclusion criteria included full-text, peer-reviewed, written in English, and research studies that discussed the utilization of blood prior to the hospital. Criteria for exclusion was articles that were greater than three years old or mentioned prehospital blood but did not discuss it. Ten articles were chosen.

Findings: Research indicates that the early administration of blood products improves patient outcomes. In the prehospital setting, this enables patients to receive blood during transport or at the scene, particularly in cases involving prolonged extrication.

Discussion: Early administration of blood prior to hospital arrival has the potential to significantly improve outcomes for patients requiring transfusion. Evaluation of resources and strategies to use blood or blood products in a prehospital setting to benefit patients and reduce the negatives, like expiration of products and product availability, should be further evaluated.

Conclusion: The use of blood products in the prehospital setting offers clear benefits for patient outcomes, particularly in trauma and hemorrhagic cases. However, successful implementation depends on addressing logistical and resource-related challenges.

Disclosures: None

Analyzing disparities in pain management for African American patients in the United States of America

Jasmine McDonald
Advisor: Dr. Anna Kaaiakamanu

Introduction: American history is marred by racism towards African Americans, and its repercussions persist in our healthcare system. Addressing systemic racism in healthcare is crucial for bridging the gap between equitable healthcare for African Americans.

Purpose: This review aims to examine existing literature on racial disparities and raise awareness about their impact on pain management for African American patients within the healthcare system.

Methodology: A comprehensive literature review was conducted using PubMed, ScienceDirect, and EBSCO. The search terms used were “ethnic disparities,” “pain management,” and “medical racism.” Initially, 283 articles were identified. Ten articles met the inclusion criteria of full-text articles written in English, quantitative research studies conducted in the United States, and focused on inequities in pain management of African American patients.

Findings: Research found significant disparities in pain relief interventions for African American patients. These disparities contribute to their poor patient outcomes and erode trust in the healthcare system.

Discussion: To address these disparities, healthcare professionals must undergo training to recognize and address inequities in pain management for African American patients. This involves recognizing implicit and explicit biases, challenging prevailing misconceptions such as African American patients having a higher pain tolerance and less sensitive nerve endings.

Conclusion: Reducing inequities in pain management for marginalized individuals within the healthcare system is a complex endeavor that requires further research. Future studies should focus on evaluating the long-term impact of racial bias on patients’ overall healthcare experiences and exploring effective strategies to combat this inequity.

Disclosure: None

Targeted imaging of glioblastoma stem cells using surface-functionalized carbon

Jenna Skeeters
Advisor: Dr. Mahsa Hosseini

This project would aim to investigate the use of surface-functionalized carbon quantum dots or CQDs as a targeted fluorescent nanoprobe for identifying CD133-positive glioblastoma stem cells or (GSCs). CQDs have gained significant attention in nanomedicine because of their tunable photoluminescence, high photostability, low cytotoxicity, and due to how adaptable their surface chemistry is. While they have been studied for general bioimaging, their selective targeting of cancer stem cell subpopulations, such as, cells responsible for tumor initiation, recurrence, and therapeutic resistance, remains underexplored. I seek to build upon existing research in CQD synthesis and surface modification and my project proposes the conjugation of CQDs with anti-CD133 ligands to enhance the binding specificity toward the glioblastoma stem cells in in vitro models. Prior studies analyzing CQD cellular uptake, fluorescence efficiency, and biocompatibility suggest that properly functionalized CQDs can demonstrate stable fluorescence signaling with minimal toxicity in physiological conditions, this supports the idea of using CQDs as a nanoprobes and suggests they could be used as non-invasive imaging tools for detecting tumor-initiating cell populations. By integrating nanotechnology with cancer stem cell biology, this study will contribute to the development of more targeted diagnostic strategies for aggressive cancers.

Case Study Analysis of Environmental Education Programs: Bridging the Gap

John Jenkins
Advisor: Dr. David Lisenby

While environmental education programs are crucial for training individuals on how to preserve natural areas at risk of being destroyed, many individuals fail to understand their purpose and benefits. Likewise, few studies highlight the goals and methods used by environmental education programs to illustrate their importance. Thus, as part of my experiential practicum project for the Honors Institute in Critical Thinking, this study analyzes Bridging the Gap, a multi-program environmental non-profit, to identify common educational methods used by environmental organizations and the goals of their programs. To accomplish this, a combination of interviews, analysis of published works, observations of program management, and on-site participation was used to gather the necessary information for this determination. Through this analysis, it is shown that environmental-based organizations categorize programs based on their underlying goals, with them being classified as either expansion, preservation, or sustainability programs. Moreover, findings suggest that the methods used by environmental expansion and preservation programs emphasize proper species identification and handling to promote the growth of natural species or inhibit the growth of invasive species, while the methods used by sustainability programs focus primarily on spreading information regarding their benefits. Therefore, this case study indicates that the goals of environmental education programs vary with their overall purpose and that each program uses methods tailored to its underlying goals. Though, as a case study, these findings are limited in scope for evaluating environmental education because they focus on a single environmental organization, emphasizing future research that analyzes multiple organizations.

Use of Smart Technology in Early Detection of Falls

Kennedy Bechtel
Advisor: Dr. Annette Behney

Introduction: Falls are a major concern among older adults and individuals with limited mobility, often resulting in serious injuries and health complications. Smart technologies have the potential to enhance patient safety and reduce response time for healthcare providers.

Purpose: To review the literature on the use of smart technologies for early fall detection and their role in enabling early medical responses to reduce complications associated with delayed detection.

Methodology: A literature review was completed with PubMed, EBSCO, Medline, and MDPI. The terms used were "fall detection technology," "time on ground," and "fall complications." A total of 771 articles were found. Exclusion criteria included qualitative studies. Four articles were selected and met the inclusion criteria of full-text articles, written in English, and published in the last 10 years.

Findings: Smart technologies for fall detection include wearable sensors, smart home monitoring systems, and AI based detection tools. These tools are especially beneficial for older adults who live alone or are unable to summon help promptly after a fall. Studies evaluating these systems found they can reduce response time, thereby decreasing the risk of complications.

Discussion: Implementing these technologies in healthcare and home settings may reduce fall-related complications and improve overall patient outcomes.

Conclusion: Research suggests that the use of smart technology in fall detection can significantly improve response times and reduce the duration individuals remain on the ground, lowering the risk of medical complications and adverse health outcomes post-fall.

Disclosures: None

Barriers Emergency Nurses Face in Managing Pain for Patients with Suspected Substance Use Disorders

Kennedy K. Wyatt
Advisor: Professor Debra Penrod

Introduction: Pain is one of the most common problems nurses encounter in clinical practice. In the emergency department, nurses often care for patients with suspected or known substance use disorders, which can make assessing and treating pain more difficult. Nurses may face an ethical dilemma between trusting the patient's report of pain, since pain is subjective, and following the principle of nonmaleficence to avoid contributing to addiction. Understanding the barriers emergency nurses face when managing pain in this population is important.

Purpose: The purpose of this paper is to examine barriers emergency nurses face when managing pain in patients with suspected substance use disorders and how these challenges affect clinical decision making and patient care.

Methodology: A literature search was conducted using MEDLINE, CINAHL, and PubMed. Search terms included emergency nursing, pain management, substance use disorder, opioid seeking behavior, and barriers to pain management yielded 72 articles. Exclusion criteria were non-English and greater than ten years old. Articles from the past ten years and written in English were reviewed. A total of 10 articles were selected that met the desired criteria.

Findings: The literature identified barriers including stigma and bias, concerns about contributing to addiction, lack of clear pain management guidelines, and time constraints in the emergency department.

Discussion: Improving awareness of these barriers may help strengthen pain management practices and support safe nursing care.

Conclusion: Further research related to how to address barriers that nurses face in addressing pain for patients with substance use disorder.

Disclosures: None

Rethinking Fluid Resuscitation: Evaluating Old Formulas and New Evidence-Based Strategies

Lauren Flickinger
Advisor: Dr. Patty Richter

Successful fluid resuscitation in pediatric burn patients persists as one of the most crucial yet debated aspects of acute burn care. While burn resuscitation protocols have heavily relied on formula-based approaches like the Parkland, Brooke, SBI-Galveston, or Cincinnati formulas, challenges continue in preventing over- and under-resuscitation. The purpose of this literature review is to compare articles examining the effectiveness of traditional formulas and newer evidence-based strategies that are individualized, patient-specific, and technology-guided. Five peer-reviewed studies published between 2020 and 2025 in the William Jewell College Curry Library Medline database were evaluated for aspects of resuscitation, including the use of crystalloid and colloid solutions, prevention of fluid creep, and the integration of non-invasive hemodynamic monitoring tools, such as transthoracic echocardiography (TTE). There was no financial gain or conflicts of interest present during the writing of this literature review. The literature on this topic reveals that while traditional formulas do provide a basic framework for fluid resuscitation, they fail to account for unique patient or facility variables, thus eliciting suboptimal patient outcomes. Emerging evidence-based strategies demonstrate the importance of real-time physiological monitoring as a basis for fluid management and adjustments. Incorporating unique and individualized assessment tools is showing promising results in minimizing complications of over-resuscitation. This evaluation highlights the need for tailored management that balances the traditional formulas with individualized assessment and adjustment protocols. Future research should work towards validating transthoracic echocardiography (TTE) monitoring parameters, refining formula modifications, and establishing standardized guidelines for clinical implementation.

Benefits of Skin-to-Skin Contact for Mothers and Newborns

Lauren Wittmers
Advisor: Dr. Patty Richter

Introduction: The first hours of a newborn's life can be vital in creating a lasting relationship and a healthier life for both mother and baby. Mothers need education on the benefits prior to birth to allow the opportunity for mothers to incorporate skin-to-skin contact in their birth plan.

Purpose: To review the literature on the benefits and evidence-based approach of skin-to-skin contact for mothers and newborns.

Methodology: A search was conducted using PubMed and the World Health Organization databases. Search terms included "skin-to-skin contact," "maternal behavior," and "preterm infant," and "newborn," yielding 188 articles. Inclusion criteria included full-text, peer-reviewed, written in English, clinical trials, and research studies that relate to neonatal and maternal outcomes in the United States. Criteria for exclusion were studies involving animal subjects, non-research articles and studies not available in full-text, 24 articles were chosen.

Findings: Studies have demonstrated that skin-to-skin contact is associated with greater cognitive development, body temperature enhancement, and greater physiological stability. Preterm babies benefit more from skin-to-skin contact compared to traditional incubators.

Discussion: Skin-to-skin contact immediately after birth should be a key topic of discussion at the pregnancy check-ups with mothers when planning the birth. Mothers should be informed of the benefits of skin-to-skin contact to ensure they are able to make informed decisions.

Conclusion: Initiating skin-to-skin contact right after birth benefits the mother and baby in many ways and should be offered to mothers for as many births as possible.

Disclosures: None

Breaking the Stone: Understanding Patient Outcomes of Opioid Versus Non-Opioid Medications in the Treatment of Renal Colic

Mackenzie Markley
Advisor: Dr. Melissa Timmons

Introduction: Throughout the course of human life, many are impacted by the side effects of opioid versus non-opioid medications used for pain. Personalizing pain management for renal colic patients helps minimize side effects, thereby improving patients' overall outcomes.

Purpose: The purpose of the literature review was to examine the initial and long-term outcomes of opioid versus non-opioid medications in the management of renal colic pain.

Methodology: A literature review was conducted using the databases for the National Library of Medicine, Brieflands, and the Cleveland Clinic. Search terms included "renal colic," "opioids," "non-opioid, and "pain," yielding 62 articles. Inclusion criteria included full-text, peer-reviewed, written in English, and research studies that included opioid versus non-opioid medications in renal colic. Studies were excluded if they studied animals. Six articles were selected that met the criteria.

Findings: Despite the opioid epidemic, providers continue to prescribe opioids as first-line treatment. Initial treatment is vital in a patient's recovery from renal colic. Research suggests that opioid medications show quicker initial outcomes in patients' pain management, but opioids have adverse effects. Non-opioid medications show slower initial outcomes but show fewer adverse effects.

Discussion: Educating nurses on the effects of renal colic is key to understanding which type of medication is appropriate, while also educating both nurses and patients on the effects of opioid versus non-opioid medication to promote accurate therapeutic effects and positive patient outcomes.

Conclusion: Choosing the appropriate medication for a patient is vital in their initial and long-term recovery from renal colic.

Disclosures: None

Vitamin B12 Treatment for Children with Autism

Nasteho Ahmed
Advisor: Professor Melissa Timmons

Introduction: Autism spectrum disorder (ASD) is a common disorder affecting children and adults in the United States. In the United States, 3.2% of children are diagnosed with autism. Potential treatments for certain abnormalities associated with autism may be Vitamin B12.

Purpose: To review the research and evidence provided about the effectiveness of Vitamin B12 as a treatment to certain symptoms of autism in children.

Methodology: The CINAHL and ProQuest databases were used. The key words were "Vitamin B12 in children with autism," "B12 deficiency in autism," and "B12 therapy for children with autism." Initially there were 6 studies. A total of 5 studies were reviewed once limited by full-text, English only, recent study in the United States and related to Vitamin B12 treatment for children with autism.

Findings: Of the 17 studies, 83% used a form of B12 called methylcobalamin in a form of injection or oral supplements, while the remaining studies did not specify. Visible improvements found from this study included improved sleep, improved communication skills, less irritability and aggression, and a decline in worsening behaviors.

Discussion: Clinical evidence has suggested that taking Vitamin B12 as a supplement or subcutaneous injection, improves symptoms in children with autism.

Conclusion: Educating parents of young children with autism about B12 treatment may help prevent worsening behaviors and ultimately lead to a better quality of life for children with ASD.

Disclosures: None

In Premature Infants in the NICU, Does Kangaroo Care Improve Physiologic Stability and Weight Gain Compared to Standard Incubator Care?

Paige Perry
Advisor: Dr. Patty Richter

Introduction: Premature infants in the neonatal intensive care unit frequently experience physiological instability because of underdeveloped organ systems. Standard care typically utilizes incubators to regulate temperature and provide a controlled environment. Kangaroo care, which involves skin-to-skin contact between a caregiver and an infant, has been proposed to improve physiological stability, promote growth, and reduce stress in premature infants.

Purpose: To review studies that evaluate kangaroo care's impact on physiologic stability in premature infants in the NICU compared to standard incubator care.

Methodology: A review of literature was conducted using EBSCOhost, CINAHL, and MEDLINE databases which used twelve controlled trials to compare kangaroo care with conventional incubator care in preterm infants.

Findings: Most researchers analyzed how kangaroo care affects heart rate, temperature, oxygen saturation, and respiratory rate in preterm infants. Infants receiving kangaroo care showed lower respiratory rates than those receiving standard incubator care. Infants who received kangaroo care also exhibited slightly higher oxygen saturation, heart rates, and body temperatures compared to standard care.

Discussion: The findings indicate that kangaroo care can contribute to improved physiologic stability in premature infants, compared to standard incubator care. Skin-to-skin contact can reduce stress and support respiratory stability.

Conclusion: Kangaroo care is a safe and beneficial intervention for premature infants in the neonatal intensive care unit because it can improve respiratory rate, oxygen saturation, heart rate, and temperature.

Disclosures: None

The Role of Dexmedetomidine in Opioid-Sparing Anesthesia

Rebecca Brackney
Advisor: Professor Debra Penrod

Introduction: Opioid-based analgesia has traditionally been a cornerstone of perioperative pain management; however, concerns regarding opioid-related adverse effects and dependency have increased interest in opioid-sparing anesthesia techniques. Dexmedetomidine, a selective α2-adrenergic agonist, has emerged as a potential adjunct for improving postoperative pain control while reducing opioid requirements.

Purpose: The purpose of this literature review was to evaluate the role of dexmedetomidine in opioid-sparing anesthesia and its effects on postoperative pain management and recovery outcomes in adult surgical patients.

Methodology: A literature review was conducted using JSTOR, the National Library of Medicine (NLM), and PubMed databases. Search terms included "dexmedetomidine," "opioid-sparing anesthesia," and "adult surgical patients." Peer-reviewed studies published within the past five years were reviewed, with emphasis on randomized controlled trials comparing intravenous dexmedetomidine with placebo or standard opioid-based analgesia in adults undergoing surgery.

Findings: Current research indicates that dexmedetomidine use is associated with decreased postoperative opioid consumption, improved pain control, and reduced opioid-related adverse effects such as nausea, vomiting, and respiratory depression. Several studies also report improved recovery profiles, including shorter time to extubation and increased patient satisfaction.

Discussion: Dexmedetomidine can modestly reduce postoperative opioid requirements and postoperative nausea and vomiting. Careful hemodynamic monitoring is recommended, and dexmedetomidine should be incorporated into multimodal analgesia strategies rather than used as a standalone intervention.

Conclusion: Dexmedetomidine may play a valuable role in opioid-sparing anesthesia by reducing opioid requirements while improving postoperative pain management and recovery outcomes.

Disclosure: None

How Do Atypical Stroke Symptom Presentations in Black Patients Affect Early Recognition and Treatment?
Tadiwanashe Katsande
Advisor: Dr. Tiffany Condren

Introduction: Stroke remains a leading cause of death and disability in the United States. While classic symptoms of facial drooping, arm weakness, and speech difficulty are widely recognized; some patients present with less typical signs such as dizziness, headache, confusion, or visual disturbances that may lead to misdiagnosis. Research highlights significant racial disparities, with Black patients experiencing higher rates of stroke and mortality. Misdiagnosis or delayed recognition of typical or atypical symptoms can postpone treatment, affecting patient outcomes.

Purpose: The purpose of this research is to examine whether the presentation of atypical stroke symptom presentations and potential recognition bias contribute to delayed identification and treatment of stroke in black patients.

Methodology: The academic databases of CINAHL, PubMed, and Medline were used. Search terms included stroke recognition, racial disparities, stroke diagnosis, and atypical stroke symptoms which initially yielded 380 articles. Exclusion criteria included studies focusing on pediatric populations and articles not addressing stroke recognition or racial disparities. Articles from the past ten years, peer reviewed research, and written in English were reviewed. A total of 8 articles were selected that met the desired criteria.

Findings: Research suggests that Black patients may experience delays in stroke recognition due to the presence of atypical symptoms and disparities within healthcare systems. These delays can result in slower diagnostic imaging and poor overall outcomes.

Discussion: Understanding racial disparities in stroke care may help improve early stroke awareness and reduce negative health outcomes for patients of color.

Conclusion: Educating healthcare providers about atypical stroke symptoms and addressing the disparities may help improve early identification and patient outcomes.

Disclosures: None

Yates-Gill 221

10:45 Yates-Gill 221

Reweaving Memory: Black History of Watkins Mill and the Family's Ties to the Kentucky Slave Trade

Caitlin Gentry
Advisor: Dr. Vernon Howard

This presentation will examine the importance of fully integrating Black history into museums and heritage sites through a case study of Watkins Mill State Park in Lawson, Missouri. Although the site interprets its nineteenth-century woolen mill, home, and industrial community, its current exhibits and tours offer only limited recognition of the Black individuals whose labor and presence were foundational to the mill's development. Using primary sources from the Watkins Mill archives, the Interpretive Manual of Watkins Mill History, and the site's published historical materials, alongside scholarship in Black public history and museum studies, this study evaluates the narrative omissions and interpretive choices that shape the park's present-day storytelling. A central goal of the project is to reframe how the Watkins family's history is presented by placing their connections to the slave trade within the broader context of the plantation and community they established in Missouri, acknowledging how these ties directly influenced the lives and conditions of the people they enslaved. The historiographical framework draws on Pero Gaglo Dagbovie's work on the activist roots of Black public history and recent scholarship on trauma-informed interpretation of difficult histories. Through qualitative textual analysis of museum signage, tour scripts, and digital materials, the paper demonstrates that Watkins Mill continues to reflect older, white-centered narrative traditions that obscure the realities of enslavement, forced labor, and the Watkins family's slaveholding lineage. Ultimately, this project argues that reinterpreting Watkins Mill is both historically necessary and essential for constructing an accurate, responsible, and human-centered narrative of the site.

11:05 Yates-Gill 221

America: The Abductor of Black American Women

Simone Collins

Advisor: Dr. Vernon Howard

Thousands of people go missing every year in America. Abduction is not restricted to race and skin color. Still, for most Black people who go missing, they remain missing four times longer due to the lack of media coverage and law enforcement involvement (Summers 2023). The awareness of the missing Black persons then goes unnoticed by communities and the country. While studies have only been done recently, the issue has been ongoing for twenty years, with missing cases neglected by law enforcement. In addition, while Black cases go unnoticed, the media has adopted the "Missing White Woman Syndrome," which helps describe its fascination and detailed analysis of missing or endangered white women, as compared to the disinterest in covering the disappearances of colored people (Summers). Combined, creates a concerning reality for black families- that when taken, abducted, missing, or killed, law enforcement and media are more likely to be uninterested, abandon, or be apathetic towards their cases than they are for missing White people.

This reality is heightened when considering that Black females are disproportionately more susceptible to violence and trafficking, which places them at a higher risk of homicide (Seabrook 2024). That is why, in this study, it will be focused on the excessive differences between missing Black females and missing White females. The research aims to shed light on the uneven coverage and sense of action from media and law enforcement by examining how both have responded over the years to cases of missing Black women. Despite the coverage of the topic being fresh and developing in recent years, solutions have already been raised and enacted in local communities. In Missouri, the new task force, Murdered African American Women and Girls, has been created by Sen. Angela Mosley after introducing and establishing a new Missouri law that helps to lower rates of missing Black women (Henderson). The law comes as a replica of Minnesota's enactment to also decrease the kidnapping rates of African females in their state. In addition, documents such as Missing Black Women and Black and Missing have also had a hand in spreading awareness on platforms like Prime Video and HBO Max (Bush-Anderson and Gandbhir). While there is still more work to be done, shedding any amount of light and awareness about the missing Black women and girls, whose cases have not been mentioned, fought for, or solved, is forever greater than letting them be forgotten.

11:25 Yates-Gill 221

ACT-UP and the AIDS Epidemic's Impact on Kansas City

Liliana Jackson

Advisor: Dr. Daniel Kotzin

In 1980, the Center for Disease Control noted an unusual cluster of deaths secondary to pneumocystis pneumonia and Kaposi's sarcoma among homosexual men. Early cases had a common characteristic of sexual contacts, but it was also later found that intravenous drug users were found to be coming down with this mystery disease as well. It was soon evident that the disease was caused by a filterable agent, by blood or sexual contact. By 1984, the virus had been identified as Acquired Immune Deficiency Syndrome, or AIDS, stemming from Human Immunodeficiency Virus, or HIV. On March 12, 1987, around six years into the HIV/AIDS epidemic, Larry Kramer. Frustrated with the ineffectiveness of HIV/AIDS advocacy groups, Kramer proposed the start of a new organization devoted to political action, later forming the AIDS Coalition to Unleash Power, or ACT-UP. In September of 1988, ACT-UP/KC was founded by Jon Barnett. The data and research for this project were done by collecting many sources from multiple different archives, including the Kansas City Public Library and the Gay Lesbian Archive of Mid America. Through this project, it was found that ACT-UP/KC is credited for giving Kansas City a greater understanding of HIV/AIDS, and the disease lost some of its stigma. ACT-UP/KC's legacy lies not only in its proactive activist tactics, but also in its role of raising awareness of HIV and AIDS, their efforts no doubt saving thousands of lives.

Yates-Gill 222

10:45 Yates-Gill 222

Guaranía: The Soundscape of Paraguayan National Identity

Amelia Beck

Advisor: Dr. Dorothy Glick Maglione

This research project examines how Guaranía functions as a sonic expression of Paraguayan national identity. The objective of this research project is to analyze the historical, cultural, and musical forces that shaped Guaranía and to demonstrate how it became a living archive of Paraguay's collective memory. While Paraguayan music has often been discussed within broader studies of Latin American nationalism, Guaranía itself is less frequently centered as a primary lens through which to understand Paraguay's cultural identity. The centennial of the genre in 2025 further invites renewed reflection on its historical development and contemporary significance.

This project takes the form of a research presentation that synthesizes ethnomusicological scholarship, historical sources, and musical analysis. Drawing on studies by scholars such as Timothy D. Watkins, Guillermo Wilde, Simone Krüger Bridge, and Alfredo Coleman, the podcast traces Guaranía's roots to the sacred musical traditions of the Indigenous Guaraní peoples, examines the hybrid sonic culture formed in Jesuit missions, and analyzes the twentieth-century formalization of the genre by José Asunción Flores. Musical elements including minor tonalities, slow 6/8 rhythms, expressive melodic contour, and the prominence of the Paraguayan harp, are analyzed alongside close listening examples to illustrate how sound itself communicates themes of longing, resilience, and belonging. These findings suggest that Guaranía operates not merely as a genre, but as a cultural framework through which Paraguay negotiates Indigenous heritage, colonial history, social class, language, and modern nationalism.

The most significant conclusion of this project is that Guaranía represents a sustained dialogue between past and present, sacred and secular, rural and urban identities. By preserving the Guaraní language and integrating folk idioms with Western harmonic practice, composers such as José Asunción Flores and Florentín Giménez constructed a musical nationalism that continues to shape Paraguay's cultural diplomacy and communal life. This project contributes to the discipline of musicology and ethnomusicology by centering Paraguay within conversations of Latin American national identity and by presenting scholarship through an accessible public-facing format. Future research might further explore contemporary reinterpretations of Guaranía in popular and digital media contexts.

11:05 Yates-Gill 222

British Orientalism in India

Konner Poynter

Advisor: Dr. Megan Groninger

Orientalism is the Western idea that anything outside of Western culture is mysterious and inferior to Western culture. It is the Western style of restructuring, having authority and dominating over the people of the East. I wanted to focus my research on the British Orientalism of indian culture, literature, and social life. I make the argument that British Orientalism in India affected the growing nationalism in Britain because of the way that the British viewed the Indian people. The British saw themselves as superior to others, and when it came to those in the East, their superiority is evident in the concept that became Orientalism. British Orientalism was developed as a result of the British occupation of India, and it was reinforced by the fact that the British would come to establish rule in India during the mid-1750s. The British see themselves as superior and coming in and telling the Orient people that they know more about their culture than they do.

11:25 Yates-Gill 222

The Last Shall Be First

Molly Haynes

Advisor: Dr. Abigail Vegter

There is a famous verse in the book of Matthew that says, "So the last shall be first, and the first last: for many be called, but few chosen" (KJV Matthew 20:16). The feeling of being slighted or coming in second to someone else presents itself in different forms; one of the most notable being betrayal. Historically, betrayal can be traced back to Adam and Eve in the Garden of Eden, who disobeyed their creator. However, in this story of disobedience, the first person to receive the blame and be cast out by the reader is Eve. Adam fell prey just as easily to the trap laid out before them, yet the villain in the story is often portrayed as the woman.

This narrative about women isn't uncommon in the church. It has spanned across time and has been studied at different points (Bednarowski 1980). Women are consistently overlooked in church settings and are rarely accepted into leadership roles with pastoral titles. Pastoral titles are where power in the church lies; therefore, this eliminates the opportunity for women to have power in the church. However, the power limitations don't stop at worship. When women grow up seeing other women put down in what is meant to be a welcoming and loving environment. It discourages them from pursuing other opportunities for high-ranking jobs, such as politics. Studies have shown that, due to societal pressures from the church and stigmas surrounding their roles, women are less likely than men to run for political office (Cassese and Holman 2024).

Women and the church have been at war since the beginning of time. Each denomination has its own perception of how women should behave, think, and worship. There is a clear connection between women's involvement in leadership roles in the church and the number of women who choose to run for office. Therefore, women should not only be allowed but also encouraged to grow up leading the church, so they are more likely to run for political office in the future.

Gano Assembly

10:45 Gano Assembly

The Obstacles and Impacts of Music Education-Based Non-Profits

Annalyse Yoder

Advisor: Dr. David Lisenby

Music education has a wide array of benefits for students, but the high cost associated with music education does not make it easily accessible to students in lower socioeconomic classes. Non-profit organizations that aim to provide music education to low income students face many obstacles in their functioning that can range from day-to-day operations, community support, and funding. For my Honors Institute experiential practicum, I conducted a project in partnership with Harmony Project KC, a non-profit that aims to provide free music education to low income, predominately Hispanic students, to address the issue of how nonprofits run, and what challenges or obstacles they face. Through working with Harmony Project it was found that the main challenges this organization faces are in regards to location, funding, and student aid. Survey data and observations from classes indicates the positive effects Harmony Project has on students and faculty inside and outside of the classroom, with some of these effects including better academic performance and socialization skills.

11:05 Gano Assembly

Examining the Impact of the Picture Word Inductive Model on Early Elementary English Language Learners' STEM Vocabulary

Sophia Giuliano, Leila Moore

Advisor: Dr. Jace'Karmon Thomas

This study investigates the effect of the Picture Word Inductive Model(PWIM) on the development of STEM academic language in 1st- and 2nd-grade English Language Learners. Picture Word Inductive Model is a structured, image-based approach to English Language Arts development that encourages word identification, word categorization, and sentence building. Over six weeks, we worked with 1st- and 2nd-graders to implement the PWIM strategy. Instruction included six mini-lessons of small-group direct instruction. Students worked with a single image connected to their general education classroom STEM-based learning to identify words, discuss their meanings, word type, and explore how those words could be used in sentences and paragraphs. We collected students' written data from the pre- and post-assessments to analyze their vocabulary use and improvement over time. We also gathered oral data from the pre- and post-assessments by listening to students' vocabulary use during discussions and noting their engagement and progress. The goal of this process was to determine whether consistent, structured vocabulary practice improves students' understanding and use of academic language. After six weeks, the post-assessment should show progress in recognizing vocabulary, understanding meanings, and using words correctly in sentences and a short paragraph. Ideally, students will also better interpret vocabulary in context and apply it in their speaking and writing. This outcome would suggest that a mini-focused weekly intervention using PWIM can have a positive impact on STEM vocabulary development and overall language comprehension for English Language Learners.

11:25 Gano Assembly

Faculty and Student Perceptions of Mental Health and Academic Accommodations

Kelsey Coleman

Advisor: Dr. Keli Braitman

This study examines faculty and student perceptions of mental health and academic accommodations at a small liberal arts college. As rates of reported mental health concerns among college students continue to rise, understanding how accommodations are perceived and implemented is critical to promoting academic success and equity. The project explores how factors such as academic discipline, years of experience, and prior training influence faculty attitudes toward students with mental health conditions, as well as how students perceive stigma, accessibility, and institutional support related to accommodations.

Participants include current faculty and enrolled students at William Jewell College. Data was collected between January-March 2026, through two anonymous online surveys administered via Google Forms. The faculty survey assessed attitudes toward accommodations, perceived challenges in implementation, confidence in supporting students, and recommendations for improvement. The student survey examined experiences obtaining accommodations, perceived effectiveness, comfort discussing mental health, stigma, and perceived faculty and campus support. Surveys include Likert-scale items and open-ended questions to allow for both quantitative and qualitative analysis.

Results will provide preliminary insights into faculty and student perceptions of mental health and academic accommodations within this campus context. The findings will explore patterns in attitudes, perceived effectiveness of accommodation processes, and areas of alignment or discrepancy between faculty and student experiences. Although limited in scope, the study aims to identify themes that may inform future research and support ongoing conversations about reducing stigma and strengthening academic support practices at small liberal arts institutions.

Pryor Learning Commons 112

10:45 PLC 112

Engineering Final Project: Designing a Commercial Building

Madison Quarles, Hayden Branson, Ethan Reynolds, Alexavier King, Kyle Scharbrough, Andrew Munson

Advisor: Dr. Taqsim Husnain

Our project consists of designing a complete civil site for a retail store, incorporating engineering disciplines into one cohesive design. The project showcases structural, geotechnical, environmental, and sustainable principles. We were tasked with developing a site layout that includes the building footprint, parking lot configuration, foundation system, and structural framework. Stormwater runoff management was included as well as water distribution and sewer system. Throughout the project, we applied engineering analysis, environmental science concepts, and cost estimation techniques to develop a realistic and sustainable retail site.

11:05 PLC 112

Aerodynamics in a Homemade Wind Tunnel

Simon Lyon

Advisor: Dr. Blane Baker

The purpose of this project is to design and construct a functional wind tunnel using readily available materials, and to use it to investigate how airflow interacts with airfoil shapes. By measuring lift and drag forces, the project aims to demonstrate basic aerodynamic principles in a hands-on, low-cost way. This approach provides an accessible method for students and hobbyists to explore aerodynamics without requiring professional laboratory equipment.

Afternoon Sessions

Yates-Gill 221

1:00 Yates-Gill 221

The Baptism of Partisanship

Ethan Naber

Advisor: Dr. Gary Armstrong

Christian nationalism, generally characterized as the belief that America should promote and defend Christian politics, culture, and governance, has become a significant factor in U.S. politics. While there is a multitude of literature analyzing the political theory and religious elements of Christian nationalism, existing literature tends to focus on only one of these dimensions. This thesis operates in the nexus of political theory and religious studies, analyzing Christian nationalism on both fronts. While Christian nationalism claims to spread Christian values, this thesis finds that Christian nationalism corrupts both Christianity and democratic governance. Moreover, the logical end of Christian nationalism is right-wing authoritarian governance, not the Christ-friendly environment it claims to be.

1:20 Yates-Gill 221

Learning About United States Immigration: What Psychological Factors Relate to Knowledge Engagement?

Lianna Morelli

Advisor: Dr. Keli Braitman

Immigration has become a contentious topic in many western countries in recent years. Despite strong feelings toward immigration there is evidence that suggests people do not know many facts about how it works in their country (Chomsky, 2014; Duffy, 2014; Mehta, 2019). This study aims to investigate attitudes about immigration in America and how many facts individuals know about it. Additionally, we would like to know how willing someone is to learn about immigration and what psychological levers (conceptual metaphor, moral foundations, self-reported knowledge engagement, issue importance, etc...) we can use to increase knowledge engagement for immigration research. The research utilized a cross-sectional correlational survey design and participants (N=173) were recruited via Amazon Mechanical Turk. They completed measures of moral foundations, perceived knowledge, expected performance, and importance of immigration issues, followed by an immigration knowledge assessment and immediate feedback. Results have been collected but not yet analyzed due to a delay in available student technology. Results will be analyzed using R Studio by March 13th. Substantial progress has been made on this project to this point (literature review, designing the study, writing most sections of the research paper), and it is on track to be completed and well-rehearsed before Duke Colloquium.

1:40 Yates-Gill 221

Immigration and Democratic Reform in the 21st Century

Matthew Parker

Advisor: Dr. Gary Armstrong

This project explores the relationships between democratic theory and immigration, specifically highlighting where the field of democratic theory falls on questions of immigration policy and national identity. Immigration was selected as the primary evaluative lens due to its salience in modern-day policy debate and its relevance to core concepts of democratic theory, including national identity and a shared sense of the common good. What's more, immigration's effects on democracy are poorly studied in theoretical literature. This project highlights three heterodox proposals for democratic reform, including the economic-centered model of Dambisa Moyo, the traditionalist and post-liberal model of Patrick Deneen, and the open-democratic and majoritarian model of Helene Landemore. Each proposal is critically evaluated, with particular attention paid to how the author understands national identity, assimilation, inclusion, and the power of communities to define and limit their membership. I highlight the successes and shortcomings of modern-day democratic theory in addressing immigration and examine which theoretical pathway provides the safest route forward while respecting the basic rights and responsibilities of democratic governance.

Yates-Gill 222

1:00 Yates-Gill 222

Milk-Derived Extracellular Vesicles as Natural Nanocarriers for Curcumin Delivery in Colorectal Cancer Cells

Mya Zavala

Advisor: Dr. Mahsa Hosseini

Effective drug delivery remains a major limitation in cancer therapeutics, particularly for hydrophobic compounds whose biological activity is reduced by poor solubility, instability, and limited cellular uptake. Curcumin is a well-studied polyphenolic compound with reported anti-inflammatory and anticancer properties, but its therapeutic potential is constrained by low aqueous solubility and poor bioavailability in its free form. Although conventional delivery systems

such as synthetic nanoparticles and liposomes can improve drug transport, these platforms may be limited by manufacturing complexity, cost, scalability, and concerns regarding biocompatibility. Extracellular vesicles (EVs) have emerged as a promising alternative because they are naturally derived, lipid-bilayer nanocarriers capable of transporting bioactive cargo in biological systems. Among available EV sources, bovine milk is especially attractive because it is abundant, accessible, food-grade, and amenable to large-scale isolation, making it a potentially practical platform for translational drug delivery applications. These advantages make milk-derived EVs a compelling candidate for improving the delivery of poorly soluble therapeutic compounds in cancer models. The purpose of this study is to evaluate whether milk-derived EVs can serve as an effective natural nanocarrier for curcumin delivery in cancer cells and to determine whether EV encapsulation improves delivery-related biological effects compared with free curcumin alone.

Milk-derived EVs were isolated from fresh bovine milk through several rounds of centrifugation and purification. Vesicle preparations were characterized using SDS-PAGE, and curcumin loading was assessed by measuring encapsulation efficiency after removal of unencapsulated compound. Cancer cells were then treated with control media, unloaded EVs, free curcumin, or EV-encapsulated curcumin, and cellular responses were evaluated using plate reader-based viability assays. Results are currently pending; however, it is expected that EV-encapsulated curcumin will demonstrate improved delivery and greater cytotoxic effects relative to free curcumin, supporting the use of milk-derived EVs as a scalable and biocompatible drug delivery platform for colorectal cancer applications.

1:20 Yates-Gill 222

Hemin-Induced Differentiation and Ara-C Cytotoxicity in K562 Cells: Effects on Viability, Morphology, and Cell Size

Ford Brandt, Jackson Cook

Advisor: Dr. Tara Allen

Leukemia develops when immature blood-forming cells stop following their normal path to become healthy, specialized blood cells. Instead, they remain stuck in an abnormal, rapidly dividing state. Because of this, researchers often study two broad treatment strategies: one that tries to force cancer cells to mature, and another that directly kills them. In this project, we used K562 leukemia cells to compare those two approaches by exposing the cells to Hemin, which can promote erythroid-like differentiation, and cytarabine (Ara-C), a chemotherapy drug that disrupts DNA replication in dividing cells. After 48 hours, we examined how the treatments affected cell survival, size, and overall appearance under the microscope. Ara-C showed the clearest toxic effect, reducing the number of viable cells and producing visible signs of cell damage, consistent with its role as a cytotoxic chemotherapy agent. Hemin showed some trends that may reflect early differentiation, including smaller average cell size, but interpretation was limited by an unintended increase in dose that likely introduced additional stress on the cells. Overall, this study highlights an important biological question in leukemia treatment: should therapy aim to destroy malignant cells, encourage them to mature, or carefully balance both? Even in a simple cell model, the results show that these two strategies can push leukemia cells toward very different outcomes.

1:40 Yates-Gill 222

Dose-Dependent Cytotoxic Effects of Dental and Chemical Compounds on L929 Fibroblasts

Caroline Beckmann

Advisor: Dr. Tara Allen

Oral health plays a critical role in maintaining overall systemic health, with fibroblasts serving as essential cells for tissue repair, regeneration, and structural support within the oral cavity. Various dental products and chemical agents, including denture adhesives, ethanol-containing mouthwashes, and tooth whitening agents, may negatively impact fibroblast viability and function. However, the extent of their cytotoxic effects and how different concentrations influence cellular responses remain unclear. This study aims to evaluate the effects of commonly used dental compounds on mouse fibroblast (L929) cells in vitro. Fibroblasts will be cultured and exposed to two denture adhesives, varying concentrations of ethanol, and bleaching agents like hydrogen and carbamide peroxide. Cell viability and proliferation will be assessed with an MTT assay after 24-72 hours of exposure. It is hypothesized that all treatment

groups will demonstrate reduced cell viability compared to controls, with cytotoxic effects occurring in a dose-dependent manner. By comparing the cell viability after treating with these commonly used dental products, this study will provide important insight into their potential impact on oral tissue health. Understanding how these agents affect fibroblast viability may contribute to improved safety considerations in oral care products and support the development of materials that better preserve tissue integrity and healing capacity.

Gano Assembly

1:00 Gano Assembly

MO-116 Community Marketplace Project

Evan Jilbert, Kimberly Munoz, Hayden Vernon, Drew Caudle, Julianne Bise

Advisor: Dr. Taqsim Husnain

This project presents the planning and design of the MO-116 Community Marketplace in Polo, Missouri, a rural community experiencing population decline and limited access to convenient goods and services. The proposed development is a Dollar General that aims to boost the local economy while improving the overall quality of life of the town through sustainable commercial development. The proposed project includes an approximately 11,000 square foot convenience store, with a beam/column steel structure, ADA-accessible parking, sidewalks, retention pond with stormwater management, with the option to expand in the future.

The design process includes research and integrates many disciplines we have covered over the years in the civil engineering program including geotechnical and foundational practices, structural, steel, and transportational design, site development, and environmental planning. We plan to involve topographic surveying, site grading, drainage and retention pond design, retaining wall design, and developing plan sheets all aligned with current codes and standards. Another major focus of our project is sustainability. With this project, we plan to design said site to meet Envision Silver certification requirements through our site design with ideas such as planning to power the store with solar energy, preparation for 50-year storms, and reusable materials.

Our work emphasizes the use of alternative analysis and project management strategies to maintain a cost efficient, yet constructable store. Our preliminary layouts explore multiple site configurations to optimize accessibility for shoppers and shippers while also staying environmentally friendly and planning for future expansion.

This presentation highlights the methodology, design decisions, and sustainability strategies used to translate an RFP into a comprehensive site development proposal, illustrating the role of integrated engineering design in small-community growth.

1:40 Gano Assembly

FIFA Event Readiness for Small Businesses

Grace Wallerstedt

Advisor: Dr. David Lisenby

This project focused on preparing small businesses in Liberty, Missouri for the estimated 650,000 visitors expected in the Kansas City region during the 2026 FIFA World Cup. Many small businesses were not fully prepared to manage a sudden increase in customers. They needed guidance on working with different cultures and languages, carrying additional inventory, and ensuring they had enough trained employees to operate successfully during a high-demand period. Without preparation, the influx could have created operational strain instead of taking advantage of a potential growth opportunity.

To address this need, I worked with Downtown Liberty, Inc. (HDTL) and local entrepreneur Kira Cheree to provide access to practical business resources. Kira assisted in sourcing the materials, while I facilitated communication between her and HDTL and managed the overall coordination of the project. The resources supported business owners in exploring short-term financing options, strengthening customer service across cultures, and preparing for increased inventory demand. HDTL distributed the materials through its business contact database to ensure accessibility.

Through project management, coordination, and adapting plans based on business owner feedback, this initiative helped position local businesses to approach the World Cup season with greater confidence and preparedness. Ultimately, the project reinforced how intentional planning can support small business growth and contribute to the broader economic prosperity of the Kansas City region.

Pryor Learning Commons 112

1:00 PLC 112

Extreme Instances of the Committee Size Paradox

Baigali Nyamdulam
Advisor: Dr. David McCune

Imagine that several candidates are running for three available seats on a city council. A committee size paradox occurs if a candidate elected when three seats are available would fail to be elected if the number of seats were increased. The research investigates how extreme such paradoxes can be under the single transferable vote (STV), a widely used voting method for multi-winner elections. We show that for an arbitrary number of candidates, there exist elections in which the unique winner in a single-seat contest is excluded from the winning set as the number of seats increases to two, three, and so on, up to one fewer than the total number of candidates. More generally, we demonstrate that STV can exhibit highly counterintuitive non-monotonic behavior with respect to committee size, while also identifying limits on the severity of these paradoxes.

1:20 PLC 112

An Alternative Proof of the Newton-Girard Formula for Non-Commutative Symmetric Polynomials

Timothy Fay
Advisor: Dr. Samuel Chamberlin

The purpose of this project was to provide an alternate proof for a non-commutative version of the Newton-Girard formula proven by Boumova, Drensky, Dzhendrekov, and Kassabov in 2022. The original Newton-Girard formulas are well-known in the field of algebra and describe the relationship between elementary symmetric polynomials and power sums. The proof technique we used took inspiration from a technique Mead used to prove the Newton-Girard formula in the commutative setting in 1992.

Pillsbury Music Center

1:40 Pillsbury Music Center 311

Astor Piazzolla “Saviour of Tango,” Meets the Saxophone

Liliana Jackson
Advisor: Dr. Dorothy Glick Maglione

The Argentine composer, bandleader, and bandoneon player Astor Piazzolla (1921-1992) initially began writing tangos early in his career but was discouraged from it in favor of classical genres and styles. At 33, Piazzolla won an opportunity to study in Paris for a year with Nadia Boulanger, who encouraged him to compose tangos. He returned home and

formed the Octeto Buenos Aires and later, the Quinteto Nuevo Tango, who performed at Piazzolla's club, "Jamaica." Piazzolla's brand of tango-later called "nuevo tango"-was initially not taken well. It included new musical elements such as extreme chromaticism, dissonance, elements of jazz, and expanded instrumentation. By the 1980s, Piazzolla's music became widely accepted, and gained the attention of classical performers.

Piazzolla composed about 750 works, including his six Tango-Études pour flûte seule (1987), which are concert pieces in tango form written for solo flute or violin. They were adapted for solo alto saxophone or clarinet two years later. In this presentation, I will share the context of Piazzolla's work as well as perform movements three and four of Tango-Études pour flûte seule. Within these movements, No. 3 is labeled as "marked and energetic" and features large, abrupt leaps from the higher to lower register. Piazzolla creates two voice counterpoint, and pays homage to Sergio Ortega's El pueblo unido jamás sera vencido ("The People United Will Never Be Defeated") in the melody. No. 4 then shifts styles, and explores the intimate and lyrical side of tango, featuring weighted glissandos, tentative dynamics, and sensual melodies.

2:00 Pillsbury Music Center 311

Performing Arts: Hell is Other People: Jean-Paul Sarte's Views of Existentialism, Power, and Tyranny as seen in "No Exit"

Lianna Morelli, Ivan Calderon, Emma Kelly, Cal Perkins

Advisor: Dr. Brendon Benz

The voice of Sartre jumps out in his most infamous line in No Exit: "Hell is other people" (Sartre, 45). The torment experienced by Garcin, Estelle, and Inez is social and emotional, not physical. There were no mirrors in their hell, which symbolizes an inability for self-reflection. Each character, therefore, relied on others' judgments to determine how to understand themselves. Garcin wanted to be seen as courageous, giving Inez power over him. Estelle wanted to be seen as beautiful by a man, giving Garcin power over her. "Hell is other people" does not imply people are inherently bad or oppressive, but that domination over others happens when responsibility over self-definition is given up for the definition of others. Tyranny grows when people seek external validation and allow others to define their worth.

If given a 30-minute session, a 10-minute presentation would be given on the basics of Existentialism in relation to power and tyranny. Following, we would present a 15-20 minute staged reading of a section of "No Exit" by Jean Paul Sarte expanding upon the concepts discussed in the oral presentation

The full script can be found at this link: https://ia800303.us.archive.org/13/items/NoExit/NoExit.pdf

The section of script to be performed is being determined with the faculty sponsor, Dr. Benz. The selection would keep lines that maintain themes and display Jean Paul Sarte's views of power and existentialism, and cut less important lines/monologues to remain within allotted time.

2:30 Pillsbury Music Center 311

Musical Theatre: Ahrens and Flaherty in Concert: Song Classification and Rehearsal Practices

Ivan Calderon, Lauren Taylor

Advisor: Dr. Laura Lowry

The Armenian Genocide remains one of the most contested events of the early twentieth century, leaving a lasting legacy for both the Armenian diaspora and the modern state of Turkey as it emerged from the former Ottoman Empire. Occurring during World War I, the systematic deportation and mass killings of Armenians between 1915 and 1917 reshaped the demographic and cultural landscape of Eastern Anatolia and the broader Ottoman state. This research examines the underlying causes of the Armenian Genocide focusing on Turkish nationalism, wartime paranoia, and Turkish Russian relations. In addition to exploring the historical context in which the genocide occurred, my research

also analyzes how historians' interpretations of the event have differed over the past century. Finally, this paper considers the genocide's broader impact, specifically its influence in the development of the term genocide in the twentieth century. By examining these historical and historiographical aspects, this study highlights how the Armenian Genocide has shaped both historical scholarship and international understandings of mass violence.

Gano Assembly

2:00 Gano Assembly

Amine-Functionalized β-Cyclodextrin for Selective Pharmaceutical Removal from Wastewater

Irene Taboada

Advisor: Dr. Shane Price

Every day, medications enter our water systems through normal human activity and pass through wastewater treatment plants largely undetected. Current treatment facilities are highly effective at removing bacteria and bulk waste, but they were not designed to capture trace pharmaceuticals. Over time, even low concentrations of these compounds can harm aquatic life. This study explores a chemical approach to selectively capturing pharmaceutical contaminants before they reach natural waterways.

The approach centers on β-cyclodextrin (β-CD), a naturally derived, ring-shaped molecule with a hollow interior that can trap certain compounds the way a lock catches a key. By attaching β-CD to ordinary cellulose filter paper, we created a material capable of capturing pharmaceuticals directly from water. We then attempted to improve this filter by adding amine chemical groups to β-CD, with the goal of making it more selective toward specific contaminants, including the antibiotic ciprofloxacin, the anti-inflammatory diclofenac, and the antidepressant fluoxetine. Performance was measured by tracking how much of each pharmaceutical remained in solution after filtering.

The unmodified β-CD filter showed promising removal of ciprofloxacin and fluoxetine, but the amine modification process unexpectedly weakened the attachment between β-CD and the filter paper, reducing its effectiveness. Future work will focus on gentler modification methods to preserve the filter's structure while still improving its selectivity. Ultimately, this research works toward developing inexpensive, adaptable filtration materials that could one day supplement existing wastewater treatment and help keep pharmaceuticals out of our waterways.

2:20 Gano Assembly

Infective Endocarditis: A Literature Review

Grace Allen

Advisor: Dr. Tara Allen

Infective endocarditis is a severe inflammatory disease of the heart's inner lining (the endocardium) caused by bacterial adherence and growth. There are three general steps that describe the development of infective endocarditis: (1) initial endocardial injury, (2) development of a clot, and (3) bacterial seeding of that clot. Endocardial injury can be sustained from previous cardiac procedures or altered patterns of blood flow caused by heart defects. Specialized host proteins are then recruited to form a clot that can heal the injured site. These proteins then become the target of binding for bacterial proteins which exploit the body's normal healing process. Once bound, bacteria possess multiple mechanisms to avoid host immune system detection, complicating treatment efforts. Despite the growing body of knowledge in modern medicine, endocarditis remains a significant clinical challenge and has an ever-increasing global burden. This presentation will characterize the risk factors mediating infection, the processes underlying infection onset and persistence, and the unequal global distribution of disease and its disproportionate impact on certain populations.

Pryor Learning Commons 112

2:00 PLC 112

Social Media, the War in Gaza, and the 2024 Presidential Election

Alyssa Engle

Advisor: Dr. Abigail Vegter

The war in Gaza has had a major impact on public opinion in the US and was one of the main topics of discussion in the 2024 presidential election. US Muslims were particularly critical of the Biden administration's policy toward the war, with many saying that it was their number one concern when voting. Normally voting democrat, many US Muslims voted either third party or Republican, with the Democratic nominee, Kamala Harris, receiving only 20% of the Muslim vote. Social media has played a major role in informing citizens of what is happening in Gaza, offering chances for personal perspectives and on-the-ground coverage. However, social media users are vulnerable to the spread of misinformation and echo chambers, which can impact political perspectives. This research aims to provide a theoretical overview of how algorithmic amplification of violent images can create perceived group threat and how this corresponds to how Muslims voted in the 2024 presidential election. This research applies the affective intelligence theory (AIT), which proposes that emotional responses to information can shape how that information is processed, which can impact the rationality of voters. This research found that the algorithmic amplification of violent images during the war, as well as extreme perspectives, worked to invoke fear among Muslim voters, helping to explain the rise in party defection during the 2024 election.

2:20 PLC 112

Making More Votes Count? Analyzing Ballot Exhaustion in Scottish Multi-Winner Elections

Ethan Naber

Advisor: Dr. David McCune

Voting theory suggests that Single Transferable Vote (STV) or ranked-choice systems better reflect voters' preferences because the ranking of candidates enables voters to avoid the strategic voting found in two-party systems. These systems come with the downside that under certain cases, votes cannot be transferred and the ballot becomes "exhausted," meaning it cannot count any more. Theoretically, exhausted ballots can have a large electoral impact; adding a losing candidate to the final rank of a previously exhausted ballot changes the winner set in over 50% of elections. But is this a problem for STV? To test this, we extend a study by Endersby and Towle (2014), analyzing 5.5 million votes across ~1,100 multiwinner local elections in Scotland. We find that only a small share of votes-about 7.5%-are exhausted, not as large an effect as existing literature suggests. However, our data defies commonly theorized factors for ballot exhaustion. Voter fatigue, ballot complexity, and demographic elements of the electorate fail to adequately explain our results. This suggests that individual- or ballot-level factors, not aggregate statistics, are causing ballot exhaustion, emphasizing the need for further research in this area.

2:40 PLC 112

"Thatcher, Thatcher the Milk Snatcher:" The Scottish Nationalist Mythologization of Maggie

Kandace-Rose Gill

Advisor: Dr. Megan Groninger

My research aimed to understand how Margaret Thatcher's time as Prime Minister led to a rise in the desire for Scottish nationalism. I used three distinct theories of nationalism, which provide frameworks for understanding how nationalist sentiments emerge, and applied these theories to three historiographical perspectives on the relationship between Thatcherism and Scottish nationalism. I will specifically examine the core issues of privatization, the poll tax, and the

struggle for devolution through each of these theoretical and historiographical interpretations to understand why the Scottish Parliament was established directly after Thatcher. My research revealed that the UK government failed to mediate the population's diverse identities effectively, leading to an overprioritization of the British state's survival and the neglect of Scots' needs. I also found that British governance was perceived as an existential threat to Scotland, met with the push for Scottish devolution, since nationalism is a sentiment the state rallies to create unity in the face of a threat. Third, since nationalism is an imagined community based on subjective narratives, Thatcher became a mythological figure used to rally nationalist sentiment in Scotland. I conclude that Scottish nationalism emerged after Thatcher's time as PM due to political neglect, leading to the cultural construction of Thatcher as a symbol of British domination and the creation of the Scottish Parliament.