UMKC

24th ANNUAL SYMPOSIUM

of Undergraduate Research & Creative Scholarship

APRIL 18, 2024, 12:00–6:00 P.M.

PIERSON AUDITORIUM

UMKC Office of Undergraduate Research & Creative Scholarship
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UMKC

Office of Undergraduate Research and Creative Scholarship

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The Office of Undergraduate Research and Creative Scholarship supports high-impact learning opportunities by funding the work of undergraduate researchers, scholars, and artists; linking students with research opportunities; providing opportunities for students to enhance intellectual and career-building skills; and supporting faculty mentorship.

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Aleigha Dollens, Earth & Environment Science
Layla Liwaru, Biology
Alijah Smith, English
Olivia Sours, Health Sciences
Lindsy Todd, Biology

24TH ANNUAL SYMPOSIUM OF UNDERGRADUATE RESEARCH & CREATIVE SCHOLARSHIP

Thursday, April 18, 2024
Atterbury Student Success Center, Pierson Auditorium

12:00-4:00 p.m. Poster Session
- Judging Odd Numbers: 12:00-2:00 p.m.
- Judging Even Numbers: 2:00-4:00 p.m.

1:30-2:30 p.m. Oral Presentations

4:00-5:00 p.m. Reception

5:00-6:00 p.m. Awards Ceremony
- Welcome
- Keynote Speaker:
  Daniel Silva, President and CEO,
  Kansas City Kansas Chamber of Commerce
  Introduction by Tamara Falicov, Dean
  School of Humanities & Social Sciences
- Recognition of
  - EUReka Students & Faculty
  - UR Associates & Mentors
  - Emerging Research Scholars
  - UR Ambassadors
  - UR Fellows
- Awards for Presentations of Distinction
- Awards for Excellence in Mentoring

AWARDS CEREMONY KEYNOTE SPEAKER

Daniel Silva
President and CEO, Kansas City Kansas Chamber of Commerce
Academic Alumni Achievement Award, School of Humanities & Social Sciences, ‘24
BA, 2000

As president and CEO of the Kansas City Kansas Chamber of Commerce, Daniel Silva leads the 125-year-old organization. Mr. Silva is charged with focusing on the following priority areas:

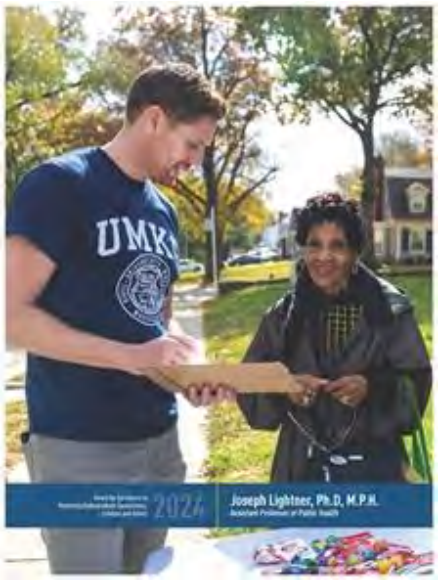
- Access to opportunities
- Resources for members
- Community development and growth
- Business leadership, influence and advocacy
- Chamber sustainability
- Board and staff inclusion

Mr. Silva is originally from Chicago, Illinois, and attended UMKC on a D1 Division Scholarship for Cross Country/Track and Field. He began his professional career as a Special Projects Coordinator with the League of United Latin American Citizens National Education Centers (Kansas City). After LNESC, Mr. Silva went on to work for UnidosUS, formerly National Council of La Raza, in Washington, DC, before returning to Kansas City. Prior to joining the KCK Chamber, Mr. Silva was the Director of Diversity and Inclusion for the Greater Kansas Chamber of Commerce. He is known for his ability to cross political and cultural lines to ensure the best results for the businesses and members he represents. He also follows a strict open-door policy to foster inclusion and is always willing to listen and respond to the needs of all members of the community. Mr. Silva has previously served on the Corporate Board of Directors of the Boys and Girls Club, Board of Directors of Catholic Charities of Northeast Kansas, and Board of Directors for Guadalupe Centers Schools.

AWARDS FOR EXCELLENCE IN MENTORING UNDERGRADUATE RESEARCHERS, SCHOLARS, & ARTISTS

Debra Leiter, PhD
Associate Professor of Political Science

Dr. Debra Leiter, Associate Professor of Political Science, is an expert in comparative politics whose research examines the intersection of elections, parties, and voting; election forecasting; and how context shapes political decision-making, primarily in Western Europe. She shares her passion for research through her classes, individual mentorship, communication with colleagues, presentations to campus groups, and publications on the pedagogy of incorporating research and teaching. Not only does Dr. Leiter incorporate components of research in upper-level courses, but she also teaches a EUReka! class that allows students to develop, execute, and present a research project while completing an introductory course requirement for the political science major. Students who have conducted independent research projects under Dr. Leiter's mentorship have published in undergraduate research journals, presented at regional and national conferences, and pursued graduate studies in prestigious political science programs. Her mentees describe Dr. Leiter as vibrant, captivating, passionate, and dedicated.



Joseph Lightner, PhD, MPH
Assistant Professor of Public Health

As Program Director and Assistant Professor of Public Health, Dr. Joseph Lightner has developed various ways to immerse students in research throughout their undergraduate studies. Dr. Lightner's research focuses on increasing physical activity for large populations, and students have been able to engage with that work through EUReka! courses, work-study opportunities, and mentored independent research projects. Dr. Lightner is particularly adept at helping students formulate research questions about the public health issues that interest them and guiding them to answer their questions through a systematic and scientific process. He and his students can be found working in local schools and partnering with municipal governments to foster healthier communities. Dr. Lightner's confidence in his students' abilities and potential have led them to pursue opportunities they might not have thought possible without his encouragement.

AWARDS FOR EXCELLENCE IN MENTORING UNDERGRADUATE RESEARCHERS, SCHOLARS, & ARTISTS

Mohammad Rafiee, PhD
Assistant Professor of Chemistry

When Dr. Mohammad Rafiee came to UMKC as an Assistant Professor of Chemistry in 2019, he immediately began seeking undergraduate students to join his lab as researchers. Over the last five years, he has developed a vibrant team of researchers that has included 17 undergraduate students. Dr. Rafiee's research on the use of electroanalytical techniques to explore and expand the scope of electrosynthetic reactions has a unique appeal to undergraduate researchers in that they can develop new experiments to be used in educational settings. Not only have Dr. Rafiee's students developed experiments that are used in UMKC's chemistry courses, but his students have also published this work in peer-reviewed scientific journals so that the techniques can be adopted in educational settings throughout the world. Dr. Rafiee's projects are ambitious and he has high standards for his students, but he teaches the skills and offers the support students need to meet their goals in the lab, in their careers, and beyond.

RECOGNIZING UNDERGRADUATE RESEARCH FELLOWS

Students who have been deeply involved in the process of research, scholarship, and artistic production from the point of inquiry to the point of presentation, publication, or performance can be recognized with the transcript designation of Undergraduate Research Fellow. The following students were awarded the Undergraduate Research Fellow designation this academic year:

Asayiel Alhajeri
Biology, Class of 2024

Victor Arellano
Public Health, Class of 2023

Trevor Bell
Biology, Class of 2024

Meghana Bhumireddy
Biology and Chemistry, Class of 2024

Mattea Brooks
Health Sciences, Class of 2024

Juan Calderon
Mechanical Engineering, Class of 2024

Grace Dang
Biology, Class of 2024

Sheyda Dehghani
Biology, Class of 2025

Aleigha Dollens
Geology, Class of 2024

Hannah P. Edwards
Music Therapy, Class of 2024

Nusaybah Ibrahim
Biology, Class of 2024

Laylah Liwaru
Biology, Class of 2024

Alijah Smith
English, Class of 2024

Emma Stauffer
English, Class of 2024

Mya Thomas
Geology, Class of 2025

Lindsy Todd
Biology, Class of 2024

Quynh Tran
Biology, Class of 2029

Jennifer Vanderslice
Physics, Class of 2024

CELEBRATING EUREKA COURSES

Experiences in Undergraduate Research are available to students early in their academic careers through EUReka! courses. In these courses, students build a relationship with a faculty mentor, learn and practice research skills and scholarly methods, complete a research project, and present their work at a campus-wide symposium.

BIOLOGY H206 Genetics
Instructors: Dr. Saul Honigberg & Dr. Scott Hawley, Biology

ENGLISH 225 Intermediate Academic Prose
Instructor: Dana Hoffmann, English

ENGLISH 309WI Rhetorics of Public Memory
Instructor: Dr. Jane Greer, English

GECRT-SC 101 How Do I Live in A Changing World
Instructor: Dr. Julia Snyder

HISTORY 430RA - World War One through its Artifacts
Instructor: Dr. Andrew Bergerson

PBHL 496 Evidence-Based Public Health Capstone & Seminar
Instructor: Dr. Joseph Lightner, Public Health

24TH ANNUAL SYMPOSIUM OF UNDERGRADUATE RESEARCH & CREATIVE SCHOLARSHIP

POSTER PRESENTATIONS

Poster #1 **Hannah Leyva** Sociology & Anthropology, Honors Program
"Ride KC": Kansas City's Streetcar and the Development Trajectory that Motivated it

Poster #2 **Victor Arellano** Public Health
Transgender and Gender Diverse People: A Review of Proposed Legislation in Missouri

Poster #3 **Nikhith Rao, Jayden Hunter, Nicholas Gaitan, & Braxton Bubp** Biology
The effects of visual and circadian proteins on BDBT and of BDBT on DBT

Poster #4 **Z Kemp** Division of Natural & Built Environment
Properties of Kaolin Slurries and Burned Soil: Applications in Post-Wildfire Debris Flow

Poster #5 **Ellery Vaughn** Cognitive Psychology
Examining Conflict Resolution Styles and Self Control in Couples

Poster #6 **Laylah Liwaru** Division of Biological & Biomedical Systems
Observing effects of the foxg1a mutation on craniofacial development in zebrafish

Poster #7 **Brady Wolff** Conservatory - Music Theory
Visualizing Music Theory: A Case Study of Post-Tonal Microtonal Music

Poster #8 **Fardowsa Ahmed** School of Nursing & Health Studies
Measuring Nutrition Insecurity and Diet Quality in College Students

Poster #9 **Aleigha Dollens** Earth & Environmental Science - Geology
Electrical Resistivity Tomography Imaging of the Motagua Fault along the 1976 Earthquake Rupture in Guatemala

Poster #10 **Trevor Bell** Division of Biological & Biomedical Systems
The Role of rRNA Post-Transcriptional Modifications in Escherichia coli Ribosome Biogenesis

Poster #11 **Jetzel Chavira** Art & Art History
Malcriadas and Proud of It: Delilah Montoya's Women Boxers: The New Warriors

Poster #12 **Natalie Castilleja, Jaime Gregory, Gabriel Salas-Mendoza, & Berenis Rodriguez** English
Street Art and Cultural Identity in Kansas City

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POSTER PRESENTATIONS

Poster #13 **Nathan Nguyen** Nursing & Health Studies
The relationship between physical activity and neighborhood among Asian-American students at UMKC

Poster #14 **Jennifer Vanderslice** Physics and Astronomy
Variations in the Electronic Band Structures of Photothermalcatalytic Materials

Poster #15 **Faisal Almethen, Izzy Buzolich, & Evan Kiefer** English
Writing Studies: Athletics

Poster #16 **Lindsy Todd** Division of Biological & Biomedical Systems
Development of Giant Fiber Escape Circuit in Drosophila

Poster #17 **Allison Scobee, Charles Turrietta, & Nico Bradshaw** Biology
Engineering an Antimicrobial Lactuca Satvia

Poster #18 **Natalie McCarthy** Philosophy
The Ethical Implications of Stem Cell Research

Poster #19 **Olivia Sours** School of Nursing & Health Studies
Charitable Food & Healthcare Industry Partnership Efforts Against Food Insecurity

Poster #20 **Grant Urban, Alyssa Schulz, Lyba Khawar, & Katelyn Erce** Psychology & Counseling
Discrimination and Social Justice Advocacy in Students of Color

Poster #21 **Meghana Bhumireddy** Pathology & Laboratory Medicine
Clinical and Gene Expression Data Reveal Subtypes of Pediatric T-Cell Acute Lymphoblastic Leukemia

Poster #22 **Taegan Denmon, Lucien Hockaday, Jay Moore, Eric Thong, & M. Percy** English
Beyond the Bounds of Books

Poster #23 **Charlie Lampe & Grant Urban** Race, Ethnic, & Gender Studies
Evoking Earthseed : A Future Informed Present

Poster #24 **McKayla Annesser & Petrea Ryan** Division of Biological & Biomedical Systems
Exploration of Potential Multibud Phenotype in rad17Δ and GAS1Δ

Poster #25 **Laine Ross** Psychology & Counseling
The Role of Sexual Assault Trauma on Nightmare Content

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POSTER PRESENTATIONS

Poster #26 **Iyanna Moss** Psychology
How dreams impact growth following a trauma

Poster #27 **Sienna Ficken** Biology
Bruno1 Isoform Regulation in Muscle Tissue – The Next Step in Muscle Degenerative Disease

Poster #28 **Sammy Abu-Namous, Daniel Jones, Scott Manuel, & Dylan Welch** History
World War One through its Artifacts: Combat

Poster #29 **Jackie Gildo** MIDE
Sowing Seeds of Change: Hydroponic Farms

Poster #30 **Sheyda Dehghani** Mechanical Engineering
Liquid-in-Liquid 3D Printing of Lipid/Hydrogel Mixtures

Poster #31 **Zaylee Cox, Greta Ebersole, Ailyn Gonzalez, Colin Green, Confiance Muhoza, & Hannah Quint** English
Writing Studies: Education

Poster #32 **Sarah Park** English Language & Literature
Camp Girlhood: The Camp Fire Girls and Redefining Teenage Culture through Nature, 1920-1938

Poster #33 **Tabitha Tyler-Post** Earth & Environmental Science
Sediment Color Changes When Acted on by Different Times and Temperatures

Poster #34 **Sudhiksha Kumar** Biology
Habitat relationship between Sigmodon hispidus and Microtus ochrogaster

Poster #35 **Jocelyn Vang** Oral & Craniofacial Sciences
Identifying Disproportionate Embryonic Jaw Length in Quail and Duck Using Comparative Anatomy

Poster #36 **Mary Dunagan, Emani Guerin, Maddy Hunt, & Isabel Patton** English
The History of Drag in Kansas City Told Through Advertisements

Poster #37 **Meghan Satterley** Computer Science
Consolidated Social Works Services, Inc. Website: Community-Driven Development

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POSTER PRESENTATIONS

Poster #38 **Daze Creamer-Ellecamp** English
The Impact of Musical Components on Human Mood: An Investigation into the Modulating Influence of Lyrics and Melody

Poster #39 Kate McKown Kate McKown, Ainsley Pickering, & Emma Angle Psychology
Trauma-related nightmares predicted by rumination in adults

Poster #40 **Samantha Carr, Jay Cravens, Rebecca Hartman, & Emma Love** History
World War One through its Artifacts: Entertainment

Poster #41 **Noah Chambers & Nesyah King** Biology
Analysis of Budding Patterns in Mutant Strain containing GAS1 deletion vs Wild Type in Saccharomyces

Poster #42 **Johnny Diep** Physics & Astronomy
Setting the Stage for Machine Learned Potential Functions in Electronic Structure Calculations

Poster #43 **Imani Dyke, Sara Kronawitter, Jessica Nguyen, Delaney Shields, Sebastian Skaggs, & Marzayna Tagaloa** English
Writing Studies: Literature, Culture, & Gender

Poster #44 **Jordan Paxton, Claire Mersmann, Logan Belt, & Reece Parker** English
Band of Sisters: Women in Protest

Poster #45 **Jordan Jackson** Political Science/Psychology
Hyper-partisanship and Voting: An Analysis of Party Strength and Voting Behavior

Poster #46 **Isabelle Schroeder** English
Away at School: The Indian Boarding School Years of Myrtle Dupree, 1931-1938

Poster #47 **Tessa Eads, Aminatu Idowu, & Erica Ludy** Biology
Linking Environmental Stress to Cell Division

Poster #48 **Victor Aguilera, Mary Brooks, Jenna Clark, Nouran Elhiweej, & Kavin Hurd** English
Writing Studies: Mental Health, Criminal Justice, Politics, & Business

Poster #49 **Aurora Welch & Asayiel Alhajeri** Biological & Biomedical Systems
Examining the Growth of Yeast Mutant spo1-Δ on Alternative Carbon Sources

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POSTER PRESENTATIONS

Poster #50 **Shauna Kim** Public Health
Physical Activity and Stress: A Protocol to Understand Biology, Behavior, and Social Structures

Poster #51 **Ruweyda Hassan** Political Science/Philosophy
Media Framing and its Impact on Muslim Political Ambition

Poster #52 **Andi Basalo & Vari Patel** Political Science
Legislative Term Limits and Representational Loss

Poster #53 **Sydney Peck, Nathan Manning, & Michael Viermann** Biology
Tumor elimination via Antigen Engineering

Poster #54 **Mia Eckstine, Emily Funk, Kian Hunt-Espino, & Timothy McGhee** History
World War One through its Artifacts: Health

Poster #55 **Juan Calderon** Energy, Matter, & Systems
Heat Transfer Enhancement Experimental Study of Developed Nanofluid Mixture Tested During a Constant Heat Flux

Poster #56 **Gianna Cado** Mathematics & Statistics
Using Mathematical Models to Analyze the Spread of ESBL-Producing E. coli Between Farms, Communities, and Hospitals.

Poster #57 **Sarah Bensahri & Huda Ammar** Biological & Biomedical Systems
Satellite Cells in Yeast: Bud Growth and Viability of BAG7 and SHE4

Poster #58 **Quinlan Patel, Olivia Vella, Elaine Pohlsander, & Garrett Menees** English
The Sound of Progress: Technological Developments of Blues Posters at the KC Grand Emporium

Poster #59 **Yasmeen Hanon** Political Science
Oil and Orientalism: Rethinking the Political Resource Curse in the Middle East and North Africa

Poster #60 **Jayla Coffee, Coral Ellette, Veraly Gomez, Kai Miller, & Isabel Yearian** English
Writing Studies: Education

Poster #61 **Jayda Paul, Rachel King, & Henry Turrietta** Biology
Issues We Need More Than Tissues For

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POSTER PRESENTATIONS

Poster #62 **Gabriel Kribbs** Division of Biological & Biomedical Systems
A Link Between DDT and Wasting Disease in Pisaster ochraceus

Poster #63 **Nikitha Sheth** Division of Biological & Biomedical Systems
Species Differentiation of Alligatoridae Using Cervical Armor Distribution

Poster #64 **Quynh Tran** Division of Biological & Biomedical Systems
Characterization of Bullera alba

Poster #65 **Bailee Ehlers** Psychology
How Fear of Sleep Predicts Thoughts of Suicide

Poster #66 **Joshua Cunningham, Alex Ly, & Andrew McDaniel** English
Writing Studies: Science

Poster #67 **Nevaeh Vang** History
Refugees during the US Civil War

Poster #68 **Ta'Sha Lumpkins & Kei'Asia Smith-Lowery** Division of Biological & Biomedical Systems
Search for satellite phenotype in S. Cerevisiae mutants JEN1 & RHO5

Poster #69 **Adelle Baker, Abby Siemer, Nate Smith, Ruth Thao, & Yue Wang** English
Writing Studies

Poster #70 **Rahma Mohamed & Mattea Brooks** School of Nursing & Health Studies
Language Use in Healthcare: Assessing Medical Translation Services in the Kansas City Metro Area

Poster #71 **Vanessa Menz & Anthony Du** Biology
Endotoxins & Bacteriophages

Poster #72 **Alessandra Smith** Dentistry
A Single-dose of rWNT5A During Facial Bone Mineralization Results in Midface Differences

Poster #73 **Samuel Herman** School of Science and Engineering
An Expression Map for Axon Guidance Molecules in the Fruit Fly

Poster #74 **Mary Klene** Earth & Environmental Science - Geology
Stratigraphic, Petrographic, and Geochemical Study of Interbedded Gypsum and Cu-ore Deposits in the Boleo Formation in Baja California Sur, Mexico

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POSTER PRESENTATIONS

Poster #75 **Cole Wilson & Muhammad Waleed** Division of Biological & Biomedical Systems
Formation of Satellite Cells: cat8Δ Results in the Formation of Multi-Bud Satellite Cells on Non Fermentable Carbon Sources

Poster #76 **Emily Bledsoe** Division of Biological & Biomedical Systems
Foxg1a is required for hair cell development and regeneration in the zebrafish

Poster #77 **Josie Newman** Media, Art & Design
Welcome to Womontown

Poster #78 **Maryam Oyebamiji** Urban Planning & Design
Unveiling Urban Trauma: The Impact of Design on Community Well-being

Poster #79 **Kailynn Barnt** Civil Engineering
Testing of Generative AI for Disaster Scene Computing and Human-in-the-loop Post-disaster Decision-Making

Poster #80 **Chris Ekengren &Austin Evans** Division of Biological & Biomedical Systems
Circadian Regulation of Spt Ada Gcn5 Acetyltransferase (SAGA) in Drosophila Melanogaster

Poster #81 **Yumiko Chen, Eli Montgomery, Kirsten Spilde, & Richard K. Watkins** English
Writing Studies: Pop Culture & Gender

Poster #82 **Charlie Bell, Hanan Hayyeh, Alec Roe, & Lydia Weaver** Psychology
Sexual minority status on trauma symptoms and suicidal cognition

Poster #84 **Anna Shaw& Sydney Rogers** Division of Biological & Biomedical Systems
Exploring the Molecular Links Between Circadian Rhythm and Neurodegeneration

Poster #85 **Sophia Baugher** Earth & Environmental Sciences
The Urban Heat Island: An Interactive Model

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ORAL PRESENTATIONS

1:30 p.m. **Robert-Abel Porras** Race, Ethnic & Gender Studies; Computer Science

Using Machine Learning and AI to Understand Trends and Future Growth in Metro KC: A Focus on the Latinx Population

2:15 p.m. **Theo Raitzer** Economics

Another Latin American Debt Crisis? Comparing Modern Economic Conditions to Those of the 1980s Debt Crisis in Latin America

ARTS & HUMANITIES

Jetzel Chavira
Faculty Mentor: Joseph Hartman
Academic Unit/Department: Art & Art History

Malcriadas and Proud of It: Delilah Montoya's Women Boxers: The New Warriors

Delilah Montoya's series, *Women Boxers: The New Warriors*, challenges stereotypical views of women within both Chicano and US mainstream cultures. By reclaiming and redefining the concept of "malcriadas" (nasty women), historically associated with disobedience, Montoya portrays women boxers as modern-day warriors who defy traditional gender norms. Through this artistic exploration, Montoya expands the boundaries of Chicano art and experience in the late twentieth century, inviting viewers to reconsider notions of gender, identity, and cultural representation.

Montoya's photographs capture moments both inside and outside the boxing ring, showcasing the multifaceted identities of these women as mothers, professionals, and fighters. The term "malcriada," often laden with negative connotations reinforced by cultural traditions, is reappropriated by Montoya to celebrate defiance against societal norms. By embracing the spirit of rebellion, Montoya's work inspires a sense of empowerment and authenticity, urging women of Mexican descent (and of all backgrounds) to pursue their dreams with unwavering determination.

Reflecting on Montoya's series prompts a broader discussion about gender inclusivity in male-dominated fields like boxing and the ongoing struggle for equality faced by women of color. Montoya's photographs serve as a testament to the resilience and courage of women who defy convention, paving the way for a future where gender-based limitations are dismantled, and all individuals are free to pursue their aspirations without constraints.

Charlie Lampe & Grant Urban
Faculty Mentor: Deja Beamon
Academic Unit/Department: Race, Ethnic & Gender Studies

Evoking Earthseed: A Future Informed Present

Inspired by Octavia E. Butler's Parable Series, the 'Evoking Earthseed' project is a public humanities initiative seeking to construct a digital archive, research paper, and mutual aid incubator. Focused on the significance of literature and interdisciplinary humanities in navigating a rapidly changing world, this project brings together creative and academic contributions from the fields of Black studies, gender studies, queer studies, environmental studies, and education. Our research utilized Octavia E. Butler's novel *Parable of the Sower* as its main text, and then extrapolated to consider other methods of apocalyptic survival with a focus on Black liberation. With a mix of textual analysis, archival research, and contemporary events, we sought to find a method for survival at the "end(s) of the world."

This produced two interconnected inquiries. First, we used Columbus, Ohio as a case study to explore how Black community supported infrastructure ruptures geographies and promotes Black, and other minoritized populations, survival. The second inquiry utilizes this research, in conjunction with the work and archive of Octavia E. Butler and fields listed above, to explore what a mutual aid incubator dedicated to the lessons of Butler's life might look like. By analyzing these real-world situations in parallel with Butler's novel, we were able to create a case for the indispensable role of mutual aid in surviving the end of the world. While sometimes dismissed as nothing more than escapist entertainment, we demonstrate that science fiction can also be a vessel for imagining a better world, when it takes seriously our identities in the present.

Natalie McCarthy
Faculty Mentor: Clancy Martin
Academic Unit/Department: Philosophy

The Ethical Implications of Stem Cell Research

Stem cells have significant potential in both medicine and research due to their capability to replace damaged cells and their potential to regenerate damaged organs, especially within the context of genetic diseases and neurodegenerative disorders. The ethical and scientific debate around the use of stem cells in research has been of great interest in recent years, as the potential uses of stem cells in research expand. Embryonic stem cell research requires the derivation of pluripotent stem cell lines from embryos and oocytes; which is ethically ambiguous due to the dispute concerning the moral significance of the embryo. Further, downstream research involving the use of human stem cells introduces dilemmas regarding consent and oversight of research. This poster will discuss the origins and history of stem cells, which will establish a basis for several ethical dilemmas involving stem cell research, such as the use of embryonic stem cells compared to stem cells from other sources, such as somatic induced pluripotent stem cells, and finally; establish the role of embryonic stem cells within the context of ethical research practices.

Josie Newman
Faculty Mentor: Zach Frazier
Academic Unit/Department: Media, Art and Design
Funding: SEARCH Grant

Welcome to Womontown

'Welcome to Womontown' is a publication exploring the history of a 1980s and 90s lesbian community in the Longfellow neighborhood of Kansas City, Missouri. Womontown was a community that challenged the system, defied traditional gender norms, and created a self-sufficient environment free from patriarchal influence.

104 pages (5" x 6.5")

This book serves as a resource that aids in the preservation of local Kansas City queer history. All materials in this publication are sourced from The Gay and Lesbian Archive of Mid-America (GLAMA).

Pictured Below: Front Cover of the publication and the symposium poster.

Sarah Park
Faculty Mentor: Jane Greer
Academic Unit/Department: English

Camp Girlhood: The Camp Fire Girls and Redefining Teenage Culture through Nature, 1920-1928

The emergence of adolescents and teenage culture in the early 20th century also brought a new social problem: what to do about girls. Teenage girls were becoming more independent, and authority figures struggled to understand this new life stage in girlhood. In defiance of gendered stereotypes being forced upon them, many teenage girls sought further independence socially and financially. Scholars such as Hahner, Miller, and Schrum have discussed this phenomenon known as the "girl problem" and documented the cultural concerns in post-World War I America. During this time, many girl groups and organizations began to crop up. One of the largest outdoor groups, known as The Camp Fire Girls, grew rapidly, and its young girl members began exploring their identities through nature and writing. My research explores how members of The Camp Fire Girls during the 1920s used nature in their writing as an extension of their girlhood and used this idea to deconstruct the "girl problem" and redefine adolescence.

The Camp Fire Girls, established in 1910 by Luther Gulick and his wife Charlotte Gulick, was created to give girls an outdoor experience that had been missing in their education. The membership numbers grew rapidly, and by 1920 there were hundreds of Campfires across the United States. A publication called *WeHeLo* was created to connect the groups spread across the states and share commonality between the girls. By 1920, the title changed to *Everygirl's Magazine*, and the contents shifted from outdoor education to girls writing to each other through fiction, poetry, and camp stories. Girls ranging from 9 to 16 sent in their writing to define their own life through their outdoor adventures and used the shared experience of summer camp to inform and define their understanding of girlhood in America.

In the pages of *Everygirl's Magazine,* girls became authorities of their own social, economic, and bodily selves. The Camp Fire Girls develop their ideal image of American girlhood in the pages of *Everygirl's Magazine* through poetry, fiction, editorials, and camp stories. Through their writing, the girls dismantle the confining ideas of adolescence and the "girl problem" by creating a space for themselves both in nature and in print culture, each carefully designed for themselves.

Isabelle Schroeder
Faculty Mentor: Jane Greer
Academic Unit/Department: English

Away at School: The Indian Boarding School Years of Myrtle Dupree, 1931-1938

At their conception in the late nineteenth century, Federal Indian Boarding Schools were institutions with the aim of erasing Indigenous culture from North America. Over time and as war with Native American tribes became less intense, the attitude of boarding schools shifted from a place of assimilation to an educational center offering new opportunities for their students. This, however, wasn't without the advocacy of the American Indian students in attendance. In fact, there's significant evidence that in the 1900s-1930s it was the young girls of these boarding schools who took initiative in their pursuit of a thorough education. In this paper, I examine the scrapbook of one such Coeur D'Alene teen, Myrtle Dupree, who used this medium while in school to strive for nursing instruction, exercise self-respect, and partake in the idea of "Indian play." "Indian play" is a method of challenging white American culture/stereotypes and exploring various versions of "Indianness." This term was created by the scholar, Lisa Neuman, who has borrowed the expression of "playing Indian" (a way non-American Indians have romanticized American Indian culture for their own amusement) from a fellow scholar and inverted its meaning to describe how Indigenous youth counter the expectations that have been placed on them.

Myrtle Dupree's scrapbook reveals much about her person and how she attempted to thrive and create an identity for herself while attending the Chemawa Indian Boarding School. Examining her compilation of invitations, certificates, memberships, poems, and newspaper clippings, I argue that Dupree is engaging in "Indian play." Not only does Dupree take advantage of and actively participate in her environment, but she does so without forgetting her community. She is able to synthesize her Euro-American education and Native American heritage. Additionally, Dupree presents a unique kind of girlhood in the 1930s throughout the pages of her scrapbook which places her in the wider demographic of scrapbookers. By examining this identity further, even more can be concluded about why Myrtle Dupree chose to document her schooling via the arrangement of personal memorabilia.

My research on Myrtle Dupree and her scrapbook as a form of "Indian play" expands upon Neuman's established methods of how American Indian youth rejected white American stereotypes through creative wordplay. I propose that Myrtle Dupree's "Indian play" was expressed through the embellishments of her scrapbook and physical representations of her individual "Indianness." In this way, Dupree's scrapbook is a novel example of "Indian play" and teen commentary on European American perceptions of what it means to be a Native American girl.

Nevaeh Vang
Faculty Mentor: Diane Mutti Burke
Academic Unit/Department: History

Refugees during the US Civil War

This research examines the experiences of refugees in the United States during the U.S. Civil War. Gathering data from historical newspapers from multiple databases to explore the causes, effects, and challenges faced by displaced individuals. The most popular stance on why so many refugees were pushed out was between the northern and the southern states of America. The U.S. Civil War was a chaotic period that left a permanent mark on the nation's history and society. The chaos of battlefields and political upheaval caused countless individuals to be displaced and flee from the ravages of war. Refugees faced a myriad of challenges as they sought safety and stability. Forced to abandon their homes, communities, and families, they embarked on journeys in search of refuge. Many refugees encountered hostility and discrimination in their journeys, which left them vulnerable to poverty, exploitation, and uncertainty about their futures. The purpose of this research is to shed light on the experiences of the U.S. Civil War and draw parallels with contemporary refugee crises unfolding around the world. We can empower refugees toward safety, dignity, and a brighter future by fostering understanding, awareness, and empathy.

Brady Wolff
Faculty Mentor: David Thurmaier
Academic Unit/Department: Music Theory
Funding: SEARCH Grant

Visualizing Music Theory: A Case Study of Post-Tonal Microtonal Music

Music theory, a field which describes the structure and techniques behind music, often employs language which conceals meaning for those who are not fluent in its methodology. In this research project, I propose an alternate way of displaying music theory concepts through the use of a visual aid, with a focus on unorthodox tuning systems. Tuning theory has a history of using complex, mathematical prose, making it a useful case study.

Musical tuning systems have undergone constant evolution throughout recorded history, culminating in the modern-standard tuning of 12-tone equal temperament. This tuning method divides the octave into 12 equal parts. The composer Ben Johnston regarded this system as imperfect and inherently "gray," inspiring him to explore an alternative tuning system which he called "extended just intonation." This system favors pure interval ratios while making sacrifices to playability and simplicity. This pursuit of purity results in sonorities which resonate with natural acoustics, evoking clarity and consonance. Johnston implements these concepts in a set of variations on the famous hymn tune "Amazing Grace," which intensifies in harmonic complexity as the piece progresses.

Research on just intonation explores the practical applications of pure harmonic ratios in composed music, fostering innovative harmonic possibilities. Current research delves into the tuning systems utilized by specific composers, but lacks a comprehensive overview for individual compositions, and specific composers' applications of this new harmonic language.

To address this gap, I have developed a visual aid capable of displaying the tuning center, harmonic reach, and harmonic complexity of numerous compositions composed with just intonation. Inspired by the lattice structures employed by Ben Johnston, my visual aid provides insight to other notable composers, including the sacred realist music of Catherine Lamb, and the microtonal electronic dance music of Sean Archibald (Sevish).

BEHAVIORAL & SOCIAL SCIENCES

Fardowsa Ahmed
Faculty Mentor: Kelsey Gardiner
Academic Unit/Department: Nursing and Health Sciences
Funding: Emerging Research Scholars

Measuring Nutrition Insecurity and Diet Quality in College Students

Objectives: Food Insecurity is a current health disparity affecting the U.S. today. The impact of food insecurity on college students can be a burden on one's life with the price of food and access as well. While there are things done to help alleviate this disparity like food assistance programs such as the Women, Infants, and Children (WIC) program, and the Supplemental Nutrition Assistance Program (SNAP). It still doesn't address certain issues like access to healthy and nutritious foods as well as a solution for those who don't qualify for these programs. This study aims to help understand nutrition insecurity and diet quality in college students at the University of Missouri-Kansas City, University of Kansas, and Missouri Southern State University. As well as through their college pantry to see if **Methods:** This study uses quantitative methods via an electronic survey. The survey consisted of questions related to pantry satisfaction, food and nutrition security status, and additional support needs. Participants included any student on-campus pantry user who used the pantry throughout the Fall 2023 and Spring 2024 academic semesters. **Results:** We received 371 results from three Universities, the University of Missouri-Kansas City (n=146), the University of Kansas(n=58), and Missouri Southern State University (n=23). When asked the question do you currently use federally funded food assistance programs? Among those who don't have access to food assistance programs (n= 124, 50.41%) the food pantry at their college is one of their main accesses to food. Some of the main concerns students have are that healthy foods are too expensive (n= 144, 96%), limited healthy food options at the store they usually shop at (n= 91, 60.26%), and stores or food pantries with healthy food are too far away or hard to reach (n= 91, 61.49%). Due to the cost of less nutritious foods being at a lower price, those are often the ones students will opt for which in turn leads to poor diet quality. After analyzing the average serving amount of the fruits, vegetables, grains, milk/dairy products, and protein eaten per day. On average students from these three schools were consuming less than 1 serving or ½ a cup of fruits (n= 84, 36.84%) and less than 1 serving or 1 cup of vegetables (n= 61, 26.64%) than the recommended daily amount due to the lack of access. **Conclusion:** College food pantries are designed to help college students struggling to access food. The resources they provide help alleviate some of the burden that students face regarding where their next meal might come from. However, access to nutritious foods is still important but the nutritional needs of college students are not being met. This survey helps highlight where students are lacking in dietary guidelines even with pantry assistance.

Andi Basalo & Vari Patel
Faculty Mentor: Greg Vonnahme
Academic Unit/Department: Political Science
Funding: SEARCH Grant

Legislative Term Limits and Representational Loss

Legislative organizations need members to function. Do term limits effect this capacity? Are members in term-limited legislatures more likely to vacate their seats, therefore curtailing the capacity of the chamber to function? If so, how many citizens are sidelined by this lack of representation? While normative theories provide competing accounts of representation, they all assume, at a minimum, the presence of a representative. When a district has no representative, there is no one working on behalf of those citizens in any capacity. There is no one with whom they have an electoral connection in the chamber. We examine data from the Missouri House of Representatives to quantify the representational loss due to term limits.

Charlie Bell, Hanan Hayyeh, Alec Roe, & Lydia Weaver
Faculty Mentor: Westley Youngren
Academic Unit/Department: Psychology

Sexual minority status on trauma symptoms and suicidal cognition

Introduction: The minority stress model suggests minority groups are at increased risk for mental health outcomes due to discrimination and harassment. As anti-LGBTQ+ attitudes and hate crimes have increased in recent years, there is greater stress placed on sexual minorities. This study aims to supplement existing research on minority stress and mental health by examining the relationship between sexual minority status, trauma symptoms, and suicidal ideation cognitions.

Methods: Ninety participants identifying as heterosexual (n = 77) and non-heterosexual/LGB (n = 13) completed an anonymous online survey that included measures of symptoms related to Posttraumatic Stress Disorder (the Post Traumatic Stress Disorder Checklist for the DSM-5; PCL-5), minority stress (2 subscales—vigilance and vicarious trauma on the Daily Heterosexist Experiences Questionnaire; DHEQ), and suicidal ideations and cognitions (the Brief Suicidal Cognition Scale; B-SCS). All participants were at least 18 years old and consented to participating in the study. Mean comparison analyses were used to examine the relationship between sexual minority status, trauma-symptoms, and suicide.

Results: Those who identified as a sexual minority had higher levels of trauma-related symptoms (t = -10.85, $p < 0.01$) and suicide-related cognitions (t = -17.48, $p < 0.01$) than those who did not identify as a sexual minority.

Conclusion: Sexual minority status is associated with higher levels of trauma-related symptoms and cognitions related to suicide. This supports previous findings of mental health disparities in the LGBTQ+ community. However, this is a small sample size with limited power. Future research should examine the role of sexual minority status on mental health using a larger sample, the full DHEQ, and additional mental health measures may enhance our knowledge of the daily stressors faced by LGBTQ+ individuals and how they may affect mental health, Understanding these challenges is critical to improving mental health treatment for the LGBTQ+ community and reducing mental health disparities.

Daze Creamer-Ellecamp
Faculty Mentor: Hayden Baker
Academic Unit/Department: Psychology

The Impact of Musical Components on Human Mood: An Investigation into the Modulating Influence of Lyrics and Melody

Introduction: It has long been understood that music has an influence over human moods and behaviors. Music psychology studies how humans perceive, experience, and respond to music. It often categories responses as emotional, cognitive, or social. This research aims to understand the emotional aspects of music psychology. The purpose is to identify which music correlates to which moods by examining the lyrics and the melody separately. The results will help to determine which has the modulating effect on human mood.

Methods: Interviews were utilized to gain personal accounts of emotional changes after being primed with music. Ten participants were utilized for this experiment. 5 women and 5 men all over the age of 18. They were asked 5 background questions and then interviewed before and after being primed with five different songs. Each of the songs had conflicting emotions in the lyrics as compared to the melody. The purpose was to determine which moods, positive or negative, came from which types of music, and which part of the music had the influential effect.

Results: The background survey revealed valuable insight into the types of music the participants are already familiar with and the moods they experience while listening to them. Almost half (40%) of the participants reported listening to whatever was on the radio, or the top 100s, as their most common genre of music. This is beneficial to the generalization of the results. More than half (60%) responded that listening to their preferred genre put them in a positive mood. Even more than that (70%) responded that they believed their moods were affected by the music they listened to. Out of the 5 songs utilized in this research 80% of participants were familiar with at least one song and 40% were familiar with 2 or more. Only 20% of participants reported negative moods associated with the songs before listening to them in the study. This familiarity did not have a noticeable impact on the results. After being primed with the five songs, interviewees unanimously responded that the melody is what resulted in the changes to their mood.

Conclusion: Based on the results of the interviews, melody is responsible for changing the mood of the participants. Most participants, even after seeing the lyrics, still rated the song similarly to how they originally perceived it based on melody alone. Lyrics did have an impact on the interviewees moods but only when presented independently. Further research is needed to solidify melody as the modulating factor and to identify the best way to utilize melodies to induce emotional changes in human subjects.

Bailee Ehlers
Faculty Mentor: Westley Youngren
Academic Unit/Department: Psychology

How Fear of Sleep Predicts Thoughts of Suicide

Intro: Fear of Sleep (FoS) is the dysfunctional belief about one's perceived safety during sleep, including fear of nightmares and maladaptive behaviors. FoS can look like (but is not restricted to) sleeping with the lights on, the use of heavy blankets, exaggerated safety checking before sleeping, delaying bedtime to avoid nightmares, or excessive fear of being vulnerable during sleep. Individuals can struggle with a FoS as a result of many things, such as trauma or anxiety. Previous research has linked FoS to many negative outcomes, such as nightmares and insomnia. Additionally, there is data that suggests FoS may also increase the risk of suicide or suicidal ideations. With this in mind, our study sought to further examine the relationship between FoS and cognitions related to suicide.

Methods: Seventy-six participants completed an anonymous online survey that included questions that assessed FoS (Fear of Sleep Inventory; FoSI) and cognitions related to suicide (Suicide Cognitions Scale; SCS). Regression analyses were used to examine the relationship between FoS and cognitions related to suicide.

Results: FoS significantly predicted suicide related cognitions, $b = 0.16$, $t(73) = 4.15$, $p < 0.001$.

Conclusion: As a result of the study, it was found that FoS predicted increases in thoughts related to suicide. Knowing that FoS is linked to suicide related cognitions is quite important, as we may be able to target FoS through behavioral interventions, with the overall goal of reducing the risk of suicide. Considering our findings, future research should explore how techniques used to decrease FoS (such as specific sleep and trauma focused therapies) may indirectly impact cognitions related to suicide.

Yasmeen Hanon
Faculty Mentor: Rebecca Best
Academic Unit/Department: Political Science
Funding: SEARCH Grant

Oil and Orientalism: Rethinking the Political Resource Curse in the Middle East and North Africa

As one of the most resource rich regions in the world, the Middle East and North Africa has become a popular point of reference in resource curse scholarship—linking civil conflicts in Arab states to relatively newfound resource wealth. The resource curse, or the theory that natural resource abundance in less developed countries is linked to political and economic dysfunction, is often used to explain the woes of the region. However, the resource curse alone is insufficient in explaining the political and economic behaviors of the Middle East and North Africa. Not accounting for the unique characteristics of political function specific to the region and generalizing all conflict-ridden states under the vague-yet-rigid diagnosis of resource cursed diminishes and dismisses a history that make some of the symptoms of the phenomena exclusive to said region in nature.

The resource curse in the Middle East and North Africa is a defensive response to foreign interest in regional resources and the subsequent instability caused by the pursuit of those interests. Autocratic regimes in MENA continue to perpetrate the curse through limiting political and economic freedoms as a means of self-preservationist prevention of state and regime failure seen amongst neighboring states. The portrayal of MENA oil resources as a national interest of foreign governments perpetrates higher vigilance among Arab states over suspected interference in domestic politics and economy. Both before, but particularly after the Arab Spring, regime failures and the downfall of regional leaders have prompted autocrats to expand economic and political restraints to ensure their rule—furthered by recent memories of regional occupation, war, and colonialism among MENA states. What is seen as the resource curse in MENA states is a response to regional instability caused by foreign interest in regional resources. As a means of self-preservation, autocratic regimes will continue to limit their countries political and economic freedom to prevent a similar downfall that their neighbors experienced.

This study demonstrates the distinct presentation of the resource curse in the Middle East and North Africa, and highlights symptoms not seen in other resource cursed states. It also emphasizes that a black and white, generalized definition of the resource curse lacking consideration for regional history and background jeopardizes the legitimacy of the theory in political and economic scholarship. Failure to consider extenuating factors when diagnosing the resource curse further exasperates the issue—the application of the theory in the literature is problematic. I conduct mixed- methods, qualitative and quantitative comparative analysis of resource curse symptoms in the Middle East and North Africa in comparison to other states and regions. My regional review of historical events and their effects on contemporary symptomatic presentation displays the importance of considering regional background in expanding the understanding and definition of the resource curse, as well as potentially redefining how we categorize resource cursed states and predict the outcomes of resource- based conflicts. My results indicate that while the resource curse may be present in the Middle East and North Africa, it is the result of underlying political and economic self-preservationist behaviors in response to a regional history of foreign intervention in resource interests and related conflict outbreaks. Additionally, diagnosing the resource curse as a regional phenomenon rather than on an individual state basis could work to explain symptom contagion cross-nationally, even among non-oil exporting states.

Ruweyda A. Hassan
Faculty Mentor: Debra Leiter
Academic Unit/Department: Political Science

Media Framing and its Impact on Muslim Political Ambition

Question: How does the media's portrayal of Islam impact the political ambition and participation of the Muslim community?

This study aims to explore the intersection of media representation and political aspirations within the Muslim community, by examining how the media utilizes framing to shape public perception and political discourse. A review of Media framing since 9/11 conducted by Dr. Khalid Sultan at the National University of modern language examines the theology of media framing of Islam and its links to terrorism. The researcher defines framing as "a term used by researchers to refer to how an event in a particular news story is portrayed" (Sultan, 2016). Frames often utilized by the media, like communication frames, draw on individuals' personal association with how important the issue in discussion is to them. When the media uses certain frames in communication, they often portray a story in a way that resonates with individual's personal perception on the importance of the story (Druckman & Chong, 2007). Given this, frames in communication can directly influence individuals' perceptions of terrorism and Islam. Using an experimental design, this study will expose student populations to one of 6 treatments that emphasize different elements of media frames related to religion, and politics particularly emphasizing the association between religion and violence. This study will provide clarity as to how media framing of Islam influences the political ambition and participation of the Muslim community by investigating whether portrayals in the media enhance or diminish political engagement.

Jordan Jackson
Faculty Mentor: Elizabeth Vonnahme
Academic Department/Unit: Political Science/Psychology

Hyper-partisanship and Voting: An Analysis of Party Strength and Voting Behavior

In our current era of supposed hyper-partisanship, there is a belief that partisan identity often outweighs policy considerations in electoral decision-making. This research aims to further understand how hyper-partisanship affects voting decisions for both Republicans and Democrats, and the correlation between party strength and willingness to vote across party-lines through a comprehensive analysis of survey data. The evidence indicates that strong partisans are significantly less likely to indicate a willingness to vote for the other party and less willingness to vote for candidates rather than the party.

Hannah Leyva
Faculty Mentor: Shannon Jackson
Academic Unit/Department: Sociology & Anthropology, Honors Program
Funding: Emerging Research Scholars

"Ride KC": Kansas City's Streetcar and the Development Trajectory that Motivated it

While the KC Streetcar plans its next extension, the Greater Kansas City (KC) Area anticipates exciting growth opportunities. Current urban planning attention is concentrated on downtown and commercialized areas; and running right through the heart of it all is the KC Streetcar. Since the KC Streetcar is limited to a North-South route on Main Street, many wonder what the streetcar can offer to the Greater KC Area. A city's transportation infrastructure interacts with its urban fabric in a way that uniquely manifests in response to the location's historical and cultural development. There are many considerations when evaluating the situation of the KC Streetcar such as ridership demographics, perceived utility, economic advantages, etc. To better understand these factors this project applies ethnographic research methods which are essential to the field of cultural anthropology. Key ideas from Clifford Geertz's concept of "thick description" are applied to data collection and analysis. Methods include a series of five individual semi-structured 30 to 50 minute interviews. Among those interviewed included community and urban planning professionals, and residents. Interview transcripts were closely analyzed to interpret for cultural insights and survey patterns to make contextual meaning of them. Interrogation of the KC Streetcar development trajectory entails a survey of the past, present, and future of Kansas City. The goal of this research is to investigate the historical and contemporary social influences that impact Kansas City's urban development patterns. Four main aspects of Kansas City, Missouri's streetcar are explored: (1) history and development, (2) transportation and infrastructure, (3) Kansas City's "smart" growth trajectory, and (4) the impact of the streetcar on gentrification and inequality. Public transit is found to be a personal topic for some KC residents and should be strongly considered in development projects. The KC Streetcar is an increasingly contentious topic as residents and professionals are disconnected in envisioning the city's future. As the KC Streetcar continues to be incorporated in the overall growth plan of the city, it leaves the community questioning the streetcar's relevance.

Kate McKown, Ainsley Pickering, & Emma Angle
Faculty Mentor: Westley Youngren
Academic Unit/Department: School of Education, Social Work, and Psychological Sciences

Trauma-related nightmares predicted by rumination in adults

Authors: McKown, K. L., Pickering, A. L., Angle, E. M., Balderas, J. C., & Youngren, W. A.

Introduction: Rumination is a process of repetitive thinking often focused on distress symptoms, causes, and consequences, while co-rumination is repeated peer discussions of problems or negative emotions. Co-rumination includes two subtypes: reflective co-rumination, unrelated to depression, and brooding co-rumination, associated with depression. Emerging research has begun to link rumination/co-rumination to trauma-related outcomes, such as nightmares. This is quite meaningful as nightmares have been linked to outcomes such as death by suicide and substance abuse. With that being stated, our study sought to expand current research by examining how rumination and co-rumination predict nightmares.

Methods: 132 participants completed a survey that included measures of Co-rumination (Co-rumination Questionnaire; CRQ), Rumination (Rumination Response Scale; RRS), and Nightmares (Trauma-related nightmare survey; TRNS). All participants were female and at least 18 years-old. A multiple regression was used to examine how rumination and co-rumination predicted nightmares.

Results: Regression analyses revealed that rumination predicted nightmares ($b = 0.04$, $p < 0.05$), but co-rumination and its subtypes did not significantly predict nightmares ($p > 0.05$).

Conclusion: Our results revealed that rumination positively predicted nightmares, while co-rumination did not. These results are meaningful because it may suggest a possible treatment target where reducing rumination may impact nightmares. This is quite important because, as stated earlier, nightmares can be linked to things such as suicide and substance abuse. With this in mind, future research could explore whether or not reducing rumination might aid the treatment of nightmares, which might indirectly help the treatment of suicide and substance abuse disorders.

Rahma Mohamed & Mattea Brooks
Faculty Mentor: Kelsey Gardiner
Academic Unit/Department: Nursing and Health Studies
Funding: SEARCH Grant

Language Use in Healthcare: Assessing Medical Translation Services in the Kansas City Metro Area

Quality medical translation services play an essential role in producing an effective communication channel between clients and healthcare providers who encounter language barriers. However, recent evidence depicts there is a notable gap in providing health equity for low English proficient clients who utilize these services. Interventions through health policies may help support the availability of base-line services such as prompt access to standard translators. This study aimed to explore current medical translation services including experiences from the perspectives of various care providers when delivering care using translator services in the Kansas City Metro area. The study implemented qualitative methods in an electronic survey disseminated via email to employees at health facilities from various sectors. There were 31 respondents from four healthcare facilities in the KC metro. Preliminary findings show that 92% feel adequate translation services are offered, through many platforms (phone, virtual, in-person), and in a variety of languages (Spanish, Vietnamese, Chinese, Arabic). The main barrier working with medical translators reported was time (32%), and 54% of respondents reported having a feedback system set up for patients to report their satisfaction with interpretation services received. Regarding policy, only 8% reported knowing local level policies associated with medical translation services, while 31% reported being aware of an organizational level policy. This study begins to review the landscape to find potential gaps in both policy and practice that could have implications for accessing medical services for among non-English speaking residence in Kansas City.

Iyanna Moss
Faculty Mentor: Westley Youngren
Academic Unit/Department: Psychology

How dreams impact growth following a trauma

Introduction: Posttraumatic growth (PTG) is a phenomenon where individuals may find positive meaning and change after a traumatic event, such as military combat or sexual assault. High levels of PTG has been linked to resilience after a trauma, and low levels of PTG have been linked to outcomes such as Posttraumatic Stress Disorder (PTSD). Considering that PTG can be protective towards one's mental health, we are curious how other variables may be linked to PTG. One variable that may be interconnected with PTG is dreaming, due to previous research that demonstrated that through dreams, hospice patients gained a greater comfort about their impending death. The same research study also revealed that participants who found meaning in dreams also had higher scores of PTG. Suggesting that dreams may affect PTG of some patients. Considering the previous research, we aim to further examine the relationship between meanings of dreams and PTG.

Methods: Seventy-six participants completed an anonymous online survey that included a measure of PTG (Posttraumatic Growth Inventory; PTGI) and a measure that assessed beliefs and values related to dreams (The Mannheim Dream questionnaire; MADRE). Within the MADRE, we used MADRE question #9 (MADRE9) to examine attitudes related to dreams. MADR9's specific question is, "How often do your dreams help you to identify and solve your problems?", to which participants could respond on an anchored scale ranging from "never" to "Several times a week". Regression analyses were used to examine the relationship between PTG and dream values and beliefs.

Results: MADRE9 significantly predicted PTG, $b = 1.70$, $t(73) = 3.71$, $p < 0.001$.

Conclusion: In summary, our results revealed that beliefs that dreams help you identify and solve problems positively predicted PTG. These results mean that the more one believes their dreams help them work through problems, the more likely one will be to find growth after experiencing a traumatic event. This is clinically relevant as it provides further insights into a known protective factor, PTG. Future research should examine how beliefs of dreams could impact and improve PTG within patients that have experienced a traumatic event.

Nathan Nguyen
Faculty Mentor: Joseph Lightner
Academic Unit/Department: Nursing and Health Sciences
Funding: SEARCH Grant

The relationship between physical activity and neighborhood among Asian-American students at UMKC

Introduction: The Asian-American population in Kansas City live on average 6 years longer than the rest of the population. Yet, there is a lack of research on what helps Asian-Americans live longer, healthier lives. While the science is clear that physical activity increases life expectancy, no studies have been conducted on the rates of physical activity for Asian-Americans in the Midwest. Additionally, Asian-Americans my live in neighborhoods that facilitate healthier lives than other populations. Neighborhood is a great indicator of health outcomes because of economic opportunities, safety, transportation, and education. The purpose of this study is to understand the relationship between physical activity and neighborhood for Asian-Americans in the Midwest.

Methods: This is a feasibility study of Asian-American students at University of Missouri-Kansas City. This study employs an online survey and Garmin VivoFit 4 accelerometer. Survey questions assessed physical health status, neighborhood, demographics, and physical activity (using the International Physical Activity Questionnaire). Institutional Review Board approval was obtained.

Results: Feasibility of studying Asian-American college students can be a difficult endeavor. In this study, we learned several lessons about conducting physical activity research with this population. Notably, it's imperative to ensure diverse representation within the Asian-American population by including various ethnic groups such as Chinese, Japanese, Korean, Vietnamese, Indian, Thai, among others. Recruiting this population is difficult, even on a college campus. This inclusivity is essential for a comprehensive assessment of the relationship between physical activity and neighborhood environments. Issues around Institutional Review Board approval also exist and limit feasibility.

Discussion: This study presents an avenue for future research to investigate whether Asian-American individuals reside in neighborhoods with advantageous characteristics and to explore the absence of correlation between physical activity and neighborhood among this population. Previous studies have indicated that Asian-Americans tend to engage in higher levels of physical activity compared to other demographic groups. Future interventions should delve into the interplay between ethnicity and neighborhood factors within the Asian-American population, considering its diverse composition. There are notable public health implications stemming from this research. Both researchers and public health practitioners should continue to scrutinize Asian-American health behaviors to discern the cultural factors contributing to their extended life expectancy and improved quality of life.

Maryam Oyebamiji
Faculty Mentor: Jacob Wagner
Academic Department/Unit: Urban Planning & Design

Unveiling Urban Trauma: The Impact of Design on Community Well-being

Design is a powerful force that shapes the physical and social fabric of our communities. When wielded responsibly, it has the potential to uplift and enrich the lives of individuals, fostering a sense of belonging and well-being. However, as we explore the transformative capabilities of design, it becomes imperative to acknowledge the darker implications of its misuse. Design negligence, a term gaining prominence in contemporary discourse, encapsulates the unintended consequences of ill-informed, or negligent design decisions. In the context of community development, design negligence not only fails to address the unique needs and aspirations of diverse populations but can also actively enforce trauma, perpetuating cycles of inequality and marginalization.

Robert-Abel Porras
Faculty Mentor: Theresa Torres and Jesse Lowe
Academic Unit/Department: Race, Ethnic, & Gender Studies/Computer Science
Funding: SEARCH Grant

Using Machine Learning and AI to Understand Trends and Future Growth in Metro KC: A Focus on the Latinx Population

This project focuses on the relationship between where people live and their access to education, aiming to show how this can lead to more extensive studies on diverse groups such as the Latinx population in Kansas City. This study offers an in-depth demographic analysis of the Latinx community in the Greater Kansas City Metropolitan area, with particular attention to the complexities of cultural categorization and the term "Hispanic" as defined by census data. Our project examines how the area where people live influence their educational opportunities, with a focus on Kansas City's Latinx community. We delve into the complexities of defining “Hispanic” in census data, recognizing that such terms can be challenging and may hinder efforts from various organizations to offer effective assistance. Initially, we aimed to consider factors like segregation and healthcare, but due to time constraints, we are currently concentrating on education and living environments. We based our research on national Census and American Community Survey data from IPUMS, supplemented by local Kansas City government statistics. This choice of public, reputable data sources ensure our findings are both trustworthy and independently verifiable. We're also exploring how computer technology, specifically machine learning, can forecast movements of inequality of underserved population groups based on different social pressures. This research underscores the importance of continued joint efforts in Computer Science and Sociology to positively impact our society. We are pointing out the need for ongoing research that brings together AI in Computer Science and in-depth, contextual understanding of diverse communities in Sociology to help contribute to society’s greater good.

Theo Raitzer
Faculty Mentor: Zhongjin Li
Academic Unit/Department: Economics
Funding: SEARCH Grant

Another Latin American Debt Crisis? Comparing Modern Economic Conditions to Those of the 1980s Debt Crisis in Latin America

The economic history of Latin America saw a pivotal event with the external debt crisis spanning the 1970s through the 1980s. This crisis led to widespread defaults on accumulated debt, compelling affected nations to seek assistance from the International Monetary Fund (IMF) for repayment. As a result, the affected Latin American countries were forced to destroy their labor protections and allow multinational corporations to set up production by implementing policies under what is called neoliberalism, creating a lost decade with declining economic growth and deteriorating standings of living for workers. In my presentation, I will argue that similar conditions are currently emerging, which could create another contemporary debt crisis in Latin America. I will explore this idea through the lens of monetary sovereignty, an idea from Modern Monetary Theory which is defined as the ability of a country to control its own macroeconomic policy. Specifically, I will argue that international institutions used the 1980s debt crisis to strip away the existence of and belief in the monetary sovereignty of the Latin American nations, which forced them into neoliberal policies. By examining case studies of Brazil and Argentina, I will argue that these institutions are again presently attempting to erode the monetary sovereignty of these countries through heavy indebtedness, which forces them to limit their choices of macroeconomic policy through forcing them to cut spending programs and possibly eliminate their own currencies. I will conclude by proposing solutions to maintain monetary sovereignty and advocate for measures to prevent crises in the future.

Laine Ross
Faculty Mentor: Westley Youngren
Academic Unit/Department: Psychology and Counseling

The Role of Sexual Assault Trauma on Nightmare Content

Authors: Ross, L., Soligo, S., Balderas, J. C., & Youngren, W. A.

Introduction: Recurring nightmares are common symptom following a traumatic event, like sexual assault. These nightmares can have significant and lasting effects on the survivors. Trauma-related nightmares (TRNs) can be associated with outcomes like depression, substance abuse, and suicide. Emerging research has begun to demonstrate that specific nightmare content may be linked to negative treatment outcomes and symptom severity. However, little is known about how certain traumas impact the content of nightmares, because of this, we sought to examine how sexual trauma directly impacts the nightmare content.

Methods: Fifty-three female participants experiencing nightmares related to a sexual trauma completed an online survey that included an assessment of nightmare themes. Regression analyses were used to examine our aims.

Results: Sexual trauma significantly ($p < 0.05$) predicted nightmare content related to Powerlessness ($b = 0.47$); Trust ($b = 0.42$), and Intimacy ($b = 0.47$), but not Safety and Esteem ($p > 0.05$).

Conclusion: Results suggest that sexual assault trauma may be associated with nightmare content related to themes of powerlessness, trust, and intimacy. These findings are clinically relevant, as they may indicate areas to target when utilizing interventions like Cognitive Processing Therapy. Additionally, understanding and treating nightmare content may have indirect effects on other outcomes like depression, substance abuse, and suicide. Thus, it is important to be aware of these possible outcomes and their effects on individuals and the community. Future research should examine how targeting specific nightmare content may increase the effectiveness of specific trauma-oriented interventions.

Olivia Sours
Faculty Mentor: Kelsey Gardiner
Academic Unit/Department: School of Nursing & Health Studies
Funding: SEARCH Grant

Charitable Food & Healthcare Industry Partnership Efforts Against Food Insecurity

Objectives: As the connections between food insecurity and chronic disease continue to receive national attention, researchers and practitioners work to find solutions through Food is Medicine approaches that support partnerships between the healthcare and charitable food sectors. Despite the fact these complex partnerships and interventions are growing, research evaluating these partnerships is limited. This study aims to fill this gap by exploring healthcare-charitable food partnerships related to Food is Medicine approaches from the perspective of two stakeholder groups 1) Healthcare professionals; 2) charitable food professionals.

Methods: This study is a mixed methods evaluation study via an electronic survey. Participants were recruited via email from a large midwestern regional food bank and their current healthcare partners. Research instruments for this scope of work are limited. The study used an investigator designed instrument informed by the research question and existing instruments (e.g. Partnership Assessment Tool for Health (PATH)) with questions focused on partnership elements (e.g. shared benefits, barriers, data collection/sharing). Participant contact information (email) was solicited at the end of the survey to recruit for follow-up interviews. Participants were then recruited for a 30–60-minute semi-structured interview guided by the same topics outlined on the survey following survey completion. Analysis primarily consists of descriptive statistics to report survey findings and thematic coding to identify key themes in interviews.

Results: Of the 34 health care partner sites contacted, thirteen completed the electronic survey. From the charitable food organization, fifteen responses were collected. Primary on-site services being offered by healthcare partners include on-site food pantries (n=8, 62%), pre-prepared food boxes (n=5, 38%), and SNAP/WIC/Emergency food program application assistance (n=5, 38%). Main barriers reported on the healthcare side include staff/volunteer shortages (n=5, 38%) and increasing costs of resources (n=3, 23%), which aligned with main barriers reported on the charitable food side, which included increasing costs of resources (n=12, 86%) and staff/volunteer shortages (n=5, 36%). Regarding relationships, healthcare participants indicated a high level of mutual respect (n=10, 90%), but were primarily neutral when asked about the partnerships' ability to achieve higher levels of funding opportunities (n=6, 54%). Charitable food participants indicate a very high level of collaboration (n=12, 100%), but also indicate lingering issues surrounding staffing shortages (n=9, 75%). Key themes identified in semi-structured interviews included current programming, data collection, and collaborative partnership components.

Conclusion: As Food is Medicine interventions continue to emerge in the field of public health nutrition creating new collaborations among social service and clinical sectors, it is important to conduct program evaluations to measure successful program components and partnerships. This study developed a novel instrument aimed at identifying and measuring these components with preliminary results showing that healthcare sites are engaging in a variety of Food is Medicine program approaches, and that professionals find value to these partnerships. Further research exploring these complex partnerships is needed.

Grant Urban, Alyssa Schulz, Lyba Khawar, & Katelyn Erce
Faculty Mentor: Johanna Nilsson
Academic Unit/Department: Psychology and Counseling

Discrimination and Social Justice Advocacy in Students of Color

Empirical research has demonstrated a significant correlation between experiences of racial microaggressions and heightened psychological distress among students of color (Robinson-Perez et al., 2020). Exposure to microaggressions correlates with lower levels of self-esteem among college students of color (Nadal et al., 2014). Microaggressions in educational settings have negatively impacted the well-being and education of minority students (Ogunyemi et al., 2020). Experiences with institutional racism and microaggressions can be important triggers for sociopolitical development among student activists (Fernández, 2018). Students of color, particularly women, engage in political activism to challenge oppressive structures and advocate for social change (Fernández, 2018). The purpose of this study is to examine whether discrimination and coping correlate with social justice advocacy among students of color, the specific research questions are:

a. Do microaggression and discrimination predict social justice advocacy among students of color?

b. Does coping (task and emotion) predict social justice?

This study included 128 undergraduate participants (19.7% cisgender men, 1.6% transgender men, 0.8% transgender women, and 78% cisgender women; 23.4% Asian American/Pacific Islander, 20.3% Black/African American, 23.4% Hispanic/Latinx, 0.8% West Indian, 7.8% Middle Eastern, 0.8% Native American, 5.5% international students, and 18% bi/multiracial) from a Midwestern university. They completed instruments assessing microaggression, stress due to discrimination, political engagement, task-oriented coping, and social justice advocacy.

Results showed significant relationships between social justice advocacy and microaggression ($r = .49, p < .001$), lifetime discrimination ($r = .28, p < .001$), political engagement ($r = .68, p < .001$), emotion-oriented coping ($r = .09, p > .05$), and task-oriented coping ($r = .39, p < .001$). Additional data will be provided in the poster in addition to implications and limitations.

Ellery Vaughn
Faculty Mentor: Lark Lim
Academic Department/Unit: Behavioral Sciences
Fundings: SEARCH Grant

Examining Conflict Resolution Styles and Self Control in Couples

Interpersonal relationships influence the physical and mental well-being of individuals. Previous research suggests that higher levels of self-control are associated with better interpersonal success. Yet, there is limited literature linking self-control with conflict resolution strategies within romantic relationships, this study aims to explore this relationship. It was hypothesized that self-control would be positively correlated to self-reported effective conflict resolution styles and negatively correlated to self-reported ineffective conflict resolution styles. Additionally, self-control will be positively correlated to partner-reported effective conflict resolution styles and negatively correlated to partner-reported ineffective conflict resolution styles. Data was collected from 9 couples with each person in the dyad completing the Conflict Resolution Style Inventory (CRSI) and Self-Control Scale (SCS). The CRSI was used to measure individuals' frequency of effective and ineffective conflict resolution styles. Individuals rated themselves on conflict resolution styles and their partners on conflict resolution styles. The SCS was used to measure self-control, where higher scores indicate greater self-control. Results show self-control was negatively correlated to partner scores on ineffective conflict resolution styles. Higher self-control is related to a lower frequency of partners using withdrawal and compliance conflict resolution styles.

BIOLOGICAL & LIFE SCIENCES

McKayla Annesser & Petrea Ryan
Faculty Mentor: Julia Snyder
Academic Unit/Department: Biological and Biomedical Systems

Exploration of Potential Multibud Phenotype in *rad17*Δ and *GAS1*Δ

Saccharomyces cerevisiae, commonly known as brewer's yeast, is a standard model organism used to understand eukaryotic processes, including cell division. When replicating, wildtype *S. cerevisiae* cells undergo a budding process, where a daughter cell germinates from the side of a mother cell. Typically, one or two buds are present on the side of a budding cell when visualized using a light microscope [1]. Previous research reports a unique phenotype among budding yeast cells in the mutant strain *rlm1Δ,* where three or more daughter buds conglomerate as satellites onto the side of the mother cell. This phenomenon was only observed when the mutant strain was grown on nonfermentable carbon sources such as acetate. As *rlm1* encodes a transcription factor involved in the cell wall integrity pathway and replication checkpoints [1], we investigated the phenotypes of two additional mutants involved in similar cellular processes to see if the phenotype reappears. *Gas1Δ* is a glucanosyltransferase involved in cell wall biogenesis and deletion disrupts the cell wall. Gas1 encodes a glucan transferase located on the surface of the cell wall which hydrolyzes the cell wall of yeast cells [2]. *Rad17Δ* is a cell cycle checkpoint protein involved in recognizing DNA damage and deletion disrupts cell viability. Rad17 is a checkpoint protein that is involved in recognizing DNA damage and signaling checkpoints in the cell cycle [3]. Additionally, rad17 is important for cell viability in wildtype yeast [4]. Experimentation of the rad17 gene would provide an opportunity to determine if there is a connection between cell division and satellite cell formation. The deletion of rad17 can determine cell viability of satellite buds. To proceed with our desired experimentation, we replica plated strains on nonfermentable carbon sources with our selected mutations. To obtain data, we counted the number of satellite buds as well as the number of viable cells using a hemocytometer. With the collected data, we are obtaining the averages of satellite buds on the different carbon sources. Preliminary observations indicate that there is no significant difference in satellite cell formation. However, quantification and analysis are ongoing.

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Trevor Bell
Faculty Mentor: Michael O'Connor
Academic Unit/Department: Biology and Biomedical Systems
Funding: SEARCH Grant

The Role of rRNA Post-Transcriptional Modifications in Escherichia coli Ribosome Biogenesis

The ribosome, with its central role in translation, is critical for the growth and development of every living organism. The biogenesis of its constituent parts, including ribosomal proteins and RNA (rRNA), involves numerous modifications and assembly factors that can have major phenotypic effects when altered. Post-transcriptional modifications are present in rRNA, such as the methylation or hydroxylation of ribonucleotides and the conversion of uridine to pseudouridine (Ψ). Understanding the consequences of the absence of such modifications can provide valuable insight into their functions and the mechanics of the translation machinery. In *E. coli*, there are 7 pseudouridine synthase (PUS) enzymes that are responsible for the 11 rRNA Ψ modifications which are present in conserved regions of rRNA such as the peptidyl transferase center (PTC), the decoding center, the exit tunnel, and subunit interfaces. Thus, Ψ modifications are likely involved in many stages of ribosome biogenesis and function. The specific roles of many of these modifications remain largely unknown. Interestingly, a knockout strain of all rRNA PUS enzymes (ΔΨ7) in *E. coli* lacks major phenotypic effects. This gives rise to the need for alternative methods to identify the functions of these Ψ modifications. In this project, we seek to uncover potential roles for these Ψ modifications in *E. coli* ribosome biogenesis by screening for genetic interactions between individual ribosome assembly factors and Ψ modifications. These ribosome assembly factors include helicases, chaperones, GTPases, modification enzymes, ribonucleases, and others whose functions are not well understood. We have thus far introduced deletions in ~25 of these ribosome assembly factors into either WT (Ψ+) or ΔΨ7 strains. Gene interactions were assessed by screening for growth differences between WT or ΔΨ7 strains carrying specific deletions. Growth was compared on LB agar plates incubated at 20 °C, 37 °C, or 42 °C, since temperature sensitivity is characteristic of ribosome assembly defects. Gene interactions have also been investigated by differences in hydrogen peroxide sensitivity. Our finding that particular ribosome assembly factors interact with the Ψ modifications suggests the involvement of Ψ in key points of ribosome assembly and biogenesis. Investigation of the remaining assembly factors is ongoing.

Sarah Bensahri & Huda Ammar
Faculty Mentor: Julia Snyder
Academic Unit/Department: Biological and Biomedical Systems

Satellite Cells in Yeast: Bud Growth and Viability of BAG7 and SHE4

Saccharomyces cerevisiae is a unicellular eukaryotic yeast that reproduces by budding. According to previous research from Dr. Honiberg, deletion of the gene *rlm1Δ* disrupts cell wall integrity and formation of satellite cells. Using Dr. Honibergs research, we will investigate different proteins to see how deletion of other genes affects the growth of satellites. The growth rate of yeast budding and the size of daughter cells can be influenced by the availability and efficiency of various carbon sources. By using alternative carbon sources our work will determine whether the deletion of *bag7Δ* or *she4Δ* has more bud growth/satellites compared to WT. We choose BAG7 and SHE4 because of known roles regulating cell wall integrity and the actin cytoskeleton. BAG7 is a Rho GTPase activating protein (RhoGAP) that regulates the actin cytoskeleton and cell wall biogenesis by downregulating Rho1p. SHE4 is a unicellular domain containing protein which binds and controls myosin function. Additionally, SHE4 plays a role in the polarization of the actin cytoskeleton, which provides the structural support needed for the bud's development and growth. As a working hypothesis, we predict *bag7Δ* would prevent the downregulation of Rho1p and disrupt actin cytoskeleton and cell wall biogenesis resulting in satellite cell formation. In *she4Δ,* we predict cell wall integrity will become affected and possibly get satellite cell formation. Our data suggests that *bag7Δ* is consistent in having more satellite cells in YED plates compared to *she4Δ* having more satellite cells in YEA and YEV plates.

Meghana Bhumireddy
Faculty Mentor: Midhat Farooqi
Academic Unit/Department: Children's Mercy Pathology & Laboratory Medicine
Funding: Children's Mercy Research Institute and Curing Kids Cancer

Clinical and Gene Expression Data Reveal Subtypes of Pediatric T-Cell Acute Lymphoblastic Leukemia

Acute Lymphoblastic Leukemia (ALL) is a rapidly progressive cancer characterized by excessive immature leukocytes, which transform into leukemic cells and proliferate uncontrollably into lymphoblasts, blocking the production of normal cells. T-ALL constitutes 10–15% of pediatric ALL cases. Unlike B-ALL, T-ALL lacks clinically defined molecular subtypes, hindering risk assessment and treatment determination. In this study, we aimed to identify connections between clinical findings and gene expression in pediatric T-ALL to move towards defining more clinically meaningful subtypes of pediatric T-ALL. We analyzed clinical and gene expression (bulk and single-cell RNAseq) data from eight pediatric T-ALL patients from the Children's Mercy Research Institute Biorepository. By utilizing various clinical data types (e.g., flow cytometry, FISH, microarray), we identified clinically relevant mutations and gene expression patterns. This offered further insight into characterizing individual patients and establishing related groups of patients. Our investigation revealed similarities in gene expression involving LEF1, NOTCH1, and RUNX1 among two patients. In the same patients, we also observed T-cell receptor alpha (TRA) rearrangements with TAL and TLX1, indicating consistency between genomic and transcriptome findings. Furthermore, a patient with ETP-ALL had a high proportion of hematopoietic stem cells (HSC)-like cells, while another patient (not classified with ETP-ALL) displayed similar proportions of HSC-like cells and an elevated expression of genes including IL-7 and LMO2 compared to other patients. Moreover, our analysis identified differential expression of ETV6 and TOX across our cohort, providing potential biomarkers for T-ALL subtyping. Similarities in gene expression patterns among T-ALL patients, even within our small cohort, emphasize the need for refined classifications of distinct subtypes to improve treatment selection and outcomes. Additionally, we found that a patient without clinically defined ETP-ALL criteria shares a similar molecular profile as the patient with Early T-cell Precursor (ETP)-ALL. Patterns of gene and cell surface marker expression offer potential biomarkers for characterizing T-ALL subtypes and prognosis. Furthermore, the diverse signaling pathway activities identified through bulk and single-cell RNA analyses present potential therapeutic targets for treatment strategies. Future exploration utilizing external gene expression datasets is planned to validate findings within the broader context of Children's Mercy's cohort of T-ALL patients and lay the foundation for more personalized approaches to diagnosing and treating pediatric T-ALL.

Emily Bledsoe
Faculty Mentor: Hillary McGraw
Academic Unit/Department: Biological & Biomedical Systems

Foxg1a is required for hair cell development and regeneration in the zebrafish

In the human inner ear, hearing and balance are mediated by specialized sensory cells, called hair cells. When damaged, these hair cells cannot regrow, resulting in deafness and balance disorders. In the state of Missouri, one in ten Missourians experience hearing loss or deafness, meaning there is a large population who could benefit from research into hair cell biology. Aquatic animals, including zebrafish (Danio rerio), have specialized hair cells used in their lateral line systems to sense water current. These hair cells are very similar to the inner ear hair cells in humans, but unlike human hair cells, these lateral line hair cells can regrow throughout the lifespan of the fish. This ability to regenerate hair cells makes zebrafish an excellent model organism to determine how hair cells develop and regenerate. My project is to investigate the Foxg1 gene, which is important for mammalian inner ear development, and to determine if it also plays a role in hair cell development and regeneration in the zebrafish. We particularly look at the lateral line hair cells of young zebrafish carrying a mutation in foxg1a. My work in the McGraw lab, with my mentor, doctoral student Jon Bell, shows that foxg1a mutant zebrafish form fewer hair cells during development and have a reduced capacity for regeneration. This work suggests that Foxg1 is a good target for future study and may provide insights into how we could someday regrow damaged hair cells in human patients.

Noah Chambers & Nesyah King
Faculty Mentor: Julia Snyder
Academic Unit/Department: Biology

Analysis of Budding Patterns in Mutant Strain containing GAS1 deletion vs Wild Type in Saccharomyces

Saccharomyces is a genus of yeast that has been used for thousands of years by humans and is often used as a model organism. Research performed by Dr. Saul Honigberg and his research partners indicates that mutated *Saccharomyces* cells may produce “satellite-daughter cells" that are incapable of continuous growth or division, even when on a medium where WT can grow and divide(Honigberg, 2017). TUP1 is a transcriptional regulator that interacts with transcriptionally involved proteins by binding histones and is involved in nucleosome positioning. Deletion mutations of TUP1 have an increased rate of fermentative growth as well as an abnormal budding pattern and cellular shape. GAS1 is a Beta-1,3-glucanosyltransferase that plays an important role in transcriptional silencing within cells. Deletion of GAS1 gene leads to defects in the production of the cell wall of Saccharomyces, resulting in decreased growth rates, abnormal cellular shapes, abnormal morphology of vacuoles within cells, and increased resistance to acidic pH levels. GAS1 was selected as our primary mutant strain due to difficulty growing TUP1 null mutant on various media (specifically YEV). While investigating possible mutants for experimentation, we found that deletion of the GAS1 gene has a large influence on the assembly of Saccharomyces cell walls. To set up the experiment, YPDA was used as a control media because it is typically used to grow yeast for research purposes, later our group replicated plated patches to alternative carbon sources. We performed a multi-bud assay with three trials of the same procedure to see the growth of buds and to determine if satellite cells would form. After experimentation, data was analyzed for interpretation using a T-test on SAS sourced from UMKC Remote Labs. Due to this being a class project, our results are pending, however, preliminary results indicate that GAS1 is not involved in making satellite cells. It is hypothesized that this is due to defects in cell wall production that prevent the formation of satellite cells when observed.

Citations:

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Tessa Eads, Aminatu Idowu, & Erica Ludy
Faculty Mentor: Saul Honigberg
Academic Unit/Department: Biology
Funding: SUROP

Linking environmental stress to cell division

The program of cell division must be able to respond to a variety of stresses or damage inflicted on the cell by its environment. One connection between environmental stress and cell division was revealed in the budding yeast *Saccharomyces cerevisiae* by the *rlm1D* mutation. Under conditions that stress the yeast cell wall (respiratory growth in low osmolarity), the *rlm1D* mutant undergoes abnormal cell divisions to form cells with an unusual morphology, termed satellite-cell groups. These groups are characterized by a central mother cell surrounded by smaller daughter cells. In the initial study investigating this phenotype, the Honigberg lab proposed that this mutant is defective in a G1 checkpoint linking cell-wall stress to changes in the actin cytoskeleton.

More recently, the Honigberg lab identified several other mutants that affect satellite-cell groups using a variety of strategies. The initial gene that identified the satellite-cell group phenotype, Rlm1, is a transcription factor in the cell wall integrity pathway, which is activated in response to cell-wall damage. Mutations in several other genes in this same pathway, including *SLT2*, which encodes a protein kinase that activates Rlm1, also form satellite cell groups under some conditions. Mutations in other genes also cause this same morphology, including *SNF1*, which encodes a protein kinase that activates metabolism of nonfermentable carbon sources and *RTG1*, which encodes a transcription factor activated by low levels of respiration. We also determined that a *bud6D* mutation suppresses the satellite-group phenotype of the *rlm1D* mutant in an *rlm1D bud6D* double mutant. Bud6 links the growing end of an actin filament to formin, which catalyzes the addition of actin monomers to the filament.

For our project, we compared the satellite-cell group phenotype in these different mutants using light microscopy. Furthermore, we compared these yeast strains under two conditions that promote this phenotype. We found that whereas all mutants affected satellite-cell group formation under some conditions, some of them were more dependent on a specific environment or displayed a stronger phenotype than others.

Chris Ekengren & Austin Evans
Faculty Mentor: Ryan Mohan
Academic Unit/Department: Biological & Biomedical Systems

Circadian Regulation of Spt Ada Gcn5 Acetyltransferase (SAGA) in Drosophila Melanogaster

The entrainment model of Drosophila Melanogaster has demonstrated that it is an ideal method for studying circadian rhythm and the impact mis-regulation can cause. Spinocerebellar ataxia type 7 (SCA7) is a disease which leads to the degeneration of the retina and cerebellum, causing neurodegeneration, blindness, and loss of motor skills. Following the ATXN7 gene, to the Ataxin7 protein, to the transcriptional cofactor called SAGA which is critical for gene expression, Atxn7 polyQ may disrupt the balance bound and free non-stop causing dysregulation. Our lab aims to investigate the dynamics of circadian regulation of SAGA and non-stop in the brain and how their dysfunction may lead to disease. The research being performed is critical to the citizens of Missouri due to the impact on their health. Missouri has roughly 38,000 new cancer diagnoses per year,34% of adults reporting they have a form of depression, and roughly 15% reported to be obese. This research is paramount because it has the potential to shed light on such a wide range of debilitating diseases and disorders that no one should have to suffer through.

Sienna Ficken
Faculty Mentor: Maria Spletter
Academic Unit/Department: Biological Science
Funding: Undergraduate Research Fellowship

Bruno1 Isoform Regulation in Muscle Tissue – Towards Understanding Muscle Degenerative Disease

Striated muscle development in *Drosophila melanogaster* is regulated by a variety of distinct transcription and splicing regulation factors. In our research, we looked at the RNA-binding protein Bruno1 (Bru1, also called Arrest, Aret), which acts downstream of the crucial muscular transcription regulator Spalt Major (Salm). Salm is used to specify and maintain muscle fiber identity with the help of Bru1 to instruct indirect flight muscle (IFM)-specific alternative splicing and myofiber function. Bru1 is a conserved member of the CELF family of RNA binding proteins, which are also found in the mammalian body and have been shown to regulate the splicing of sarcomere genes, muscle function and sarcomere growth. CELF 1-2 in mammals are muscle-specific factors which promote embryonic splicing patterns and have increased activity in patients with myotonic dystrophy type 1 (DM1); thus, our study can provide mechanistic information on CELF factor function that will have lasting impacts on the understanding and treatment of muscular disease. Interestingly, Bru1 itself undergoes alternative splicing and produces at least 11 mRNA transcripts that encode 6 distinct proteins, but the function of individual Bru1 isoforms in IFM development are not known. To investigate this, we have assembled a set of isoform-specific transgenes. My project has focused on characterizing these tools and testing how sensitive IFM is to the expression level, or dosage, of specific Bru1 isoforms. To test this, I performed flight assays and found that increased expression of Bruno1 isoform A greatly reduced flight ability and muscle function. I then tested the question: does adding a GFP tag at the N-terminus or C-terminus disrupt Bru1 function? I found that adding a GPF tag to the C-terminus but not the N-terminus reduced flight ability at both 18 and 25 ℃. However, at 27 ℃ there was a significant decrease in flight ability for both N- and C-terminally tagged Bru1 isoform A. I am also using confocal microscopy to determine the localization of GFP-tagged Bru1 isoforms. Bru1 isoforms A and D are localized preferentially to the nucleus in granule-like structures. Thus, to conclude this research, we show that expression of Bru1 isoform A is dosage sensitive leading to sarcomere defects and the inability to fly. This indicates that the increase in CELF 1-2 function in mammalian muscle can contribute to the irregular sarcomere growth and function observed in DM1 patients, possibly by influencing the binding affinity or site occupancy of CELF 1-2/Bru1 to RNA.

Jackie Gildo
Faculty Mentor: Angela Cottrell
Academic Unit/ Department: Missouri Institute for Defense & Energy (MIDE)

Sowing Seeds of Change: Hydroponic Farms

Many studies show that a revolutionary advancement in agriculture was the findings that plants don't actually need soil to grow, and that growing can be possible through hydroponic farming. Hydroponics is the technique of growing plants with a water-based nutrient solution instead of soil. You can cultivate plants without dirt and use a different material to support the roots of the plant and grow crops directly in nutrient-filled water. Instead of plants growing their roots down into soil, they gain all their essential nutrients through the hydroponics system. Controlled Environment Agriculture (CEA) is where plants grow in a controlled atmosphere, CEA attempts to create the "perfect day" for crops indoors. CEA gives everything plants need at their various growing stages, including water, temperature, light, humidity levels, ventilation, and CO2. Eliminating the challenges connected with traditional farming can have a significant influence on production, long-term cost savings, and the environment. A nutrient film technique system was used to grow a variety of Prismatic mini mixed lettuce heads. After the approx. 6 weeks long process the lettuce was ready. We harvested a total of 49 plants; 14.3 lbs. of lettuce in total. After the process the lettuce was washed and packaged, and donated to the Roo Pantry for students and faculty. Bringing farms to urban areas in this modern age is significant to our improvement for bettering the way of life in our community.

Samuel David Herman
Faculty Mentor: Haluk Lacin
Academic Unit/Department: School of Science and Engineering
Funding: Student Research Assistant, Lab Startup Fund

An Expression Map for Axon Guidance Molecules in the Fruit Fly

Background:

Neurons must establish connections with their correct synaptic partners amongst an ocean of other neurons during development. Molecules that coordinate axon guidance are crucial for this event. Aberrations in axon guidance have been implicated in many neuro-developmental diseases. *Drosophila* is an excellent model organism due to its simplicity and tools available to study neuronal development. Slits, Robos, Netrin, Frazzled, Sema, Plexin and Ephrins are guidance molecules whose functions are largely conserved from flies to humans. These molecules work by repelling or attracting axons through signaling pathways. Fruit flies have two types of nervous systems: a larval and an adult nervous system. The fly's central nervous system has two components: a brain and a ventral nerve cord (VNC), the "spinal cord" of the fly. Most studies have focused on how these molecules establish the larval nervous system. How these molecules act to build the adult nervous system is understudied.

Aim:

Our aim is to generate an expression map of guidance molecules during the assembly of the adult nervous system, which occurs during the pupal stage.

Methodology:

Specific antibodies are used with immunohistochemical methods to visualize the expression patterns of axon guidance molecules, namely Robo1, Robo3, Sema2a, and DPTP99A in the fly VNC at two time points during development: 24 and 48 hours after puparium formation (APF).

Results:

Robo1 showed a broad expression pattern and Robo3 showed more restricted expression. Both were excluded from the midline region of the VNC, a finding that mirrored observations in embryonic studies. Sema2a displayed no or low ubiquitous expression. DPTP99A showed a broad expression pattern. There were no differences in expression between time points.

Future work:

Our next step will be to study how expression of these molecules vary between neuronal lineages and how they operate to construct the adult CNS. This will be carried out by staining VNCs obtained from specific molecule- and lineage-specific drivers, and combing through the single cell RNA sequence database to identify what lineages express what molecules.

Gabriel Kribbs
Faculty Mentor: Jessica Magana
Academic Unit/Department: Biology and Biomedical Systems

A Link Between DDT and Wasting Disease in Pisaster ochraceus

The present study investigated a link between sea star wasting disease and DDT residues in the keystone predator *Pisaster ochraceus.* Sea star wasting disease has been decimating populations of numerous sea stars across the west coast of the United States, resulting in devastating environmental consequences. This research was conducted through review of relevant literature on *Pisaster ochraceus*, sea star wasting disease, and DDT; as well as analysis of links between this information. Regions with high DDT residues on the west coast of the United States were found to have high percentages of *Pisaster ochraceus* die-offs following the 2013 epizootic. These sites are also shown to have a low relative juvenile population, suggesting that recovery is limited. More research is needed into the DDT contamination at other sites on the west coast and bioaccumulation in *Pisaster ochraceus*. Bioremediation efforts are also suggested to minimize future damage to these populations and their ecosystems.

Sudhiksha Kumar
Faculty Mentor: Aaron Reed
Academic Unit/Department: Biology

Habitat relationship between Sigmodon hispidus and Microtus ochrogaster

The purpose of this study is to observe if a newly migrated species, the cotton rat (*Sigmodon hispidus*), competes with a species native to Kansas, the prairie vole (*Microtus ochrogaster*). Spatially-explicit capture-recapture analysis was used to determine if the two species segregate habitat.

Data was collected on a plot of 2 hectares for a period of 40 years. It was collected by recording the frequency of tagged mammals across 100 traps set up evenly through the plot. Program R was used to create population density maps of the months when there were significant populations of the mammals of interest (*Sigmodon hispidus* and *Microtus ochrogaster*). The maps show areas of greater and lesser mammal density through a difference of colors.

The results suggest that the populations of *Sigmodon hispidus* and *Microtus ochrogaster* fluctuate throughout the year. The populations generally occupy the same areas even as the population numbers fluctuate. The change in population density over time implies that these mammals gravitate towards areas with abundant food and resources, and suggests that the species compete with each other for resources in the areas they occupy.

This data could be further used in a larger investigation to observe trends of the relationship between similar small mammals occupying the same habitat and any changes to the habitat itself. Using climate trends and this spatially explicit data, we can observe migration patterns due to climate change and implications of overall habitat segregation due to climate change.

Laylah Liwaru
Faculty Mentor: Hillary McGraw
Academic Unit/Department: Biological and Biomedical Systems
Funding: SEARCH Grant

Observing effects of the foxg1a mutation on craniofacial development in zebrafish

A critical method for understanding human development disorders is understanding their genetic mutations through the study of biological model organisms. This project uses the zebrafish as a model to study the genetic regulation of jaw and forebrain development. Foxg1 is a gene that is critical for embryonic development. The Foxg1 gene regulates the development of the forebrain, cellular proliferation, differentiation and morphogenesis. In humans, Foxg1 mutation is directly linked to Foxg1 syndrome, which is defined by defects in neural development, intellectual disability, and movement disorders. Our work focuses on a zebrafish *foxg1a*^{a266} mutant line, which was generated using CRISPR-Cas9 genome editing (Thyme et al. 2019). Preliminary analysis of the *foxg1a*^{a266} mutants reveals defects in skeletal muscle of the developing jaw, changes in the position of cartilage elements, decreased cell proliferation in the forming jaw, and a reduction in forebrain size. Understanding how the *foxg1a*^{a266}mutation alters development in the zebrafish will help in uncovering how Foxg1 mutations affect human development.

Ta'Sha Lumpkins & Kei'Asia Smith-Lowery
Faculty Member: Julia Snyder
Academic Unit/ Department: Biological & Biomedical Systems

Search for satellite phenotype in S. Cerevisiae mutants JEN1 & RHO5

S.cerevisiae is a unicellular fungus that is used as a model organism to study eukaryotic cell biology. Dr. Honigberg proposes a connection between the cell wall integrity pathway and the connectivity of carbon sources at low osmolarity, which generates cell groups with a mother cell surrounded by smaller satellite-daughter cells. Satellite-daughter cells are defined as small cells that form alongside the daughter cells during cell division. The cell wall provides structural support and protection for yeast cells, the outer shell of a satellite is critical for its functionality and protection from the harsh environment of space. Understanding the materials and processes involved in maintaining cell wall integrity in yeast could potentially inform the design and construction of more robust and durable satellites. Dr. Saul Honigberg's lab discovered the satellite phenotype in the rlm mutant, and we are investigating for any additional genes that may play a role. To test this hypothesis, we selected two mutants, jen1 and rho5, to investigate their cell division integrity and potential connection to the formation of satellite-daughter cells on three different non-fermentable carbon sources: YEA (acetate), YEV (ethanol), and YED (low glucose). RHO5 plays a crucial role in regulating the organization and movement of the cell's internal structures, as well as in cell division and stress response. It encodes a GTPase that downregulates the thioredoxin reductase (TRR1) system. The TRR1 system, in turn, is involved in maintaining the cell's redox balance and is crucial for a sufficient lifespan. JEN1 contributes to yeast metabolism by encoding a protein involved in food transport, especially the absorption of lactate and pyruvate. These compounds are essential energy sources for yeast cells. JEN1 protein helps yeast to efficiently use lactate and pyruvate as carbon sources. Mutations in the JEN1 can impair the transport pathway, causing changes in yeast metabolism and potentially impacting growth and energy generation. As a working hypothesis, we expected to find satellites with the rho5, on the carbon sources, YEA, YEV and YED and expected jen1 to have less satellite cells due to the decrease in ATP being produced. To test this, we performed multi-bud assays and membrane permeability tests on the jen1, rho5, and wildtype (WT) strains. While results are forthcoming, preliminary data indicate that jen1 and rho5 mutants may not exhibit the expected satellite phenotype, contrary to our initial hypothesis.

Nikhith Rao, Jayden Hunter, Nicholas Gaitan & Braxton Bubp
Faculty Mentors: Jin-Yuan Fan & Jeffrey Price
Academic Unit/Department: Biological and Biomedical Systems
Funding: SEARCH Grant awarded to Nikhith Rao and Jayden Hunter

The effects of visual and circadian proteins on BDBT and of BDBT on DBT

The BDBT protein is important in regulating circadian rhythms and possibly eye light sensitivity. In a Light Dark cycle, this protein accumulates in photoreceptor foci during the dark phase, and these are not detected in the light phase. The foci are not formed by accumulation of BDBT protein because BDBT levels do not change but likely involve light-induced changes with the actin filaments (rhabdomeres) in the eye, and these interactions may eliminate the accessibility to antibodies to BDBT during the light phase. BDBT is required for nuclear localization of circadian kinase DBT. Here we addressed if both the visual and circadian pathways are inputs to BDBT foci, if visual sensitivity to light is regulated by the circadian clock, and if specific nuclear importins regulate DBT's nuclear import.

CRY (*cry*; circadian photoreceptor) and RHODOPSIN-1 (*ninaE*: visual photoreceptor) are both needed for light-mediated disappearance of BDBT foci in the eye. These results could suggest that the mechanism of this process involves both circadian and visual pathways. However, the results could also be explained by *cry* and *ninaE* involvement in the phototransduction pathway. Interactions between visual photoreception proteins and a complex called INAD are disrupted by light, and C terminal deletion mutants of CRY (cry^{m}) exhibit impaired CRY interactions with INAD and therefore may not reduce BDBT foci in response to light if the visual pathway mediates the effects of the *cry* mutants. Alternatively, CRY might signal through the circadian pathway via TIM, which it is known to degrade in response to light in the circadian pathway, to affect BDBT foci expression. In this case, the C terminal deletion mutants (cry^{d}) would have the opposite effect – degradation of TIM even in the absence of light that is normally required for TIM degradation, leading to disappearance of BDBT foci in the dark. To assess this, we assessed expression of BDBT foci in the cry^{M} C terminal deletion mutants and with overexpression of C terminally deleted CRYs (cry^{d}) in the photoreceptors. Our results showed that overexpression of CRYd had little to no effect on PER nuclear localization with either tim-GAL4 or eye-specific GMR-GAL4 drivers. There was a weakened BDBT dark peak with GMR-GAL4-driven expression of CRYd, and also in a cry^{M} mutant genotype. We also found that a tim^{O} loss of function mutant eliminated BDBT foci accumulation. These results are consistent with circadian effects of CRY on BDBT.

To address the effects of the circadian clock on visual sensitivity, we analyzed the effects of various circadian mutants on movement of the Ga protein out of the rhabdomeres in response to light. This movement reduces the sensitivity of the eye to light in response to light-mediated Rhodopsin- Ga signaling. The circadian mutants led to constitutively high or constitutively low detection of Ga, implicating the circadian system in visual sensitivity.

Our lab previously showed that *bdbt* RNAi knock eliminates DBT nuclear localization during the day and that BDBT binds to a Nuclear Localization Signal (NLS) in DBT. Since an NLS typically binds to a nuclear a importin to mediate nuclear localization, it is likely that BDBT binding to this site produces interactions with one of the four a importins. To investigate this possibility, nuclear localization of DBT was assessed in knock-downs of each a importin. Our initial results show effects of knock-downs of a importins 1, 2 &3 on nuclear localization of DBT, but some of these effects may be complicated by eye neurodegeneration.

Anna Shaw & Sydney Rogers
Faculty Mentor: Ryan Mohan
Academic Unit/Department: Biological & Biomedical Systems

Exploring the Molecular Links Between Circadian Rhythm and Neurodegeneration

Sleep quality is important for every dimension of mental and physical health, and numerous analyses show a correlation with sleep loss and disease. Our research focuses on the irregularities of an organism's circadian rhythm and how they affect brain function. The circadian rhythm is a 24-hour internal biological clock that bodily proteins rely on to determine their level of activity throughout the day. It is responsible for your sleep-wake cycle, regulating alertness during the day and rest during the night. It also greatly influences other biological functions including hormone and immune control, eating habits, and body temperature. Disruption of this internal cycle causes circadian dysfunction which can be correlated with the onset of a wide spectrum of neurodegenerative diseases such as Alzheimer's and Parkinson's.

At a molecular level, the circadian rhythm impacts ubiquitination, which determines the rate of protein degradation by tagging proteins to be broken down. Our research identifies sleep patterns using behavioral analysis of Drosophila melanogaster to investigate how loss of sleep disrupts these ubiquitination patterns. SAGA is a protein complex that harbors the deubiquitinating enzyme Non-stop. Non-stop is shown to participate in the regulation of the circadian rhythm and could be a key factor in understanding the effects of sleep disruption. Researching these effects can help us understand why loss of sleep may cause reduced health and disease.

Nikitha Sheth
Faculty Mentor: Rachael Allen
Academic Unit/Department: Biological and Life Sciences, School of Medicine
Funding: SEARCH Grant

Species Differentiation of Alligatoridae Using Cervical Armor Distribution

The order of Crocodilia comprises three families: Crocodylidae, Alligatoridae, and Gavialidae. Crocodile species are distributed across Africa, Asia, and Australia, while Alligator species are representative of the New World, found predominantly in North America and South America.

The focus of our research was to analyze the cervical armor, made up of epidermis-derived scales and dermis-derived osteoderms, of several species belonging to Alligatoridae.

We conducted the research by traveling to the Florida Museum of Natural History in order to gather data in the form of photographs of preserved specimens from around the world. Previously conducted research showed that the cervical region is diagnostic, so we focused our research on cervical armor of the specimen. The distinctive patterns of groupings of osteoderms especially highlight similarities and differences between genera and the results are displayed in the form of a phylogenetic tree.

Our research findings will be combined with data of other crocodilian families for armor patterns as part of larger studies. Additionally, poaching of crocodilians for their skins and meat has been on the rise in recent years at significant rates, which could give rise to populations of certain crocodilians being pushed towards extinction and subsequently imbalance biodiversity across a multitude of ecosystems. Thus, a more robust understanding of cervical armor patterns can potentially aid in identification of skins of poached crocodiles and alligators and consequently combat poaching and its harmful impacts on the ecosystem.

Alessandra Smith
Faculty Mentors: Claire J. Houchen, Portia L. Hahn Leat & Erin E. Bumann
Academic Unit/Department: School of Dentistry, Oral and Craniofacial Sciences
Funding: School of Dentistry, Oral and Craniofacial Sciences

A Single-dose of rWNT5A During Facial Bone Mineralization Results in Midface Differences

Objective: Wnt family member 5A (WNT5A) signaling is among the numerous signaling pathways that influence craniofacial development. Previous studies on the role of WNT5A signaling suggest that it plays a role in normal facial development and bone. Mutations in members of the WNT5A signaling pathway result in Robinow Syndrome which is characterized by maxillary hypoplasia, frontal bossing, an upturned nose, and other craniofacial differences. Our objective was to determine the effect of a single treatment of WNT5A on facial bone morphogenesis during mineralization.

Methods: To determine the effects of increased WNT5A on facial development, quail (*Coturnix japonica*) embryos were microinjected with a single dose of either 5uL of Phosphate Buffered Saline (PBS) or recombinant WNT5A (rWNT5A, 0.125 mg/kg) at the developmental stage where facial bone is beginning to mineralize (HH33, embryonic day 7). Once the injected quail reached the embryonic stage where the facial bones are mostly mineralized (HH39, 4 days later), they were collected, fixed in 70% ethanol, and scanned via micro computed tomography. The images were then reconstructed into three dimensional renderings and a total of 14 landmarks were placed on relevant anatomical features, the data from which was used to calculate overall centroid size and quantify facial measurements, including premaxilla length, midface length, maxilla length, superior lower jaw length, and inferior lower jaw length. Percent change and effect size were also calculated based on this data. Unpaired, two tailed t-tests were performed to evaluate significance ($p<0.05$).

Results: The rWNT5A-treated embryos have a significant 3.2% shortening in their midface length ($p <0.05$; $d=-1.53$) and a near significant 2.8% shortening of their premaxillary length ($p<0.07$; $d=-1.01$) when compared to controls. The rWNT5A-treated embryos also demonstrated other qualitative changes in their facial structure, such as mild frontal bossing and an abbreviated, rounded premaxilla. No significant differences were seen in centroid size, maxilla length, superior or inferior lower jaw length.

Conclusion: The facial differences noted in this research, where only one single-dose of rWNT5A was given during mineralization, were similar to facial differences seen clinically in patients with Robinow Syndrome. Our data shows that WNT5A signaling plays an important role in facial development, and specifically the midface. Further research on the specific roles and pathways of WNT5A could provide additional information to develop new therapies for patients with Robinow Syndrome and other craniofacial differences.

Lindsy Todd
Faculty Mentor: Haluk Lacin
Academic Unit/Department: Biological and Biomedical Systems

Development of Giant Fiber Escape Circuit in Drosophila

Neuropsychiatric and neurodevelopmental disorders affect millions presenting immense challenges in our community today. Substance abuse during pregnancy contributes significantly to their incidence. Various studies have demonstrated that drugs affect neuronal circuit formation during development, but the underlying molecular mechanisms are poorly characterized. Escape circuits are advantageous for studying neurobiology because of their conserved features, ease of manipulation, and readily quantifiable activity. The Drosophila Giant Fiber interneurons connect to the flight motor system and trigger the fly to jump and escape in response to stimuli. In the adult fly, the giant fiber (GF) relays visual stimuli from the eye to the ventral nerve cord (VNC), analogous to the spinal cord. Subsequently, the tergotrochanteral motor neuron (TTMn) is activated which directly synapses, forming the neuromuscular junction with the tergotrochanter muscle (TTM), also called the jump muscle.

While the components of the escape circuit are well known, a challenge preventing the use of this circuit for developmental studies is limited knowledge of when it becomes functional. We hypothesize the circuit develops during metamorphosis and that stimulus-independent neuronal activity is critical for its formation. Our objectives include defining when 1) neural circuitry is fully established and 2) is completely functional. Due to the immobile state of the developing pupa, we cannot measure or observe the jump behavior. Our experimental design incorporates genetic reporter tools that allow us to visualize calcium release in real-time under fluorescent microscopy throughout the maturation process. Our data points to distinct phases of calcium firing which can indicate when this activity is intrinsic to the muscle and once it is neuronally activated. Specifying the unique development of the escape circuit could facilitate its use as a model for alterations to neural circuits in neurological disorders or under the influence of substances.

Quynh Tran
Faculty Mentors: Ted White & Brooke Esquivel
Academic Unit/Department: Biological Sciences
Funding: SEARCH Grant

Characterization of *Bullera alba*

Bullera alba is a fungal species that was isolated during a larger study that identified fungi present in the canine oral mycobiome. Our lab observed two isolates of *B. alba* that displayed two drastically distinct colony morphologies. One isolate appears smooth and slime-like, where the other appears wrinkled. The main purpose of this project is to characterize the factors that lead to these observed phenotypic changes in *B. alba*, as well as determining if the morphological changes affect the isolate's fitness or drug susceptibility.

We have established that the *B. alba* isolates were genomically related based on Randomly Amplified Polymorphic DNA assay. Although related, the isolates are distinct strains based on finding nucleotide differences within gene sequence alignments. We identified conditions that can trigger a phenotypical switch from slimy to wrinkled, such as pH 3.5 and in high salt conditions. Additionally, we found that the two phenotypes exhibit differences in growth rate, or doubling time, in certain growth media. Finally, we have demonstrated that the two phenotypically distinct *B. alba* isolates display differences in drug susceptibility to medically relevant antifungal drugs.

Jocelyn Vang
Faculty Mentors: Claire J. Houchen & Erin E. Bumann
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Funding: Research reported was supported in part by the National Institutes of Health (NIH) and the Robert Wood Johnson Foundation (RWJF). The content is solely the responsibility of the authors and the views expressed here do not necessarily reflect the views of the NIH or RWJF

Identifying Disproportionate Embryonic Jaw Length in Quail and Duck Using Comparative Anatomy

Background/Objective: Comparative anatomy is an important method of analysis that can be used to identify differences in bone length and shape in evolutionarily diverged species. Previously, comparative anatomy analysis was applied to investigate the Egyptian jerboa (*Jaculus jaculus*) and the house mouse (*Mus musculus*). The two species diverged from a common ancestor about 50 million years ago and exhibit proportionally similar radius and ulna of the forearms, but the jerboa has extremely disproportionate metatarsals of the hindfeet allowing them to hop across hot sand (Saxena et al, 2022). Our group adapted the jerboa-mouse analytic framework to investigate jaw length, because correct formation of jaw length is important to allow for proper breathing, mastication, and speech in humans. To better understand jaw length, our lab uses Japanese quail (*Coturnix japonica)*, which have a short, narrow jaw, and white Pekin duck (*Anas platyrhynchos*), which have a long, broad jaw. These two species diverged from a common ancestor approximately 100 million years ago. The objective of our study was to find proportionally similar long bones to compare to their disproportionally lower jaw bones.

Methods: To identify the long bones in quail and duck embryos appropriate to analyze for proportionate length against the disproportionate length of the lower jaws, we collected and weighed Hamburger-Hamilton stage 39 (HH39) duck embryos (n=7) and quail embryos (n=5), fixed them in 70% EtOH, and took radiographic Faxitron images. Lines were then placed on each radiograph on the right humerus, tibia, and lower jaw from proximal to distal mineralizing fronts. The lines were then quantified using ImageJ to obtain the true length (mm) of all bones. Next, the humerus and lower jaw measurements were made relative to the tibia. Mean, standard deviation, and percent difference were also calculated to show differences in weight and length. Unpaired, two tailed t-tests were performed to evaluate significance ($p<0.05$).

Results: Unsurprisingly, duck is significantly larger in body weight to quail at HH39 (370%; $p<0.05$). The humerus, tibia and lower jaw are significantly longer in duck than quail (43-54%; $p<0.05$). Interestingly, the humerus relative to the tibia is proportional in quail and duck (2%; ns), while the duck lower jaw relative to the tibia is significantly and disproportionally longer in the duck when compared to the quail (19%; $p<0.05$).

Conclusions and Future Studies: Our data demonstrate that while some of the long bones in embryonic quail and duck are relatively proportionate in size, the lower jaw bone between the two is disproportionate in size. Future studies are planned to analyze the specific gene differences in quail and duck that result in duck having a much longer lower jaw than the quail despite the humeri being similar in length.

Aurora Welch & Asayiel Alhajeri
Faculty Mentor: Julia Snyder
Academic Unit/Department: Biological and Biomedical Systems

Examining the Growth of Yeast Mutant spo1-Δ on Alternative Carbon Sources

Saccharomyces cerevisiae, more commonly known as yeast, is genetically simple and possesses traits that can be transposed to other eukaryotic organisms. For those reasons, we used yeast as the model organism in our experiment. Our focus was on attempting to find mutant strains of yeast that would yield "satellite" cells when grown on media made with non-fermentable carbon sources. Additionally, through using different media, we looked at the number of buds produced in correlation with alternative carbon-sources. In wildtype yeast, the *spo1* gene plays an important role for separation and duplicating the spindle pole body. We selected a mutant strain with a *spo1* deletion for our experiment because we theorized the absence of *spo1* would have negative consequences for cell division. With *spo1* mutant cells lacking the capability to maintain cell wall integrity during meiosis, this likely requires optimal carbon-sources to produce more buds. Through assaying the number of buds produced between wildtype and the *spo1* mutant on varying carbon-sources, we observed a greater number of buds on sources with easily fermentable media types.

Cole Wilson & Muhammad Waleed
Faculty Mentor: Julia Snyder
Academic Department: Biological and Biomedical Systems

Formation of Satellite Cells: *cat8Δ* Results in the Formation of Multi-Bud Satellite Cells on Non Fermentable Carbon Sources

Our project is centered around explaining the cause of the formation of satellite daughter cells in *Saccharomyces cerevisiae* previously observed in Saul Honigberg's lab. Since the first satellite cell was found in a *rlm1Δ*, the current theory is formation of satellite daughter cells is a result of a deficiency in the integrity of the cell wall.[1] However, more experiments must be completed before the integrity of the cell wall is a supported theory. For this reason, *cat8Δ* and *rim15Δ* mutants were selected for examination. The *rim15* mutant was selected because *rim15* encodes a protein kinase that regulates the start of mitosis or a redirection toward G0 state.[2] The *cat8* mutant was chosen because it encodes a zinc cluster transcriptional activator which is needed for the activation of gluconeogenesis enzymes from a blocked state. A *cat8Δ* results in repression of gluconeogenesis and a defect in glucose production.[3] We theorized a yeast cell in the *rim15Δ* would not be able to respond properly to a lack of resources required for proper growth of daughter cells resulting in the formation of satellite daughter cells. Likewise a *cat8Δ* was theorized to produce growth defects on non fermentable carbon sources (NFCs). Our results showed that a *cat8Δ* produced satellite daughter cells on NFCs and produced more 3+ buds on YEV media compared to other media. Against our hypothesis, *rim15Δ* did not produce satellite cells.

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COMPUTING & ENGINEERING

Kailynn Barnt
Faculty Mentor: ZhiQiang Chen
Academic Unit/Department: Civil Engineering

Testing of Generative AI for Disaster Scene Computing and Human-in-the-loop Post-disaster Decision-Making

Generative AI, specifically large multimode models (LMM), is transforming the practice of machine learning or conventional AI for applying predictive analytics in engineering and many other fields. In Civil Engineering, one traditionally hard problem, image-based built-environment understanding, has become surprisingly easy. In our testing, using an LMM engine, one can readily obtain semantics-rich outputs, including pixel-level parsing and descriptive captions. The underlying learning is realized through a hybrid set of generative supervised deep learning and zero-shot learning (ZSL) models; for the latter, an inference is created based on the parsed patterns and spatial contexts, and auxiliary information is generated for a general description. However, it is recognized that, due to the underlying complexity of mixed learning models in an LMM architecture, no confidence or posterior-probability scores are generated, which hinders the design of a human-in-the-loop (HITL) decision-making process. In our case, we focus on applying LMM for disaster-scene understanding, including image-based parsing and damage recognition toward rapid decision-making for post-disaster recovery. We argue that in such a process, humans should not wait for the output from a GAI-driven workflow as 'end-users'; rather, they should collaboratively participate in different phases, including crowd-based data collection, cleaning, report generation, and visual analytics creation. To realize this process, generating confidence scores from GAI models is crucial as it provides the mechanism for deciding when a human intervention is necessary when a low GAI score is encountered (for example, a human user needs to provide a new class label for a miss in detecting an object or a wrong caption over a disaster scene image. Using a data-centric approach and an open-source LMM framework, we curate a disaster scene database and test the LMM outputs against human generation, based on which we manually grade GAI outputs as the ground-truth confidence scores. By differentiating the instances of largely supervised inference and ZSL inference, we further develop a predictive model to generate the GAI confidence score in terms of a set of intermediate measurements from the LMM model. We will demonstrate that such GAI confidence scores are instrumental in developing a HITL decision-making workflow for achieving rapid and objective disaster-scene-enabled post-disaster response.

Juan Calderon
Faculty Mentor: Sobhansarbandi Sarvenaz
Academic Unit/Department: Energy, Matter, and Systems
Funding: SEARCH Grant

Heat Transfer Enhancement Experimental Study of Developed Nanofluid Mixture Tested During a Constant Heat Flux

Continuing work on testing Heat Transfer Fluids (HTF) that were developed by utilizing nanoparticles (NP) and base fluids. The goal of this study is to build a constant heat flux generator (CHFG) to determine which HTF absorbed more heat and to help decide if the amount of heat absorbed is worth the cost of producing a large batch to implement in a Parabolic Trough Collector (PTC). For this investigation three samples were tested with varying cost in producing a large batch for the use in a PTC.

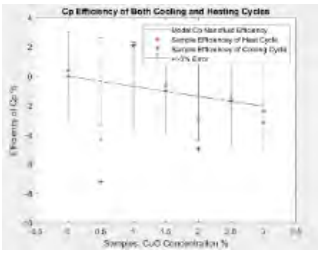
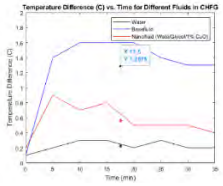


Figure 1: Heat Transfer Fluid Specific Heat (Cp) Data

Figure 1 shows the results of the previous experiment that determined the most efficient HTF in specific heat (Cp) with varying concentrations of the NP Copper Oxide (CuO).

Figure 2: (Left) Schematic of Test Bench Setup (Center) Built Test Setup (Right) Internals of Casing

The test bench that was built to determine which fluid would be the most cost effective to implement to a PTC can be seen in Figure 2.



Efficiency of Different Heat Transfer Fluids: Data from Tes Bench							
Fluids:	Volumetric Flow Rate (m^3/s)	Density (kg/m^3)	Mass Flow Rate (kg/s)	CP(kJ/kg*C)	Avg. dT (C)	Q (kW)	% Better than Water
Water	3.15451E-05	1000	0.031545	4.184	0.225	0.029696555	0
Base Fluid (70%Water/30% Glycol)	3.15451E-05	1012	0.031924	3.5443	1.2875	0.145676705	390.5508482
HTF (70%Water/30% Glycol/1% CuO/0.01% TEA)	3.15451E-05	1020.479	0.032191	3.6188	0.5625	0.065527395	120.6565526

Profit per Year: Including the Cost of PTC ($19350)			
Year:	Water	Basefluid	Nanofluid
1	-10973.13	13044.62	-9969.65
2	-2596.26	45439.24	-589.30
3	5780.61	77833.86	8791.04
4	14157.48	110228.48	18171.39
5	22534.36	142623.10	27551.74
6	30911.23	175017.72	36932.09
7	39288.10	207412.34	46312.43
8	47664.97	239806.96	55692.78
9	56041.84	272201.58	65073.13
10	64418.71	304596.20	74453.48

Figure 3: (Left) Temperature Difference vs. Time (Center) Efficiency of Fluid (Right) Profit per Year

The results showed that the base fluid was the most efficient and cost effective based on the data and the projection of profit for 10 years.

Sheyda Dehghani
Faculty Mentor: Zahra Niroobakhsh
Academic Unit/Department: Science and Engineering
Funding: SEARCH Grant

Liquid-in-Liquid 3D Printing of Lipid/Hydrogel Mixtures

Lipids, a diverse group of biomolecules, have gathered considerable attention due to their unique properties and potential biomedical applications. Among these lipids, monoolein is a unique and specific lipid with promising prospects in pharmaceutical applications, including drug delivery, tissue culture, and liquid-in-liquid 3D printing of intricate structures. Its amphiphilic nature, characterized by both hydrophilic and hydrophobic regions, makes monoolein an ideal candidate for various biomedical applications, owing to its compatibility with aqueous environments and biological systems.

In this study, we aimed to investigate the properties and stability of monoolein, particularly focusing on its performance in swelling degradation tests. By subjecting monoolein to swelling degradation tests using the enzyme lysozyme, we sought to quantify the weight gained during swelling in water and the subsequent weight loss during degradation. These tests served as crucial indicators of monoolein's suitability as a lipid, providing insights into its structural integrity and durability under physiological conditions.

Our findings from the swelling and degradation tests offer compelling evidence supporting the suitability of monoolein as a lipid for biomedical applications. Notably, monoolein demonstrated favorable properties and stability, showcasing promising results in terms of printability in liquids such as water and carbopol baths. These findings underscore the potential of Monoolein as a versatile material for advanced biomedical applications, paving the way for further exploration and development in lipid-based drug delivery and tissue engineering.

Z Kemp
Faculty Mentors: Megan Hart & Micah Wyssmann
Academic Unit/Department: Natural and Built Environment
Funding: SEARCH Grant

Properties of Kaolin Slurries and Burned Soil: Applications in Post-Wildfire Debris Flow

Climate change has increased the presence of wildfires and high-impact precipitation like flash flooding. After a wildfire, soil becomes hydrophobic, and greater hydrophobicity increases water runoff and mobile sedimentation, leading to large amounts of sediment mixing with water runoff and becoming debris flow: a threat to human life and infrastructure. In this research project, kaolin clay slurries with and without a dispersing agent are created to simulate naturally occurring debris flow material. For pure kaolin samples, rheometer tests were used to conduct amplitude sweep, frequency sweep, and flow sweep tests, and the resulting flow curves are compared for 10%, 20%, and 30% concentrations. Additionally, natural soil samples from a prescribed burn were collected and hydrophobicity tests were conducted for these samples to demonstrate water repellency of post-burn soil. This project plans to study prescribed burn effects on flow behavior and shear strength of soil using pre- and post-burn samples. Both the idealized kaolin mixture and the natural soil samples used here grant the opportunity to better understand the flow behavior of post-wildfire debris flow.

Meghan Satterley
Faculty Mentor: Alexa Summers
Academic Department/Unit: Computer Science

Consolidated Social Works Services, Inc. Website: Community-Driven Development

Introduction: This thesis outlines the creation of a modern website for, Consolidated Social Works Services, Inc., a small community organization, emphasizing its role in improving outreach. By prioritizing user-friendly design and simplified coding for easy maintenance, the project aims to provide the organization with an effective digital platform. Through this endeavor, the goal is to enhance community connections, amplify impact, and promote engagement. This project highlights the significance of accessible digital tools in advancing grassroots initiatives and fostering community development.

Methods: This project utilized HTML, CSS, and JavaScript to focus on simplicity and ease of use, employing basic coding strategies to facilitate independent maintenance by the organization. Through iterative development and testing, the website's functionality and user experience we optimized to meet the organization's needs. This methodological approach ensured that the website not only fulfilled the organization's requirements but also empowered them to maintain the website autonomously, enhancing its long-term sustainability and effectiveness in supporting community outreach efforts.

Results: The website successfully combines modern design elements with a simple coding structure through efficient strategies. Utilizing HTML, CSS, and JavaScript, the site features contemporary layouts and intuitive interfaces while ensuring ease of maintenance. Basic coding techniques such as modularization and semantic markup ensure the site's scalability and accessibility across devices.

Conclusion: The project's results demonstrate the achievement of a modern website design that remains easily maintainable for Consolidated Social Works Services, Inc. By prioritizing simplicity in coding, the organization can independently manage the website, enhancing its long-term sustainability and effectiveness in community outreach efforts.

PHYSICAL & NATURAL SCIENCES

Sophia Baugher
Faculty Mentor: Fengpeng Sun
Academic Unit/Department: Earth and Environmental Sciences
Funding: SEARCH Grant

The Urban Heat Island: An Interactive Model

As urban areas increase in population and temperatures increase each year, the Urban Heat Island Effect only grows as it affects more people daily. This project seeks to create an interactive model that will help with educating those affected by the most intense areas of the Urban Heat Island, giving the user an introductory understanding to this increasingly prominent effect. Utilizing a modified table and real materials, such as real roofing material, concrete, and asphalt combined with real plants grown to showcase the effect of greenspace, the model helps showcase the intensive and wide-scale Urban Heat Island Effect on a more localized level, giving the user hands-on opportunity to utilize a FLIR C5 thermal camera to see the effect themselves. The model succeeds in showcasing the effect, as temperature variances are seen within the model, reaching the extremes that mimic the large-scale real Urban Heat Island that affects major urban areas around the world. This model could be used in the future for a greater outreach in areas that are most effected by the UHI, those in areas redlined by city structure, to further showcase the need to invest in mitigation techniques to combat this increasing effect.

Gianna Cado
Faculty Mentor: Majid Bani
Academic Unit/Department: Mathematics & Statistics

Using Mathematical Models to Analyze the Spread of ESBL-Producing E. coli Between Farms, Communities, and Hospitals

With the rise of antibiotic resistant organisms, there is increased interest in using mathematical models to aid in controlling the spread of these diseases. One such example is the spread of foodborne illnesses, such as *Escherichia coli (E. coli)* from farms to the public. Our goal was to create and graph a mathematical model to study the spread of *E. coli* in a livestock farm and the spillover from the farm to local communities. After conducting a numerical exploration of the mathematical model, we graph six cases of disease spread.

Johnny Diep
Faculty Mentor: Paul Rulis
Academic Unit/Department: Physics and Astronomy
Funding: SEARCH Grant

Setting the Stage for Machine Learned Potential Functions in Electronic Structure Calculations

The creation of new technologies such as specialized semiconductors and optically active materials relies on the development of advanced structural and functional materials. Unfortunately, the development process can be extremely time consuming and expensive. Computing the relevant material properties from first principles quantum mechanics can be a powerful and cost-effective way to study complex material systems. However, most *ab initio* also programs have a significant computational cost that makes them inconvenient to use for larger scale systems, beyond a few thousand atoms. This is unfortunately, because many of the most interesting material processes and properties often require at least a couple of thousand atoms to reasonably model.

In that context, we use the orthogonalized linear combination of atomic orbitals (OLCAO) method developed by UMKC's Computational Physics Group, to present a novel way of addressing the computational complexity challenge. In the standard approach a key iterative part of the calculation uses initial conditions that are based on isolated and non-interacting atoms. Our approach is to make use of potential functions that are drawn from previously computed materials as the initial condition for the self-consistent field (SCF) cycle. We demonstrate the method on silicate materials. By substituting the initial isolated, non-interacting silicon and oxygen atoms in a solid-state system with similar, selectively chosen initial potential functions from previously converged SCF calculations, fewer iterations are often required to achieve convergence in the new system. Using similar compounds, we computed the electronic structures and took the converged potential functions to be used as silicate inputs. Depending on the input chosen, our research has shown that SCF iterations could be reduced by as much as 25%, a dramatic reduction in the overall run time. Further research suggests the possibility that these results could to serve as training data for machine learning algorithms.

Aleigha Dollens
Faculty Mentor: Tina M. Niemi
Academic Unit/Department: Earth and Environmental Science
Funding: SEARCH Grant

Electrical Resistivity Tomography Imaging of the Motagua Fault along the 1976 Earthquake Rupture in Guatemala

The Motagua fault is a sinistral, strike-slip fault that forms part of the North American-Caribbean plate boundary. A 230-km-long segment of the Motagua Fault ruptured in the 1976 M7.5 Guatemala earthquake. We collected Electrical Resistivity Tomography (ERT) data using the Wenner array method at three locations (La Laguna, Gualán, and Estanzuela) where the 1976 ground rupture was exactly located using historical photographs and an extant offset canal. The data were processed using RES2DINV software to develop an inverse model with topographic corrections. At La Laguna and Gualán, the Motagua fault is defined by a 20-30 m wide zone with either a high or low resistivity, respectively. At Estanzuela, the fault appears buried with low resistivity sag pond material tilted toward the south. While the historical photographs of the 1976 rupture define a single, narrow rupture mole track, the subsurface data indicate additional parallel strands of the fault accommodate the deformation.

Mary Klene
Faculty Mentor: Tina M. Niemi
Academic Unit/Department: Earth and Environmental Science
Funding: SEARCH Grant

Stratigraphic, petrographic, and mineralogical study of interbedded gypsum and Cu-ore deposits in the Boleo Formation in Baja California Sur, México

Economically important copper and cobalt ore deposits are found in sedimentary layers of the Upper Miocene Boleo formation of the Santa Rosalia Basin (SRB) along the central Baja Peninsula of México. Wilson and Rocha (1955) defined the stratigraphy of the SRB with a basal limestone overlain by a basal gypsum followed by five major sedimentary cycles that host copper mineralization in ore sheets called "mantos" that are numbered from 0 at the top and 5 at the base. An exploration company drilled boreholes across the northern SRB to estimate mineable gypsum. Samples were collected from one 150-m-thick core (DDB 10) that showed interstratified gypsum and metal-rich clastic sediment indicating that the evaporites are coval with the copper mineralization providing the opportunity to investigate the relationship between the brine that deposited the gypsum and the ore fluid. Stratigraphic descriptions, petrographic analyses, and energy dispersive spectroscopy using a scanning electron microscope were used to identify textural and mineralogical changes at representative levels in the core. Mantos 0, 1, and 3 are layered between beds composed of secondary gypsum, and manto 2 is overlain with possible nucleated gypsum crystals. The lower mantos 2 and 3 contain mud cracks and some anhydrite while the upper mantos are layered with clays. The bed below manto 3 contains dolomite and vertical inclusions. Dark bands composed of carbon are visible throughout all the samples except for above manto 1. There is evidence of celestite above and below every manto except for manto 0. Celestite is a strontium sulfate commonly found in environments where bedded anhydrites convert to gypsum. The presence of mud cracks indicates that the beds were dehydrated at some point by subaerial exposure. Dolomite indicates the ore fluid was rich in Mg and the vertical inclusions are signs of a fluid moving through the pores of the sediment. These data suggest that the ores were deposited in a sabkha environment. Dark bands of carbon form in anoxic environments as the basin margin playa flood with stratified water. Understanding the relationship between the brine depositing the gypsum and the ore fluid is valuable knowledge to apply to other environments similar to this one or to find others like it.

Tabitha Tyler-Post
Faculty Mentor: Alison Graettinger
Academic Unit/Department: Earth and Environmental Sciences
Funding: SEARCH Grant

Sediment Color Changes When Acted on by Different Times and Temperatures

When lava travels over sediment the extreme temperatures ca. 1200 C can physically alter the sediment, potentially permanently recording a temperature proxy in the deposits. The purpose of this research is to see at what temperature and at what time interval sediment color changes become visible to the naked eye up to the temperature of basaltic lava.

Our first run of tests were ran at temperature intervals of 100 C, starting at 500 C and ending at 900 C, for a time of5 minutes per interval. The next run of tests started at 500 C and increased by 100 C until 1200 C was reached, for a time of 2 minutes and 30 seconds. Sediments were poorly sorted gravels made up of rock fragments of limestone, sandstone, and siltstone.

A very slight color change was visible at 500 C at the 5 minute mark. The higher the temperature, the more visible the color change. At 900 C for five minutes there were multiple different colors visible throughout the sediment. Color changes included a reddish hue and some particles started to fracture at 700 C. For the next set of tests, we used the original crucibles from the first set of tests to see if we could obtain color at lower temperatures for two and a half minutes from 500 C to 800 C. For 900 C to 1200 C graphite crucibles were used. Color change was minimal but noticeable at two and a half minutes at 500 C. Using the graphite crucibles from 900 C to 1200 C at two and a half minutes, we were able to obtain much more color change variation. At 1200 C, we obtained a melt layer on top of a baked layer.

In conclusion, color change in our sediment was visible at 400 C after only two and a half minutes with a more drastic color change and melt was achieved at higher temperatures.

Jennifer (Jay) Vanderslice
Faculty Mentor: Paul Rulis
Academic Unit/Department: Energy, Matter, and Systems, Physics & Astronomy Program
Funding: SEARCH Grant

Variations in Electronic Band Structures of Photothermalcatalytic Materials

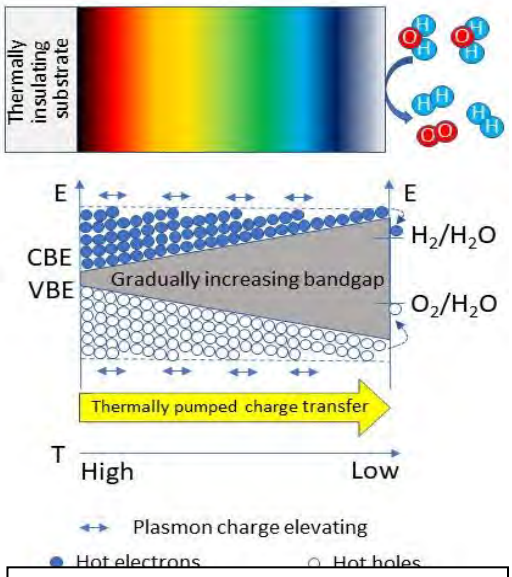


Figure 1. Illustration of a PE2DGIP solar water splitting device (Li X, Low J, and Rulis P, 2015)

Funded by UMKC SEARCH, our research enhances understanding of layered semiconductor-based technologies in sustainable energy. To meet increasing demand, new systems must be developed. Layered semiconductor devices, including plasmon-enhanced two-dimensional gradually inverted photothermocatalytic (PE2DGIP) devices, offer supplemental solutions. We investigate electronic structure variations in sulfide semiconductors crucial for PE2DGIP devices, especially under temperature fluctuations.

Our investigation has aimed to assess how temperature-induced lattice expansion influences the electronic properties essential for PE2DGIP functionality. Specifically, we focus on a subset of sulfide semiconductors (i.e., Ag_2S, Bi_2S_3, HgS), chosen based on their potential suitability for PE2DGIP applications.

Utilizing density functional theory (DFT) within the Orthogonalized Linear Combination of Atomic Orbitals (OLCAO) method, we compute the ground-state electronic structures, including bandgap, valence band edge (VBE), and conduction band edge (CBE) for each material. To simulate temperature effects, the lattice parameters of each material were uniformly expanded by 2%, 5%, and 10% and then the same electronic structure properties were computed.

By systematically analyzing the band structures, VBE, and CBE with different lattice parameters, we can verify whether the changes in the electronic structure properties are sufficiently small so as to not disrupt the required gradually increasing band gap for PE2DGIP functionality. As a subtle point, we also consider changes in the position of the VBE and CBE in k-space. Our approach integrates previous developments in k-point paths for consistent analysis of band structures across different crystal types, enhancing the understanding of our results.

This research contributes to the fundamental understanding of temperature-dependent electronic structure variations in sulfide semiconductors, crucial for designing PE2DGIP devices with optimized performance under real-world operating conditions. Insights gleaned from this study will inform strategies for effectively managing temperature effects in semiconductor-based technologies, advancing the prospects of sustainable energy production.

EUREKA! COURSES

BIOLOGY H206
Genetics

Vanessa Menz & Anthony Du
Faculty Mentor: Saul Honigberg
EUReka! Course: Biology H206 Genetics

Endotoxins & Bacteriophages

Bacteriophages are predators of bacteria. Hence, they could become powerful tools in an age of antibiotic resistance. However, bacteriophages have several weaknesses that diminish the potential of phage therapy to become as commonplace as antibiotics. One such weakness is the endotoxins released by bacteria upon lysis by the bacteriophage. Endotoxins are responsible for sepsis shock, a severe condition that often afflicts patients with bacterial infections. Thus, the design of a bacteriophage that harbors an anti-endotoxin mechanism to reduce or eliminate endotoxins upon lysis could bypass one barrier of phage therapeutics. Here we describe a strategy for using bacteriophages in order to break through the lipopolysaccharide outer membrane in a gram-negative bacterium. Using the bacteriophage's ability to insert its recombinant DNA in order to replicate LALF proteins which bind to the lipopolysaccharides, reducing the number of endotoxins present.

Jayda Paul, Rachel King, & Henry Turrietta
Faculty Mentor: Saul Honigberg
EUReka! Course: Biology H206 Genetics

Issues We Need More Than Tissues For

The inspiration for our topic of research is one of the researcher's mother; Brenda King, she is a female, 65 years old, was diagnosed with type 2 diabetes, COPD, fibromyalgia, osteopenia, nodules on bottom of her left lungs.

This project is about using an iGem mechanism that utilizes the enzyme metallopeptidase-1(MMP-1) to dissolve post-traumatic scar tissue for patients who have recurring surgeries and develop a thick buildup of fibrous scars that interfere with bodily processes such as blood circulation leading to other medical issues. MMP-1 is known to help degrade type III collagen, which is ideal for post-traumatic scar tissue which has high concentration of type III collagen. Using a mouse model, our goal is dissolve type III collagen in scar tissue and reduce inflammation. This was concluded due to the ability for stem cells to differentiate into different types of cells and be modified to produce the MMP-1 insert. To promote efficiency there will be an incorporation of a tissue engineered matrix that consists of stem cells using hydrogels. The type of stem cell that was most efficient based on this project is induced pluripotent stem cells (iPSCS). A viral vector will be modified to carry MMP-1 and used to infect mouse iPSCs. These stem cells will then be injected together with the hydrogel into the scar tissue. In addition to the MMP-1 insert, there is a CMV promoter, BGH polyadenylation signal terminator. *With this technology there are limitations and ethical concerns*. First, this procedure will be expensive and may favor some demographics. Second, there are risks involved within this procedure. Finally, an ethical issue may arise for some patients due to altering natural enzymes in the body.

Sydney Peck, Nathan Manning, & Michael Viermann
Faculty Mentor: Saul Honigberg
EUReka! Course: Biology H206 Genetics

Tumor Elimination via Antigen Engineering

Many current cancer treatments, such as chemotherapy and immunotherapy, target tissues undergoing high replication or specific cancerous genes, yet only a few therapies exist that specifically encourage an immune response to cancer cells themselves. Cancerous cells proliferate due to the immune system's inability to sufficiently induce cell death, which is partly due to both cancerous and noncancerous cells exhibiting the same identifying antigens.

In this presentation, a model to achieve personalized and cancer specific targeting by the body's immune system is proposed in mice. Specifically, the expression of a readily recognized and hemagglutinin, a targeted surface antigen, will be induced into a cancerous tissue to stimulate the mouse's natural immune response.

Sections of the tumor will be removed from the mouse and a P(Bla) promoter and antigen gene inserted. Using the BioBrick plasmid model, and an E. coli plasmid will be constructed containing both a mammalian promoter and the hemagglutinin gene. This protein is an antigen from the mammalian virus influenza A.

Verification of the insert can be done by gel electrophoresis. Once confirmed the insert was successful, the recombinant gene will be loaded into a viral vector and used to infect cells in vitro taken from the original tumor. With the presence of P(Bla) promoter, the tumor cells will continuously express the hemagglutinin protein. These cells will then be injected back into the tumor. Inserting the hemagglutinin antigen into tumor cells may allow for further recognition by the immune system. This recognition will allow for the deterioration of tumors, further presenting a viable and less invasive treatment option. The success of the strategy can be measured by the efficiency of eliminating recombinant tumor cells in the mouse and in vitro.

Allison Scobee, Nico Bradshaw, & Charles Turrietta
Faculty Mentor: Saul Honigberg
EUReka! Course: Biology H206 Genetics

Engineering an Anti-Microbial *Lactuca satvia*

In agriculture, disease and infections are major barriers to food production. In crops such as lettuce, microorganism infestations and bacterial infections can create problems with growth. Bromelain protein, commonly found in pineapple plants, is known to have antimicrobial and antibacterial properties, which could be effective at eliminating infestations. The goal of this project is to create a new strain of bacterial and microbial resistant lettuce using recombinant DNA technology. Through polymerase chain reaction (PCR), the gene that encodes for bromelain production would be inserted into an agrobacterium vector. This plasmid would allow the bromelain gene to be inserted into a lettuce plant. This transgenic lettuce could reduce the frequency of infections and infestations in lettuce plants, thereby creating a more productive crop. The new transgene could be incredibly beneficial to agriculture, as lettuce is a common crop in many cultures around the world.

ENGLISH 225

English II: Intermediate Academic Prose

Victor Aguilera
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

This research project looks into the deeply personal and emotional impact of divorce on families, focusing on the changes in feelings, thoughts, and behaviors experienced by the family. The study aims to provide a thorough analysis of how divorce affects the mental health and overall well-being of families, while also exploring the various ways families cope and find support. To gather data, the research employs a mixed-methods approach, including interviews, surveys, and case studies, involving divorced families.

Experts talk a lot about divorce and how it affects families. They say we need to understand divorce better, especially how it affects families emotionally. Studies show that divorce can stress out families, leading to anxiety and sadness. Kids of divorced parents might act out more and have trouble in school. Parents might feel bad about the divorce and feel lonely. Families need to find ways to cope, like going to therapy or joining support groups, to help them deal with the challenges of divorce and keep their relationships healthy.

This study looks at how having help from family, friends, and the community can make divorce easier for family members. It also examines how this support can help families during and after the divorce. Understanding how important this support is can help make the support networks for divorced families stronger. The study investigates how divorce affects children's development, including their emotional well-being and academic performance. It examines how factors such as age, gender, and the presence of parental conflict influence children's adjustment to divorce. This understanding can help educators, counselors, and parents provide appropriate support to children of divorced parents. This study looks at how divorce affects families over a long time. It explores how divorce changes the way parents and kids get along, how siblings interact, and how the whole family works together. The goal is to understand how families can handle these changes and keep good relationships after a divorce.

This study looks at how divorce affects families' feelings and thoughts in a detailed way. By understanding all the different things that happen during and after a divorce, people who make decisions (like policymakers), teachers, and mental health professionals can create specific ways to help families through this hard time. More research in this area is important to come up with good ways to help families going through divorce. The study also looks at how cultural and societal ideas about marriage, divorce, and families affect how people see and deal with divorce. By studying these things, the research aims to understand better how different families experience divorce. Additionally, the research looks at how divorce can make it hard financially, change where and how people live, and force them to adjust their lifestyle. Knowing the financial effects of divorce can help create rules and programs to support families during and after divorce. Overall, this research wants to understand all the different ways divorce affects families' feelings, relationships, culture, and money. By showing all the different sides of divorce, the study aims to help create ways to support families during this big change.

Faisal Almethen
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Urban Green Spaces: Catalysts for Enhanced Community Well-being

This study investigates the transforming impact of urban green spaces (UGS) in improving the well-being of urban communities, with an emphasis on health, social cohesion, and ecological sustainability. It seeks to expose the numerous advantages of incorporating UGS into the fabric of urban planning, emphasising their critical role in promoting healthier, more sustainable cities.

It uses a methodological approach that combines interviews and surveys with students and urban residents to gather nuanced insights into how UGS contributes to physical and mental health improvements, provides a respite from the urban grind, and encourages active, healthier lifestyles among city dwellers. These green areas serve as crucial social infrastructure, encouraging community engagement and inclusivity while tackling critical environmental goals such as air pollution reduction and biodiversity enhancement. The findings highlight the important necessity for urban development plans to prioritise the inclusion of green spaces. By arguing for legislative actions to expand and preserve UGS, the study contributes to an urban planning paradigm that prioritises the well-being of its residents.

The purpose of this study is to highlight the extensive variety of benefits that urban green spaces (UGS) offer and to establish urban greenery as a vital component in the effort to create resilient and future-ready urban communities. It argues that green spaces, in addition to being a luxury, are essential to the development of cities that are liveable. It also proposes a change in the way urban spaces are conceived of and constructed in order to better meet the needs of urban people in terms of their health, social life, and the environment.

Work Cited

Doe, John, and Jane Smith. “Urban Green Spaces: Catalysts for Enhanced Community Well-being.” *Journal of Urban Ecology*, vol. 12, no. 4, 2024, pp. 123-145.

Adelle Baker
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

The Effects of the Decline of Letter Writing

The decline of the practice of letter writing and how it affects not just the older generations, but also the younger ones, is a topic that is not as talked about as it should be. Letter writing is a form of communication that has connected people for thousands of years. The decline of letter writing could be a contributing factor to the decreased number of meaningful relationships between people in this generation. With a focus on writing studies, this project looks into how letter writing connects people on a more meaningful level. This study examines how writing letters to others can improve and make relationships more meaningful, compared to modern day communication such as email or text, by using interviews and previous letters to explore this topic more. Findings from interviews with older and younger adults provided crucial context for understanding how letter writing and the lack thereof has affected their experiences with friends and family. The amount of modern day communication, such as texting or email, is overwhelming for the older adults that were interviewed while it is just a part of life for the younger adults that were interviewed. The adults that continued writing letters found that they were more connected and up to date with distant family and friends' lives and what they had been going through, compared to the adults who did not write letters. The findings of this research show the importance of letter writing between people that supports maintaining personal connections between loved ones.

Mary Brooks
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

LYRICAL EVIDENCE

This study aims to analyze the practice in the last century of U.S. history of censorship/suppression of a population/movement via usage of their music to prove criminality. Specifically, the cases in which music lyrics have been used to prove membership in a criminal organization (such as a gang or a political party) are being analyzed. Extensive research has already been conducted on the impact of these cases on specific genres/time periods, but there is a gap in the research regarding the connections between cases from different genres and time periods.

To this end, this study will compare and contrast two cases each from both the anti-hip hop movement of the 1970's-present and the anti-communist movement in the decades post-WWII, in order to better understand the greater structure of this practice across U.S. history. Textual analysis will be performed on both the lyrics in question as they pertain to the court case, as well as the legal documents surrounding each case.

Preliminary research has found that in each case 1) separation of the author's views and action from the views and actions expressed in their art was not present, 2) that the background of the widespread practice of using lyrics as evidence stemmed from a moral panic associated with the identity of the defendant, which extended to the nature of their music, and 3) given that other genres that contained similar sentiments/lyrical conventions were not used in court on the same scale and in the same ways, it can be concluded that the reason for using these lyrics as evidence is not the nature of the lyrics themselves, but the identity of the group being prosecuted or the group to which an individual being prosecuted belongs. This suggests that the usage of music lyrics as evidence to prove criminality or membership of a criminal organization is not only often faulty, but also that it is specifically targeted at certain groups in order to suppress those groups. Further research will be conducted into the specifics of the structures of these cases.

Izzy Buzolich
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Mental Health of Colligate Student-Athletes

The research on the mental health of student-athletes is crucial due to its various impacts on their life. Understanding the causes of mental health issues, such as academic and social pressures alongside athletic performance is important. Moreover, tackling the stigma surrounding seeking help for mental health problems is essential. Investigating this topic involves exploring various theories and their implications. Some key areas of focus include mental health services accessibility, the correlation between mental health and academic performance, and the effects of mental health issues on athletes' lives. Notably, athletes may look at quitting professional sports due to mental health struggles. There can also be a comparison made between student-athletes and non-student-athletes which provides valuable insights into different challenges. interviews I am conducting with student-athletes and coaches supplement research findings, offering firsthand perspectives. Charting interview responses aids in visualizing and understanding data. These interviews also offer observations like posture and nervousness, for a writing studies analysis. My ongoing interviews aim to validate or refute theories explained in secondary sources. Through my secondary and primary sources, I hope to be able to find more into some topics and reveal more about others as there are topics that have a multitude of research while others have very little. I hope with this research I can spread the word on mental health with student-athletes and make a change in how they get help, especially in a world with stigmas against mental health. The journals and interviews should explain the different factors that are a part of this subject as well as the inside perspective from those who deal with these struggles firsthand.

Yumiko Chen
Faculty Mentor: Dana Hoffmann
EUReka! Course: ENGLISH 225 Intermediate Academic Prose

Impact Modernization of Tang Dynasty Hanfu has on Cultural Preservation

As China modernizes, Hanfu, a traditional attire reflecting Tang Dynasty's cultural values, undergoes a revival influenced by social media. Previous analysis explores the risks of misinterpretation when the revival of Hanfu incorporates aspects of modernization that might unintendedly differ from its original values. To better understand the implications modernization has on aspects of fashion, this research focuses on the preservation of Tang Dynasty values in modernized Hanfu. This study utilizes the collection of modernized Hanfu transformations present after its revival as well as the "4 Real Tang Style Dresses" from the social media digital archives, YouTube. Preliminary research indicates that only certain aspects such as the femininity, wealth and diversity persist while new values such as the addition of a seductive portrayal. Moreover, notably, most revived Hanfu styles are worn by elites, misrepresenting commoners' lives. It is imperative that future designers prioritize cultural values when taking inspiration from traditional clothing.

Jenna Clark
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Social Media vs. Foreign Wars

This study investigates the similarities and differences in American public discourse related to foreign wars and how it has evolved over the last decade due to the rise of social media. Specifically, the research will examine the American public's reactions to the Wars in Israel/Gaza Strip and Iraq, focusing on controversies around presidential candidates, activism, and fake news. Considering the differences between traditional media sources like television and newspapers and rapidly spreading information on social media platforms. The research analyzes newspapers from 2003-2011 to identify patterns, phrases, and activism that reflect the opinions of Americans during the War in Iraq. For the War in Israel/Gaza Strip in 2023, currently analyzing a variety of scholarly articles that present different perspectives. Additionally, the study is closely monitoring the comments and discourse on various social media platforms. Scholarly journals delve into the history of warfare in the United States and the public reaction that follows, with a particular focus on the impact of fake news on social media. Research has shown that foreign conflicts often become a significant part of public discourse and a critical weapon during presidential campaigns and among political parties. Activism has become a highly debated issue, particularly in the context of foreign wars. Since 2023, social media platforms have played a significant role in amplifying activism and exposing companies that allegedly support Israel. Social media has been a source of social power, creating biases and discourses. Understanding the biases that affect judgment is crucial to forming our opinions.

Jayla Coffee
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

The Effectiveness of Teaching to the Test

My Teaching To The Test project discloses how *teaching to the test* is not a reliable method for students. It can be difficult to navigate which methods of teaching can be more effective at times but when it comes to critical thinking, students aren't getting the proper attention necessary. It becomes ineffective towards students' learning process and retention. There is a lack of desire to expand their base of knowledge. The cycle just puts students in the thought process of knowing that it is a necessity and tends to feel the desire to just to get it over with. This is not elevating, this isn't effective. Teachers that act in accordance with this teaching method merely teach what they have been taught to teach and from that standpoint, teachers aren't able to get proper results from at least half of their students either. It is proven that information is quickly forgotten without active learning strategies. When considering the alternatives, taking tests shouldn't be completely excluded from the picture, that is not the true issue at hand. It is the course of action being taken that is ineffective for students' ability to recite their learnings during these tests. We need to take a stand and manage the way we are taught within a classroom in order to be more engaged, to make learning way more fun, and to enjoy this part of our life instead of being in a rush to escape it. Not being able to recite crucial learnings can make a person feel dumb and uneducated.

Zaylee Cox
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

What *really* happened: The Boston Tea Party

The purpose of this research will be to challenge the mainstream story line of the Boston Tea Party by asking the question: How do the Ezekiel Price Papers and similar sources from Colonial New England in the 18th century conflict with the mainstream story line of the Boston Tea Party and what alternate plot and motive do they suggest? Historical documents from the 18th century, 18th century political propaganda, and modern recounts of the Boston Tea Party, all come together to suggest a more realistic story behind the protest. High-value marine insurance policies held by prominent political figures in the colonies suggest that the cargo manifests were not accurate. This further implied that there was extremely valuable cargo aboard these ships, that likely being *highly* unsanctioned tea. The founding fathers profited heavily off smuggling tea into the colonies, and when a British tea tax went into effect, the profitability of their business was threatened.

The founding fathers then played into their political influence by angering the citizens and organizing a protest, known as the Boston Tea Party, to devastate the British tea trade. Ironically, the illegal tea trade of the American Colonies is very comparable to how more modern-day mafia families and drug trades operate. These findings, along with other historical and modern documents, will show that the Boston Tea Party was less of a patriotic movement and more of a ploy put on by illegal tea smugglers to protect their monopoly over the tea trade in the colonies. The Boston Tea Party was a desperate attempt to keep a very profitable (and very illegal) tea trade alive. I will use an archival research method overlayed with a textual analysis to prove this thesis.

Joshua Cunningham
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Science vs Religion: Do They Really Conflict

The argument between science and religion more specifically Christianity and evolution has been going on since the theory of evolution has existed. When this topic is discussed, you never see it in the light of either side believing there are parts of the other that coincide with each other. The main question I want to answer is why is that? What rhetoric has been used by scientists, theologians, and even teachers that has led us to believe that science and religion cannot coexist. This research paper argues that even though there are some areas that science and religion disagree on they go together and prove each other more than what common rhetoric around this topic has led us to believe. This project will use textual analysis to compare how different scholarly articles and books use rhetoric to prove their argument. Most scholarly articles do not allow there to be questions on if their side of the argument is wrong, most articles, even just in their titles, use terms that give the feeling of absolute. Some sources call the conflict between the two “tragic nonsense” and others say exactly why they cannot coexist. This paper argues that there is a possibility of both sides being wrong or correct. Another common thing between most research articles is that most of the sources try to appeal to people’s intelligence, meaning the authors are using logos. Not many scholarly arguments try to appeal to people’s ethics or emotions but rather care about people's logic.

Imani Dyke
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Race, Representation and the Media

This research looks at and analyzes how athletes of different backgrounds are reported on and covered differently by sports media. Using the method of textual analysis, information will be gathered, and examples will be used to show the discrepancies in media's coverage on black and white athletes. The beginning of the history in sports shows the early racial divide already established by Jim Crow laws and the difficulties certain athletes had to face to even gain recognition from the media. This highlights the early divide in the ways athletes from different backgrounds were viewed. Understanding the early history is critical when approaching the topic of racial bias and differences in coverage in today's sports media. When analyzing how today's media covers athletes, data from major sports companies like SportsCenter will be used to show concrete evidence pointing to the contrasts in reporting on black and white athletes and furthering the discourse on race in sports and sports media. Examples of a variety of comments made by sports broadcasters during games will also display the distinction in the way those in sports media depict players from different backgrounds as well. The research also looks at long-lasting stereotypes that are being projected through coverage on certain races of athletes, reestablishing the point of differences in media coverage. Through understanding the history of race in sports, then contextualizing, analyzing, and connecting it to race in today's sports media, a light is shown on a still ongoing issue in today's sports news and broadcasting media, making it easier for others to point out the differences and starting bigger conversations moving forward.

Greta Ebersole
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Impact of Bilingual Education in the United States

Bilingual education is a key part of the education system and carries extensive cognitive benefits, yet the topic has not been fully explored or encouraged to the extent that it deserves. Through primary research and exploration of secondary scholarly articles, I will delve into the relationship between bilingual education and an individual's writing ability in the academic realm. I aim to demonstrate that being bilingual or working towards achieving a bilingual education positively impacts a student's everyday writing ability and cognitive abilities. By questioning and studying the impact of secondary language acquisition in students at the University of Missouri – Kansas City, the need for greater incorporation of foreign languages in the United States education system stands clear.

By drawing from personal experiences, primary research demonstrates how bilingual education transforms individuals' lives. The results of interviews with bilingual students on the UMKC campus indicate that the vast majority believe learning a foreign language, whether at a young age or not, has lifelong benefits. Primarily in academics, knowing more than one language provides a student with more forms of study. If a technique or skill does not translate logically for a student in one language, they have the ability to switch forms when needed. Furthermore, knowing two or more languages expands a person's pool of words in which they can use rhetorical devices from. If something from a class or elsewhere proves difficult to understand in one language, the context clues from another language can guide a student to improved comprehension. With this advantage, an individual's line of thinking expands, including a larger vocabulary and greater memory retention. As one of the interviewees stated, bilingual students can think of language structures differently, allowing them to express themselves in different ways. Obtaining a bilingual education helps students change for the better because they gain more knowledge applicable to everyday life, beyond solely academics.

Research done by professionals examines how bilingual education fosters enhanced cognitive flexibility, facilitates word retrieval, improves the ability to store information in memory, and cultivates a deeper interest and appreciation for other cultures. Although I argue strongly for the inclusion of bilingual education in school systems, the disadvantages cannot be ignored. Arguments have been posed that bilingualism can inhibit a person's everyday life by making one language dominant over another, errors in communication due to language mixing, or struggles within cultural identity and disconnection from a certain background. These arguments are all valid and pose real issues, yet they can be worked through by drawing more awareness and action to the topic. By unraveling and exploring the manifold benefits of bilingual education, this research paper highlights how one's cognitive abilities and academic experience can transform with new knowledge. Furthermore, it proposes and advocates for wider integration of foreign language learning in the United States education system and even beyond.

Nouran Elhiweej
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

How has Women's Role in the American Workplace Evolved Over the Past Century?

This research project aims to understand gender roles in the workplace and spark future advances toward gender equality by examining the historical evolution. This research project utilizes two media magazines to research the representation of women in the workplace. This study utilizes an archive from the University of Missouri-Kansas City's (UMKC) LaBudde's Special Collection titled, "*Just between Office Girls*." The second media magazine used was Forbes, an American business magazine; the articles can be accessed online. This approach can provide valuable insights into how working women were perceived and treated over the past century by analyzing how the representation of women in the workplace in the media has changed over time. This research project utilizes secondary sources to collect statistical data on the historical trends of women's employment rates in the American workplace, and it continues to examine the impact of gender roles on women's inclusion in the workforce over the past century. Historically, there was limited representation of working women in the media, but over time it continues to increase as women's inclusivity rates increase. Additionally, the content in the media has diversified to include a wider range of perspectives from women with diverse backgrounds, offering a more inclusive representation of women's experiences in the workplace. The increased representation of working women plays a role in sparking future advances toward gender equality by addressing gender inequality, challenging gender stereotypes, advocating for advances toward gender equality, and promoting inclusivity.

Coral Ellette
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Technology in Classrooms

This research project highlights the effects technology has on students' learning and literacy performance. Technology became very prevalent in American schools during the 2000s. The rapid onset of e-books, laptops, and iPads in classrooms brings up an important question: How does the use of technology in classrooms affect the writing skills of students? This research will breakdown the benefits and downsides of technology use in students' writing. It will also lay out how to incorporate technology into students' education.

Ultimately, the research comes to a consensus that technology provides digital literacy, access, equity, and revision and feedback to students. Few sources conclude that technology hurts students' growth and learning. As technology continues to grow, it will push its way further into classrooms. In order to get the best use out of technology, educators and policymakers must implement strategies that promote digital literacy without overusing it in classrooms. A further analysis of the long-term effects of technology use would be extremely beneficial in solidifying the addition or continuation of certain practices in schools.

Veraly Gomez
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

How are different school districts within Kansas City preparing their students for college?

This undergraduate research targets the minority of groups surrounding our school system, growing up in Wyandotte county. I have seen the need for a change within our community, the low numbers of gradation, low funding, and lack of parents involved in the life of these students. I think the success of a student begins in the schools previously attended and, in this case study, I am targeting high schools in different communities in Kansas City such as Overland Park (Blue Valley), Shawnee, and Wyandotte County. There is a difference between the suburban, rural, and urban communities and the way students are being taught with the high funding in some schools and the bare minimum in others you begin to wonder how is that not going to differentiate when it comes to succeeding academically in college. College is one of the most competitive realms to enter with multiple students wanting to go after the same dream but only a few getting into their dream program, but what is the cause of that and why is that happening? In research shown it has been said that more people are moving into better areas with better schools instead of really getting into the root of the problem and changing the curriculum of where it is needed, being involved in what is so called racial segregation. I know that these new parents only want the best for their future students and that it's not something that you think of when buying a new home to move into the worst area, but I do think that there is a change that needs to happen within.

Ailyn Gonzalez
Faculty Mentor: Dana Hoffmann
EUReka! Course: ENGLISH 225 Intermediate Academic Prose

Education Throughout the Decade

The researcher was interested to know what was important to someone in the 80's as an educator, and how does it compare to today's education. The primary source was conducted on a book/report Ricardo Juan Martinez Campo wrote in 1981. The main reason for the research topic "education" was to know more about him, by focusing this research on his work they are able to find comfort and peace.

The researcher was able to find a more interesting way of seeing things, as Juan mentioned in his study "The child is a reflection of the community if he appropriates most of the customs that the inhabitants have, the teacher is the one indicated to elevate and put good habits before the customs that flow in a negative way in the training of children". This theory is essentially stating that teachers/educators etc. are responsible for influencing knowledge in a way that drives scholars closer to success and away from negative habits. The researcher has done further background research on this topic of education and so far, they have seen a similar theme. Most of the sources have indicated and agreed that both students and teachers were affected the most by the economy.

The project is still an ongoing process but upon further analyzation of the economy things have shifted to be like it was before or like the 1980's, were education was a privilege and not so much a right we see this by the increase of cost of education, Inflation, housing, close mindedness and most importantly poverty has increased luring young scholars further and further away from education.

Colin Green
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

How Confederate Academics Were Able to Rewrite History During Reconstruction

The purpose of this study was to examine how Confederate figures were able to rewrite history during the Reconstruction period, and the ways that it has affected Civil War education in the United States. This is an important undertaking because how we understand the past colors the way we perceive the future. If we believe a false account of the Civil War it invalidates the experiences of all the men and women who suffered and died during it.

The purpose here is to understand how history can be rewritten and how to identify misinformation in historical accounts. By performing textual analysis using scholarly sources and contrasting them against the Lost Cause account the differences serve to show how academic misinformation was able to spread and become the dominant account of the Civil War in the US. Also by performing textual analysis on modern scholarly sources dedicated to showing the inaccuracies and legacies of the Lost Cause Mythology the study is able to show the impact historical misinformation has had to this day. The research clearly shows the way that the Lost Cause Mythology was able to supplant an accurate historical account and become the sole Civil War history in the South.

In conclusion, this study shows the ways that Confederates were able to retake important positions in society during Reconstruction and slowly change the narrative using biased academic accounts to rewrite the history of the Civil War. It also shows how these falsehoods have maintained ignorance of the true causes of the Civil War into the modern day and how that has led to conflict and civil strife in the populace.

Kavin Hurd
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Hip-Hop is Black CNN

The Hip-Hop music genre has transcended from being just a genre to also a movement for black culture to express themselves, speak for their communities, spread awareness, and news. First by dissecting two songs, one called "The Bigger Picture" (Lil Baby) and the other one called "Changes" (2Pac) we can see how artists use Hip Hop to spread ideals, bring light to issues and help raise awareness and news while trying to ignite unity within our culture and communities. Next, interviewing people about how Hip-Hop has been an influence when it comes to spreading messages and just bringing ideals and topics to their mind that they wouldn't have thought about otherwise to see how people interact with it. The questions I asked them about was, how they view Hip-Hop? Do you think it acts as a medium for news, messages, awareness, and other things such as those to spread? What type of impact do you think Hip-Hop have on the black community? Almost unanimously all the people so far have said along the lines of "Hip-Hop is a representation of black culture" or "It's a movement", etc. About half of them feel that Hip-Hop is a way to spread messages and raise awareness but the other half majority think it can be used for that, it's just not done enough to really agree. Lastly, they all agreed to a level that it has become a voice and representation for black people regardless good or bad. It shows that Hip-Hop is seen more than just a form of music and as a part of culture. A few of the interviewees also talked about how artists and groups like Public Enemy, Ice Cube, and Dead Prez prompted them to do more research into issues concerning black communities or influencing them to want to spread the information they gain to other people themselves.

Evan Kiefer
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

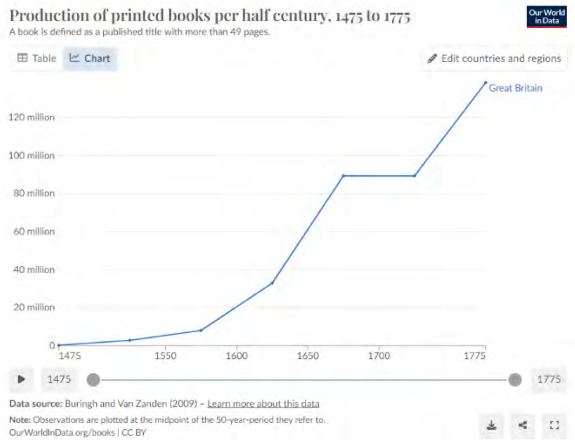
How Does Mental Health Impact Track and Field Athletes?

The following presentation that I have put together shows how track and field athletes are affected by mental health such as stress and anxiety and how they handle and cope with it. I myself am a track and field athlete here at UMKC so I wanted to do a project that interests me and something that I had experience with. I also wanted to do this project because I believe mental health in athletes is a crucial topic that is under researched and isn't talked about enough, so I want to make a difference and let the public know more about mental health and the stress and anxiety sports can cause, specifically in track and field since that is what I am familiar with. I have done primary, background, argumentative, and method research to get the most knowledge as possible. I had lots of fun with the research and found great resources and learned a lot with my project.

Sara Kronawitter
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Impact of Publishing History on American & British Film Adaptations

This project investigates how the publishing history of the United States and Great Britain contribute to the number of films that are adapted from each area's literature and why there are more adaptations stemming from British literature. It analyzes graphs that show the number of new book titles published per million people from 1500-2009 and the production of printed books per half century from 1475-1775, as well as analyzing the list of all previous Oscar and BAFTA winners/nominees for best adapted screenplay to find a small sample of the number of adaptations produced during film history, and compares the award history of both regions. This paper also analyzes scholarly articles explaining the history of film adaptations from both places and explains possible reasons for the difference in what literature is chosen for adaptation. Scholars have touched on how publishing history could impact the number of adaptations both types of literature have, but none seem to look in depth at that impact. Preliminary findings show that from 1475-1775, 360,858,000 books were printed in Great Britain, meaning Great Britain had a more than 360 million lead of printed books when the United States officially became a country, leading to a greater amount of source material for the years to come. Scholarly articles show that some scholars agree that since Great Britain has been an official area longer than the United States has, that leads to literature originating from the Great Britain area having more time to become popular or considered "classics," therefore potentially leading to a greater number of film adaptations.



Alex Ly
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Bacteriophage Infects the World of Literacy

Little is known about medical interventions upcoming in our modern world. However, the internet has grown significantly and now is the main source of information for people. This can serve a positive outlook on science but can come at a cost. In this research it will be going through how social media portray bacteriophage as treatment against multidrug resistant bacteria versus how peer reviewed research journals convey their findings. The hypothesis of this research is that social media is not giving enough information and hyping up bacteriophage as a treatment to replace antibiotics. It will specifically look into the Youtube channel Kurzgesagt and their video called The Deadliest Being on Planet Earth. The video will go through a textual analysis to find what information is being told and what is missing that is vital for the watcher to know. That is then compiled for comparison to research journals about bacteriophage. The research journals that will be used as reference for comparison is The Safety of Bacteriophages in Treatment of Diseases Caused by Multidrug-Resistant Bacteria and Potential Usefulness of Bacteriophages for the Treatment of Multidrug-Resistant Acinetobacter Infection. In the research finding the video posted in 2018 mentions we can use bacteriophage to treat multidrug resistance but in the research journal published in 2023 claim that bacteriophage is still incomplete for a reliable treatment against the multidrug resistant bacteria. Kurzgestagt claims that bacteriophage is safe for humans as they only target bacteria and human cells as they are too different from one another. The research paper argues that bacteriophage testing is inconsistent and the possibility of a mutation to occur that can allow bacteriophage to attack our own cells. Kurzgesagt is a educational YouTube channel and their video on bacteriophage is informational. When talking about what a bacteriophage was, the video did an excellent job explaining when compared to what researchers found about it. It also uses fun visuals that keeps the watcher's attention making it easier for people to learn the material even at a young age. It’s a very influential channel with over 22.1 million subscribers on YouTube. Even though it is a very popular channel their video on bacteriophage does carry some flaws which can give watchers the wrong impression about bacteriophage and getting their hopes up, when in reality research is far from using bacteriophage as a viable medication. By comparing the video to researchers' findings, you can see clearly the discrepancy between them. Science is not something that can be viewed with one lens but with multiple. This paper serves as an insight to the difference in what is being told about bacteriophage and their use as medical treatment. Allowing readers to keep an open mind and look into other aspects of information being foretold to them and not blindly accept it all as fact. The research allows for more future research to expand upon it looking more deeply into other bacteriophage topics on social media or entirely different medical interventions and comparing to where it stands in today’s research.

Andrew McDaniel
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Climate Communications: It's The End of the World As We Know It

Communication about climate change can plays a major role in shaping the public's understanding, attitudes, and willingness to act. Unfortunately, the current communication strategies often used rely on divisive rhetoric, fearmongering, and/or exaggerated claims. Though well-intentioned, these approaches often have the potential to backfire eroding the public's trust in the science, while weakening the public support that is needed for effective climate action to take place. This research project examines the impacts of different climate change communication strategies, aiming to identify an effective and inclusive approaches that will foster greater public engagement and inspire collaborative solutions.

This project will try to answer several key questions:

- How do the aggressive and/or fear-based climate communications influence the emotional responses of people's beliefs about climate change, and their willingness to take action and what is their psychological response?
- How does misinformation, exaggerations, and biases in climate communication affect the public's trust in climate science? When inconsistencies or inaccuracies are used, does it lead to a broader skepticism about the soundness of climate science?
- What communication strategies are the most effective in reaching the most diverse audiences, including those who may be skeptical or disengaged? How can we modify the way we communicate about climate change to be more inclusive to all audiences, considering their backgrounds, values, and concerns, to create an atmosphere of hope and empowerment?

This project will utilize textual analysis to examine a range of climate communications. The analysis will include:

- **Background Source:** The documentary *An Inconvenient Truth* with Al Gore serves as a key case study. While influential, the documentary will be analyzed for inconsistencies and the potential impact it might have on public's perception and the credibility of climate science.
- **Exhibit Sources:** Research articles (Feinberg and Willer) and (Yuan and Lu, 2020) will be used to explore how dire messaging and aggressive communication styles can inadvertently decrease support for climate solutions.
- **Argument Sources:** Research article (Treel et al.) investigate how biased communication that target specific demographics and/or political affiliations, can destroy peoples trust in climate science. Research article (Robb Willer, et al.) analyzes how extreme tactics involving violence or disruption and can backfire alienate potential supporters of climate action and diminishes their connection with the cause.

The project has the potential to significantly improve climate communication practices.

By identifying the communication strategies that fall short, this project will try to create a roadmap to empowering media outlets, speakers, bloggers, researchers, and climate advocates to work together in creating a widespread public understanding and support for climate action. The emphasis on inclusivity, empowerment, and solution-oriented messaging is crucial because addressing climate change requires a collective effort that supersedes political and social divides.

Kai Miller
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Procrastination In Writing Studies

Procrastination is a common practice of having something to do, but waiting until later to complete it. It is especially common in college students as there is an intention to do essays or projects, but life or other priorities get in the way especially when the assignment is writing related because they are often more involved and require more thinking. The purpose of this experiment is to see the effects of procrastination on writing and the thought process behind it, seeing if this is an intentional thing and the way that writing studies can impact whether or not a student procrastinates. For primary research a survey was sent out to forty five University of Missouri at Kansas City students in an English research class asking eleven questions about their experiences with procrastination around writing projects like essays or drafts in college. The survey included four multiple choice questions about if a student procrastinates and whether their study space affects this, if they proofread, and if they believe procrastination as a habit can be changed. It also has seven long answer questions that ask about students' writing process and their different habits that impact the way they plan assignments including brainstorming and the length of time between when they start and the assignment is due. It also asks why they procrastinate and if they think it is a bad thing and if procrastination, especially in writing, affects their grades or final product in terms of mistakes or confusing concepts or sentences. The last set of questions ask about if waiting until the last minute is a positive thing for their experience as well as advantages of actually doing an essay or draft before the due date. The preliminary research for this project highlights procrastination as a big problem for the college students in the class. Study space affected the majority of students and their need to not do an assignment depending on the environment and proofreading was important to everyone who responded to the survey. Eighty three percent of students believed that procrastination is a habit that can be broken. Some key responses to the long answer questions were that the thought process behind procrastinating on writing is prioritizing self care, motivation, waiting can produce great writing, and essays or drafts can also feel like a box to check off so students get it done last minute. Doing assignments right before the deadline can affect the amount of time that is left to proofread, spelling mistakes, and result in a little less detail but many students said there is no effect. Students keep the assignment in the back of their minds to brainstorm through the week before doing them which can help the ease of completion. Half of the surveyors said procrastination was bad and half said it was okay. Overall, it is up to students themselves whether or not they procrastinate on writing based on the way they feel about the assignments. For some, it negatively affects writing but others find it is helpful to their mindset toward essays and feel that being organized in other aspects of their lives helps them think better.

Eli Montgomery
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Vincent van Gogh: An Artist's Impact on Today

The purpose of this research is to provide artists with a simplified analysis of the complex question "what makes a piece of art great?". By conducting a case study on Vincent van Gogh's painting "starry night" and comparing it to modern ideals, three main answers to this question can be reached. First and foremost, without any prior knowledge, his painting is easy to connect with. Second of all, for those who know the background of the painting, the obstacles Van Gogh had to overcome were extraordinarily difficult which make his painting easy to empathize with. Finaly the passion captured in his brushstrokes is easily visible and creates a powerful connection into his life. By considering "how will my work connect with my audience?", "what obstacles am I overcoming through my work?", and "how am I displaying passion in my art?" Artists are given a jumping of point and a good understanding of whether a concept will turn out as a great painting. Because of limited research time these ideas have not yet been tested, but they provide a great understanding of the complex question previously stated. I recommend further research and testing to see how a group with these ideals in mind compares to a group without them.

Confiance Muhoza
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

The Effects of Mental Health in 200-level English courses

The study explores the impact of writing practices in 200-level English courses on college student's mental health, emphasizing journaling and expressive writing. Interviews uncovered those students, though acknowledging skill development in critical thinking and persuasion, often feel overwhelmed by writing demands. They observed a significant impact of mental health on their concentration and paper quality, particularly during stressful times. Coping strategies for writer's block varied, from meditation to shifting attention. Recommendations include improving mental health resources with regular check-ups, reduced assignments, and integrating mental health-themed meditation sessions into writing studios. Despite existing mental health services on campus, resources combining writing and mental health are limited. The study highlights the importance of enhancing support services and promoting mental health transparency to foster a supportive learning environment. Professional development for educators is essential to adequately support students, emphasizing the need to prioritize.

Jessica Nguyen
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

The Revival of Rococo

The purpose of this study is to study and explore the revival of the Rococo aesthetic in modern fashion trends and how they reflect the repetitive nature of historical trends and what exact features of it prompted its return to current fashion trends. This research paper delves into the reasons behind the revival of Rococo within modern fashion trends by examining the inherent nature of the aesthetic and its appeal that has inspired many other styles like Lolita and Coquette. This study will be utilizing archival research by examining the "The Swing" painting from the Rococo movement as well as designs from Selkie, a fashion designer known for their dresses and clothing that take inspiration from Rococo. This will be done by examining the features found in both, the nature of Rococo from the Swing painting during its time, and how Selkies design show how some features of it have been recreated and implemented into current fashion trends. Through an analysis of current fashion trends inspired and influenced by Rococo like Lolita and Coquette this study learns more about the evolution of the connotations behind Rococo and how it's bad reputation for its opulence and immaturity during it's time has evolved into a style that helps women embrace their femininity and even become a tool of empowerment. Furthermore, this paper investigates the ways that Rococo has been reinterpreted and integrated in current fashion trends and reflects shifts in its connotation during the 17th century and now. This could help future studies explore the global diffusion of Rococo fashion since Rococo's influence stretches beyond its French origin to Japan and America and many other countries.

Hannah Quint
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Educational Outcomes of Foster Youth

The relationship between the foster care system and educational outcomes presents a challenge that demands attention and solutions. This research aims to understand the dynamics between these relationships, targeting the challenges faced by foster youth and identifying ways of improvement. Regardless of the foster care system's role in children's well-being, the foster care system continues to show its systemic deficiencies, highlighting concern about educational outcomes. By investigating how the lack of support within the foster care system impacts educational achievements, especially in writing, this project aims to illustrate the contributing factors to this issue. Through interviews and textual analysis, this project examines the influence on educational outcomes, including instability within homes, placement changes, disruptions in schooling, and trauma within the system. Scholars have shed light on the role of the foster care system and how it shapes the educational outcomes of youth.

From primary sources such as the Child Welfare Outcomes Report Data, this study follows scholarly literature, which exemplifies the need for collaboration between education and child welfare agencies to seek growth in the outcomes of foster care children. This study follows statistical points with studies that show the educational outcomes of foster youth, in particular, how over half of the foster children entering kindergarten were at-risk for phonological awareness skills. By age 17-18, foster youth are reading at a seventh-grade level on average, with only 44% reading at a high school level (Somers, 2020). Practically, this research utilizes ethnographic methodologies by Kinkead (2015) and Crouse (2023) to gather insights into the lives of foster youth within educational settings. It highlights the importance of being an outsider to gain perspective and highlight characteristics of ethnography. Principles of ethnography are outlined, including participant observer-based inquiry, studying culture from its point of view, and using various data-gathering techniques. By engaging in the narratives of language-diverse communities, this study seeks to promote practices and social justice within educational views.

This research revealed findings of factors that contribute to the educational outcomes of foster youth. It became evident that instability, frequent placement changes, and disruption in schooling significantly impact educational outcomes, particularly in writing. Therefore, poor educational support, limited access to resources, and trauma experienced by foster youth worsen these issues, creating challenges within the educational system. Additionally, there is a critical need for interference in addressing the systemic deficiencies within the foster care system and enhancing education outcomes for youth in care. By advocating for trauma-informed practices and supportive services, policymakers, educators, and child welfare professionals can further understand and work around the effects of instability and trauma faced by foster youth in academic success. Furthermore, tending to the relationship between education and child welfare agencies can allow for support systems, allowing foster youth to receive the necessary resources and allow them to thrive academically. Conclusively, addressing these challenges can help promote access to education and how society can empower foster youth to overcome barriers and achieve their full potential.

Delaney Shields
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Representing Women in 20th Century Vogue

This undergraduate research project examines the well-known lifestyle and fashion magazine, *Vogue.* This print and online magazine was frequently created by women and targeted at women. The purpose of this study is to investigate the way in which the magazine depicted women, and the messages that were sent to women and young girls in the 20th century America. This study identifies the changing images and diverse approaches of representing women closely through three articles. An article was chosen from the 1920's, 1940's, and 1960's. These were highly influential time periods of the 20th century. The articles were accessed through the University of Missouri-Kansas City Vogue Archive collection. This case study uses direct observations through visuals and textual analysis in order to identify representation of women and reoccurring themes of the times. The findings indicate that this magazine frequently depicted women as sexual objects and fashion symbols with unfavorable stereotypical female roles. These roles consist of submissive women, dedicated mothers, and brainwashed housewives. This study analyzes whose voice these articles were written in and whose voices were left out. Most of the models in the articles were white, thin, upper class, American women. These articles do not depict women of color or differing body types, shapes, or sizes. These specific articles send messages that were not realistic or respectable. Scholarly conversation highlights the overall poor depictions of women found in *Vogue,* calling out the problems with such depictions. Numerous scholars discuss the ideas concerning the traditional roles women were placed in. If not shown in traditional roles they are then criticized for being in those new roles in the first place. The publishers had women trying to live up to other's standards based on the magazine's postings. If this study had more time, it would cover more articles over a larger span of time. It would compare the media outlet through the centuries. For instance, it would observe articles then versus now to see how media representation for women has evolved over time. *Vogue* should continue to work towards more favorable representation of women in the media, especially since it is a magazine made for women. Bringing respectable messages and innovative ideas could foster higher self-esteem, confidence, and overall happiness for women and girls reading. It is important to not only have excellent female role models but also depict women in a reputable and honorable light equivalent to their male counterpart. As women continue to be put into the media, society must look at how far they have come while also looking ahead. A few good articles do not make up for the bad but changing images, discourse, and attitudes would suffice much more. As the United States continues to shift to online and technological advances the people must shift with it and decide how they should represent one another equally and fairly.

Abby Siemer
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Individuality in Handwriting

My project explores the accuracy of graphology as a way to tell the fundamental parts of a person's personality by only studying their handwriting. Graphology is defined by Webster's Dictionary as, "the study of handwriting especially for the purpose of character analysis". In my research I want to know how accurate graphology is in pinpointing college students' major personality traits. Graphology has gained a big following over the last couple decades despite lacking critical research that proves its effectiveness. Even with this information lacking, people swear by its accuracy. This has upset some people in the scientific community who claim that it's not an effective way to tell personality and shouldn't be used in making important decisions. If graphology is accurate it could mean a new way to help choose political candidates, look at job applications with a new perspective, and more, however, the research just isn't there to prove that's a good idea. Plenty of sources claim that slants, spaces, loops, margins, pressure, writing utensil of choice and other handwriting patterns/ aspects of handwriting can be good indicators of a person's sexuality, emotional state, curiosity, friendliness, quietness, wit, decisiveness, impulsiveness, etc. Because they claim that handwriting analysis can reveal such intimate details of a person's personality, I wanted to test it myself. Using books about how to perform graphology from the UMKC library, I created a survey asking about personality. I did this by reading through the books and picking specific patterns that claimed to reveal what I thought were major pillars of personality. For example, according to "Graphology" by Barabra Hill, the degree of how slanted a person's writing is can reveal how timid they are in social situations, so a question on the survey is "Would you consider yourself more of an introvert or an extrovert?". Additionally, I asked the participants all to hand write the exact same few sentences. The book "The Handwriting Analysis" by Jerome Meyer recommends analyzing handwriting written in pen, on unlined paper, that contains at least 50 words, so that's what I asked of my five participants. I also asked that they not write their names on the top of their writing and fold the surveys before returning them to me. This way I didn't know whose handwriting was whose and could avoid looking for certain traits I think they have. I also chose to refrain from looking at the surveys until I was ready to do the comparisons to avoid further bias. Then, using my sources and a blank copy of the survey as a guideline, I analyzed their handwriting and when I was done I compared my analysis to the survey they filled out about themselves. My goal was to see if my analysis of their major traits matched up with their perspective of themselves to conclude if graphology is accurate.

Sebastian Skaggs
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Trans Poetics in Kansas City

The purpose of this study was to analyze the role of poetry in the lives of transgender/trans individuals (those who do not identify with the gender they were assigned at birth) in Kansas City. More specifically, the goal was to research how poetry presents itself as a unique vehicle for self-expression, identity, affirmation, and building community for trans people in Kansas City. For this study, a handful of trans poets who are based in Kansas City were interviewed on how they use poetry to express themselves. Their answers and poems that they wrote were analyzed to see if there may be any common themes in the writings of these poets, particularly regarding themes of identity, gender expression, and community. According to these poets, and the scholarly conversation on the subject, poetry allows for trans people to express their unique life experiences and the ways in which they navigate a society that is not typically built for them. Poetry is also an important tool for building community and fostering a sense of belonging amongst transgender people, as it allows them to connect with one another and to feel seen in their unique life experiences. This study aims to contribute to both transgender studies and creative writing studies by shedding light on the importance of poetry in the transgender community. This study aims to amplify trans voices and further build upon the current discussion on trans poetry by showcasing the individuality of the Kansas City trans poetry scene. The findings of this research could have implications for educators, activists, allies, poets of all kinds, and trans youth who are hoping to find a sense of identity and belonging in their community.

Nate Smith
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

The Macintosh Advertisements: How Has the Rhetoric changed?

This paper will explore the changes in the rhetoric found within the Apple Advertisements for the Macintosh computer. This paper will cover from the years starting in 1984 and going onto the mid-2010s. The rhetoric found within the Macintosh advertisements has changed from the original advertisement. Based on George Orwell's *1984*, the original Macintosh Advertisement is a spin on the idea of a "Big Brother", and going against the said "Big Brother". The advertisement features a woman running through the dystopian world created by Orwell. The woman, carrying a sledgehammer, breaks the "telescreen" displaying "Big Brother", and frees the people who have been brainwashed by "Big Brother". The advertisement then fades to show the Macintosh computer. This advertisement was very successful, and had many consumers lining up outside stores waiting for the chance to purchase a Macintosh computer. This project aims to understand the rhetoric found within the different Macintosh advertisement campaigns. More specifically, how the rhetoric has changed as Apple has gained more traction and popularity. For example, the "1984" advertisement was created when Apple was still relatively new to consumers, especially in the electrical industry. Apple had only been created for around 8 years, and needed to make a splash to garner the attention of consumers.

The next campaign this project focuses on is the "Get a Mac" campaign. The Get a Mac campaign features two men, one wearing a formal suit, and the other wearing casual clothes. The informally suited man, found to be named Mac, and the suited man, labeled Personal Computer (PC), get into hijinks throughout the campaign. The campaign was a group of commercials that aired throughout the late 2000s, specifically around 2006 to 2009. The campaign features PC frequently getting injured or being shown as "lame" or "boring", while showing Mac as "fun" and "trendy". This is a direct comparison between a Macintosh and the PC as character, but it is also supposed to be reflective of how much better a Macintosh computer is than a regular PC.

Using a case study on specifically Macintosh advertisements, and using online archives, this research found that preliminary results indicate that Apple has shifted its advertisements for the Macintosh PCfrom its rhetorical strategies from the year 1984 to the late 2000s. The initial advertisement, or the "1984" advertisement, features the woman, who is shown to be a regular person, going against the brainwashed masses. This is also interpreted as the woman being Apple, and "Big Brother" is other tech companies. Based on the time, it is assumed that Apple is targeting IBM specifically. IBM was the largest technology company at the time, and was clearly much better than its competitors. With the Macintosh, Apple became IBM's biggest competitor and arguably became more popular than IBM. During the "Get a Mac" campaign, Apple switched their rhetorical strategy towards a comparison, showing the "Mac" was much better than "PC", and that consumers should invest in Macintosh's instead of PCs (Personal Computers). This is a key part of Apple's history, and shows how companies trying to make a name for themselves can create a brand, even in markets where specific brands rule above everything else.

Kirsten Spilde
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

How Fashion Portrays Societal Issues

My research project consists of my discoveries from Vogue article archives. I will be analyzing how different articles in Vogue correlate to the societal issues of a specific time period. For my primary research, I will be researching and analyzing modern articles, which means the time period is a current time period. My two primary research articles are titled “In the Pink” and “Signs of the Times”. The first article is from the year 2019 and the second one is from 2020. Each of these articles discuss some sort of issue that has gained popularity in society. However, the articles are about a fashion related topic. This demonstrates my main research question, which is “How does the trending fashion and fashion-writing of a time period demonstrate what is culturally important at that time?” The first article discusses how femininity is being refined through the #MeToo movement. It explains how the color pink is becoming popular in fashion because as a society we are making the color powerful, instead of being portrayed as weak. It describes that the color pink is now being portrayed as a color of resistance. The second article is about a jewelry collaboration, which promotes the anxiety of our culture, during 2020. It discusses how the jewelry line was a way to bring awareness to police violence and brutality. The background sources that I am analyzing are articles written about the societal issues going on, which are the same issues displayed in my primary research articles from Vogue.

Marzayna Tagaloa
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Samoan Culture: The Meaning behind the Tatau and Malu

The present study will interpret and investigate the historical value and meaning behind the Samoan *Tatau* and *Malu*, exploiting the Samoan culture and people. It will expand on the writing studies of the *Tatau* (the Samoan translation for the English word '*tattoo*') and the intricate designs that were created to hold the history of the Samoan culture and to tell ancestral stories. The *Tatau* allowed the Samoan people an opportunity to express themselves freely and boldly, without judgment or criticism from those who were unfamiliar with Samoa's distinct expression of self and history. This is considered one of the oldest and most influential traditions of the Samoan culture, making them well-known in many countries. The study aims to explore the importance of the *Tatau* and *Malu* in the Samoan culture and the significance it holds for its people. An in-person interview was conducted over a 1–2-hour period, involving 3 participants. The participants were all of Samoan descent and the ages ranged from 21-67 years old. Every person was asked the same set of questions from the interviewee and each response was logged and recorded. Each participant had their personal and unique meaning of the Samoan *Tatau* and *Malu*. By utilizing scholarly resources and ethnographic analysis methods, this study provided evidence to support the Samoan *Tatau* and *Malu's* cultural history and the power it holds for its own and others. This study guides others to understand the seriousness of the preservation of traditional practices of one's culture. Learning to respect and appreciate the richness that the Samoan culture had to offer in the past and figuring out ways to maintain that same appreciation in the present.

Ruth Thao
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

Metacognition

This study aimed to explore the significance of metacognition in shaping students' writing approaches. Metacognition, the understanding of one's thinking processes, is crucial for enhancing creative output and achieving proficiency in writing. By examining individuals' awareness of their cognitive processes and how they utilize them in writing, this research aimed to uncover insights into effective writing practices. The study-informed interviews and a Google form were employed to gather data from students and close acquaintances, revealing varying levels of metacognitive awareness among participants. Results indicated that individuals with higher metacognitive awareness demonstrated better problem-solving skills and coherence in their writing. The findings underscore the importance of integrating metacognitive strategies into writing instruction to foster students' reflective and self-regulated writing abilities. Educators can utilize these findings to design interventions that promote metacognitive development, thereby empowering students to enhance their writing skills. Ultimately, understanding and teaching metacognition can significantly benefit students in their writing endeavors.

Yue Wang
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

The Impact of Digital Platforms on Writing and Publishing

Digital platforms have revolutionized the landscape of writing and publishing, fundamentally altering how individuals engage with textual information. This research focuses on exploring the impact of digital platforms on the writing and publishing practices of college students at the University of Missouri Kansas City (UMKC). By exploring individual experiences, habits, challenges, and successes in utilizing digital platforms, this study seeks to provide insights into the evolving nature of writing in the digital age.

The planned approach involves conducting interviews and surveys to UMKC students, gathering information of their habits, experience of using digital platforms for writing and publishing. By establishing histograms throughout these data, this research aims to figure out how digital platforms have influenced writing practices, providing valuable insights for researchers to develop digital platforms and bridge the gap between theoretical frameworks and practical applications.

The primary research of interviewing several students has plenty findings. Before these digital platforms popped up, some students were forced to read some historical books that we might not be interested in. This situation is because published books are scholarly and they might not involve too many topics. With the help of those digital platforms, college students can have access to several books that are non-scholarly that they might be interested in. This can help a lot in exploring writing studies. Also, students prefer to search on Google or YouTube to watch some videos teaching writing skills. Throughout these findings, the research aims to explore what college students make use of those digital platforms and how these platforms help in writing studies. Furthermore, the scholarly conversation surrounding the impact of digital platforms on writing and publishing practices is dynamic. Scholarly articles have already recognized the transformative effects of technology on literacy and communication.

Richard K. Watkins
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

How Music Influences Our Communication & Behaviors?

We have all heard or listened to music before, some of us may enjoy listening more frequently than others. It's a form of art which has been used to express feelings, ideas, and beliefs to influence others in the world we live in. The goal of this research is to find out how music influences people's communication and behaviors. For the primary exhibits to help guide this research, it incorporates songs composed by music artists to help illustrate those influences. By analyzing the song lyrics through textual analysis, this data will point out what has the most impacts on the listeners and how the lyrics from those songs cause these types of meaningful influences. The research project includes citations of multiple reliable sources from credible sites which all support the findings within this study. The scholarly conversation at work around this topic seemed to be broad. Articles gathered in this research support and make claims to a correlation between communication and music. However not many actually looked into how the actual lyrics cause changes in behavior by the type of communication they utilize. Interesting discoveries within my research included that music can be used for informal language learning, helping to improve the communication skills of those with disabilities, contributing to brain development and learning in children, influencing consumer buying behaviors, and cultural appropriation. Music helps retain words and expressions easier with rhythms and repetitive patterns. It connects cultures by providing a deeper understanding of beliefs and practices. Moreover it enhances vocabulary, pronunciation, listening, and analytic skills. All these things help someone with trying to learn a new foreign language by simply just enculturating themselves in and listening to the artist's music as thoroughly explained in Li Yuan-Cloris and Daniel Cassany's research around this theory on "Informal learning of Spanish in a Chinese music fan community". Interestingly, through music culture can be expressed and appreciated by object appropriation. Such as by using fashion to convey or represent a message like what Kanye West did with Yeezy. In general overall my discoveries within this research project have been astounding. Considering this, it's a pretty new area to be explored but with the exhibits, sources, facts, and evidence provided it is promising that influences like these exist in music.

Isabel Yearian
Faculty Mentor: Dana Hoffmann
EUReka! Course: English 225 Intermediate Academic Prose

The Effect of Technology on Writing Studies in Elementary School

As technology advances, the world must learn to advance with it, but where is the line that we draw on when to expose our children to these tools? Where is the line between helpful and harmful when it comes to our education? This undergraduate research project follows how technology is impacting writing studies in elementary school students. The project is studied using a survey conducted on a convenience sample of forty-six people who both had and didn't have these technologies growing up. The survey consisted of seventeen questions, many of which were open ended to allow for detailed responses and additional thoughts. Using textual analysis, scholarly secondary sources of text have also been studied with the goal to understand the background of this topic fully. As technology becomes more prevalent in our classrooms, students are getting noticeably worse in terms of writing skills. Evidence from responses suggest that while it's been very easy to blame it all on technology, getting rid of those technologies entirely isn't a viable plan of action either. How deep does the issue of technology in elementary classrooms run? Or is it actually part of the solution? This research is all about answering the crucial question: What is the impact of technology on elementary school students' writing studies? Writing and communication skills are the future; they are what make humans advanced and able to keep advancing. Losing independent writing skills could set humanity back centuries and it's imperative to find the best way to teach them. It starts in the schools.

ENGLISH 309WI
Rhetorics of Public Memory

Natalie Castilleja, Jaime Gregory, Gabriel Salas-Mendoza, & Berenis Rodriguez
Faculty Mentor: Jane Greer
EUReka! Course: English 309WI Rhetorics of Public Memory

Street Art and Cultural Identity in Kansas City

The goal of the Kansas City street art display is to share the thriving urban art culture in Kansas City expressed through murals. The culture and identity of the artists and their communities are expressed in various ways within their murals, including by communicating messages, through commemorating local heroes, and through their unique creativity. By engaging with the vast array of murals across Kansas City, we can begin to understand the spectrum of cultures that make up the Kansas City communities represented in each. It is important to engage in this tapestry of meanings painted across Kansas City to leave with an understanding that this city's art scene has been fostered and cared for by its community members of all identities and cultures. For everyone who explores its vibrant narratives, our exhibit will leave a lasting impression by garnering appreciation for the inventiveness, community engagement, and social criticism embedded within the local urban art scene.

Taegan Denmon, Lucien Hockaday, Jay Moore, Eric Thong, & M. Percy
Faculty Mentor: Jane Greer
EUReka! Course: English 309WI Rhetorics of Public Memory

Beyond the Bounds of Books

Libraries have long transitioned from private institutions focused solely on renting books to instead offering a wide variety of services to their local communities. This exhibit analyzes how Kansas City Public Libraries use signs to advertise these services to visitors. The colors, fonts, and pictures will be examined to show how the library communicates these messages. The three categories of library signs that the exhibit will focus on are health services, community clubs and events, and internal library services.

Health is more than just a good diet and exercise routine. Health can range anywhere from mental and emotional to physical safety. Kansas City Public Libraries disseminate signs that cover everything from mental health plans to storm preparedness. The stark red and professional font alerts the viewer to the seriousness of the material. Each uniquely delivers its message, with its forms carefully designed to match the message.

Libraries are vibrant hubs that foster community engagement. Kansas City Public Libraries offer diverse clubs and events that create opportunities for individuals to come together, learn from one another, and develop new skills. There is tremendous diversity in the design of these signs just as in the events and clubs they advertise. From book club discussions to poetry slams, these signs help cultivate a sense of belonging and personal growth by connecting visitors to the community.

Public Libraries offer many services within their physical locations. These interior services range from free-to-use public phones and computers to career and education help. These signs are simple and unassuming because they are intended to be informative without being distracting.

Mary Dunagan, Emani Guerin, Maddy Hunt, & Isabel Patton
Faculty Mentor: Jane Greer
EUReka! Course: English 309WI Rhetorics of Public Memory

The History of Drag in Kansas City Told Through Advertisements

Drag Queens in Kansas City have been celebrated for their exciting, glamorous performances since the end of the 19th Century. They have pushed for inclusion and acceptance through many decades by advocating for human rights, celebrating pride, and raising money for charity. Looking through the promotion of Drag in the last six decades, it's evident these performers have been an active and valuable part of the Kansas City community. Through advertisements we can observe the documentation of the historical state of affairs and explore and appreciate the development and changes of Drag queen culture.

Known for their extravagance, Drag queens are artists who create their own outfits, costumes, make-up, and wigs. They push the boundaries of fashion and gender presentation, creating various forms of entertainment through their gender-fluid characters and theatrical music performances. This artistry has developed over time and contributes to the uniqueness of Drag in every individual setting. They are both reflections and muses of popular culture and comedy. Aside from entertainment, Drag queens have been an outlet for the queer community and an inspiration for everyone towards striving for self-expression and self-acceptance.

Kansas City Drag queens were closely aligned to the civil rights movement and the artform has been known for welcoming diversity throughout the decades. They have been advocates for the LGBTQIA+ community and were some of the only employers of trans people in earlier decades. Drag shows have also helped raise money for charitable organizations such as the AIDS foundation. They celebrate the holidays with us every year by hosting special events for Christmas, Halloween, Easter, etc... Even with all of the support they have added into our community, the existence of drag queens has been met with high levels of hostility from the heterosexual community. Current Drag shows in Kansas City are still threatened by homophobia and transphobia but run a lower risk of hate crimes than in previous decades.

The origins of Drag have changed from being marketed as exotic shows that mimic and mock women to an artform of individual self-expression. This change occurred around the 1950's, and so the current state of drag helps defy the traditional social expectations related to gender. Drag's progression in its marketed purpose and intention has challenged the previous dominant belief patterns, reshaping the definition of identity. Changing and developing views on Drag, different takes on style, and an emerging journey to liberation have all had a major impact on what Drag has meant to the community and the performers.

Quinlan Patel, Olivia Vella, Elaine Pohlsander, & Garrett Menees
Faculty Mentor: Jane Greer
EUReka! Course: English 309WI Rhetorics of Public Memory

The Sound of Progress: Technological Developments of Blues Posters at the KC Grand Emporium

We can learn a lot about culture and society by looking at music. Music has torn apart families and brought together varying communities of like-minded individuals. It has been the foundation for movements both musically and socially. There are many ways in which one can analyze the history of music, how it has changed, and the impact it has had. When looking at music through the lens of advertisements, we are able to see how music groups and individual artists adapt to the times in order to reach their audiences and beyond.

Kansas City itself has a deep and profound history with the music scene, one that is very broad and covers almost the entirety of the musical spectrum. By far, however, Kansas City is known for its connection to blues music. With over twenty music venues in the metropolitan area, blues artists have the option to play on certain stages in order to attract a specific audience. A large part of their reach also lies in the promotional content they release. When looking specifically at promotional flyers and posters at the Grand Emporium, a local music venue located in downtown Kansas City, we can see how artists had to change and adapt to the ever-changing music scene.

We looked at posters from the early 1980s to the early 2000s to see what changes we could observe and the similarities and differences present. One of the major factors we found in the changes observed stems from technological advances. For instance, with new color printing technology, complex posters could be produced at a fraction of the cost if they were done with traditional printing methods.

Jordan Paxton, Claire Mersmann, Logan Belt, & Reece Parker
Faculty Mentor: Jane Greer
EUReka! Course: English 309WI Rhetorics of Public Memory

Band of Sisters: Women and Protest

The Women's March on January 21st, 2017 marked the largest single-day protest in U.S. history as millions of people across the globe joined the movement to advocate for reproductive, environmental, and human rights. Thousands of "sister marches" emerged nationwide, marking the day as a historic moment in women's rights activism. Fueled by the recent inauguration of Donald Trump, women's rights activists participated in protests fired by a desire for equality for all. In particular, Kansas City residents garnered a distinctive sense of community through their handmade posters, which UMKC archivists collected after the completion of the protest held in Washington Square Park. Our exhibit calls for a specific examination of three crucial themes: policy, rhetoric, and unity; the rhetorical function of these displays demonstrates a strong kinship between participants along with their unwavering commitment to making their communities heard.

Our enduring question is: How were the people of Kansas City and their concerns represented in the signage of the posters? The exhibit contains perspectives from a multitude of identities in Kansas City; mothers, fathers, environmentalists, and local government officials can all be found among the curators of the posters.

Examination of archived pieces from the Kansas City's Women's March and relevant research on the political landscape of the time allowed our team to categorize signage into the categories of policy, rhetoric, and unity. The allusion to political rhetoric was evident. Excerpts from speeches and media sources during the 2016 presidential campaign were prominently displayed on various posters during the march. Another prevailing motif revolved around policy matters and the need for transformation. Altogether, an undeniable message of solidarity, unity, and love permeated the posters exhibited at the Women's March. The rhetoric contained in these posters exerts themes of empowerment and "sister"hood, illuminating the power of local activism in cultivating a community for change.

HISTORY 430RA
World War One through its Artifacts

Sammy Abu-Namous
Faculty Mentor: Andrew Bergerson
EUReka! Course: History 430RA World War One through its Artifacts

Digging into the Trenches of the Western Front

Caption: Amidst the mud and misery, soldiers endure the relentless stalemate of trench warfare in the haunting landscapes of World War I.

● During the First World War, soldiers on the western front developed an intense form of warfare that transformed the farms and villages of France and Belgium into an intricate system of trenches soldiers dug which stretched from the coast of the English Channel to Alsace.

● What were the long-term physical and psychological effects that soldiers and the surrounding land endure under the the brutality of trench warfare, and how do these effects persist into the current day?

● In his book, Pandora's Box historian Jörn Leonhard expertly explains the defensive and offensive purpose these trenches served using the MG08 as an example of how German forces defended their trenches.

● In her book, The Body in Pain philosopher Elaine Scarry argues that soldiers destroy the built environments of their enemy as a way of causing further harm and injury.

● In this paper I will investigate the experiences of the soldiers who lived and fought within these trenches as well as piece together a justification for the methods implemented in the trenches with the aid of artifacts such as the Training manual for British officers and men on Trench Warfare.

Samantha Carr
Faculty Mentor: Andrew Bergerson
EUReka! Course: History 430RA World War One through its Artifacts

Playing Cards in World War I

Altenburger Spielkartenfabrik company. ca. 1914. Reichs Karte Deck of Playing Cards. Altenburg, Germany. Accession number 1938,1017.4.1-53. The British Museum, London, England. Accessed April 5th, 2024.

In the midst of absolute destruction, the soldiers of World War I turned to playing cards for moments of reprieve. In *Pandora's Box,* historian Jörn Leonhard explains in detail the many phases of the war, with emphasis on the beginning of the war, middle, and end stages. In *The Body in Pain,* philosopher Elaine Scarry argues that objects made by human beings become extensions of the human body, including the places destroyed during the war, and the objects, such as playing cards, that soldiers always had with them. In this paper, I will explore the role of playing cards in soldiers' lives during World War I. I will analyze this through the Reichs Karte deck of playing cards made by the Altenburger Spielkartenfabrik company in Germany circa 1914. By closely examining primary sources such as photographs, postcards, and letters, I will show how means of entertainment, such as playing cards, became an integral part of the small moments of peace for soldiers in the war.

Jay Cravens
Faculty Mentor: Andrew Bergerson
EUReka! Course: History 430RA World War One through its Artifacts

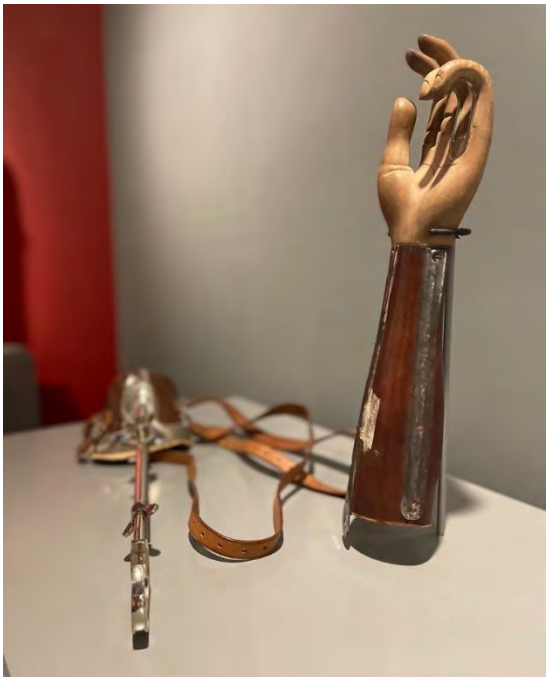
Gambling in the Trenches: The Roll of Soldiers

"March 12 / … / No poker is allowed / Sure is Hell" (Linman, pgs. 134-35). Corporal Leland Oscar Linman recorded his reaction to the loss of poker, his primary pastime activity during his time served in World War I. In *Pandora's Box*, historian Jorn Leonhard studied the experiences of soldiers through the course of World War I, explaining how soldiers were physically and mentally altered by the war. In her book *The Body in Pain*, philosopher Elaine Scarry discussed the manufacturing of pain in war and how fictions, human created ideas, served to both protect soldiers from that pain and inflict pain upon their enemies. In this paper I will investigate how soldiers transformed gambling and competitive games into wartime tools. My artifact is a set of wooden dice used for gambling in the trenches of World War I, archived within the National World War One Museum. I will explore the use of games in soldier-created photos, drawings, diaries, and pamphlets. I will show that as modern war transformed soldiers into workers, soldiers transformed games into wartime tools for distraction.

Mia Ekstine
Faculty Mentor: Andrew Bergerson
EUReka! Course: History 430RA World War One through its Artifacts

Prosthetics in World War One

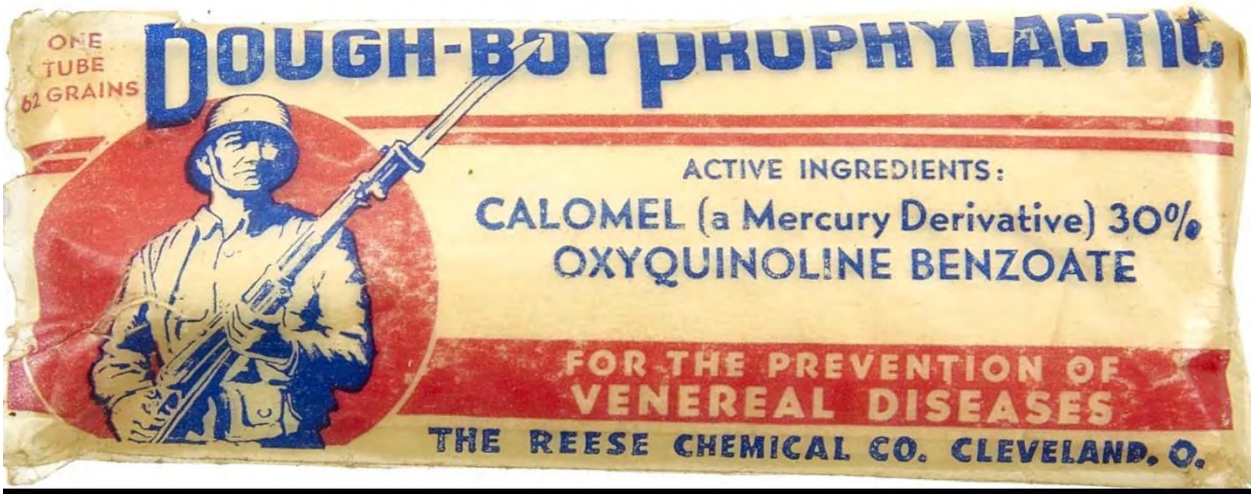
In 2013, Isabelle Simmons, the daughter of a World War One veteran, Henry Botjer, donated a prosthetic arm to the National World War One Museum and Memorial, reportedly having never witnessed her father wear it. In his book *Pandora's Box,* historian Jörn Leonhard contended that in the Great War governments assumed a new responsibility of citizens' welfare which extended to a provision of prosthetics to as well as the expectations of disabled veterans. In her book *The Body in Pain,* literary critic Elaine Scarry argued that the role of injury in war is not accidental but serves to ensure that both winner and loser agree on the outcome. This essay will explore the experience of disabled soldiers and their attitudes towards prosthetics provided by the United States government, to soldiers such as Private Henry Botjer, who lost his arm in an action in France in 1918. By using historian Andrew Bergerson's method of interpreting historical artifacts as historical palimpsests, I will view prosthetics as embedded with layers of meaning given by both states and soldiers. Through applying Scarry's theory of injury's role in war to instruction manuals, letters, and magazines, this essay will show that states used prosthetics in the Great War as visual representations of the cost of war, that is, injured bodies which gave meaning to their participation in the war. If I were going to continue this research, I would expand the topic to include facial prosthetics as this would incorporate a greater pool of experience that was unique to World War One due to new technologies.



Botjer, Henry. Prosthetic Arm. 1918. National World War One Museum and Memorial. Kansas City, Missouri. Accessed 04/08/24.

Emily Funk
Faculty Mentor: Andrew Bergerson
EUReka! Course: History 430RA World War One through its Artifacts

Dough-Boy Prophylactic Analysis



Reese Chemical Co. Dough-Boy Prophylactic
ca. 1918
1979.14

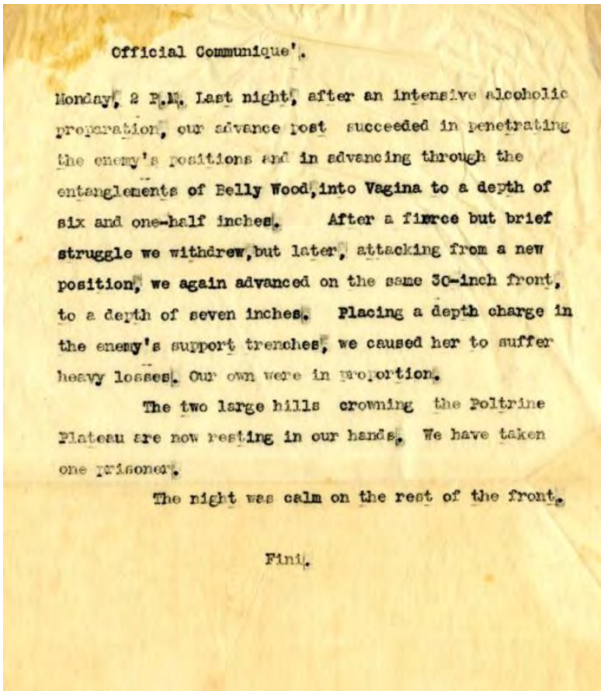
In a letter about the 1918 sexual education film "Fit to Fight," Brigadier-General F.H. French wrote, "I am convinced of the futility of trying to prevent men from associating with prostitutes by showing them disgusting or horrible cases of venereal disease." In *Pandora's Box* Historian Jörn Leonhard explained that liberal Progressives in the United States used World War I as a testing ground for ideologies. This idea is reinforced in the book *Bodies in Pain*, where philosopher Elaine Scarry argued that fictions are generated through war and that new realities are determined by the victor. Once the United States entered World War I, Progressive activists created sexual education programs for military training camps which promoted sexual purity as a sign of masculinity. Despite their campaign for abstinence, the United States contracted the Reese Chemical Company between 1917-1918 to produce Dough-Boy Prophylactic Kits for soldiers to treat themselves after sexual contact. With these contradictory messages in mind, I am going to compare the different rhetorical strategies, scientific reports, and military regulations to illustrate the efficacy of these methods. I will show that the Social Hygiene ideals of self-control did little to prevent soldiers from visiting sex workers, but the educational programs that promoted chemical prophylactics dramatically lowered the rates of sexually transmitted infections across the board.

Rebecca Hartman
Faculty Mentor: Andrew Bergerson
EUReka! Course: History 430RA World War One through its Artifacts

The Madonna-Whore Complex and How American Soldiers Viewed Women

During the Great War, American propaganda depicted women as either pure and saintly, thus requiring the protection of "Yankee Doughboys," or as sexually promiscuous vectors of disease. For instance, while embedded with US troops between May 1918 and July 1919, *The Kansas City Star* foreign correspondent, **Otto P. Higgins**, wrote a satirical communique which used puns and violent rhetoric to describe a nonconsensual sexual encounter with a foreign woman. This mock article raises the question of how US soldiers viewed American women "back home" compared to European women "over there." German historian **Jorn Leonhard** argues that European women fell victim to the Madonna-Whore Complex, where they were seen as both fragile victims in need of male protection, as well as objects of conquest for men to prove their virility. American author **Elaine Scarry** posits that language is altered during war to make the acts of war and violence more palatable, though it still results in destroying bodies and annihilating the identities of the victims. Additionally, American historian **Andrew Bergerson** asserts that through "anticipatory memories" people cause pain to others by justifying their actions based on fictions and false narratives. Through letters, instructional pamphlets, and posters, this paper will show that US soldiers viewed American women as chaste and sacred while believing European women were morally and sexually depraved.

Higgins, Otto P.. Sexually explicit mock article. n.d.. Catalog Number 2010.145.277. The



Official Communique'.

Monday, 2 P.M. Last night, after an intensive alcoholic preparation, our advance post succeeded in penetrating the enemy's positions and in advancing through the entanglements of Belly Wood, into Vagina to a depth of six and one-half inches. After a fierce but brief struggle we withdrew, but later, attacking from a new position, we again advanced on the same 30-inch front, to a depth of seven inches. Placing a depth charge in the enemy's support trenches, we caused her to suffer heavy losses. Our own were in proportion.

The two large hills crowning the Poitrine Plateau are now resting in our hands. We have taken one prisoner.

The night was calm on the rest of the front.

Fini.

National WWI `Museum and Memorial, Kansas City, MO.

Kian Hunt-Espino
Faculty Mentor: Andrew Bergerson
EUReka! Course: History 430RA World War One through its Artifacts

The Perceived Effectiveness of Ambulances by Soldiers


Ford Motor Company, Ford Model T Truck, 1918

In 1918, 16-year old Walt Disney forged his age in order to join the Army in World War I, ending up as an ambulance driver (his ambulance, of course, being covered in the cartoons he would become famous for after the war)!

During the length of World War I, ambulance drivers from services such as the British Red Cross or the United States Army Ambulance Service (U.S.A.A.S.) transported heavily injured soldiers to field hospitals from the front lines with their respective fleets of ambulances.

In a local sense, the ambulance was a motor vehicle produced in within 10 years of the introduction of motor vehicles to the public, and immediately being put to use in war.

In essayist Elaine Scarry's book "The Body in Pain", she relates the idea of a hospital to the idea of hope, but also relates it to the idea of generosity being undone.

In relation to "Pandora's Box" by historian Jörn Leonhard, the hospital is seen by him to reproduce the differences brought about by war.

This paper will explore the question of whether soldiers saw the ambulance as being used to the best of its intended purpose or that the destructive nature of war and relative infancy of car technology inhibited its usefulness.

I will study this question through stereoscopes, insignias, interviews, letters, and photographs relating to my artifact.

This artifact being the Ford Model T, the most common vehicle used for ambulances during the war.

In this paper I will explore why my research and previously mentioned analysis of artifacts leads me to believe that, from the personal viewpoints of the soldiers, ambulances, while indisputably useful, could also be a major hinderance to morale and the war effort at large.

This paper will show that as a grim message, a morale-sucking engine of injury, the ambulance enforced the loss of the self inflicted through pain, giving soldiers a bias against it and its perceived usefulness.

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Case Study of Steel Helmets in WW1

In late 1914, Private Brown, a British soldier on sentry duty in a makeshift trench, looked over the parapet just a moment too long; a bullet pierced his skull (Ashurst, Reel 3, 27:20). In *Pandora's Box,* historian Jörn Leonhard argues that, by using technological innovations like sniping and artillery barrages soldiers posed a perpetual threat to each other on the western front (2018, 293-294). In *The Body in Pain,* Elaine Scarry, a philosopher, argues that human beings create objects in civilization that act as a projection of our bodily functions (1985, 39). As a response to mass head injuries, the belligerent nations created mass produced steel helmets for the first time to protect the skull. In this paper, I will apply Scarry's theory of objects to investigate how steel helmets effected soldier's experiences in World War One. I will utilize photographs, soldier's interviews, and painted helmets to show that, as the war continued, soldiers developed a deep connection to their helmets both as a tool for survival and a conduit for self-expression.

Corporal Luther Peterson's Painted helmet. Object ID: 1938.160.0. The National WW1 Museum and Memorial. Accessed April 5, 2024.

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Playing Cards

In the Summer of 1916, Ludwig Wittgenstein, a solider on the Russian frontlines wrote in his diary: "From time to time I become an animal. I can think of nothing but eating, drinking, and sleeping…I suffer like an animal…I am then at the mercy of my appetites and aversions." (Leonhard, 500). Jörn Leonhard, a World War I historian and author of the book Pandora's Box, noted that during the Great War battlefields saw an escalation of violence. Elaine Scarry, philosopher and author of The Body In Pain, argued objects are an extension of the human body. In this paper, I will explore how soldiers on the front line used games as a way to escape the horrors of war. I will answer this question through the study of a deck of playing cards, manufactured by H.V. Loring in 1917. Furthermore, I will use letters and photos to provide evidence for this claim. Soldiers in WWI used cards games as an abstraction to help them not think about death.

Playing cards deck, H.V. Loring, 4557 Oaken Wald Ave, Chicago, Ills; 1917, 2016.24.15a, The National WWI Museum and Memorial, Collections Database, Kansas City, MO. Accessed February 11, 2024.

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World War I Gasmasks as Facades

Figure 1: WW1 British Gas Mask. This artifact is a gas mask worn by a British soldier during the Great War. Equipment from the Auckland War Memorial Museum, Tamaki Paenga Hira Collection. Accession 612653.

At times, injured people create facades to hide their pain; likewise, people create facades to shape how their audiences perceive reality. In my paper, I will explore how World War I *soldiers* created facades to reshape the outcome of the Great War. According to the historian Jorn Leonhard, in an attempt to outflank their enemies in 1915, scientists for the Entente and Central powers created gas masks to protect their soldiers from gas attacks. The scholar Elaine Scarry has argued in her book *The Body in Pain* that soldiers associate their pain with objects and equipment like gas masks in a *reification* of their injuries. In my work, I will emphasize how soldiers did the opposite. By analyzing diaries, letters, and photographs from 1917 and 1919, I will demonstrate that ordinary soldiers tried to actively *dis*associate their gasmasks from their pain to assert their control over the violence of the war.

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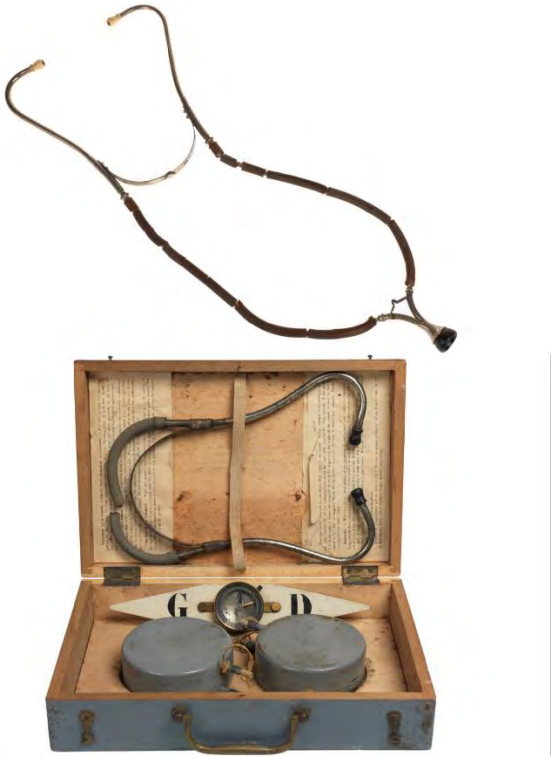
Dueling Fates of the Stethoscope During World War One

1919 Lt. Morley of the 1st T.C. described a key adaptation utilized during the Great War by sappers like himself. **"With the use of the geophone — a very sensitive listening apparatus, on the principle of the stethoscope … our listeners were able to locate the position of the enemy…".** By 1915, The **Western Front had become a stalemate** as Soldiers dug themselves into elaborate trenches. **Jörn Leonhard explains in Pandoras Box**, that the opposing forces **needed to find ways to circumnavigate these deadlocks**, while maintaining their positions with fit soldiers. **Philosopher Elaine Scarry** argues that **human beings create tools** for the purpose of **projecting the functions of the human body beyond themselves**. This research paper will **explore the uses of the stethoscope and it's adaptation into a geophone**. Using instruction **manuals, photographs, and an article**, this paper will show that soldiers, **Medics and Sappers, used these similar technologies** to divergent ends: for both **saving and destroying worlds**.



Top: Scottish Women's Hospital Stethoscope. Catalogue number: EPH 3329. Imperial War Museum. Accessed: April 6 2024
Bottom: Geophone (Pair of geophones), in Box. Catalogue number: FEQ 874. Imperial War Museum. Accessed: April 6 2024

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The Cost of Flight

Major James McCudden was a British pilot in the First World War who authored a posthumous memoir: “I saw a long dark brown form fairly streaking across the sky… a German machine, and when it got above and behind our middle machine, it dived on it… like a hawk on a hapless sparrow.” In his book *Pandora’s* Box, historian Jörn Leonhard correctly argued that at the Battle of “Verdun, both the German and the French armies made their first systematic use of aircraft, which would become increasingly important as the war went on.” In her book *The Body in Pain*, literary critic Elaine Scarry offers thought, saying that “war is a contest where the participants arrange themselves into two sides and engage in an activity that will eventually make it possible to one side the winner and one side the loser… a self-cancelling duality.” My research seeks to understand how early combat aviators were affected by aerial warfare. The Albatross D. Series, which was a line of fighter planes widely utilized by the Central Powers, is a focal point for this study. Through a close reading of their memoirs, oral histories, and photographs, this research will show that these pilots transformed personally and developed socially a sense of camaraderie through their trying circumstances. This story fits the general pattern of soldiering in a new frontier of war and serves as a reference to the cost of national calls to dare.

PBHL 496

Evidence-Based Public Health Capstone & Seminar

Victor Arellano
Faculty Mentor: Joseph Lightner
EUReka! Course: PBHL 496 Evidence-Based Public Health Capstone & Seminar

Transgender and Gender Diverse People: A Review of Proposed Legislation in Missouri

Introduction: State legislatures across the United States, particularly Missouri, have increasingly introduced legislation targeting transgender and gender diverse (TGD) people at an alarming rate in recent years. Submitted bills often aim to negatively impact access to healthcare, civil rights, liberties, and general freedom of expression for TGD people. This study aims to review legislative bills submitted to both chambers of the 102nd Missouri General Assembly during the first regular session of 2023 and their potential impact on TGD people.

Methods: Bills submitted to the House of Representatives (n = 1,539) and Senate (n = 723) of the Missouri General Assembly during the 2023 Regular Session were accessed and reviewed via files from the Missouri House of Representatives and Missouri Senate online archives. Bills (n = 2,262) were reviewed for relevance to TGD people by selecting broad keywords commonly found in recent legislation: accommodation, agender, bathroom, cabaret, cisgender, drag, discrimination, education, expression, feminine, FTM, gender, gender-affirming care, gender dysphoria, genital, health care, hormone, hormone therapy, identity, intersex, _man, marriage, masculine, mental illness, MTF, nonbinary, pronoun, puberty, puberty blocker, restroom, sex, sex education, sexual, sexual orientation, sport, surgery. Legislation submitted during the 2023 Regular Session with at least one keyword associated with TGD people was selected for further review.

Results: Fifty-one bills directly impacting TGD people were submitted during the Missouri Assembly's 2023 Regular Session from the House of Representatives (n = 28) and Senate (n = 23) and were separated into: anti-discrimination, athletics, birth certificate, drag shows, education, employment, gender-affirming care, and workplace. Two bills were passed into law. Twenty-one representatives and 13 senators submitted TGD-related bills during the 2023 Regular Session, with six representatives and seven senators submitting more than one piece of TGD-related legislation. Among the assembly members that submitted TGD bills, 13 representatives and 11 senators affiliated with the Republican Party, while eight representatives and two senators affiliated with the Democratic Party.

Discussion: Of all the bills proposed during the 2023 Regular Session, 2.25% directly impacted TGD people. While this is a small amount of the total proposed bills, the majority of proposed TGD legislation, including both bills passed during the 2023 Regular Session, negatively impacts the population. Legislation with a negative TGD impact far outweighs proposed positive legislation, increasing the risk of passing new laws that limit TGD rights.

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Physical Activity and Stress: A Protocol to Understand Biology, Behavior, and Social Structures

BACKGROUND:

Physical inactivity is a pervasive public health issue; about 25% of adults are completely inactive and about 76% of children participate in little to no physical activities. Increasing physical activity may lead to lower chronic stress experienced by marginalized populations. Marginalized youth tend to experience higher levels of stress during their lifetime due to factors such as segregation, systematic discrimination, neighborhood violence, and poor neighborhood environments. Evidence suggests that these stressors reduce physical activity throughout the life course. The purpose of this study is to describe a protocol for understanding the relationship between stress and physical activity for marginalized youth.

METHODS:

This study employs a cross-sectional, observational approach to measure stress and physical activity. Stress will be measured via salivary cortisol collected using Salivettes. Saliva samples will be analyzed by a centrifugation process that breaks the saliva down. Physical activity will be measured using Garmin watch accelerometers. Non-parametric test (Spearman's r) will be used to test the relationship between stress and physical activity.

RESULTS:

We expect that the results will show that marginalized children who have higher rates of physical activity will have lower rates of cortisol.

DISCUSSION:

Outside stressors (e.g., food insecurity, unsafe neighborhood, etc.) increase stress for youth, especially for marginalized youth. We predict that participation in physical activity will decrease the stress response for marginalized youth. Compared to sedentary youth, physical activity youth will be better able to manage the stressors of everyday life. Future studies should employ more rigorous study designs, including control groups and other comparison groups. Future intervention should understand the effect size of physical activity interventions on stress levels of youth. School districts and policymakers should use the outcomes of this study to increase physical activity in school settings. By increasing physical activity among youth who experience trauma, discrimination, racism, and other negative social factors, we are able to decrease long-term chronic disease and reduce health inequities.

24TH ANNUAL SYMPOSIUM OF UNDERGRADUATE RESEARCH & CREATIVE SCHOLARSHIP

Alphabetic List of Undergraduate Researchers, Scholars, & Artists

FACULTY MENTORS

UMKC's Office of Undergraduate Research & Creative Scholarship has been supported by numerous members of the UMKC community. As always, the talented faculty mentors who give so freely of their time and expertise deserve special recognition.

Rachael Allen
Hayden Baker
Majid Bani-Yaghoub
Deja Beamon
Andrew Bergerson
Rebecca Best
Erin Bumann
ZhiQiang Chen
Angela Cottrell
Midhat Farooqi
Zach Frazier
Kelsey Gardiner
Alison Graettinger
Jane Greer
Joseph Hartman
Dana Hoffmann
Saul Honigberg
Shannon Jackson
Haluk Lacin
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Zhongjin Li
Joseph Lightner
Lark Lim
Jesse Lowe
Jessica Magana
Clancy Martin
Hillary McGraw
Megan Hart
Ryan Mohan
Diane Mutti Burke
Tina Niemi
Johanna Nilsson
Zahra Niroobakhsh
Michael O'Connor
Jeffrey Price
Aaron Reed
Paul Rulis
Julia Snyder
Sarvenaz Sobhansarbandi
Maria Spletter
Alexa Summers
Fengpeng Sun
David Thurmaier
Theresa Torres
Elizabeth Vonnahme
Greg Vonnahme
Jacob Wagoner
Ted White
Westley Youngren

ACKNOWLEDGEMENTS

Many thanks to the supporters of undergraduate research and creative scholarship across campus. Today's symposium would not be possible without their willingness to share news and information; offer feedback to students; provide technical and administrative support; volunteer at events; and advocate for students.

Mary Anderson
Casey Bauer
Bonita Baxter
Ebony Berymon
Sarah Bigge
Gerald Blanton
Jennifer Burrus
Amy Carlson
Curt Crespino
Janet Dexter
Stephane Dissel
Leonard Dobens
Molly Doroba
Stacy Downs
Sarah Dressler
Marjory Eisenman
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