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April 2023

## 2023 Program

Kate Votaw

katevotaw@umsl.edu

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UNIVERSITY OF MISSOURI - ST. LOUIS

*Undergraduate*  
**RESEARCH**  
*Symposium*

MILLENNIUM STUDENT CENTER

**APRIL 28, 2023**

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11:00-12:30

**STUDENT LUNCH**

CENTURY ROOM A/B

12:30-2:55

**ORAL PRESENTATIONS**

MSC ROOMS 314, 315, 316, 317

1:00-3:00

**VISUAL PRESENTATIONS**

3RD FLOOR ROTUNDA  
& CENTURY ROOM A/B

3:00-3:55

**STUDENT PRESENTATION  
& PIANO PERFORMANCE**

*THE LIFE AND MUSIC OF HAZEL FELMAN*  
CENTURY ROOM C

3:30-4:45

**SOCIAL HOUR &  
RECOGNITION RECEPTION**

MSC CENTURY ROOMS A/B

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# Oral Presentations

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## PANEL A

12:30-1:25 | MSC 314

EFFECTS OF FOSTER CHILDREN'S EPIGENETICS IN ABUSIVE ENVIRONMENTS

Shamika Ellis

PSYCHOPATHY & PERCEPTIONS OF CONTROL

Amy Kenny

HOPE FOR THE UNHOUSED:

MEDICAL TREATMENT ACCESS AND RETENTION AMONG UNHOUSED INDIVIDUALS WITH OPIOID USE DISORDER IN THE ST. LOUIS REGION

Allison Token

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## PANEL B

12:30-1:25 | MSC 315

STABILITY AND CRISIS RESPONSE:

COMPARING THE U.S. AND CANADIAN BANKING SYSTEMS

Sarah Boslaugh

AFTERLIGHT: GAME DESIGN AND THE POWER OF NARRATIVE

Elio Hollenbeck

MEMORY AS A FOUNDATION FOR LEARNING

Manuel Vicuna-Rios

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## PANEL C

1:30-2:25 | MSC 316

TOTAL VARIATION FLOW IN  $R^n$  DIMENSIONS WITH EXAMPLES RELATING TO PERIMETERS OF LEVEL SETS

Luis Schneegans & Victoria Shumakovich

APPLYING SUSTAINABLE, TRIBLOCK COPOLYMERS

Campion Smith

ANTIBIOFOULING PROPERTIES OF ZWITTERIONIC CO-POLYMERS

Liam Lundergan

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## PANEL D

1:30-2:25 | MSC 317

SEEING ME: INFLUENTIAL QUEER BLACK MEN IN ENTERTAINMENT

Jay Gaskin

THE ROARING LION OF BERLIN: THE LIFE, THOUGHT, AND INFLUENCE OF EUGEN DÜHRING

Arden Roy

WHITE ALLIES IN THE AMERICAN SOUTH

Diamond Cannady

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## PANEL E

2:00-2:55 | MSC 314

MAKING AND MOVING MONEY - GROWING WEALTH AND CORRUPTION IN XI JINPING'S CHINA

Brady Yanko

GANGSTERISM, THE URBAN RULING ELITE, AND THE GUOMINDANG:

POWER SHARING DURING THE EARLY YEARS OF THE CHINESE REPUBLIC, 1927-1937

Evan Boyle

HUMAN ZOO HEALTHCARE AT THE 1904 WORLD'S FAIR

Angel Blake

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## PRESENTATION & PIANO PERFORMANCE

3:00-3:55 | CENTURY ROOM C

THE LIFE AND MUSIC OF HAZEL FELMAN

Shane Devine

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# Visual Presentations

## MSC 3RD FLOOR ROTUNDA

INVESTIGATION OF ALZHEIMER'S AMYLOID-B PROTEIN AGGREGATION WITH A NEW FLUORESCENT DYE  
Emma Alberty

ETHERIFICATION OF PROPARGYLIC ALCOHOL USING FERROCENIUM IONS  
Cody Amann, Sai Anvesh Bezawada, & Eike B. Bauer

LEARNING CURVES IN BUMBLEBEE FORAGING (BOMBUS IMPATIENS)  
Samir Benbakir, Becky Hansis-O'Niell, & Aimee Sue Dunlap

EFFECTS OF FUNGAL BIOPESTICIDE DOSES ON MORTALITY IN BUMBLE BEES  
Colton Burris

DETERMINATION OF ANTIBODY AFFINITY FOR THE ALZHEIMER'S AMYLOID-B PROTEIN  
Bree Carlton

EVALUATING FARM SIZE CHANGE AS AN EXPRESSION OF PREFERENTIAL ALIGNMENT IN THE CORPORATE FOOD REGIME  
Rachael Carpenter

THE EFFECT OF CAFFEINE ON BEE BEHAVIOR: A PROGRESSIVE RATIO STUDY  
Kayle Cohen, Becky Hansis-O'Neil, & Aimee Dunlap

COMPARING SUCROSE PREFERENCE BETWEEN COLONIES OF BOMBUS IMPATIENS  
Kevin R. Corrigan, Becky Hansis-O'Niell, & Aimee Dunlap

TIME-DOMAIN NOISE IN "PER-DECADE SPECTRA" FROM AFM IMAGES OF MICA  
Theodore Davich

TRITONS UNITED: AGAINST GENDER-BASED VIOLENCE  
Jessica Emert, Kayla Bowling, Kimberly Werner, & Maggie Gross

CHEMTRAILS: DEADLY SKIES OR DANGEROUS MISINFORMATION?  
Abigail Foust

CONTENT ANALYSIS OF BACKYARD CONSERVATION WEBSITES  
Katie George & Sam Holzer

THE FENTANYL CRISIS IN THE AFRICAN AMERICAN COMMUNITY: EXPLORING GEOGRAPHIC DIFFERENCES IN OVERDOSE IN THE STL REGION  
Tanys Giles, Devin Banks, Rashmi Ghonasgi, Maria Paschke & Rachel Winograd

HVALDIMIR: RUSSIAN BELUGA SPY WHALE  
John Granicke

EXAMINING IMMUNE MARKERS AS DETERMINANTS OF COGNITIVE DIFFICULTIES AMONG PERINATALLY INFECTED YOUTH WITH HIV  
Addie Halbrook

FINDING GENE CANDIDATES THAT INTERACT WITH MARA TO CONTROL HILA EXPRESSION IN SALMONELLA ENTERICA  
Kylee Hempel

THE FAILED 1971-1973 REDEVELOPMENT OF PRUITT-IGOE  
Rachael Heriford

RECOGNITION PROMOTES SODOMY: GAY LIB VS. THE UNIVERSITY OF MISSOURI  
Micah Hillier

STUDYING THE GENES AND CONDITIONS THAT INFLUENCE ROOT DEVELOPMENT  
Tessa Holtkamp & Hannah Ordonez Webb

RECOVERING ANCIENT DNA USING THE POLYMERASE CHAIN REACTION (PCR)  
Rose Jennings

THE 1904 WORLD'S FAIR: INTENDED IMPACT OF THE U.S. GOVERNMENT BUILDING VISITOR EXPERIENCE  
Dalton King

HOW THE WEST WAS STOLEN: A CLOSER LOOK AT THE ST. LOUIS TREATY OF 1804  
Lisa Koziejka

COVID-19 EFFECTS ON ADOLESCENT ANXIETY  
Lyndsay Lamey

ANIMAL CONSERVATION IN ST. LOUIS  
Kate O'Sullivan

LIFE BEYOND THE HORIZON: THE UNIVERSE WAS BORN IN A BLACK HOLE  
Zahria Patrick

THE EFFECT OF VARIATION OF N-SUBSTITUENTS ON OXIDOPYRIDINIUM IONS IN (4+3) CYCLOADDITIONS  
Zahria Patrick & Madison Clark

EFFECTS OF BEAVERIA BASSIANA ON THE MORTALITY AND THORAX WIDTH OF BOMBUS IMPATIENS COLONIES  
Bri Petty

## MSC CENTURY ROOMS A/B

### CLASS SHOWCASE

WHERE WE LIVE:  
HISTORY CAN MAKE A DIFFERENCE

BERKLEY PRESENTATION  
Emma O'Donnell, Isabel Schnittker, Weston Arnold, Alex Dougherty, Rida Niazi, Skylar Baxter, Ashton Hartman, & Jennifer Thiele

NBA CONSPIRACIES: A LEAGUE THAT VALUES MONEY OVER HONESTY  
Rebecca Littrel

FLORISSANT PRESENTATION  
Rebecca Littrel, Emily Jesse, George Shawi, Jeanette Memmer, Gavin Graves, & Ashley Maempa

MUSEUM ACCESSIBILITY AS A MULTIFACETED ISSUE: INVESTIGATING ACCESSIBILITY AND THE SAINT LOUIS ART MUSEUM  
Jeannette Memmer

NAZI GERMANY AND  
THE HOLOCAUST IN AMERICAN MEMORY

A VACCINE AGAINST HOLOCAUST DENIAL: DENIAL: KNOWLEDGE  
Riley Andreason

HOLOCAUST DENIAL: THE CONSPIRACY OF IGNORANCE  
Morgan Nelson

"KILLIN' NAZIS": HOW JEWS ARE PORTRAYED IN TARANTINO'S INGLOURIOUS BASTERDS  
Skylar Baxter

UNRAVELING THE TRUTH: THE WANNSEE CONFERENCE AND HOLOCAUST DENIAL  
Howie Parkes

LUCAS' EMPIRE: STAR WARS AND NAZI GERMANY  
Karli Dean

HOW TECHNOLOGY IS HELPING HOLOCAUST DENIERS REWRITE HISTORY  
Michael Raffelson

SPACE NAZIS - THE SPECIFIC CONNECTIONS BETWEEN STAR WARS AND NAZI GERMANY  
Jeremy Dobrzanski

THIRD REICH IN HARRY POTTER: FICTION IMITATING FACT  
Paul Sanders

CONCEPTUALIZING NAZISM IN AMERICA THROUGH ALTERNATIVE HISTORY MEDIA  
Matthew Fear

ERWIN ROMMEL: NOBLE KNIGHT OF GERMANY OR NAZI KNAVE?  
Jake Schultz

HOGAN'S HEROES: FACT OR FICTION?  
Mark Granicke

MAGNETO'S ORIGIN IN THE HOLOCAUST AND HOW IT INFLUENCES HIS CHARACTER TODAY  
Rena Usprich

"I HATE ILLINOIS NAZIS:" REMEMBERING HATE SPEECH AND THE FIRST AMENDMENT IN SKOKIE, IL  
Morgan Myers

PRESERVING SACRED MEMORY: THE EFFORT TO CREATE THE UNITED STATES HOLOCAUST MEMORIAL MUSEUM  
Jessica Wachtel

SOCIO-DEMOGRAPHIC RISKS AFFECT EXECUTIVE FUNCTIONING  
Brittany Rodgers, Nicole Shelley, & Hannah B. White

TELEHEALTH TREATMENT FOR OPIOID USE DISORDER IN MISSOURI'S URBAN AND RURAL AREAS PRIOR TO AND SINCE COVID-19  
Aurora Rojo, Rashmi Ghonasgi, Zachary Budeska, & Rachel Winograd

THE ASSOCIATION BETWEEN COPING-MOTIVATED DRINKING AND ALCOHOL-RELATED CONSEQUENCES  
Jacob D. Salsler, Ian A. McNamara, & Ryan W. Carpenter

SURVEYS OF APHONOPELMA HENTZI IN MISSOURI: CONSERVATION EFFORTS THROUGH POPULATION, GENETICS, AND HABITAT STUDIES  
Anderson B. Spencer & Becky Hansis-O'Niell

BANANAS VS. COFFEE: WHY DID ONE INSTIGATE VIOLENCE AND THE OTHER COMMUNITY?  
Sydney Stark

THE REVOLUTIONARY ST. LOUIS INSANE ASYLUM  
Julia Talbert

AN INVESTIGATION ON THE COGNITIVE IMPACTS OF BEAVERIA BASSIANA ON BOMBUS IMPATIENS COLONIES  
Jake Venegoni

THE DEVELOPMENT OF GENDER BIAS IN STEM  
Addison Vogt

EXPLORING BEST PRACTICES IN UMSEL'S COLLABORATIVE LABORATORY INTERNSHIP AND MENTORING BLUEPRINT (CLIMB) PROGRAM  
Dakota Warren

PRECAUTIONARY BUYING DURING THE COVID PANDEMIC: EVIDENCE FROM GROCERY SCANNER DATA  
Blake Williams & Trilce Encarnacion

DOSE-DEPENDENT EFFECT OF BUMBLEBEE COGNITION AND BODIES  
Summer Wise

THE FIGHT FOR FLUORIDATION IN STL  
Noor Yousef

THE LIFE AND MUSIC OF HAZEL FELMAN  
Shane Devine

## Investigation of Alzheimer's Amyloid- $\beta$ Protein Aggregation With a New Fluorescent Dye

Emma Alberty

*Faculty Sponsor: Dr. Michael R. Nichols*

Alzheimer's Disease (AD) is the most common form of dementia characterized by the impairment of at least two brain functions such as memory loss and judgement. AD is a progressive illness that can last as many as 20 years. AD is largely considered to be caused by the formation of extracellular amyloid plaques and intracellular neurofibrillary tangles. A better understanding of the structure and function of these plaques may lead to clearer understanding of the disease. To analyze amyloid plaques, aggregation assays are often used. During these assays we begin with monomer and place the sample in biological conditions to see how long it takes for the monomer to aggregate. A key component of these assays is a tracer molecule such as Thioflavin T. The tracer molecule allows us to determine when the monomer has begun to aggregate. I have been analyzing a new fluorescent dye to determine if it may be a better fit for amyloid beta aggregation assays.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 1**

## Etherification of Propargylic Alcohol Using Ferrocenium Ions

Cody Amann, Sai Anvesh Bezawada, & Eike B. Bauer

*Faculty Sponsor: Dr. Eike Bauer*

Our research efforts are directed toward the improvement of iron-based catalyst systems. The Bauer research group recently found that the ferrocenium cation is a catalytically active in the etherification of propargylic alcohols. My research was to compare the effect of two different counteranions of the ferrocenium cation on the catalytic activity. Etherification test reactions were performed using 2-methyl-2-phenol-propargylic alcohol and *n*-butanol to afford the corresponding propargylic ether substitution products. The complexes used as catalysts were ferrocenium hexafluorophosphate (I) and ferrocenium tetrafluoroborate (II).

Test reactions shown below were performed using equimolar amounts of a propargylic alcohol and the primary *n*-butanol alcohol in  $\text{CH}_2\text{Cl}_2$  at 40 °C with an increasing amount of catalyst load. The formation of the propargylic ether product was analyzed by using gas chromatography in 2 h and 18 h intervals. We observed an increase in the ether formation with increasing catalyst load. The research assists with increasing the efficiency of the catalyst system for the title reaction, which overall saves energy and resources in potential industrial applications.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 2**

## A Vaccine Against Holocaust Denial: Knowledge

Riley Andreasen

*Faculty Sponsor: Dr. Christoph Schiessl*

Holocaust denial is founded on antisemitism and hatred. Understanding the psychology behind Holocaust denial and the associated risks is vital to protecting the public.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 32**

## "Killin' Nazis": How Jews are Portrayed in Tarantino's *Inglorious Basterds*

Skylar Baxter

*Faculty Sponsor: Dr. Christoph Schiessl*

In Quentin Tarantino's *Inglorious Basterds*, Jews are portrayed as violent, revenge-seeking Nazi hunters. This portrayal creates an ironic conflict within Tarantino's audience because Jews are seen as capable of the same atrocities of which they were victims. Under Hannah Arendt's definition of Nazis, the actions of the Jews in *Inglorious Basterds* are not equivalent to the crimes that Nazis committed. Jewish revenge fantasies are thereby not the same as the actual violence that Jews received from Nazis.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 33**

## Learning Curves in Bumblebee Foraging (*Bombus impatiens*)

Samir Benbakir, Becky Hansis-O'Niell, & Aimee Sue Dunlap

*Faculty Sponsor: Dr. Aimee Dunlap*

This poster investigates if bumblebees (*Bombus impatiens*) learn during foraging. Specifically, we modeled if bumblebees would exhibit an increase in foraging efficiency as the cumulative time they spent foraging increased after training: this is known as a learning curve. In addition to modeling, we measured foraging efficiency over time as bees gained more experience with a novel reward paradigm. We also identified that total sucrose consumed correlated with increased bumblebee foraging efficiency. Bumblebees were given the opportunity to forage in a closed experimental setup and rewarded with sucrose solution representing nectar. The nature of this closed setup allowed us to both manipulate variables, such as sucrose concentration, and collect precise data, such as flowers visited per minute, that would be impractical to collect the bumblebees' natural habitat. After analyzing the data, we did not find evidence for increased efficiency in bumblebee foraging after training was completed or with a new reward paradigm. However, we believe this is a result of our experimental setup and does not reflect how bumblebees forage in their natural habitat. We did, however, find evidence that total rewards earned is positively correlated with efficiency. More research is needed to identify factors that influence if and how bumblebees learn during foraging, and whether that learning is applied.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 3**

## Human Zoo Healthcare at the 1904 World's Fair

Angel Blake

*Faculty Sponsor: Dr. Susan Brownell*

Were precautions taken or put into place for the Human Zoo performers at the 1904 World's Fair? This topic has been overlooked and understudied by historians, there are few articles written and we do not know the true death toll which shows the racism towards these indigenous peoples. The research for this project was conducted at the State Historical Society of Missouri, the St. Louis Mercantile Library, Newspapers.com, Archives.com, St. Louis Public Library, and the Missouri Historical Society, including research on primary sources such as official World's Fair committee meeting minutes, hospital records, vaccination records and immigration records, as well as library research in secondary sources. A substantial number of indigenous peoples died at the fair due to improper healthcare for multiple reasons: They were brought to live here without proper vaccinations upon arrival; they were treated as sub-human. They were not prepared for the weather or diseases that they were introduced to, they were not properly clothed, all while on display and gawked at for being "savage". This is a relevant topic as we deal with the ongoing COVID-19 pandemic, which has disproportionately affected poorer people and people of color, demonstrating the connection between social inequality and poor health. The racism and inequality in the U.S. today emerged out of the racist attitudes evident at the fair over a century ago, so research on the World's Fair helps us understand the legacy of racism today and its impact on public health.

**2:00-2:55, MSC 314  
Panel Presentation E3**

## Stability and Crisis Response: Comparing the U.S. and Canadian Banking Systems

Sarah E. Boslaugh

*Faculty Sponsor: Dr. Max Gillman*

In 2007-08, the United States experienced a banking crisis, as 5 of the 6 other G-7 countries. The exception? Canada, which experienced only a mild recession, with no bank failures or government bank bailouts. Further research reveals that while banking crises have been commonplace in the United States (8 occurred in the 19th century alone), they are essentially nonexistent in Canadian history. I find that the primary reasons for these differences in national experience lie not in the strictness of government regulation or the qualifications demanded of borrowers in the two countries, but in the differing structures of the banking system in the United

States and Canada. Understanding these differences suggests ways the American banking system could become more stable while still meeting the demand for credit.

**12:30-1:25, MSC 315**  
**Panel Presentation B1**

## **Gangsterism, the Urban Ruling Elite, and the Guomindang: Power Sharing During the Early Years of the Chinese Republic, 1927-1937**

Evan Boyle

*Faculty Sponsor: Dr. Susan Brownell*

China's Republican era, prior to the Japanese occupation and while under the authority of Chiang Kai-shek and the Guomindang (c. 1927-1937), has in many respects been underexplored by historians. The Shanghai Massacre, Chiang's subsequent military campaigns against the Communists, the factious divisions within the Guomindang, and the ongoing Japanese campaign to annex parts of the Chinese mainland are often highlighted. In my presentation, rather than focusing on the various foes of the Guomindang, I plan to focus on the political alliances Chiang forged. In particular I will explore his ties to, and alliances with Organized Crime (specifically Du Yuesheng and other members of the so-called Green Gang) and the Urban Elite of Shanghai. The complex web of interested parties and political players that emerged in Shanghai during this decade serves as an interesting reflection (or alternatively, vestige) of the capitalist and colonial forces that had been shaping the city since the Opium wars. Chiang's association with Shanghai and its contingent of organized crime bosses and bourgeois ruling elites (which became increasingly indistinguishable during this period) is illustrative of the Guomindang's fundamental modus operandi for governance and power sharing from 1927-37.

**2:00-2:55, MSC 314**  
**Panel Presentation E2**

## **Effects of Fungal Biopesticide Doses on Mortality in Bumble Bees**

Colton Burris

*Faculty Sponsor: Dr. Aimee Dunlap*

Agricultural practices often include the use of pesticides to produce meaningful crop yields. While the pesticide may be used to target "pest" insects (e.g. thrips, aphids, whiteflies), it can also have negative effects on important pollinating insects such as bees. Neonicotinoid pesticides have been found responsible for widespread decline in bee biodiversity, and were even banned in Europe (Sgolastra et al. 2020). Beauveria bassiana, sold as Botanigard, on the other hand, is a fungal biopesticide that is marketed to be a safer alternative for bees, and has been found to have other possibly harmful effects to the inner workings of the hive in honey bees (Carlesso et al. 2020). I challenged this notion that B. bassiana has little to no effect on bee mortality, by testing individual bees of the species Bombus impatiens. By dosing bees in a range of concentrations of Botanigard, I can see how they are individually affected by B. bassiana inoculation. I collected death per day and average survival time post dose, thorax width, and mycosis assessments (death due to fungal exposure). Bumble bees are of interest in addition to honey bees due to their more widespread and native ranges. Determining the impacts related to their thorax sizes could show important differences in resilience. This data will ultimately confirm dosage methods for the main experiment looking at sublethal impacts on the same system.

**1:00-3:00, MSC 3rd Floor Rotunda**  
**Presentation Number 4**

## **White Allies in the American South**

Diamond Cannady

*Faculty Sponsor: Jason Vasser-Elong*

From the era Chattel Slavery, which marks people as the personal property to their owners, to modern day police brutality, African Americans have fought for equality in American society. Great black leaders have emerged throughout this fight for equality, but there is another group of leaders that aren't so popularly known. These leaders have put their time, resources, and lives on the line for this fight for freedom. These leaders are

spies, allies, and secret friends to the African American fight for equality. Many of these leaders were influenced by one another to stand together in solidarity with African Americans. Although many of these leaders are unheard of, their stories speak for themselves. This paper unmask those hidden leaders in history, specifically the era of Chattel Slavery in the American South and examines how religion, and personal observations influenced personal convictions against the institution of slavery.

**1:00-1:55, MSC 317**  
**Panel Presentation D3**

## **Determination of Antibody Affinity for the Alzheimer's Amyloid- $\beta$ Protein**

Bree Carlton

*Faculty Sponsor: Dr. Michael R. Nichols*

Alzheimer's Disease (AD) is a common form of dementia that is characterized by inflammation, loss of brain mass, and loss of motor function and memory. One of the pathological hallmarks of AD is the accumulation of Amyloid- $\beta$  ( $A\beta$ ) in the brain as senile plaques.  $A\beta$  is formed from a large protein called Amyloid Precursor Protein (APP) when specific enzymes cut a segment of the protein into a shorter polypeptide chain,  $A\beta$ . Different aggregation species were used in this project, specifically monomers and protofibrils. Monomers are naturally occurring and nontoxic, while protofibrils are neurotoxic and neuroinflammatory. One way that  $A\beta$  can be studied is through the Indirect ELISA technique. This technique aims to determine how aggregation intermediates of  $A\beta$  interact with different antibodies. Antibodies recognize a specific sequence of the amino acid chain. Antibody (Ab) 5 and 2.1.3 were used in these experiments. Ab5 binds to the N-terminus of the polypeptide chain, while Ab2.1.3 binds to the C-terminus. The Indirect ELISA assay has aided in determining which part of the amino acid the antibody recognizes and binds to. Data obtained from Indirect ELISAs indicates that the N-terminus and C-terminus of the polypeptide is exposed on both protofibrils and monomers. However, Ab5 has a higher affinity for both protofibrils and monomers. These results give insight into the conformation of protofibrils and monomers.

**1:00-3:00, MSC 3rd Floor Rotunda**  
**Presentation Number 5**

## **Evaluating Farm Size Change as an Expression of Preferential Alignment in the Corporate Food Regime**

Rachael Carpenter

*Faculty Sponsor: Dr. Stephen Bagwell*

Food system awareness is increasingly prevalent in international development and relations. In particular, the impact of food systems on climate change, and the impact of climate change on the capacity of production form a feedback loop that has the potential to have a severe impact on the future. Whether this contribution will be positive or negative hangs in the balance, but the window of opportunity for forming and implementing such policies may be closing. In many ways, this understanding of food as a fundamental force in shaping the lives of people, particularly those who will be severely impacted and face disproportionately negative consequences, is the basis of the concept of food justice, which the UN and other international bodies have recently prioritized as essential to Human Rights. Understanding the nexus of state power, economic activity, social preference, and food systems is important to both forming these policies and, even more significantly, to the effective public presentation and implementation of such policies. Food Regime Theory takes a multi-disciplinary approach to understand the base ideologies and institutions that form the prevailing tendencies of states toward food policy. As such, it has the potential to be used as a framework for understanding how to address some of the most pressing problems of the modern age. This research project attempts to apply the Food Regime Theory paradigm to understanding the aggregate effect of political, economic, and social activity on food systems.

**1:00-3:00, MSC 3rd Floor Rotunda**  
**Presentation Number 6**

## **The Effect of Caffeine on Bee Behavior: A Progressive Ratio Study**

Kayle Cohen, Becky Hansis-O'Neill, & Aimee Dunlap  
*Faculty Sponsor: Dr. Aimee Dunlap*

This presentation focuses on the effect of caffeine on bee behavior using behavioral pharmacology methodologies. Researchers trained bumblebees to drink out of artificial flowers, then administered sucrose nectar or caffeinated sucrose nectar during a schedule of progressive and fixed ratios. The finding suggests that caffeine did increase the number of rewards during the fixed ratio, but not in the progressive ratio. However, research is still ongoing as bees continue to be tested..

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 7**

## **Comparing Sucrose Preference Between Colonies of Bombus impatiens**

Kevin R. Corrigan, Becky Hansis-O'Niell, & Aimee Dunlap  
*Faculty Sponsor: Dr. Aimee Dunlap*

Current studies in nectar concentration preference generally take the form of a static laboratory experiment in which a multitude of feeders provide a constant source of nectar in differing concentrations and data is collected on which one is preferred most by bees. Studies like these are important because they seek to gain an understanding of bee foraging patterns. Having a strong biological understanding of these organisms better prepares us to combat issues regarding conservation should they occur. Here, we conduct an analysis on the foraging patterns of two colonies of *Bombus impatiens* (B. Impatiens) with data gathered from fixed ratio (FR) & progressive ratio (PR) schedules of reinforcement. FR is more similar to previous study methods and PR makes it so bees won't receive a reward for every response. Thus, PR is more akin to a real foraging setting.

Findings of FR runs show a significant preference for  $\geq 45\%$  sucrose for individual bees in both colonies and significantly higher average earned rewards for colony B2 over the colony A6. For PR both colonies had no significant differences regarding sucrose preference or average earned rewards. However, when comparing FR and PR data we find that colony B6 does not have a higher average earned reward like it does for FR conditions. Lastly, we did not find a significant difference in colonies for FR and PR sucrose preferences, this is potentially due the need for more colonies in the dataset.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 8**

## **Time-Domain Noise in "per-Decade Spectra" from AFM Images of Mica**

Theodore Davich, Bishal Nepal, & P. Fraundorf  
*Faculty Sponsor: Phillip Fraundorf*

The absolute strength (as opposed to the relative strength) of spatial periodicities is seldom discussed, since Fourier analyses have a wide range of "ways to normalize", and line strengths (unlike in the temporal frequency) are seldom linked to energy flow. However, Parseval's theorem relates those periodicities directly to root-mean-square (rms) roughness, whose size scale is often useful to understand. In this paper, we illustrate an application for an earlier-proposed strategy [1, 2] to track rms-roughness per decade over a wide range of size scales, for any single-valued function of two "translation variables". In particular, in context of a project to characterize the roughness per decade of spatial frequency for very flat surfaces (like gigascale integrated-circuit silicon, and cleaved mica or graphite), we here use this strategy (along with a "stationary-tip" [3] atomic force microscope (AFM) "image") to characterize vibration noise in relatively-new installation site. Let's begin with 1024x1024 pixel AFM images of freshly cleaved mica, with field-widths of 100, 10, 1 and 0.1 micron. Each was recorded over about 17 minutes i.e. with line scans of 1 second duration. This means that the tip is moving about 100 microns per second for the large field image, but only 100 nm per second for the small field image. The median line-filtered images evidenced little structure shown in Fig. 1 exhibited little structure, except for a likely 1nm mica step in the 1 micron square image. Although azimuthally-averaged spectral profiles might be of interest in some applications, they contain more line-to-line noise and poorer statistics (at least for isotropic specimens) in that sticking to only fast-scan profiles gives us 1024 instances with no line-to-line noise,

and lag-statistics available as well if needed. Hence Fig. 2 shows averaged fast-scan spectral profiles of "rms roughness per decade of spatial period" versus "spatial period", i.e. all in distance units. Taking the root sum of this quantity squared, over each decade, yields a good approximation to the rms roughness of each image as a whole. As you can see, the three smaller-field images show some evidence of connecting together, and perhaps providing some insight into specimen roughness over a wide range of sizes. The much higher "roughness" seen in the 100 micron field-width image does not connect up, and may well be a result of feedback-loop spikes as the rapidly moving tip's feedback loop over-reacts to oncoming variations. This is consistent with the "spikes on a dark field" nature on the 100 micron field-width image itself. The smaller-field width image roughness spectra, however, also contain spike-features which seem to be shared in time, rather than in space. The largest, labeled in each of these spectra at about 328 Hertz, is a case in point. To investigate this possibility further, we did a purely time-domain analysis of the 1,048,476 data points in a "stationary-tip image" (feedback loop engaged but scan-width 0) taken earlier on the same microscope site (Fig. 3). As you can see, the "time-domain" spikes in the three smallest-field AFM images may be showing up in the stationary-tip image as well. This kind of analysis, therefore, opens the door to further exploration of noise sources in the environment of the microscope itself.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 9**

## **Lucas' Empire: Star Wars and Nazi Germany**

Karli Dean

*Faculty Sponsor: Dr. Christoph Schiessl*

Through research, I aimed to find why a director like George Lucas would model the Empire after a group like the Nazis. In my research, though, I found that the Nazis were not the only influences on the films, or even the Empire.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 34**

## **The Life and Music of Hazel Felman**

Shane Devine

*Faculty Sponsor: Dr. Susan Brownell*

At the turn of the 20th century, a new generation of American women began to make their mark on the male-dominated industry of classical music. The sexist policies which historically barred women from entering music conservatories had loosened, offering greater access to formal music education and producing America's first great wave of professional female composers, performers, and conductors. Today, very few of these women would find their work exalted in the canon of western classical music, much of it having gone critically unappraised, underperformed, and haphazardly preserved. This thesis examines the life and music of Hazel Felman (1892 - 1974), a composer and arts patron from Chicago who between 1916 and 1945 maintained a vibrant career in the classical music industry, collaborated with many notable 20th century literary and musical personalities, produced hundreds of compositions, and yet remains virtually unknown today. Included in this thesis are the first-ever biography of the composer and an annotated catalogue of her surviving music.

In the absence of an existing biography of Felman, biographical information was synthesized from primary source materials – letters of correspondence, newspaper articles, and performance reviews. In addition to the biography and catalogue, the project includes a live performance of several of Felman's surviving compositions, to be featured at the Undergraduate Student Research Symposium. Some of these pieces were never published, and most have not been performed since the 1930's. This research fills a gap left by the historic suppression of female creativity and highlights the need for music historians to shift their attention to the neglected corners of the classical genre, which are cluttered with minority-created music unduly forgotten as ephemera.

**3:00-3:55, MSC Century Room C**



## Space Nazis - The Specific Connections Between Star Wars and Nazi Germany

Jeremy Dobrzanski

*Faculty Sponsor: Dr. Christoph Schiessl*

Star Wars has been a pop culture hallmark ever since its release. However, its undertones and political themes have often been overlooked, and the connections between those undertones and themes to real world events have been obscured. This presentation reveals the connections between Star Wars and the historical events in the context of Nazi Germany.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 35**

## Effects of Foster Children's Epigenetics in Abusive Environments

Shamika Ellis

*Faculty Sponsor: Dr. Hannah White*

This presentation will review the literature on the epigenetics of abused foster children, and the subsequent acute, delayed, and long-term physiological, cognitive, and behavioral effects. One study experimentally investigated the effects of sexual and physical abuse on 150 foster children from 8 to 19 years of age and found post-traumatic stress disorder (PTSD) was diagnosed in 64% of children who experienced sexual abuse and 42% of children who experienced physical abuse. Further, of the foster children who had not experienced either form of abuse, 18% were still diagnosed with PTSD (Dubner & Motta, 1999). In consideration of this, other findings were imperative to investigate literature concerning how chronic exposure to adverse environments, such as a history of trauma abuse, may alter gene expression over time to better understand the epigenetic changes associated with negative physiological, cognitive, and behavioral outcomes. One such gene implicated in stress response and regulation is known as the FKBP5 gene, which is responsible for altering glucocorticoid receptor responsiveness to stress signaling (Tyrka et al., 2015). A latter study indicated child maltreatment exposure may lead to the demethylation of FKBP5 in individuals with a high-risk variant of the gene, resulting in structural and functional brain alterations (Tozzi et al., 2018). As demethylation of the FKBP5 gene decreases the body's ability to regulate stress, it is related to a variety of negative consequences, including an increased chance of developing mood disorders (Tozzi et al., 2018). Therefore, childhood maltreatment substantially raises the probability of behavior problems and mental delays due to environmental stressors (Dubner & Motta, 1999; Tyrka et al., 2015), and FKBP5 demethylation is related to those changes (Tozzi et al., 2018), the current review gathered research concerning the physiological, cognitive, and behavioral effects associated with altered FKBP5 expression, and other epigenetic outcomes, in abused foster children, in order to inform future prevention and intervention practices from a biological perspective.

**12:30-1:25, MSC 315  
Panel Presentation A1**

## Tritons United: Against Gender-Based Violence

Jessica Emert, Kayla Bowling, Kimberly Werner, & Maggie Gross

*Faculty Sponsor: Dr. Kimberly Werner*

This project presents the campus interventions UMSL's Tritons United: Against Gender-Based Violence has been able to accomplish under the U.S. Department of Justice, Office on Violence Against Women's campus programming grant. We explain the goals of Tritons United and the structure of our Coordinated Community Response Team (CCRT). Tritons United was established in 2019, and since then has implemented 6 campus education and 3 professional training curriculums on UMSL's campus, one of which was developed by our team, and others are facilitated by in conjunction with our community partnering agencies and help from the Tritons United CCRT. The current campus interventions are outlined in the Available Trainings portion of the poster. We have also received multiple positive reviews from the trainings we have provided, as shown in the Training Outcomes section of our presentation. Finally, we have included ways to contact our team, as well as important dates surrounding gender-based violence. Lastly, we included some of the awareness materials that we provide to the UMSL campus community, including posters that you

will see in the upcoming months.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 10**

## Conceptualizing Nazism in America through Alternative History Media

Matthew Fear

*Faculty Sponsor: Dr. Christoph Schiessl*

Even before the United States' entry into World War II, there has been a unique fascination regarding the prospect of the triumph of Nazism over the collective Allied powers. While every work exists as a product of its time, all share common themes and examine historical facts with an allohistorical lens to imagine a world wherein Hitler and the German Reich were successful in their schemes of world domination and the Final Solution. Despite plenty of historical narratives available for review and analysis, the idea of Nazism surviving beyond the confines of a doomed Germany has remained the most explored, written about, and discussed by a wide margin. Through exploration of various allohistorical examples, or alternative histories, one may map how attitudes regarding how Nazism and the destruction of the German Reich have changed over time, what life under an oppressive Nazi regime would've been like in more contemporary settings, as well as how the usage of Nazism in allohistorical narratives allows historians to dispel historical nostalgia commonly used by populist movements throughout the Cold War into the modern age. Each work presents an ever-evolving perception of Nazism, speaking to the author's beliefs and those of greater society.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 36**

## Chemtrails: Deadly Skies or Dangerous Misinformation?

Abigail Foust

*Faculty Sponsor: Dr. Rob Wilson*

A common sight on a clear day is a thin strip of white across the otherwise blue sky: A contrail. Most people do not think anything of these contrails, and assume they have little to no impact on the world at large. Suppose for a moment, however, that they are not as harmless as some believe. Suppose these cloud trails are actually composed of dangerous chemicals, and are being used by sinister forces in a conspiracy to kill off the weak, mind-control the population, or simply dull our minds in preparation for a government takeover. As far-fetched as this may sound, there is evidence both for and against the idea of such a conspiracy. The allegedly toxic "chemtrails," as they are called, have been a subject of discussion for conspiracy theorists and skeptics alike. This research paper synthesizes many different sources on the topic of chemtrails, in order to discuss the origins of the chemtrails conspiracy theory, varying viewpoints on the theory, and the evidence that supports or opposes these different viewpoints. Considering all of the evidence will help to determine whether chemtrails are truly a danger to public health or just a distraction from the real issues.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 11**

## Seeing Me: Influential Queer Black Men in Entertainment

Jay Gaskin

*Faculty Advisor: Jason Vasser-Elong*

Queer black men have had an incredible impact on society in many areas, from politics, fashion, and especially entertainment. However, they are often overlooked or disregarded. In recent years, there have been more who have gained the attention and recognition that they deserve. Jay Gaskin celebrates several influential queer black men in entertainment through a paper and presentation. And will discuss their backgrounds and why their representation matters for him and others within the LGBTQ community, particularly queer black men.

**1:00-1:55, MSC 317  
Panel Presentation D1**

## Content Analysis of Backyard Conservation Websites

Katie George & Sam Holzer  
*Faculty Sponsor: Dr. Lara Zwarun*

Backyard conservation program websites are common, but it is unknown how effective they are. The purpose was to create a content analysis of the persuasive techniques/appeals that communication theory suggests are effective.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 12**

## The Fentanyl Crisis in the African American Community: Exploring Geographic Differences in Overdose in the St. Louis Region

Tanys Giles, Devin Banks, Rashmi Ghonasgi, Maria Paschke & Rachel Winograd  
*Faculty Sponsor: Dr. Devon Banks*

The opioid overdose crisis in the United States has disproportionately affected the African American community. These increases are due in part to increased availability of fentanyl in the drug supply. However, little is known about the geographical characteristics of opioid overdose in the post fentanyl era and how it may vary based on neighborhood racial make-up. The current exploratory study investigates the geographic characteristics of opioid overdose in St. Louis City and County from 2016-2021. Data included geographical location of fatal opioid overdose among St. Louis residents (N=3,755). Analyses included examining hotspots (i.e., significantly high clustering) and cold spots (i.e., significantly low clustering) of overdose by race. Results indicated that opioid overdoses within the Saint Louis Region were more clustered in North St. Louis and primarily among African Americans. For non-African Americans, opioid overdoses arose in parts of South County. Results show that opioid overdoses are not distributed randomly but cluster as a function of race. Findings also point to important areas to target as the fentanyl crisis becomes worse.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 13**

## Hogan's Heroes: Fact or Fiction?

Mark Granicke  
*Faculty Sponsor: Dr. Christoph Schiessl*

When it first debuted in 1965, Hogan's Heroes was not met with the fondness it later garnered. Set in Stalag 13, a fictional German Luftwaffe (Air Force) prisoner of war (POW) camp during World War II (WWII), the show follows the American POW Colonel Robert E. Hogan and his band of compatriots as they run a secret sabotage operation within the camp under the nose of the inept camp commandant Colonel Wilhelm Klink. Hilarity ensues as Hogan and crew outwit the Germans, portrayed as bumbling idiots, in all sorts of missions, from smuggling prisoners, stealing plans, blowing up trains, and many other operations. However, critics at the time felt the show was disrespectful to survivors and victims of Nazi concentration and extermination camps, as well as to Allied POWs. Moreover, it was seen as romanticizing WWII and by extension the Nazis by portraying them as lovable fools. The purpose of this research project is to investigate the appropriateness of the show, both in the context of the show's setting and current events, from the view of the show's cast and crew. Likewise, it will demonstrate how accurately the show depicted life in a German POW camp. Finally, it will examine how Hogan's Heroes dealt with the Holocaust memory before the topic had hit the mainstream, setting the stage for future works.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 37**

## Hvaldimir: Russian Beluga Spy Whale

John Granicke  
*Faculty Sponsor: Dr. Rob Wilson*

In April of 2019, a beluga whale was found off the coast of Norway. The whale's presence there is perplexing, as beluga whales are not often seen in the area. What is even more strange is the fact that the whale was wearing a mysterious harness and seemed to be tame. Nobody has offi-

cially claimed ownership of the whale, and nobody really knows why the whale is in Norway. Most importantly however, nobody knows what the whale's real mission is. Conspiracy theorists have proposed that the whale, dubbed Hvaldimir, is a trained Russian spy who escaped and abandoned his mission. Other people have argued that Hvaldimir is a therapy whale who wants to help people. Four years later, the Norwegian authorities still have many questions about Hvaldimir's origins, but very few definitive answers.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 14**

## Examining Immune Markers as Determinants of Cognitive Difficulties Among Perinatally Infected Youth with HIV

Addie Halbrook, Jacob Bolzenius, Julie Mannarino, & Robert Paul

*Faculty Sponsor: Dr. Robert Paul*

This research explores the relationship between immune markers and cognitive performance in perinatally HIV-infected youth. While the use of antiretroviral therapy has greatly improved the mortality rate among children with perinatal HIV, these children still experience various health consequences, including cognitive difficulties. Previous studies have reported that children with perinatal HIV have worse cognitive performance in domains of learning, memory, processing speed, executive function, and motor function when compared to their HIV-uninfected peers. However, there is substantial heterogeneity in cognitive performance reported across studies, possibly due to significant heterogeneity in psychosocial and demographic backgrounds. This study aims to investigate whether immune markers are potential determinants of cognitive difficulties among perinatally infected youth. A cross-sectional study of adolescents residing in privately funded orphanages in Yangon, Myanmar, was conducted, and the results suggest that lower neurocognitive performance correlates with higher plasma markers of inflammation, including CD14, CD163, neopterin, and MCP1. The study highlights the importance of investigating the role of immune markers in cognitive outcomes in perinatally HIV-infected youth.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 15**

## Finding Gene Candidates That Interact with MarA to Control hilA Expression in Salmonella Enterica

Kylee Hempel

*Faculty Sponsor: Dr. Lon Chubiz*

Salmonella is a well-known pathogen that is linked to food born illnesses common around the world. This pathogen can cause symptoms such as fever, diarrhea, and chills in the host. One of the mechanisms Salmonella uses to infect its host's epithelial cells deals with the S. typhimurium pathogenicity island 1 (SPI-1). Expression of SPI-1 is activated in response to environmental signals that correlate with the ileum of the small intestine (low oxygen, high osmolarity, and neutral pH). HilA is the central activator of the SPI-1 complex, and when the transcription factor, MarA, is over-expressed in Salmonella, hilA transcription is repressed. It seems, though, that MarA does not directly cause hilA repression, and the proteins and/or other components that MarA interacts with to aid in repression of hilA are unknown. Here, I show several gene candidates that possibly interact with MarA and how I found them. These candidates include narP, csgA, and nfi. Through transposon mutagenesis, we were able to sequence different portions of the Salmonella genome that were interrupted in several different mutants. These sequences were then compared to the known genes in the Salmonella genome using the National Center for Biotechnology Information database. These results bring us a step closer to narrowing down a possible gene that is responsible for interacting with and aiding MarA-dependent in repression of hilA. These findings open a whole new horizon of possibilities in testing how different conditions and different drugs can target these multiple pieces to the puzzle that is Salmonella pathogenesis and antibiotic resistance.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 16**

## The Failed 1971-1973 Redevelopment of Pruitt-Igoe

Rachael Heriford

*Faculty Sponsor: Dr. Andrew Hurley*

Majority of public housing in the United States is a failure of cyclical nature. Historians have examined the collapse of public housing either at a local level via the examination of a specific housing project or through a federal level by researching HOPE VI, the current federal housing policy since the 1990s that encourages demolishing and privatization of public housing. Up until the 1990s, demolition wasn't as common as it is today, and became more normalized after the demolition of Pruitt-Igoe in 1973. Pruitt-Igoe is one of the more notable examples of how badly public housing can fail. However, the first ever closure of a public housing project could have been completely prevented. The failed redevelopment of Pruitt-Igoe occurred from 1971-1973, and failed because of cost, lack of city commitment, and conflict between government entities over the vision of Pruitt-Igoe.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 17**

## Recognition Promotes Sodomy: Gay Lib Vs. The University of Missouri

Micah Hillier

*Faculty Sponsor: Dr. Andrew Hurley*

In the spring of 1971 Larry Eggleston, president and founder of the Gay Lib student organization at the University of Missouri, submitted the proper documentation for formal recognition of his club. The dean, and subsequently the executives of the University of Missouri, denied the club's petition. What followed was a contentious game of chess between the university and its gay student population, the outcome of which would span seven years and litigation that rose all the way to the supreme court. What motivated the University of Missouri's decision to ban gay student organizations in the 1970s? The answers can be found in archival materials that reveal the true intentions and desires of those who had decision making power.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 18**

## Afterlight: Game Design and the Power of Narrative

Elio Hollenbeck

*Faculty Sponsor: Dr. Maureen Quigley*

In the last few decades we as a society have watched the evolution of games as a storytelling medium. From Candyland to The Last of Us, all games use some form of narrative to bring players into the world of the game. Over the course of the last six months, I've been developing a tabletop card game with the working title of Afterlight. In this presentation, I will be explaining my process as I've worked on designing and refining this game. I will also talk about why I feel game design can be an effective way to engage people with difficult topics and the broader uses of game design in helping people deal with and process difficult narratives in the real world. The core of this is centered around the "magic circle" players create when they choose to play a game, and the fantasy of empowerment and disempowerment players willingly accept in taking on their role as a "player".

**12:30-1:25, MSC 315  
Presentation Number B2**

## Studying the Genes and Conditions That Influence Root Development

Tessa Holtkamp & Hannah Ordonez Webb

*Faculty Sponsor: Dr. Bethany Zolman*

Root development in plants is essential for their survival and understanding how hormones influence their development can explain how plants grow under different circumstances. Researching how Indole-3-butyric acid (IBA), a hormone that induces root production, affects the plant model *Arabidopsis thaliana* helps explain the hormone's effect in agricultural crop systems. To understand root pathways, we performed assays on mutant lines of *Arabidopsis* by growing plants on varying concentrations

of IBA. For wild-type and mutant lines, phenotyping experiments like branching of roots, lengths of stems, and root length were conducted along with PCR and restriction digest genotyping experiments to compare their genetic differences. The root length experiment indicates that mutant lines grow longer roots than wild-type, suggesting these genes are involved in the normal responses. IBA concentrations have an influential effect on root development in all experimental conditions. The results from these experiments give insight into the genes that are disrupted by these mutations. This research explains how the roots behave in varying conditions and hormone concentrations that can translate to agriculture. With the climate changing rapidly in the world, our research gives insight on how roots of plants can be influenced to best support growth in a variety of environments.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 19**

## Recovering Ancient DNA Using the Polymerase Chain Reaction (PCR)

Rose Jennings

*Faculty Sponsor: Dr. Bethany Zolman*

Investigations into aDNA offer a window into the past that modern DNA and paleontological studies alone cannot provide and help address the evolution and connections between hominids, domestication timelines, the analysis of populations over time, and general diversity. Progress in aDNA research has been inherently technology-driven, with modern molecular biology methods, such as the inventions of Polymerase Chain Reaction (PCR) and Next Generation Sequencing (NGS), substantially increasing the analysis possibilities of aDNA. My research this semester has taken me along two parallel paths of investigation: literary research into aDNA and practical exposure to the laboratory techniques used in its analysis. My work in the lab exposed me to the utilization of PCR as a technique to amplify DNA regions that permits a doubling of the number of target molecules with each cycle. The PCR process is essential for studying aDNA samples since the DNA found on site is limited in quantity and quality.

Under favorable conditions, DNA has survived for several millennia, though the length of time varies considerably between preservation environments. Its degradation and post-mortem chemical alterations make its quantification and amplification difficult. The major bottleneck in its research lies in DNA extraction from low-quality and quantity samples and contamination by exogenous current DNA. My practical lab experience was in the extraction process, PCR amplification of the pieces, and analysis with agarose gel electrophoresis using a plant-based system. I experienced firsthand the problems researchers encounter with PCR, such as insufficient amplification with a low amount of template, incomplete or incorrect amplification due to contaminants, and excessive smearing. Using parallel lines of evidence, such as aDNA studies and the fossil record, will aid us in new understandings concerning evolutionary history.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 20**

## Psychopathy & Perceptions of Control

Amy Kenny

*Faculty Sponsor: Dr. Carissa Philippi*

Psychopathy is a complex personality disorder characterized by egocentricity, antisocial tendencies, and emotionally insensitive behavior. One trait of psychopathy is a grandiose sense of self-worth, related to positive self-regard and egocentricity. A few studies have shown relationships between psychopathy traits and self-report measures of locus of control. However, less is known about how psychopathy traits, including grandiose self-worth, relate to perceptions of control in the moment using computer-based tasks. This study explored the correlation between psychopathy traits and perceptions of control in undergraduate students. We hypothesized that: (1) overall psychopathy scores would negatively correlate with perceptions of control, and (2) egocentricity scores would positively correlate with perceptions of control. As part of a larger study, undergraduate students (n = 71) completed the Psychopathic Personality Inventory to measure psychopathy traits (overall psychopathy scores, egocentricity scores) and a computer task to assess perceptions of control across different noise conditions. We also controlled for demographic variables related to the dependent variables in our analyses. Results suggested partial support for the first hypothesis with a trend-level negative correlation be-

tween overall psychopathy scores and perceptions of control in the 30% noise condition ( $r = -.22, p = .069$ ), after controlling for age and sex. The second hypothesis was not supported, with significant negative correlations between egocentricity and both 75% ( $r = -.27, p = .022$ ) and 90% ( $r = -.25, p = .039$ ) noise conditions. Overall, the findings suggest psychopathy and egocentricity traits may be associated with lower perceptions of control in the moment.

**12:30-1:25, MSC 315**  
**Panel Presentation A2**

## **The 1904 World's Fair: Intended Impact of the U.S. Government Building Versus Visitor Experience**

Dalton King

*Faculty Sponsor: Dr. Andrew Hurley*

The 1904 Saint Louis World's Fair, known as the Louisiana Purchase Exposition, has long been known for its significant impact on America and the world. This research explores the intended purpose of the 1904 World's Fair's United States Government Building and its exhibits of the War and Navy Departments. Furthermore, this analysis investigates the visitor experience of the Government Building's characteristics and exhibits. During the Progressive Era, American society was undergoing a significant paradigm shift through countless evolutions in industry, technology, and culture, and this research contextualizes historical study of the time.

Though the recent body of literature revolves around analyzing the impact of the anthropological exhibits at the fair, an inquiry into the Government Building and its impact on visitors reveals important aspects of the fair, American society, and the U.S. Government during this transformative period. By investigating official documents, newspaper articles, diaries, and photographs, this research reveals that those in charge of the construction of the building and its displays were used as a showcase of American superiority and military might. This conclusion is furthered to discover that visitors generally accepted the impositions of the building and its exhibits, thus strengthening fond American sentiment regarding superiority and dominance.

**1:00-3:00, MSC 3rd Floor Rotunda**  
**Presentation Number 21**

## **How the West Was Stolen: A Closer Look at the St. Louis Treaty of 1804**

Lisa Koziejka

*Faculty Sponsor: Dr. Andrew Hurley*

Land back is a social movement of indigenous groups in North America. Land justice is a high-priority topic in current society. Exploring the indignities of indigenous removal from their tribal land in the United States implores us to open our minds and look closer at the methodology of westward expansion. Aggressive tactics for acquiring ownership of land from non-cooperative tribes and land trade clauses in treaty language allowed the United States government to lay the foundation for The Indian Removal Act of 1830. The St. Louis Treaty of 1804 ceded 50 million acres of Sauk and Fox tribal land to the United States government on November 3, 1804. An alleged murder of three white settlers just two months prior to the signing of The Treaty of St. Louis, provided the means for which the United States brought an uncooperative tribe to treaty negotiations in St. Louis. In my research, I primarily focused on establishing the credibility of the murder claims as an entity to be either proved or disproved. Then, I focused on the creditability of the persons involved in reporting the alleged murder based their financial benefits from Pierre Chouteau and how each person benefitted from the St. Louis Treaty of 1804. It is clear that without this alleged murder, there would not of been any treaty negotiations on November 3, 1804 and this alleged murder was a means for coercion by the United States government to acquire the land of the Sauk and Fox tribes.

**1:00-3:00, MSC 3rd Floor Rotunda**  
**Presentation Number 22**

## **COVID-19 Effects on Adolescent Anxiety**

Lyndsay Lamey

*Faculty Sponsor: Dr. Hannah White*

Identify effects of the Covid-19 pandemic on adolescents mental health with a focus on anxiety.

**1:00-3:00, MSC 3rd Floor Rotunda**  
**Presentation Number 23**

## **NBA Conspiracies: A League That Values Money Over Honesty**

Rebecca Littrel

*Faculty Sponsor: Dr. Rob Wilson*

This poster contains information on three conspiracies in the National Basketball League that try to prove that the league and its leaders value money over honesty. This poster includes the conspiracy of Draymond Green being suspended in the 2016 finals, and the referees in game six of the 2002 western conference finals, which looks at how the NBA staff extends series to get more money on tickets and more television views. The last conspiracy is known as the frozen envelope theory from the very first NBA draft lottery. This was thought to be a rigged situation, making sure Patrick Ewing went to one of the biggest sports markets in the United States. These three conspiracy theories show the main idea that the National Basketball League values money over honesty.

**1:00-3:00, MSC 3rd Floor Rotunda**  
**Presentation Number 28**

## **Where We Live : Florissant**

Rebeca Littrel, Emily Jesse, George Shawki, Jeanette Memmer, Gavin Graves, & Ashley Maempa

*Faculty Sponsor: Dr. Rob Wilson*

The City of Florissant proudly stands united behind the slogan "Florissant Strong!" which reflects both the strong communal ties as well as the own's historical resilience and growth in the face of hardship. Working alongside Florissant's government and historical societies, we developed five projects, each of which contributes to the strength of Florissant's historical memory or inter-communal bonds. The premier piece which we developed is a timeline of the township and region since its roots in the late 1700s to the present era, recording notable events in the town's history such as the construction of commemorated architecture and legal alterations to the town, community, and local government. The aim with this piece is for it to be displayed in the Florissant City Town Hall, that visitors and residents alike can glean an overview of the region's past through the little descriptions of each noted event. We also developed a line of commemorative magnets centered around the Valley of Flowers parade, a bedrock of Florissant's annual festivities in order to spread awareness both in and around the city. Additionally, we revitalized and enhanced the existing website for the Historic Florissant Society, as well as aided them in fact-checking, editing, and in some places rewriting, a "Green Line" tour of Florissant, which will allow interested parties to tour 64 of the city's historic architectural highlights at their own pace. The fifth and final project was a group-wide initiative to construct a butterfly garden on the grounds of a local church at 825 Graham Rd., using flora drawn specifically from Florissant. With the garden, our goal is to provide Florissant residents with a beautiful place to forge new connections with each other, while the rest of our work aims to strengthen the town's bond connection to its lengthy, lauded past.

**1:00-3:00, MSC 3rd Floor Rotunda**  
**Presentation Number 29**

## **Antibiofouling Properties of Zwitterionic Co-Polymers**

Liam Lundergran

*Faculty Sponsor: Dr. Jinjia Xu*

We are testing the ability of zwitterionic polymers to prevent the adhesion of biomolecules to their surfaces.

**1:30-2:25, MSC 316**  
**Panel Presentation C3**

## **Museum Accessibility as a Multifaceted Issue: Investigating Accessibility and the Saint Louis Art Museum**

Jeannette Memmer

*Faculty Sponsor: Dr. Rob Wilson*

The purpose of conducting this research is to find statistical and scholarly evidence that defines, examines, and supports accessibility in museums from all perspectives. The overarching research question that I chose to answer is as follows: How can museum accessibility efforts be the most intersectional and beneficial for the most people in their respective communities? Then, how does the Saint Louis Art Museum either fulfill, exceed, or fall short of those accessibility standards? Within that larger question though remained a few underlying ones that required attention. First, I chose to define museum ethics to establish a baseline for museum conduct. Then, I concluded what accommodations have been proven to be effective in improving the overall experience of a museum goer, particularly those who belong to marginalized communities, I also investigated how sociocultural factors impact a potential museum goer's experience and whether or not they are considered when designing accessibility programs (or not considered). My overall conclusion is that accessibility in museums requires being addressed with a four-pronged approach: physicality, cost, location, and socio-cultural factors. Only when the needs of these four groups are addressed can a museum call itself truly accessible.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 31**

## **"I Hate Illinois Nazis:" Remembering Hate Speech and the First Amendment in Skokie, Illinois**

Morgan Myers

*Faculty Sponsor: Dr. Christoph Schiessl*

In 1976, the leader of the Illinois chapter of the National Socialist Party of America (neo-Nazis) sent over 30 requests to hold demonstrations in various areas of Chicago. The village of Skokie was the only one to respond, denying their request. The Nazis sued the city, claiming their freedom of speech was being impeded. The resulting court case has had lasting legal and social consequences that continue to define the meaning of both free speech and hate speech in the United States.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 38**

## **Holocaust Denial: The Conspiracy of Ignorance**

Morgan Nelson

*Faculty Sponsor: Dr. Christoph Schiessl*

Holocaust denial means denying that the intentional mass extermination of Jews by the Nazi Regime during WWII happened. It is essential to know about these deniers and to refute their claims to stop the spread of misinformation. Topics investigated were what Holocaust denial is, why deniers support it, who are Holocaust deniers, an example being David Irving, the major claims of deniers, and how historians refute those claims. Those answers were found from multiple sources, including *Denying the Holocaust* by Deborah Lipstadt and *Hitler's War* by David Irving. The major findings were there are many denier claims. Three major ones are deaths in the camps were caused by disease and starvation caused deaths, not gas chambers, less than six million Jews died, more like 300,000 to 1 to 2 million, and there was no intentional Nazi plan to annihilate the Jewish population. However, there is extensive evidence to refute those claims, including photos and eyewitness accounts of the gas chambers being used, the six million figure is based on various population demographics, and the intent of the Nazis was evident through the actions of Jewish deportation and eventual concentration into camps and murder. Holocaust denial is not a thing of the past and should not be tolerated today. It is important to educate yourself and others on the Holocaust and WWII to help prevent Holocaust denial.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 39**

## **Where We Live : Berkley**

Emma O'Donnell, Isabel Schnittker, Weston Arnold, Alex Dougherty, Rida Niazi, Skylar Baxter, Ashton Hartman, & Jennifer Thiele

*Faculty Sponsor: Dr. Rob Wilson*

Berkeley experienced white flight and chronic disinvestment in the early twentieth century, similar to other North St. Louis County communities. While the community cannot disregard the past, it focuses on the future. Employing "shared authority," we designed five projects highlighting essential components of Berkeley's history to enhance civic pride. We researched the significance of the Washington Park Cemetery, the oldest African American cemetery in St. Louis, by conducting oral histories with members of the St. Louis Preservation Crew in Berkeley. We rendered these oral histories into podcast episodes for community members to access. We also organized a clean-up to rid the Washington Park Cemetery of trash and uncover headstones. We involved the children of Berkeley with our "Berkeley Rocks" project. The children painted rocks with their favorite aspects of their community, and we placed these rocks around the city. Finally, we bestowed the Berkeley City Council with two pieces of art to display in the community. One large canvas detailed the community's points of pride, and a banner featured community members' handprints with quotes about why they like Berkeley. We presented these projects to the Berkeley City Council on April 17, 2023.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 30**

## **Animal Conservation in St. Louis**

Kate O'Sullivan

*Faculty Sponsor: Dr. Lesley Sieger-Walls*

St. Louis has a multitude of organizations involved in the natural sciences. But how many of them actually contribute towards animal conservation?

The St. Louis Zoo is an organization that focuses a lot of its effort on presentation, so how does that impact the funds that go towards actually saving the animals? I plan to dive into the different animal-based organizations in St. Louis and its surrounding areas, as well as discuss the positives and negatives of each organization. Furthermore, I will provide examples from several sources that I have been reviewing all year to support my claims. I plan to educate my audience on what exactly animal conservation is, as well as describe how animal conservation advocates can best support these species. My goal is that guests will be more aware of what exactly these animal-based organizations do, and which is the best to support in terms of animal conservation.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 24**

## **Unraveling the Truth: The Wannsee Conference and Holocaust Denial**

Howie Parkes

*Faculty Sponsor: Dr. Christoph Schiessl*

The Wannsee Conference, held in January 1942, marked a crucial turning point in the Holocaust, as it signified the Nazi regime's decision to systematically exterminate Europe's Jewish population on an industrial scale. This poster presentation examines the role of the Wannsee Conference in Holocaust denial narratives and the portrayal of the conference in the critically acclaimed film, *Conspiracy* (2001). I discuss how Holocaust deniers use the Wannsee Conference to argue against the existence of a plan to exterminate Jews or to suggest that the conference never took place. Through an analysis of the conference transcript, I demonstrate its significance in establishing the collaboration between various Nazi agencies in implementing the Final Solution and its importance as evidence during post-WWII trials of Nazi war criminals. Our findings challenge Holocaust denial narratives by highlighting the use of subtle language and innuendo in the Wannsee protocol, which allowed Nazi officials to discuss the extermination plan without explicitly mentioning it. This poster presentation contributes to understanding the historical memory of the Holocaust and refuting Holocaust denial claims.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 40**

## Life Beyond the Horizon: The Universe Was Born in a Black Hole

Zahria Patrick

*Faculty Sponsor: Dr. Rob Wilson*

It is a widely accepted fact that obtaining information about a black hole is a near-impossible task without being stretched like a spaghetti noodle and trapped in one due to its strong gravitational pull. If the universe exists in a black hole, however, it will mean that it could be possible to survive after crossing its inescapable borders. As surprising as all of this may seem, this theory has existed for quite a while amongst a few different physicists. One person that has shed light on and expanded people's knowledge of this frightening theory is theoretical physicist, Nikodem Poplawski. The aim of this research project was to give insight into Poplawski and many other physicists' and scientists' minds discussing how the idea of the universe being born in a black hole came about and evidence to support the theory. The Big Bang Theory, dark matter, dark energy, and torsion are all key components as to why some scientists believe this is true. If this hypothesis is accurate, it will give scientists significant explanations and provide vital evidence for some of the world's most popular, unanswered questions about the origins of life and the contents of space.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 25**

## The Effect of Variation of N-Substituents on Oxidopyridinium Ions in (4+3) Cycloadditions

Zahria Patrick & Madison Clark

*Faculty Sponsor: Dr. Michael Harmata*

The aim of this research project is to expand the scope of 4 + 3 cycloadduct chemistry by varying functional groups attached to the prerequisite oxidopyridinium ion for each respective cycloadduct product. While N-substitution of the pyridinium precursor is known to proceed smoothly if alkylated by a lone methyl group, we evaluated the effect a larger alkyl group would have on the overall yield of the 4 + 3 cycloadduct product. Isobutyl triflate, generated from the known reaction between isobutyl alcohol and triflic anhydride, was reacted with ethyl 5-hydroxy-nicotinate to generate the respective N-isobutyl oxidopyridinium ion in quantitative yield, which subsequently underwent a 4 + 3 cycloaddition reaction with 2,3-dimethylbutadiene to generate the desired 4 + 3 cycloadduct in 67% yield. Furthermore, we experimented with N-acyl substitution of the oxidopyridinium ion in 4 + 3 cycloaddition reactions. (*Trans*)-2-phenylcyclohexyl 2-chloroacetate, derived from (*trans*)-2-phenylcyclohexanol, and chloroacetyl chloride using a known literature procedure, were reacted with ethyl 5-hydroxy-nicotinate to generate the respective N-acyl oxidopyridinium ion in quantitative yield, which subsequently underwent a 4 + 3 cycloaddition reaction with 2,3-dimethylbutadiene to generate the desired 4 + 3 cycloadduct in 28% yield. While we were able to cleanly obtain the desired 4 + 3 cycloadduct products for each derivative, reaction condition modifications are necessary to improve the overall yields for each new compound. Future research could include modifying the conditions of the aforementioned reactions to achieve better results and running these reactions with different substituents to obtain new derivatives of the (4+3) cycloadduct product.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 26**

*This project has also proudly been shared at the annual University of Missouri System Undergraduate Research Day at the Capitol and at the AAAS Emerging Researchers National Conference*

## Effects of *Beauveria bassiana* on the Mortality and Thorax Width of *Bombus impatiens* Colonies

Bri Petty

*Faculty Sponsor: Dr. Aimee Dunlap*

Pesticides are widely used to protect against unwanted insects, but risk assessments of the effects on pollinators have traditionally only been applied on an individual level, not a population level. This has allowed many pesticides to be approved without the knowledge of sub-lethal

effects, such as life history characteristics and population structure to name a few. The biopesticide BotaniGard, containing the entomopathogenic fungus *Beauveria bassiana*, has previously been thought to be safe for non-targeted insects, but recent studies have found it to have significant negative effects on pollinators. Such negative effects can include decrease in longevity and odorant responsiveness with an increase in sucrose sensitivity and mortality rates. Most of the current literature of the effects of BotaniGard on pollinators is limited to honeybees. However, it is important to explore this question in other native pollinators as well, such as the bumblebee *Bombus impatiens*. This species is an important pollinator because it is essential for both greenhouse pollination and agricultural pollination. An important factor in bumblebee survivability is body size as its variability allows them to be less susceptible to environmental changes, with smaller bees tending to be less impacted by starvation.

**1:00-3:00, MSC 3rd Floor Rotunda  
Presentation Number 27**

*This project has also proudly been shared at the annual University of Missouri System Undergraduate Research Day at the Capitol*

## How Technology is Helping Holocaust Deniers Rewrite History

Michael Raffelson

*Faculty Sponsor: Dr. Christoph Schiessl*

In the age of social media, it is easier to connect to people with like-minded views. Well, my poster offers an explanation for how prevalent holocaust deniers are on social media and what exactly companies are doing about it.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 41**

## Socio-Demographic Risks Affect Executive Functioning

Brittney Rodgers, Nicole Shelley, & Hannah B. White

*Faculty Sponsor: Dr. Hannah White*

The goal of study 1 was to see if there was an association between average fixation durations in infants and socio-demographic risk. There were 102 infants (3.5 month old) that participated in the study. While infants were looking at stimuli, the researchers tracked their average fixation durations; their mothers took the socio-demographic risk scale (Rutter, 1979; Sameroff, 2000). This scale shows the mothers cumulative risk score by giving points to mothers based on their socio-demographic circumstances. Mothers received a point if they were, below median maternal education, below median estimated family income, or a racial minority. Results showed that the higher the socio-demographic risk score for the mothers, the higher the average fixation durations in infants. The goal of study 2 was to see if there was an association between academic performance and average fixation durations. There were 67 undergraduates who participated in the study. Participants self reported their GPA and took the same eye tracking procedure as study 1. Results showed that the lower the GPA the higher the average fixation durations.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 46**

## Telehealth Treatment for Opioid Use Disorder in Missouri's Urban and Rural Areas Prior to and Since COVID-19

Aurora Rojo, Rashmi Ghonagsi, Zachary Budesa, & Rachel Winograd

*Faculty Sponsor: Dr. Rachel Winograd*

Opioid use disorder (OUD) is a chronic health condition that can be adequately treated when individuals have access to needed services. Telehealth services can be delivered remotely through audio-visual technological communications rather than in-person visits, which can greatly improve care accessibility. Following the onset of COVID-19, there were swift clinical and policy adaptations to promote telehealth services across medical and behavioral health fields. This study aims to identify changes in the frequency of telehealth for OUD treatment in Missouri's rural and urban counties prior to and since the onset of COVID-19. Chi-square tests and analysis of changes between years and across urban and rural counties

demonstrated telehealth utilization was dependent on both year and rurality, with lower than expected utilization seen in Missouri's rural areas in 2020, 2021, and 2022. Instead, utilization of telehealth in urban areas was higher than would be expected in 2021 and 2022, compared to 2020. Statewide, there was a 31.8% increase in telehealth for OUD in 2021 and 2022 (combined), compared to total telehealth use in 2019 and 2020. However, there was an overall decrease of 27% in telehealth utilization in 2022, suggesting telehealth service delivery has begun to return closer to pre-pandemic levels. Findings from this study can contribute to the discussion of client preferences and treatment effectiveness related to telehealth services, as well as what barriers may prevent or facilitate treatment access for individuals living in rural areas.

**1:00-3:00, MSC Century Rooms A/B**  
**Presentation Number 47**

## **The Roaring Lion of Berlin: The Life, Thought, and Influence of Eugen Dühring**

Arden Roy

*Faculty Sponsor: David Griesedieck*

The life and influence of 19th-century German polymath Eugen Dühring remain but a mere footnote in the history of ideas, being primarily relegated to the status of little more than a theoretical rival to Marxism in the German socialist movement and the occasional object of Friedrich Nietzsche's rhetorical flogging. Despite the current consensus on the subject, Eugen Dühring was a scholar of vast, remarkable learnedness, contributing greatly to philosophy, economics, and the natural sciences. The aim of this talk will be to clear the fog surrounding the life and work of the controversial blind scholar and give an account of the extraordinarily idiosyncratic legacy he left behind.

**1:00-1:55, MSC 317**  
**Panel Presentation D2**

## **The Association Between Coping-Motivated Drinking and Alcohol-Related Consequences**

Jacob D. Salser, Ian A. McNamara, & Ryan W. Carpenter  
*Faculty Sponsor: Dr. Ryan Carpenter*

**Background:** College students' alcohol use is an important topic of research. Past research indicates that people who drink to cope are at a higher risk for alcohol-related consequences compared to other drinking motives (i.e., enhancement, social, or conformity motives). This project aims to analyze drinking motives, specifically the subscales of coping-anxiety motives and coping-depressive motives, and their association with alcohol-related consequences in a unique population. In addition, the moderating effects of stress will be tested. **Methods:** The data for this project was collected through a survey that was given to students (N=176) at the University of Missouri – St. Louis. Participants were eligible if they reported drinking in the past four weeks and were compensated with SONA extra credit or entry into a raffle for a \$20 gift card. To test the relationship between coping-anxiety and coping-depressive motives and alcohol-related consequences, we conducted a negative binomial regression using R version 4.1.3 and the packages "foreign" and "MASS". **Results:** Greater coping-anxiety motives were associated with a reduced number of alcohol-related consequences (IRR = 0.939, CI = [0.888, 0.994],  $p = .029$ ) while coping-depressive motives were associated with experiencing more alcohol-related consequences (IRR = 1.065, CI = [1.001, 1.132],  $p = .047$ ). Stress did not moderate these relationships. **Discussion:** Our findings for coping-depressive motives are congruent with previous findings while coping-anxiety motives run contrary to previous research. This may indicate that coping with feelings of depression are particularly salient for understanding drinking consequences for students at UMSL. This project tested the effects of drinking motives on outcomes, but it is possible that experiencing consequences may shape individuals' beliefs and motives about drinking. Future research should examine trajectories of drinking motives from consequences experienced so that we may better understand who is at risk for long-term, repeated drinking-related consequences.

**1:00-3:00, MSC 3rd Floor Rotunda**  
**Presentation Number 48**

## **Third Reich in Harry Potter: Fiction Imitating Fact**

Paul Sanders

*Faculty Sponsor: Dr. Christoph Schiessl*

Nazi Germany makes an appearance in numerous forms of media, however none so popular across the world as the Harry Potter book series. This poster will be examining how J.K Rowling incorporates aspects of the Third Reich in her writing of the Harry Potter series.

**1:00-3:00, MSC Century Rooms A/B**  
**Presentation Number 42**

## **Total Variation Flow in R<sup>n</sup> Dimensions with Examples Relating to Perimeters of Level Sets**

Luis Schneegans & Victoria Shumakovich

*Faculty Sponsor: Marianne Kortzen (Kansas State University)*

In this project, we explore radial solutions to the Total Variation Flow (TVF) equation with the help of the Sign Fast Diffusion Equation (SFDE) and prior results in the 1-dimensional case. Specifically for radial solutions, we derive equations and explicit solutions relating to the n-dimensional case. Lastly, we look at how level sets and (time) profiles change.

**1:30-2:25, MSC 316**  
**Panel Presentation C1**

*This project has also proudly been shared at the Emerging Researchers National Conference & at the Central States Math Undergraduate Research Conference*

## **Erwin Rommel: Noble Knight of Germany or Nazi Knave?**

Jake Schultz

*Faculty Sponsor: Dr. Christoph Schiessl*

This poster seeks to explore the historical memory of Field Marshal Erwin Rommel and his legacy today in commemoration in modern Germany.

**1:00-3:00, MSC Century Rooms A/B**  
**Presentation Number 43**

## **Applying Sustainable, Triblock Copolymers**

Campion McRee Smith

*Faculty Sponsor: Dr. Jinjia Xu*

The omnipotence of plastic and its associated wastes are commonly a focus of environmental pollution where such plastic, typically single use, accumulates rapidly in dumps and natural habitats, presenting a global problem common to all mankind. To address this issue, the use of thermoplastics has been considered. Here, a common characteristic inherent in thermoplastics is the loss of structural integrity through a "softening" upon heating – giving a cheap and light material with good recycling potential. Regarding the ecological harm of plastics, a sustainable source of monomers (the building block of most plastics) should be considered, such as from vegetable oils. In using these sustainable and widely available resources, the synthesis of thermoplastics doesn't require the use of otherwise hard-to-get, unsustainable, or potentially hazardous materials. In the ongoing experiment under the supervision of my research team, a triblock copolymer of varied monomeric composition and/or block ratio is undergoing development. Through the application of anionic polymerization techniques, a known and effective polymerization technique of bio-based materials like terpenes, we hope to achieve an eco-friendlier plastic.

With successful syntheses, structural, thermal, and molecular weight analyses will be performed. Such may involve the application of 1H-NMR, gel permeation chromatography (GPC), differential scanning calorimetry (DSC), and other analytical methods. With good results, this experiment may give insight into the production of cheaper, more sustainable plastics finding application in greener plastic production, ecologically friendlier food packaging, other single use plastics, and greener recycling processes. In addition to this goal, these bio-based thermoplastics could appear favorably when applying a life cycle assessment (LCA), where the lifespan and intended purpose of a plastic is considered in evaluating a material's role in greener developments.

**1:30-2:25, MSC 316**  
**Panel Presentation C2**

## Surveys of *Aphonopelma hentzi* in Missouri: Conservation Efforts through Population, Genetics, and Habitat Studies

Anderson B. Spencer & Becky Hansis-O'Niell

*Faculty Sponsor: Dr. Aimee Dunlap*

*Aphonopelma hentzi* and other tarantula species are greatly understudied organisms. In the Missouri regions there is little knowledge on their mating patterns, gene diversity, or population sizes. The focal glades in this experiment display regional fragmentation, which could prevent tarantulas from traveling and mating between regions of their glades. Due to the lack of knowledge surrounding them, methods for determining gene diversity are harmful to the organism. Our recent work has shown that it is possible to extract genetic information from the molts of burrowing tarantulas. This will allow us to safely determine the lineages and interbreeding patterns of the tarantula populations within our focal regions in Missouri. Through utilizing ISSR analysis and determining Wright's F statistic for each population it will be possible to follow the gene flow patterns.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 49**

*This project has also proudly been shared at the annual University of Missouri System Undergraduate Day at the Capitol*

## Bananas vs. Coffee: Why Did One Instigate Violence and the Other Community?

Sydney Stark

*Faculty Sponsor: Dr. John Trevathan*

Violence. Nationalism. Racism. A community ripped apart by multinational corporations. These are likely not the words and ideas associated with bananas. However, in Costa Rica and other South American countries, these words only begin to describe the history surrounding this fruit.

Community. Fair Trade. Globalization. A nation brought together by a simple drink. These words all describe none other than our beloved drink coffee. Costa Rica relies heavily on the exports of coffee and this crop has actually helped produce an entire subculture, known as *café cultura*, which promotes community and belonging. But why are these two crops vastly different, despite each being extremely prominent in Costa Rica and Latin America? This research aims to explore the history surrounding both crops, analyze the communities they foster, and to compare the similarities and explain the differences between them. The research reviews and analyzes research articles, first-hand accounts, semi-autobiographical novels, and interview data to dive into themes of sustainability, nationalism, exploitation, environmentalism, and so much more surrounding the banana and coffee cultures in Costa Rica.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 50**

## The Revolutionary St. Louis Insane Asylum

Julia Talbert

*Faculty Sponsor: Dr. Lesley Sieger-Walls*

Even with its grand structure on Arsenal Street towering over the city below, few residents of St. Louis and surrounding areas are aware of the grand history or even existence of the St. Louis Insane Asylum. The building is over 150 years old and was a place of hope, failure, strife, and empathy. The asylum had a large impact on St. Louis and provided revolutionary outlooks, unique perspectives, and curious therapies.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 51**

## Hope for the Unhoused: Medical treatment access and retention among unhoused individuals with Opioid Use Disorder in the St. Louis region

Allison Token

*Faculty Sponsor: Dr. Rachel Winograd*

Medical treatment for Opioid Use Disorder (MOUD) can be highly effective,

but may be particularly difficult to access among individuals who are unhoused. This study investigated how experiencing insecure housing affects the receipt of and retention rates of MOUD among participants in the St. Louis region's Engaging Patients in Care Coordination (EPICC)—a peer-based program designed to connect people with evidence-based OUD treatment. We hypothesized EPICC clients who were unhoused received MOUD less often than clients who were housed, and that EPICC clients who were unhoused were retained in treatment for shorter periods of time than EPICC clients who were housed. Analyses were based on 2020-2022 data from the EPICC database, which contained counts of housed and unhoused individuals, whether or not they received initial MOUD, and whether or not they were retained in treatment at the 30-day, three month, and six month timepoints. Chi-square tests indicated initial receipt rates of MOUD of both housed and unhoused individuals were similarly high, at 93% and 92% for housed and unhoused individuals, respectively. Additionally, there were no differences in retention rates between housed and unhoused individuals at 30 days, three months, and six months. Results did not support the initial hypotheses predicting lower MOUD receipt and retention among unhoused individuals. Rather, findings suggest efforts by the EPICC program are comparably effective in reaching both groups. Given these results, the question of if a program such as EPICC works may not be as important as how and why. Further research is needed to identify which aspects of the EPICC program are most actively facilitating the MOUD receipt and retention among unhoused individuals. Investigating these aspects may aid in streamlining and expanding programs like EPICC to other areas throughout the country.

**12:30-1:25, MSC 315  
Panel Presentation A3**

## Magneto's Origin in the Holocaust and How It Influences His Character Today

Rena Usprich

*Faculty Sponsor: Dr. Christoph Schiessl*

Marvel's Magneto was created in 1963, originally with no connection to the Holocaust. However that changed in the late 1970's when his origin was reworked to make him a Jewish Holocaust survivor. That origin persists to this day and is explored in modern media produced by Marvel, both film and comic-wise.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 44**

## An Investigation on the Cognitive Impacts of *Beauveria bassiana* on *Bombus impatiens* Colonies

Jake Venegoni

*Faculty Sponsor: Dr. Aimee Dunlap*

Biopesticides are marketed to the public to be safer for pollinators, while still targeting pest species. BotaniGard is a popular biopesticide that contains the fungus *Beauveria bassiana*, which specifically targets insects and claims to have no lethal effects to pollinator species. This has shown to be somewhat inaccurate according to recent studies (Carlesso et al., 2020) conducted on honeybees that have shown that BotaniGard can in fact cause changes to both cognition and mortality. Changes to such aspects could have serious longevity implications that could potentially limit the pollination services insects provide. Since most biopesticide risk assessments only investigate honeybees, the subject of this project is the species *Bombus impatiens*. Bumblebee species such as *Bombus impatiens* are responsible for pollinating a wide variety of crops and wild plants across North America, including Missouri. The goal of this project is to highlight the cognitive effects of field realistic doses of BotaniGard on colonies of *Bombus impatiens* within a controlled lab setting. Preliminary results of cognitive testing suggest a trend that treated bees score lower on cognitive assays when conducting free moving proboscis extension response (FMPER) tests. Any cognitive impacts this biopesticide may have could seriously impact the pollination success of these wild pollinators. Further experiments and additional replicates are needed in order to provide data that is statistical significance. Additional data would also help highlight clearer trends in learning when comparing treatment and control colonies.

In depth research over the sublethal effects of biopesticides on species such as *Bombus impatiens* could help develop species specific risk assess-



ments which would in turn help in the conservation of wild pollinator species.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 52**

*This project has also proudly been shared at the annual University of Missouri System Undergraduate Day at the Capitol*

## **Memory as a Foundation for Learning** Juan Manuel Vicuna-Rios

*Faculty Sponsor: Dr. Trilce Encarnacion*

The object of this research is to emphasize the importance of memory in the professional environment and to suggest a change in the direction of educational plans to endow students with a powerful cognitive tool – memory – for the rest of their lives. Presently, memory is a fundamental human function that the educational process dismisses, making learning more difficult. Memory and professional intuition – both the result of knowledge and experience – should be a natural adjunct to any training and not a sudden source of inspiration as intuition, in particular, needs conscious and subconscious cultivation. In both subjects, the author will support his assessments with current neurological and radiological research.

**12:30-1:25, MSC 315  
Panel Presentation B3**

*This project has also proudly been shared as part of a copyrighted publication by the author, Manuel Vicuna-Rios*

## **The Development of Gender Bias in STEM** Addison Vogt

*Faculty Sponsor: Dr. Hannah White*

Women make up only a small portion of the STEM workforce in the United States, and the women in these fields experience frequent gender bias. Studies have shown that these stereotypes can result in reduced STEM identity and outcomes for female students. A strong female presence in a scientific field has also been shown to devalue the field. Though traditional STEM gender stereotypes develop during adolescence, they emerge during childhood. Through further research and understanding of these biases, we can develop and implement prevention programs targeted toward adolescents.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 53**

## **Preserving Sacred Memory: The Effort to Create the United States Holocaust Memorial Museum**

Jessica Wachtel

*Faculty Sponsor: Dr. Christoph Schiessl*

This poster attempts to provide insight on how the American government remembers the Holocaust through its formation of the United States Holocaust Memorial Museum in Washington, D.C. Topics include the physical structure of the museum, the history of the museum, and the relationship between original museum chairman Elie Wiesel and U.S. presidents Jimmy Carter and Ronald Reagan.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 45**

## **Exploring Best Practices in UMSL's Collaborative Laboratory Internship and Mentoring Blueprint (CLIMB) Program**

Dakota Warren

*Faculty Sponsor: Dr. Ann Torrusio*

The Collaborative Laboratory Internships and Mentoring Blueprint (CLIMB) was inspired by the University of Missouri–St. Louis and the Jennings School District's desire to address the opportunity gap among minority students in the St. Louis region. Since its inception in 2015, CLIMB has expanded to meet the needs of local students to reduce the opportunity gap facing disadvantaged local school districts.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 54**

## **Precautionary Buying During the COVID Pandemic: Evidence from Grocery Scanner Data**

Blake Williams & Trilce Encarnacion

*Faculty Sponsor: Dr. Trilce Encarnacion*

At the onset of the COVID-19 pandemic, individuals across the world engaged in Disaster Related Buying Behaviors to prepare for extended lockdown periods. These behaviors, commonly referred to as “panic buying”, had retailers scrambling to meet the new demand patterns for critical supplies, which are goods that are indispensable for sustaining life and the normal functioning of households and businesses. The inability of supply chains to rapidly increase the production and distribution of critical supplies resulted in widespread shortages. The main goal of this research is to explore the role that media coverage of the pandemic has on “panic buying” purchases. We use retail scanner data on toilet tissue products consisting of weekly pricing, volume, and store environment information from retail chains across all US markets from 2016 to 2020 to model the effect that media reports about the COVID-19 pandemic have on changes in purchasing behaviors for critical supplies. Our research identifies several themes covered by the media that impacted purchases of this critical item. We model consumer reactions to these themes, which include news reports on the status of the COVID-19 pandemic, announcement of social distancing measures, as well as reports of empty shelves, among others. The findings are relevant for the development of supply chain management policies that can anticipate these precautionary buying episodes and mitigate their impacts.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 55**

## **Dose-Dependent Effect of Bumblebee Cognition and Bodies**

Summer Wise

*Faculty Sponsor: Dr. Aimee Dunlap*

Testing bumblebee cognition at different dosages of a biopesticide.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 56**

## **Making and Moving Money – Growing Wealth and Corruption in Xi Jinping's China**

Brady Yanko

*Faculty Sponsor: Dr. Susan Brownell*

The sons of once prominent Communist leaders, dubbed “Princelings” have used the opening of China's economy to profit immensely. These wealthy Chinese nationals are buying land and other assets in the United States. How exactly have wealthy Chinese amassed fortunes in China and moved them to the United States? Have the anti-corruption measures taken by Xi Jinping worked?

**2:00-2:55, MSC 314  
Panel Presentation E1**

## **The Fight for Fluoridation in STL**

Noor Yousaf

*Faculty Sponsor: Dr. Lesley Sieger-Walls*

Fluoridation is the addition of fluoride to a source of drinking water. In St. Louis's public water supply, the amount of fluoride remains the same since 1953 at 5ppm. Dr. Ralph Rosen and his team of dentists and researchers advocated for the fluoridation of the water because it reduced the frequency of dental caries occurring in children and adults alike, but the public had opinions on the sudden addition of chemicals to their water. This includes how the public's health will be affected, how consumer products would change, and also how effective this addition of fluoride would be. This debate was the beginning of the modern day debate and struggle to regulate the amount of certain chemicals in the U.S. drinking water, including lead, PFAS, and trihalomethane.

**1:00-3:00, MSC Century Rooms A/B  
Presentation Number 57**

# Thank You!

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