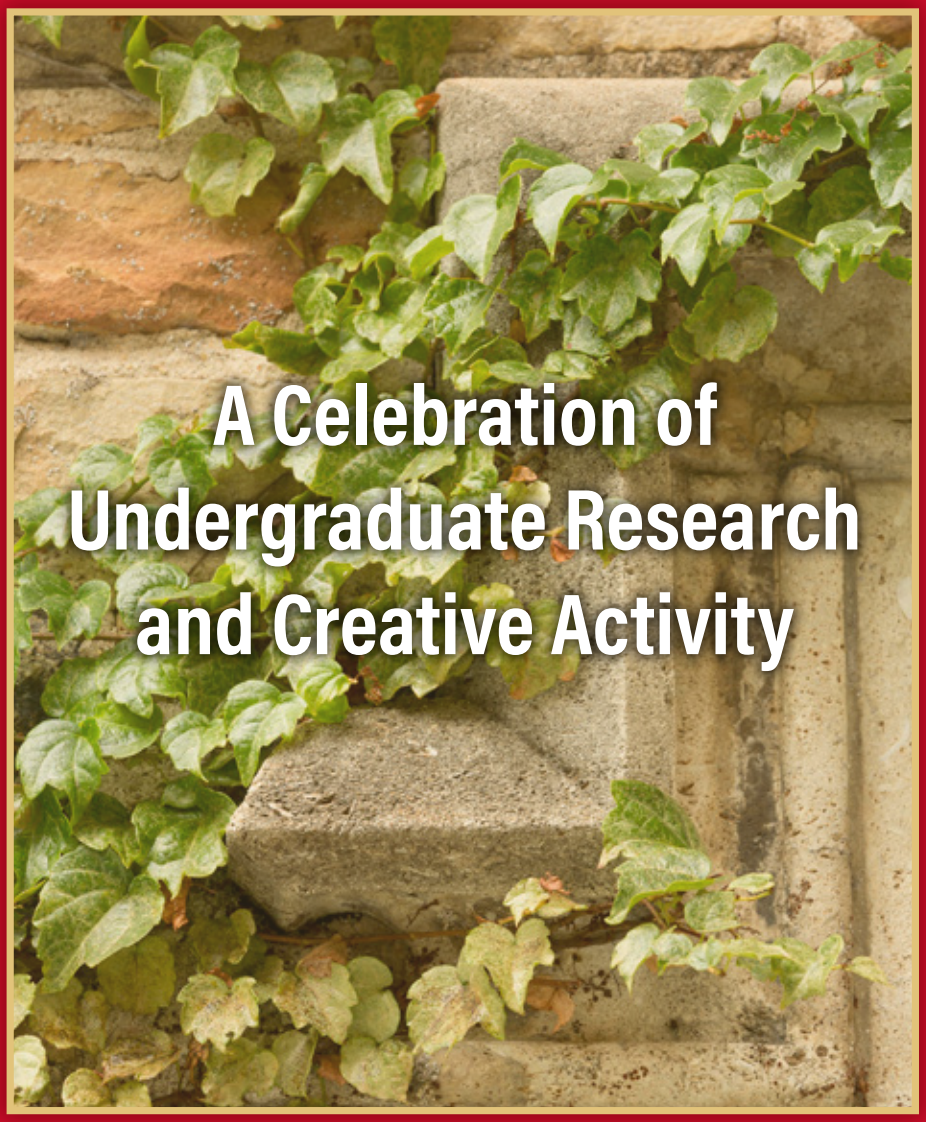
CELEBRATE THE LIBERAL ARTS



RHODES SYMPOSIUM
MAY 2, 2025

rhodes.edu/symposium

Rhodes College

RHODES SYMPOSIUM
MAY 2, 2025

SCHEDULE BY DIVISION

TIME	ROOM	SESSION TITLE	DEPT/PROGRAMS
FINE ARTS			
11:00 – 12:00	Hassell 100	Music	Music
11:00 – 12:20	Clough 204	Media Studies	Media Studies
12:30 – 1:10	Hassell 100	Art History	Art & Art History
2:30 – 3:30	Tuthill Performance Hall	The Cauthen Competition	Music
HUMANITIES			
11:00 – 12:40	Buckman 200	History	History
11:00 – 12:00	Southwestern LLC	Spanish I	Modern Languages
11:00 – 12:15	Briggs 119	Ancient Mediterranean Studies	AMS
11:00 – 12:00	Southwestern 207	English	English
12:30 – 1:30	Southwestern LLC	Spanish II	Modern Languages
12:30 – 1:30	Briggs 119	German I	Modern Languages
12:30 – 1:55	Southwestern 207	English Honors	English
1:30 – 2:45	Southwestern LLC	Spanish III	Modern Languages
1:30 – 2:15	Briggs 119	German II	Modern Languages
2:00 – 3:00	Southwestern 207	Africana Studies/French	Africana Studies
3:00 – 4:15	Briggs 119	Interdisciplinary Studies	Search
3:00 – 4:15	Southwestern 210	Chinese	Modern Languages
3:00 – 4:00	Memphis Turley Ctr	Turley Fellows	Turley Center
3:30 – 4:30	King Hall, Orgill Room	Meeman Center	Meeman Center
NATURAL SCIENCE			
11:00 – 12:00	FJ-B	Physics	Physics
11:00 – 12:00	Robertson 110	Computer Science / Math	CS / Math
12:30 – 1:30	FJ-B	Biology / BMB	Biology / BMB
12:30 – 1:45	Robertson 110	Computer Science I	Computer Science
2:00 – 2:45	FJ-B	Chemistry	Chemistry
2:00 – 3:00	Robertson 110	Computer Science II	Computer Science
SOCIAL SCIENCE			
11:00 – 12:00	Ohlendorf 225	Economics I	Economics
11:00 – 11:40	FJ-D	Social Sciences	Ed. Studies / Philosophy
12:30 – 1:30	Ohlendorf 225	Economics II	Economics
1:30 – 2:00	Ohlendorf 225	Economics III	Economics
2.00 – 3:20	Buckman 200	Politics & Law	Politics & Law
3:00 – 4:15	Robertson 110	Psychology	Psychology
POSTERS			
1:00 – 2:30	BCLC Multi Sports	Poster Session I	
2:45 – 4:15	BCLC Multi Sports	Poster Session II	

LLC == Language Learning Center

RHODES SYMPOSIUM
MAY 2, 2025

SCHEDULE BY BUILDING

BUILDING	TIME	ROOM	SESSION TITLE
Briggs Hall	11:00 – 12:15	119	Ancient Mediterranean Studies
Briggs Hall	12:30 – 1:30	119	German I
Briggs Hall	1:30 – 2:15	119	German II
Briggs Hall	3:00 – 4:15	119	Interdisciplinary Studies
Buckman Hall	11:00 – 12:40	200	History
Buckman Hall	2:00 – 3:20	200	Politics & Law
Clough Hall	11:00 – 12:20	204	Media Studies
Frazier Jelke	11:00 – 12:00	Lecture Hall B	Physics
Frazier Jelke	12:30 – 1:30	Lecture Hall B	Biology / BMB
Frazier Jelke	2:00 – 2:45	Lecture Hall B	Chemistry
Frazier Jelke	11:00 – 11:40	Lecture Hall D	Social Sciences
Hassell Hall	11:00 – 12:00	100	Music
Hassell Hall	12:30 – 1:10	100	Art & Art History
Hassell Hall	2:30 – 3:30	Tuthill Performance Hall	The Cauthen Competition
King Hall	3:30 – 4:30	Orgill Room	Meeman Center
Ohlendorf	11:00 – 12:00	225	Economics I
Ohlendorf	12:30 – 1:30	225	Economics II
Ohlendorf	1:30 – 2:00	225	Economics III
Robertson Hall	11:00 – 12:00	110	Computer Science / Math
Robertson Hall	12:30 – 1:45	110	Computer Science I
Robertson Hall	2:00 – 3:00	110	Computer Science II
Robertson Hall	3:00 – 4:00	110	Psychology
Southwestern	11:00 – 12:00	Southwestern LLC	Spanish I
Southwestern	12:30 – 1:30	Southwestern LLC	Spanish II
Southwestern	1:30 – 2:45	Southwestern LLC	Spanish III
Southwestern	11:00 – 12:00	207	English
Southwestern	12:30 – 1:55	207	English Honors
Southwestern	2:00 – 3:00	207	Africana Studies/French
Southwestern	3:00 – 4:15	210	Chinese Studies
Turley Center	3:00 – 4:00	Turley Center	Turley Fellows
BCLC	1:00 – 2:30	Multi Sports Forum	Poster Session I
BCLC	2:45 – 4:15	Multi Sports Forum	Poster Session II

LLC == Language Learning Center

May 2nd Events

- Awards Convocation: 9:30 a.m., McCallum Ballroom, Bryan Campus Life Center
- Oral Presentation Sessions: 11:00 a.m. – 4:30 p.m., various locations
- Poster Session I: 1:00 p.m. – 2:30 p.m. Multi-Sports Forum of the Bryan Campus Life Center (snacks and refreshments provided)
- Poster Session II: 2:45 p.m. –4:15 p.m. Multi-Sports Forum of the Bryan Campus Life Center (snacks and refreshments provided)

Acknowledgements and Special Thanks

- Communications – Rhodes Symposium program cover design, flyers, and program schedule (esp. Charlie Kenny)
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- Golam Hisham, Rhodes Student Associate for Fellowships – program creation, coordination, approvals, Qualtrics wrangling, and communication

Rhodes Symposium Planning Committee

- Dr. Brian Larkins, Department of Computer Science, Director of Fellowships and Undergraduate Research
- Dr. Brooke Schedneck, Associate Professor, Department of Religious Studies
- Dr. Qian Shen, Assistant Professor, Department of Biology
- Dr. Jacob Sunshine, Assistant Professor, Department of Music
- Dr. Matthew Weeks, Associate Professor, Department of Psychology

Related Events

- Rhodes College Venture Challenge – 5/1 5:30 p.m.-7:30 p.m. – Blount Auditorium
- Lavender Celebration and Reception – 5/2 5:00 p.m.-6:30 p.m. – King Hall
- Media Studies Showcase – 5/4 7:00 p.m.-8:00 p.m – Barret 034

Table of Contents

(F) Rhodes Fellowship

FINE ARTS ORAL SESSIONS

Music
11:00 am – 12:00 pm
Hassell 100
Moderator: Lily Spencer

(F) 11:00 – 11:20 Refugee Empowerment through Creative Arts: Making Art and Music at the Refugee Empowerment Program in Binghampton, Memphis
Ferris Andrews, Raven Baker, Maddie Hazelrig, Grady Bryant
Faculty Sponsor: Vanessa Rogers, Department of Music
This year, with the help of a Lainoff Grant and a Curb Fellowship, four fellowship students at Rhodes College have been working with the children of refugees and immigrants in Memphis by offering weekly group music and art classes for middle- and high school-aged children at the Refugee Empowerment Program (REP). Through the arts, we promote Rhodes College's (and the REP's) goals of assisting our community and building ties between different groups. This presentation will discuss the highs (and the lows) of our attempts to create a space for local kids to express themselves creatively.

11:20 – 11:40 Experiences Writing, Producing, Mixing, and Mastering Original Music
Dorian Coleman and Lily Eckford
Faculty Sponsor: Carole Blankenship and David Shotsberger, Rhodes College Department of Music
As I began brainstorming my final project as a Music Major, I knew I wanted to produce four songs, fully arranged, recorded, mixed, and mastered. I had acquired a large backlog of demos over my time composing and writing, and felt as if I could finish these drafts to complete my four song goal. What I neglected in this process was the appeal of collaboration with other musicians. Lily Eckford and I had worked together over the summer on one of her own songs, I thought it would be a great idea to work together again, contributing two of the four songs I planned to produce for this final project. Once we started working it was very clear that we couldn't just do two songs. Plans started changing and now all four of the songs I present here were created in collaboration with Lily and myself. Together we wrote the songs, planned out recording dates, selected musicians for recording, worked on the mixes, and we hope to release the final project this summer. Before then, I will present four songs from the album and the process of their formation as exemplary of my experience creating this music.

11:40 – 12:00 Artistic Theologians: Examining the Musical and Theological Thought of Martin Luther and John Calvin
Jonathan Sundermeier
Faculty Sponsor: Vanessa Rogers, Department of Music
This research paper explores the theological and musical philosophies of Martin Luther and John Calvin, examining their distinct approaches to hymnody and psalmody during the Reformation. While both Reformers sought to restore congregational singing, their theological convictions shaped their musical choices in different ways. Luther viewed music as a divine gift capable of teaching doctrine and stirring the affections, leading to the development of a vernacular

hymnody that emphasized grace and faith. Calvin, adhering to a stricter interpretation of sola scriptura, promoted metrical psalmody as the only suitable form of congregational song, ensuring that worship remained grounded in Scripture. Through an analysis of their influences, writings, and musical compositions—particularly Luther's Aus tiefer Not and Calvin's Pseaume CXXX—this study highlights how their musical reforms reflected their broader theological frameworks.

Media Studies
11:00 am – 12:20 pm
Clough 204
Moderator: Kate Keith

11:00 – 11:20 Echo Chambers and Empowerment: TikTok's Algorithmic Influence on Public Discourse
Grant Grabowski
Faculty Sponsor: David Maxson, Department of Media Studies
With its explosion in popularity, TikTok is a compelling study of where free thought ends and algorithmic control begins. With over a billion active users, the platform thrives on its promise of democratized creativity. Everyone has a voice, or do they? Beneath the catchy dances and viral trends lies a powerful algorithm, subtly orchestrating and controlling what we see, think, and engage with. By prioritizing viral content and user engagement, TikTok's algorithm rewards conformity over complexity, pushing creators to tailor their voices to fit the system's preferences. While this hyper-personalized feed promises endless entertainment, it also reinforces echo chambers, amplifying familiar perspectives while silencing marginalized voices. This paves a disconcerting path where public spheres are more about engagement than discourse, more about entertainment than enlightenment. While it's fun to engage with, users must be careful of the double-edged blade it wields. TikTok can be both a space for cultural empowerment and a carefully curated echo chamber. How much freedom do we truly have when our digital participation is shaped, even manipulated, by algorithms designed to maximize attention and profit? In a world where what you see is often determined by what you've clicked on before, can anything actually be new?

11:20 – 11:40 The Text, Context, and Consequences of Taylor Swift's 2024 Presidential Endorsement
Aurora Ahlstrom
Faculty Sponsor: David Maxson, Department of Media Studies
This presentation analyzes Taylor Swift's Instagram post from September 10th, 2024, focusing on her endorsement for the 2024 Presidential Election from a rhetorical critic's perspective. By analyzing both the text and context surrounding Swift's endorsement, this rhetorical criticism concludes if, why, and how this short passage persuades readers to cast their vote. In terms of implied context, this presentation examines Swift's complex relationship with AI, a history of being a victim to uninformed media posts, and her past voice of activism throughout her career. As far as written text, this paper will examine the carefully constructed use of irony, the complex timing surrounding the posting of the message, and the object of persuasion. Furthermore, this presentation highlights the consequences of this post, including mixed responses from fans, an immediate influx of individuals who registered to vote, and responses directly from both of the presidential candidates. Studying Swift's endorsement from the viewpoint of a rhetorical critic is

beneficial for a general audience as she continues to establish herself as more than a pop icon, but rather an intellectual and influential figure in today's world.

11:40 – 12:00 Cracks In the Sidewalk
Gracie Shapard
Faculty Sponsor: David Maxson, Department of Media Studies
This presentation examines the importance of everyday rhetorical objects in our daily lives. I argue that viewing sidewalks as both physical and metaphorical beings allows us to understand their significance within societal structures through the ways sound interacts with our movements, how our environment creates rhetoric, and the ways that naturally created paths communicate our historical rhetoric. This presentation encourages audiences to begin to think outside the box of rhetoric. While seemingly mundane, the topic of sidewalks importantly contributes to ongoing scholarly discussions in media and communication studies that try to go beyond the stereotypical boundaries of our social system. This presentation highlights the impact of human relationships with nature and land and how that correlates to the production of rhetoric from our very own feet. My research will help the audience understand the significance of our humanistic movements and how they renavigate social constructs in place.

12:00 – 12:20 The Evolution of Queer Chinese-American Women in Cinema
Sarah Monroe
Faculty Sponsor: Joy Brooke Fairfield and Rashna Richards, Department of Media Studies
While there has been an increase in individual Asian, feminine, and LGBTQIA+ representation in Western film, the intersectionality of those groups is seen few and far between, and thus the research into the topic is even more scarce. In analyzing three of the only well-known films centering queer Chinese-American women—Saving Face (2004), The Half of It (2020), and Everything Everywhere All At Once (2022)—as well as contextually important films in the history of Asian-American film—The Joy Luck Club (1993) and Crazy Rich Asians (2018), a pattern is found in relation to larger themes (both within the context of the film and in the real world) and plot points. Four of five films are produced by Asians or Asian-Americans, and two of five are written and directed by the same person: Alice Wu. Further, each film converses with themes of generational trauma & blame, physical & emotional presentation, and, finally, acceptance & support, all of which reflects the distinct shortage of variety in queer Asian film, and while the depth of existing content is positive, there is significant emotional weight both for spectators and creators knowing that this media has to make a statement in order to be taken seriously.

<u>Art History</u>
12:30 pm – 1:10 pm
Hassell 100
Moderator: Noah Friedman

12:30 – 12:50 Queer, Consume, Consecrate: A Religious Consideration of Andy Warhol's Early Drawings
Kait Berry
Faculty Sponsor: David McCarthy, Department of Art History

In the mid-1950s, Andy Warhol began appropriating his Boy Drawings, reworking them into his Golden Boy series. This transformation from black and white to gold raises the question; Is the artist aiming to uplift the status of the Queer male nude through his newly gilded depictions? If so, do we see an icon as Warhol would have understood it through his Catholic perspective or through the newer notions of a self-actualizing icon that exists as a reflection of an audience's desires? Scholars have continually separated his sexuality from his religion, dividing a lived experience he would have had, as we know the artist was both was Catholic and Queer. It can also be understood that sexuality is a major component in the Catholic faith, therefore, the multidimensionality of the artist is lost when these components of his art and identity are isolated, especially when it would be proactive to consider the inherent overlap these things would have had in his art as they did in his life. This paper seeks to evaluate how Queering commercialism turned products into icons and how the worship of another male's body was not just an act of lust but one of adoration.

(F) 12:50 – 1:10 Unraveling the Mysteries of the Voynich Manuscript Artists
Madeleine Magilow
Faculty Sponsor: Victor Coonin, Department of Art History
For decades, the mysterious Voynich Manuscript has captivated researchers across disciplines. However, while the illustrated codex features both esoteric language and visuals, the former has received the most scholarly focus. This has ultimately left us with little academic analysis of the illustrations, which have long been assumed to be created by a singular artist. My research, done alongside Professor Victor Coonin with funding from a Lainoff Fellowship, has centered around these images and what they indicate about the definitively plural group of anonymous artists and scribes behind the manuscript, as well as how that aids in developing our understanding of the complete document. My presentation focuses on the four distinctive artistic hands I've found within the manuscript and how these styles can be used to characterize the people behind them along with the way their artistic team functioned. While the Voynich features botanical, celestial, and bathing imagery, I will be primarily focusing on the botanical images, a richly creative and varied group of illustrations in terms of visuals and artistic contributors. Within this artwork, I've found supporting evidence for hypotheses regarding the artists' backgrounds, education, genders, and even personalities, helping to indicate intent and meaning within the manuscript.

The Cauthen Competition
2:30 – 3:30 pm
Tuthill Performance Hall in Hassell Hall
Gladys Cauthen was one of the founding influences in the development of the Rhodes College Department of Music, which grew out of the Memphis College of Music. In her honor and memory, Gladys Cauthen's legacy is remembered through the naming of this solo competition. The Gladys Cauthen Solo Competition provides students who are taking applied music lessons at Rhodes College, the opportunity to demonstrate their musical talents by being featured as a soloist during a public concert sponsored by Rhodes College Department of Music. Both a winner and a runner-up will be selected to perform their piece with the Rhodes College Orchestra as an accompanied soloist during the 2025-2026 academic year. All current Freshman, Sophomore, and Junior applied music lesson students who are planning to continue their education at Rhodes College the school year following the competition, are eligible to apply and compete.

HUMANITIES ORAL SESSIONS

History
11:00 am – 12:40 pm
Buckman 200
Moderator: Eliza Fleming

11:00 – 11:20 Pierre Schoendoerffer's Influence on Vietnam War Film Making and its Reflection of Differences in Thought About Western Involvement in Indochina
GraceAnne Hodgson
Faculty Sponsor: Seok Won Lee, Department of History
In 1967, one work about the American military conflict in Vietnam took home an Oscar for best foreign documentary, a French film called La Section Anderson. This documentary was made by director and veteran of France's Indochinese war, Pierre Schoendoerffer, who, thirteen years before, was parachuting into Dien Bien Phu to capture footage of the siege. Though professionally renowned, Schoendoerffer's work remains largely unknown, including several other complex reflections on American and French hostilities in Indochina such as his novels La 317e Section, and Le Crabe-tambour, both of which he also produced in film. Despite the fact that Schoendoerffer remains unknown to most American audiences, he has had a documented influence on the world of American Vietnam War filmmaking, a practice that would become central to the nation's understanding of their involvement. Famous and accredited films such as Francis Ford Coppola's Apocalypse Now and Oliver Stone's Platoon give accolades to Schoendoerffer's impact on their styles of storytelling and cinematography. Pierre Schoendoerffer's own work on war in Indochina, as well as his hand in creating the American film genre, provide an interesting window into this era of film, as well as a new lens to examine this point of cross-cultural exchange.

11:20 – 11:40 Magna Carta as a Market Mechanism: An Economic Take on Legal History
Peyton Randolph
Faculty Sponsor: Sarah Ifft Decker, Department of History
This paper examines Magna Carta through an economic lens, arguing that its primary significance lies not just in its legal principles but in its function as a market mechanism that reshaped England's economy. While traditionally celebrated as a cornerstone of parliamentary governance, Magna Carta was fundamentally an economic contract between the monarchy and the barons, designed to regulate taxation, standardize trade, and secure property rights. Ultimately, Magna Carta's legacy extends beyond law into the realm of economic history, illustrating how legal structures evolve in response to market forces.

11:40 – 12:00 Disaster Revisited: The Internal Themes of the Kaiju Genre in Postwar Japanese Media
Luke Crocker
Faculty Sponsor: Sarah Ifft Decker, Lynn Zastoupil, Department of History
In my research article, "Disaster Revisited: The Internal Themes of the Kaiju Genre in Postwar Japanese Media," I first analyze the sociopolitical and artistic background of pre-1954 Japan and Japanese cinema. I then use the examples of Godzilla (1954) and Ultraman (1966) to explore themes of wartime devastation, the end of empire, environmental degradation, atomic anxieties,

and reemergent Japanese power. My approach intensively examines these two pieces of media through these themes, and problematizes why the background of these franchises and their continued success in the Japanese media market. I argue that the popularity of the kaiju genre, to which both franchises belong, is representative of their success at channeling popular sentiments while remaining silent on certain uncomfortable historical truths. Similarly, this success remains in the present with recent adaptations of Godzilla. My article is published in the Rhodes Historical Review for this academic year as well.

12:00 – 12:20 The World's Savior: How Billy Graham's South Korea Crusade Became an Avenue for America's Cold-War Agenda
Tanner Chapman
Faculty Sponsor: Sarah Ifft Decker, Charles Hughes, Department of History
Billy Graham's 1973 South Korean crusade was not simply a religious revival; it also helped to advance U.S. Cold War policy. This paper highlights how Graham and fellow minister Billy Kim aligned their evangelical interest alongside the U.S. geopolitical interests in the Korean peninsula, particularly in the fight against Communism. Ultimately, this paper will examine a variety of both primary and secondary sources, including personal correspondence between Billy Graham and President Dwight D. Eisenhower, writings from both Billy Graham and Billy Kim, as well as numerous books, articles, and publications detailing the life, times, and mission of Graham's visit. The paper will seek to argue that in analyzing the Cold War in South Korea through the lens of religion, Christian Evangelicalism became an avenue for pro-United States sentiments and the promotion of a "Western Agenda," allowing for the solidification of U.S. presence and involvement in the Asian Peninsula.

12:20 – 12:40 Women's Agency in Medieval Healthcare: Sexism as an Outcome of the Professionalization of Medicine
Sarah Finch
Faculty Sponsor: Sarah Ifft Decker, Department of History
In parallel with the 12th century European medieval legal revival, there was an equal effort on the part of medical practitioners to professionalize their own work. One outcome of this professionalization was the exclusion of women from their own healthcare (i.e., practicing gynecology and obstetrics). Much scholarship blames this exclusion on the introduction of sexist policies in tandem with professionalization efforts which claimed that women were unfit to practice medicine or otherwise 'tainted' the profession with their femininity. However, a further analysis of 12th and 13th century court cases where women were excluded indicates that the actions of these courts were frequently driven by financial, comparative, or structural reasons. Although the outcomes (banning women from practicing medicine) are clearly sexist, the intention of sexism on the part of fellow medical professionals is unclear at best. This investigation into the role of women in healthcare in the 12th and 13th centuries makes a strong case for sexism as an incidental outcome of the professionalization of medicine, rather than a primary aim of it.

Interdisciplinary Studies
3:00 pm – 4:15 pm
Briggs 119
Moderator: Kait Berry

3:00 – 3:15 The White Knight: Protecting White Conservative Womanhood and Identity
Lilia Russell
Faculty Sponsor: Benjamin Curtis, Interdisciplinary Humanities
Conservative women often consider themselves to be anti-feminists, and in extreme cases they consider themselves feminists who exclude certain groups of individuals (i.e., TERFS). As Second Wave feminism rose to prominence in the 1960's and 1970's, conservative women against feminism advocated against the Equal Rights Amendment (ERA) and against pro-abortion stances as they interestingly found these political stances to be anti-women. For these women, it seems being a woman is the most important aspect of their identity. However, intersectionality–a core concept of Third Wave feminism–explores the idea that different identities of an individual intersect and create unique experiences, often dealing with different experiences of oppression, for every individual. Thus using the idea of intersectionality along with the Social Identity Theory–where our group membership informs our self-concept and self-esteem–I will analyze how important being a woman is for conservative white women, but also how they fail to recognize that their identity intersects with their race. For this analysis of the intersectionality between gender and race for conservative white women, I will also analyze how their identity can be tied to white supremacy and fascist ideologies

3:15 – 3:30 Environmental Racism: A Historical and Modern Approach
Cas Perry
Faculty Sponsor: Benjamin Curtis, Interdisciplinary Humanities
This research project aims to investigate the historical and current applications, as well as visible repercussions of environmental racism in the greater Memphis area. The primary objectives are (1) to define environmental racism and (2) seek historical examples in the southern United States, in order to highlight its often unspoken, yet deeply felt presence in impacted communities. The manner in which these biases are portrayed in literature and the media is also discussed. Further, the discernible cycles and patterns that companies engage in when zoning in underrepresented and affected communities and the consequences of these devices throughout history are examined. A specific focus is placed on the multimillion dollar xAI facility built in southwestern Memphis and its relationship with the community in Boxtown. By engaging with organizations dedicated to environmentalism in Memphis and consulting literature that analyzes disproportionately influenced areas and their relationship with pollution and injustice, this paper aims to interpret and showcase the historically present environmental injustice.

3:30 – 3:45 The Limits of Thought: Kant, Meillassoux, and the Question of the Absolute
Kate Keith
Faculty Sponsor: Benjamin Curtis, Interdisciplinary Humanities
This paper situates Kant's Critique of Pure Reason in dialogue with Quentin Meillassoux's After Finitude. Meillassoux critiques Kant's epistemic framework, describing it as 'correlationist'—the idea that reality is only accessible when filtered through experience, never as it is in itself. By binding knowledge to perception, Kant redefined the limits of human reason and grounded later

philosophical developments that, according to Meillassoux, prevent knowledge of an absolute. However, a close reading of Kant's Critique suggests that his project is not merely restrictive but an attempt to establish the necessary conditions for objective knowledge. In doing so, Kant seeks to navigate between dogmatic metaphysics and radical skepticism. By revisiting Kant through Meillassoux's critique, this paper clarifies the rationale behind Kant's transcendental turn. Ultimately, this reading highlights a central tension in contemporary metaphysics: whether philosophy must remain bound to relation or break free into an absolute outside.

3:45 – 4:00 Neuroscience and the Philosophy of the Self: A Multi-dimensional Perspective
Areej Khan
Faculty Sponsor: Benjamin Curtis, Interdisciplinary Humanities
My paper will address the interdisciplinary nature of neuroscience with the philosophy of mind through the lens of the self. Drawing from David Hume's understanding of the self, the self is conceived of a person's characteristics, unique personality, emotions and experiences that distinguishes them from other individuals. Humans are generally understood to be biological, computational, and functional beings - three perspectives that will be examined in relation to selfhood. After establishing the philosophical foundation of the self, the paper will dive into the neurological and psychological disorders such as dissociative identity disorder and schizophrenia, which challenges the notion of a singular, unified self. Addressing these diseases will argue that the self is a compilation of context-dependent experiences that are subjective to human behavior. Ultimately, the paper will support the idea of the self being a complex, multi-faceted process that is shaped by biological, computational, and functional mechanisms born from both biological brain activity and cognitive operations.

4:00 – 4:15 Secularization of Buddhism in the West
Maximillian Martin
Faculty Sponsor: Benjamin Curtis, Interdisciplinary Humanities
My project is on the secularization of Buddhism in the West. A declining level of cultural influence on Religion allows the idea of practicing the values that Buddhism teaches, such as mindfulness, meditation, and straying from worldly desires, without the deeper implication of the spiritual practice of Buddhism. Over time, this concept has become increasingly accepted as, throughout history, many countries have stopped governing through religion. As people became more individualized, countries. Specifically, America allowed those governed by the state to have no obligation to follow a religion. The movement away from a theocracy allowed those approaching religion to have no obligation to coincide with one specific opinion and allowed for diversity within belief. This lack of obligation was met with the reframing of the religion, making it far less spiritual and more of a practice that helped individuals mentally. The reformation of ideology about Buddhism is being fought in differing perspectives through David McMahan's book, Making of Buddhist Modernism, Charles Taylor's book, A Secular Age, and Ann Gleigs's book American Dharma: Buddhism Beyond Modernity. These books give differing perspectives on the modernization and Westernization of Buddhism, reforming it into a mindful practice.

Spanish I
11:00 am – 12:00 pm
Southwestern LLC
Moderator: Elizabeth Pettinaroli

11:00 – 11:15 Decolonization in Sab: Race, Gender, and Resistance in Colonial Cuba
Kearstyn Seay
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
This project looks at the novel Sab by Gertrudiz Gomez de Avellaneda through a decolonial perspective that allows a critique of the injustices of colonial rule, and prefigures modern discussions about Afro-Caribbean identity, forced migration; and how race and gender shape the struggle for freedom. Sab offers a strong critique of oppression racial injustice and gender inequality. The novel highlights the struggles of marginalized people and questions the traditional ideas of freedom and belonging, calling attention to issues that remain relevant today in day, such as Afro-Caribbean identity and the lasting impact of the colonialism. Looking at Sab through a decolonial perspective helps us see how literature can reflect and challenge the oppression, showing that Avellaneda's novel continues to be important in discussions about race, gender, and freedom.

11:15 – 11:30 Erased but Unforgotten: Women's Narratives and the Fight Against the Pact of Silence in Franco's Spain
Zoe Zigler
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
This project explores the pact of silence (pacto de silencio) and its impact on women's experiences during and after Francoist Spain. The pact of silence suppressed historical memory and prevented open discussions about the human rights abuses committed under Franco's regime. Women, particularly political prisoners and marginalized individuals, were among those most affected by this repression. Faced with forced silence, they turned to literature and oral history as tools of resistance. This study analyzes *Cárcel de mujeres* by Tomasa Cuevas and *Las mujeres caminaron con el fuego del siglo* by Lidia Falcón to examine how female voices, long erased, were reclaimed through testimony. Additionally, *El Patronato de Protección a la Mujer* by Carmen Guillén Lorente reveals the state's role in controlling and silencing women under the pretext of moral protection. These narratives demonstrate how personal testimonies and collective memory serve as a means of historical justice and healing from social trauma. The study also explores the enduring legacy of the pact of silence in modern Spain and the continued fight to recover historical truth. By amplifying female voices, literature serves as an act of defiance against systemic repression. Ultimately, this project argues that literary resistance plays a crucial role in challenging historical erasure.

11:30 – 11:45 The Discourse of Scarcity in the Literature of Spanish Social Resistance in Times of Crisis
Nolita Palomar
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
This study explores the concept of scarcity in *Nada* by Carmen Laforet as a counter-discourse to the official Francoist narrative of postwar Spain. The Franco regime sought to project an image of stability and prosperity, encapsulated in slogans such as [No home without lumber, no

Spaniard without bread]. However, *Nada* directly contradicts this rhetoric by exposing the harsh realities of postwar life that is marked by deprivation, repression, and emptiness. Through its depiction of material, emotional, and symbolic scarcity, the novel critiques the official version of history that sought to erase the suffering and trauma of the Spanish Civil War. The protagonist, Andrea, arrives in Barcelona with hopes of independence and opportunity, only to find herself trapped in an oppressive environment where hunger, poverty, and isolation define daily life. The house on Aribau Street reflects the state of postwar Spain, where economic hardship mirrors the emotional and psychological conditions of its residents. Silence and censorship further contribute to a scarcity of memory, suppressing personal and collective trauma. This project analyzes how *Nada* amplifies the idea of absence to make the uncertainty and fear of the Francoist period irrefutable. Through spatial representation, character development, and narrative techniques, Laforet transforms the notion of nothingness into an act of resistance, challenging the illusion of national stability imposed by the regime. By portraying a world stripped of resources, agency, and hope, *Nada* offers a stark and authentic portrayal of postwar Spain, ultimately reclaiming suppressed voices and memories through its literary denunciation.

11:45 – 12:00 The Female Migrant Experience in "La Carreta": A Puerto Rican Sociolinguistic Perspective
Anna Rush
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
"La Carreta" is a play by René Marqués about a family of jíbaros, or Puerto Rican farmers, who migrate to New York in search of a better life. In my presentation, I make three main comparisons. Firstly, I focus on how the family's experience differs from those of native New Yorkers. Next, I compare the experiences of the women in the family—Juanita and Doña Lola—to the men. Lastly, I argue that Juanita's experience in the mainland United States primarily differs from Doña Lola's because of her ability to speak English. Using feminist theory, migration theory, and a sociolinguistic lens, I explore how the family, particularly the women, adapt to life in a strange new land.

Spanish II
12:30 pm – 1:30 pm
Southwestern LLC
Moderator: Elizabeth Pettinaroli

12:30 – 12:45 The "Emplotments" of Soccer in Latin American Literature
Connor McMahon
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
My research examines how Eduardo Galeano's 'El fútbol a Sol y Sombra'(Football in Sun and Shadow) explores soccer as a literary narrative that shapes national identity. Using the literary technique of "emplotment," a phrase coined by author Hayden White, Galeano turns historical events relating to soccer into a story that reflects the cultural, political, and emotional ties between soccer and nationalism in Spanish-speaking countries and beyond. Soccer is more than just a game or sport, it is a collective narrative that builds and shapes national identity. Through his work, Eduardo Galeano positions himself as both a historian and a storyteller, carving soccer and the individual stories that surround it into a story that explores themes of passion, power, and nationalism. Eduardo Galeano's "El Fútbol a Sol y Sombra" serves as a lens to explore how

soccer functions as a tool to build national pride and identity in Spanish-speaking countries and globally. Galeano's work reveals the cultural, political, and emotional ties between sport and national identity. Through Galeano's work, we can see that history is not simply about facts, but rather it is the way these facts are explained and explored that gives them a distinct meaning. Through the use of emplotment, Galeano turns soccer's most infamous moments into a drama where nations discover heroes, suffer tragedies, and celebrate victories. Galeano's framing of history illustrates that soccer is more than just a game but also a reflection of key themes like identity, pride, and struggle. Galeano's work reveals how soccer can function not simply as a sport, but as both a unifying and divisive tool in relation to national identity. While some governments manipulate the sport for power and control, soccer also becomes a source of resistance

12:45 – 1:00 Poetry as a Vehicle Against the Linguistic Racialization of Latinx Bodies in Educational Environments
Esther Lamb
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
This project analyzes the works *Primera Página* and *The Poet X* by The Latino Writers Collective and Elizabeth Acevedo, respectively, to better understand two things: The linguistic racialization suffered by Latino students and how poetry works as a means of protest against these struggles. This unique theoretical lens is supported by the books *Looking Like a Language, Sounding Like a Race* by Jonathan Rosa and *Borderlands/La Frontera* by Gloria Anzaldúa, as well as the article "The New Oral Tradition: Spoken Word Poetry as a Platform for Civic Engagement in the Digital Era" by Grace Yoon. I argue that the various authors of *Primera Página* and *The Poet X* intentionally chose poetry as a medium for their narratives because its lyrical form reflects the historical silence of Latinx voices. Through their poetry, these authors illustrate how linguistic racialization lends itself to the negotiation of cultures among Latino students, which positions being in an educational environment as a burden. The poetic literature of Latinx authors offers audiences a window into the complexities of translingualism and the realities of linguistic racialization in the Latinx community.

1:00 – 1:15 The Reinvention of Argentine Identity through the Milonga in José Luis Borge's "Para las seis cuerdas"
Rachel Zurbuch
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
In Argentina, the milonga is regarded as a widely popular and cultural dance for the country. The milonga — a dance that helped create the tango — originated in the neighborhoods of Buenos Aires, Argentina and Montevideo, Uruguay in the late 19th century. It quickly became a cultural and national phenomenon in Argentina. Milonga halls, songs, poems, and other literature developed to describe the impact and relevance. Argentine poet and writer Jorge Luis Borges wrote a variety of works about the importance of the tango and milonga in Argentina. In his poetry, Borges showcased the importance of the milonga. In his collection of poetry called "Para las seis cuerdas," Borges wrote about Argentina's culture and the impact of milonga on it. Borges uses his poems in "Para las seis cuerdas" to persevere a memory in Argentina and create a national identity through the milonga. Borges creates a mystic space that represents the importance and history of the milonga. The impact of Borges' writing in Argentina revolutionizes the phenomena of two Argentine identities: one for the cowboy called the

"gaucho" and one for the tango, as seen in the milonga. In this project, "Para las seis cuerdas" will be analyzed for the influence of the milonga on the culture of Argentina. It will conclude that through the use of "Para las seis cuerdas," Borges creates another national identity within Argentina that is not only the gauchos.

1:15 – 1:30 The Sacred and the Profane in "El lobo, el bosque y el hombre nuevo" by Senel Paz
Olivia Garcia Walsh
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
Senel Paz's short story "El lobo, el bosque y el hombre nuevo" tells the story of the friendship between a gay artist and a young revolutionary in Havana, Cuba roughly thirty years after Fidel Castro's revolution. The two men meet at an ice cream shop in the center of Havana, and from there, their relationship develops. Throughout the story, Diego, the gay artist, and David, the young revolutionary studying at the university in Havana, challenge each other and their beliefs about art, religion, and the revolution that turned their country upside down. Given that one of the two primary characters identifies as "*maricón*," "El lobo, el bosque y el hombre nuevo" by Senel Paz and director Tomás Gutiérrez Alea's film adaptation, *Fresa y chocolate*, have received a great deal of attention as queer works of art. As many critics have observed, however, both the story and the film adhere to stereotypical notions of homosexuality. In this project, I propose that "El lobo, el bosque y el hombre nuevo" complicates the sacred and profane in order to challenge inherited narratives about sexuality, the Cuban revolution, and religion.

Spanish III
1:30 pm – 2:45 pm
Southwestern LLC
Moderator: Elizabeth Pettinaroli

1:30 – 1:45 Translingualism and The Translational Turn in Junot Díaz's "Negocios"
JM Simms
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
This project examines how the monolingual culture of the United States has created a hostile and uncomfortable learning environment for English learners. Through the perspectives of *The Politics of Translingualism* by Jerry Won Lee and *A Translational Turn* by Marta Sánchez, this project analyzes Junot Díaz's *Negocios* and what the collection of stories reveals about the immigrant and language-learning experience in the United States. I argue that Díaz's work explores the idea of translingualism among youth in the United States and how a multilingual framework promotes the blending of social and cultural expression, challenging the dominance of monolingualism in the country. His writing introduces readers to the linguistic practices and cultural challenges of the Dominican American experience. Furthermore, I preliminarily conclude that the monolingual culture of the United States creates an experience of abjection, which Díaz portrays in *Negocios.*

1:45 – 2:00 The Medicalization of Humanity: Exploring Counternarratives of Illness in "La muñeca menor" and "Parirás con dolor"
Kelsey Steinmetz
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
Healthcare and literature are seldom considered complementary disciplines. However, the creative mystification of illness has shaped how diseases—and those who suffer from them—have been perceived and treated throughout history. The short stories "La muñeca menor" by Rosario Ferré and "Parirás con dolor" by Jenny Soto, though fiction, contribute to this historical canon of illness, influencing both societal perceptions of patients and medical treatment practices. Each narrative blends literary and historical elements, offering engaging storytelling while simultaneously critiquing oppressive, and potentially deadly, hierarchies in healthcare. This project explores how literature not only serves as a powerful means of self-expression in the face of illness and mortality but also functions as a critical lens to expose and challenge systemic injustices within the medical field.

2:00 – 2:15 Parallel Exploitations: Nature and Women's Roles in La vi mutar by Natalia Rodriguez, and the Call for a Denaturalization of Nature's Reproductive Perceptions in Capitalism.
Camille Quiampang
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
This project will focus on exposing the parallel exploitation of women and nature in the literary text La vi mutar by Natalia Rodriguez Simon. I will explore the theories of materialization of nature and social reproduction theory with nature's undermined role in social reproductive work. My thesis is the following: In La vi mutar, Natalia Rodríguez Simón draws a parallel between the exploitation of women and extractivism in nature. In the work, a mother suffers from a debilitating mysterious condition caused by a silent toxicity. I propose that the author presents this story as a metaphor for the pernicious effects of patriarchal and capitalist exploitation on nature. Through a double structure in the work, Simón challenges the naturalization of women and nature in their reproductive role to reimagine new modes of existence that reverse the control of the capitalist system. I will argue that the end of the story's literary symbol of an alamo tree, which grows uncontrollably to take over the now abandoned town, is a symbol of the possibility of a new world where nature has more power over capitalism, and symbols a penetrating destruction of logic and our comfort to follow the natural order of life.

2:15 – 2:30 Meaning, Form, and the Representation of Child Migrants in "Los niños perdidos" by Valeria Luiselli
Lily Resha
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
Affect Theory provides a key framework for understanding why the form of Luiselli's novel creates such a powerful representation of the migrant child's experience. By focusing on the emotional impact of her narrative structure, it becomes clear how Luiselli's use of fragmented storytelling and intimate interviews allows the reader to connect deeply with the lived experiences of child migrants. Specifically, the dialogues between the children and Luiselli highlight the vulnerability and humanity of the migrants. Through her interviews, Luiselli crafts more intimate and poignant moments, where the emotional weight of their stories resonates profoundly. These exchanges not only deepen the reader's empathy but also illustrate the

complexities of displacement and the psychological toll on young migrants. By examining these intimate moments in greater detail, it becomes evident how Luiselli's unique approach to narration and form provides a more empathetic and humanizing perspective on the migrant crisis.

2:30 – 2:45 "Una Pesadilla Circular": El desafío literario del sueño americano
Maya Khalife-Hamdan
Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages
This study examines how Valeria Luiselli challenges the existing notion of the American Dream through literary symbolism in her essay "Los niños perdidos: Un ensayo en cuarenta preguntas" (2019). Luiselli centers her writing around the symbol of the "pesadilla circular" in describing child migrants' journey crossing the Southern Border and experience within the United States. Although the circular narrative style generally signals coherence and consistency, Luiselli departs from this literary tradition by employing the structure to emphasize the urgent and distinctive nature of the current state of migrant rights in the US. Through her application of circularity, Luiselli foregrounds the historical socio-political dehumanization of child migrants and the lack of systematic change surrounding the issue. Nonetheless, she also suggests an escape of this circularity through citizens' and activists' mobilization and engagement. Luiselli's divergence from traditional literary structure accentuates the unique dehumanization of the situation and the exigent action needed to achieve critical change.

Chinese
3:00 pm – 4:15 pm
Southwestern 210
Moderator: Han Li

3:00 – 3:15 From "Leftover Women" to "56-Year-Old Auntie Who Hits the Road": China's "Accidental" Feminists
Maya Bridgeman
Faculty Sponsor: Han Li, Department of Modern Languages
China has witnessed the rise of "accidental" feminist icons over the past decade. One notable phenomenon is the emergence of the term "leftover women" as a significant topic in Chinese society. With its growing presence in official discourse and mass media, it has sparked widespread debate. Why do some women choose not to marry? What does this term truly signify? And what impact does it have on women's lives? At the same time, older women—often confined to traditional domestic roles—have found empowerment through social media, using it as a platform to pursue personal fulfillment and happiness. My project examines these women who reject conventional gender norms, proudly transform societal shame and stigma into a badge of honor and become China's "accidental" feminists.

3:15 – 3:30 From "Leftover Women" to "The Determination to Leave": Changing Gender Politics in Contemporary China
Andy Chai
Faculty Sponsor: Han Li, Department of Modern Languages
From "Leftover Women" to "The Determination to Leave": Changing Gender Politics and Family Relations in Contemporary China. In contemporary China, people have observed two

simultaneously contrasting and interconnected phenomena regarding women at two ends of the age spectrum. On the one hand, there is a group of young, successful, and financially independent women who choose not to get married despite the mounting societal pressures, causing them to be referred to as "leftover women" (剩女, shèng nǚ). My project examines the phenomenon and politics behind labeling these women as "leftover." On the other hand, an increasing amount of elderly women who have traditionally been confined in a domestic household and endured unpleasant or abusive domestic relationships are now discovering the "determination to leave." The rapidly changing Chinese social media landscape seem to empower these women. By analyzing the parallels and differences between these two groups, my paper seeks to help us understand the changing gender politics and family relations in contemporary China, where women on both sides of the age spectrum are rebelling against entrenched patriarchal norms.

3:30 – 3:45 From "World Factory Worker" to "China's Van Goghs": The Blood, Sweat and Tears of Chinese Migrant Workers
Matthew Zhang
Faculty Sponsor: Han Li, Department of Modern Languages
Since China's reform and opening-up in 1979, the country has witnessed the largest human migration in history. Millions of rural residents have migrated to urban areas in search of employment opportunities. The majority of these migrant workers have found jobs in factories, becoming the backbone of China's rise as the "world's factory." However, despite their crucial role in the global supply chain, they are often denied the same rights and benefits as urban residents. While many remain at the bottom of the global production and consumption hierarchy, some have transcended their circumstances-such as migrant workers who, after years of replicating famous oil paintings, began creating original artworks to express their own artistic visions. My paper analyzes a series of documentaries that capture different facets of the migrant worker experience, including their living and working conditions, family struggles, aspirations, and the blood, sweat, and tears on their journey to becoming "China's Van Goghs."

3:45 – 4:00 "To Tell China's Story Well": The Global Communication of the Belt and Road Initiative
Eleanor Ellsworth
Faculty Sponsor: Han Li, Department of Chinese, Department of Modern Languages
In 2013, China's president Xi Jinping introduced the Belt and Road Initiative (BRI / 一带一路), a global infrastructure development strategy that has now expanded to over 140 countries worldwide and been a considerable determinant of China's foreign policy approaches, especially in the Global South. Interestingly, media coverage of the BRI from Western media outlets has been overwhelmingly negative despite the BRI's considerable reach. This project looks the media representation of the BRI from China's end, ranging from state media textual coverage to documentaries produced by various agencies to "self/we-media" influencers' stories. By examining these primary materials, the paper discusses the strategies used by China's various media outlets to garner greater international support for the BRI, their evolution over time and the efficacy of these methods.

4:00 – 4:15 Between Master Narratives and Lived Realities: Africans in Contemporary China
Luke Antesberger
Faculty Sponsor: Han Li, Department of Modern Languages
Historically, China has not been a country of immigrants. In fact, it is often regarded as one of the world's largest exporters of emigrants. However, in contrast to this reality, hundreds of thousands of Africans have come to China for various purposes. Why do they come to China? What are their lives like in the country? And, how is their presence perceived by Chinese society and represented in the media? This project analyzes a range of media portrayals documenting the lives of Africans in China, including state-sanctioned narratives, independent and non-official perspectives, and social media (self) representations. By examining the patterns behind these narratives, this project aims to offer a deeper understanding of the realities of African migrants in China and the everyday social dynamics that shape China-African relations.

Ancient Mediterranean Studies
11:00 am – 12:15 pm
Briggs 119
Moderator: Maximillian Martin

11:00 – 11:15 The Mithraeum of Hawarte and the "City of Darkness" Fresco
Sarah Curran
Faculty Sponsor: Kenny Morrell, Department of Ancient Mediterranean Studies
Of the gods worshipped in ancient Rome, few are less understood than Mithras, the Persian bull-slayer god. Though many mithraea dedicated to him remain, we know very little about his cult's practices. In one such temple, in the town of Hawarte 270 kilometers north of Damascus, sits a fresco known as the "City of Darkness" for its depiction of decapitated heads atop darkened city walls. The mithraeum at Hawarte hosted rituals until the fifth century CE, despite Rome's embrace of Christianity. My project investigates the fresco's unique nature relative to the changing religious climates. Michal Gawlikowski, who excavated Hawarte, recalled no motif like it in Mithraism, and thought it Zoroastrian. While scholars have not formed a consensus, most now believe it non-roman, and many, like Gawlikowski, agree the piece is Zoroastrian. In addition to examining its origins, I will discuss its possible interpretations in a historical context, which I believe are a key factor in its uniqueness. I believe the fresco exists only at Hawarte because local people melded Mithraism and Zoroastrian theology as a reaction against Christianization.

11:15 – 11:30 Gaius Marcius Coriolanus in the Accounts of Livy, Dionysius of Halicarnassus, and Plutarch
Sarah Sanders
Faculty Sponsor: Susan Satterfield, Department of Ancient Mediterranean Studies
Gaius Marcius Coriolanus is a famous historical figure from early Rome. Three accounts from ancient times exist today and are believed to be complete. These accounts are written by Roman historian Livy in his *Ab Urbe Condita* (27 BCE), Greek historian Dionysius of Halicarnassus in his *Roman Antiquities* (7 BCE), and Greek biographer Plutarch in his *Parallel Lives* (100 CE). While scholars recognize that these accounts discuss the same man, the content is not always consistent and in some places varies dramatically. However, these authors agree Coriolanus is an accomplished Roman general, who partners with the Volscians after being banished from Rome.

Leading the Volscian army, Coriolanus intends to invade his homeland, a plan he abandons after hearing the pleas of the Roman women. The details chosen by these authors paint Coriolanus in a positive or a negative light, making his story flexible. This larger project concludes that the discrepancies occur as a result of each author's attempt to support his perception of Coriolanus. To illustrate these observations, this presentation examines each author's depiction of Coriolanus' death and how the inclusion and omission of certain details distorts the audience's interpretation of this figure to the author's wishes.

11:30 – 11:45 Poem 63: The Feminine, Religious, and Mythic Faces of Catullus
Noah Friedman
Faculty Sponsor: Kenny Morrell, Susan Satterfield, Ancient Mediterranean Studies
The Roman poet Gaius Valerius Catullus (84–54 BCE) left behind a large collection of first-century BCE neoteric poetry. In Catullus' poem 63, he follows Attis, a young man who travels to the Phrygian wilderness, now modern-day northwestern Turkey. After Attis arrives, madness overwhelms him, and he castrates himself in the name of Cybele—a Phrygian goddess the Romans call Magna Mater. Earlier traditions depict Attis' castration, but Catullus alters core aspects of the myth. In poem 63, Attis' castration transforms him into a Gallus, a eunuch priest who castrates himself for Magna Mater. Latin literature portrays the Galli as emasculated and feminine due to their ritual castration, and historical texts describe them as presenting themselves in an effeminate manner. These themes also appear in Catullus' poetry about a woman he names Lesbia. In Poem 11, he describes his love as an effeminate flower and Lesbia's infidelity as the plow that cuts it down. By associating Lesbia with a plow—a sexual term for men in Latin literature—Catullus reverses traditional gender roles. By cross-referencing Attis' speeches in poem 63 with his writings on Lesbia, I will show how the relationship dynamic between Attis and Cybele mirrors how Catullus portrays his relationship with Lesbia.

11:45 – 12:00 The Vestal Virgins: Death, Duty, and Deception
Sydney Lucas
Faculty Sponsor: Kenny Morrell, Department of Ancient Mediterranean Studies
Sacrifice in the ancient Roman World comprises social, political, and religious elements. While the Romans showed commitment to rituals and religious practices, human sacrifice was one they associated with barbarity and something foreign to their own culture. The deaths of the Vestal Virgins challenge this perspective. These women, a group of female priestesses who were honored for their purity and symbolic role within society, were put to death when found guilty of violating their vows of celibacy. The execution of a Vestal falls under a form of "ritual murder" due to the religious characteristics of the death. By examining the Vestals' social status, the rituals surrounding their death, and the role of virginity, I argue that the Vestals were seen as symbolic embodiments of the city itself. In turn, this symbolic role, combined with their detachment from the traditional family structure, allowed the Romans to view their deaths not as sacrifices to the gods but as acts of ritual murder in times of crisis. I will support this conclusion by analyzing trial of three Vestals in 114 BCE.

12:00 – 12:15 Paul and Seneca: Warriors
Andrew Pickens
Faculty Sponsor: Kenny Morrell, Department of Ancient Mediterranean Studies
Paul and Seneca were influential figures in the first century CE, both living under the reign of Emperor Nero, but with different experiences. Paul, a Christian apostle, faced persecution, while Seneca served as Nero's advisor. Despite their different roles, they shared similar views on the moral dangers of public violence, particularly the brutal spectacles in Roman arenas, such as gladiatorial games and public executions. Seneca, in his writings like Letters to Lucilius, condemned these violent spectacles, arguing that they desensitized people to human suffering and eroded moral values. He believed that such cruelty degraded both the victims and the spectators. Paul, in his letters to early Christian communities, also criticized violence and encouraged peaceful resistance. He taught that Christians should avoid retaliation and live with compassion, emphasizing love and respect for human dignity. Though their perspectives were shaped by different experiences, both Paul and Seneca warned against the corrupting influence of public cruelty. They believed that society's acceptance of such violence harmed individuals and communities, calling for a more ethical and humane approach to life. Their critiques offer timeless lessons about the responsibility of individuals and society to resist the normalization of violence.

German I
12:30 pm – 1:30 pm
Briggs 119
Moderator: Erin McTigue

12:30 – 12:45 Radical Empathy: Religious Symbolism and Social Activism in the work of Käthe Kollwitz, 1893-1934
Augusta Ambrose
Faculty Sponsor: Katy Holihan, Department of Modern Languages
When considering voices of revolution in German art it is impossible not to include Käthe Kollwitz. Born in Prussia in 1867 and active until 1937, Kollwitz passionately fought for German workers' rights, and especially those of women and children, through her art. Through her use of the female figure, Kollwitz evoked empathy in her audience, inspiring them to fight for workers—a group Kollwitz understood as wrongfully dehumanized and disregarded. Refusing to distance herself from her subject matter, Kollwitz embraced female subjects and causes, depicting her personal experiences to engage a broad audience. I argue that Kollwitz grounds her evocation in two iconic tropes of feminine iconography: the Madonna and Pietà. I argue that Kollwitz utilized the familiar, emotive female figure in a modern and secular mode, employing these tropes as a rallying call for her viewers, effectively linking the workers' plight with traditional stories of sorrow, sacrifice, motherhood, and the human experience. Analyzing multiple works of art, I examine Käthe Kollwitz's creative incorporation of female emotion and experience in her many Madonna and Pietà renderings, ultimately revealing a radically empathetic and revolutionary approach to the depiction of social issues and causes.

12:45 – 1:00 The Misery in Medicine: The Legacies of Nazi Medicine in Scientific and Popular Culture

Connor Bronze

Faculty Sponsor: Katy Holihan, Department of Modern Languages

Under the swastika German physicians carried out inhumane medical experiments on detained human beings against their will. These victims were subjected to experiments in which they were infected with disease, subject to hypothermia and altitude sickness, and issued drugs and poisons with otherwise unknown effects on humans all for the supposed sake of advancing medical knowledge. In spite of the utter inhumanity, undeniable knowledge that was gained from these experiments, which have since saved countless lives and improved modern medicine. My project analyzes the legacy of Nazi medical experiments and its resulting knowledge through a bioethical lens. I will consider what medicine has gained from the eyes of the medical community, juxtaposing this response with an alternate, fictional reality posed in the film "Nichts als die Wahrheit" (Nothing but the Truth), wherein the infamous Nazi physician Josef Mengele is put on trial and brought to justice.

1:00 – 1:15 From Socialism to Skepticism: The Political Consequences of German Unification

Logan Deutschmann

Faculty Sponsor: Katy Holihan, Department of Modern Languages

The reunification of Germany in 1990 marked the abrupt transition of East Germany from a socialist planned economy to a capitalist market system. This transformation resulted in severe economic instability, including widespread unemployment, deindustrialization, and persistent wage disparities between East and West Germany. The economic hardships faced by East Germans in the post-reunification period contributed to a deep-seated skepticism toward traditional political institutions and mainstream parties. Over the past four decades, this skepticism has manifested in increased support for parties advocating for systemic change, such as the Party of Democratic Socialism (PDS), its successor Die Linke, and more recently, the right-wing Alternative für Deutschland (AfD). This research explores the economic consequences of reunification, the political attitudes that emerged in response to economic insecurity, and the lasting divide in electoral behavior between East and West Germany. By analyzing historical trends, voter demographic data, anecdotal accounts, and party platforms, this study aims to demonstrate how economic hardship fostered political disenchantment and continues to shape electoral patterns in the former East Germany. The findings contribute to a broader understanding of the long-term consequences of rapid systemic change and regional disparities in political identity within Germany.

1:15 – 1:30 Bonhoeffer and Germany's Carceral System: Are Germany's Reformed Prisons a Holocaust Legacy?

Ashleigh Edwards

Faculty Sponsor: Katy Holihan, Department of Modern Languages

Discussion of mass incarceration and prison reform swarm conversations about the prison system in the United States. Germany, like most of its surrounding countries, has a significantly lower incarceration rate than the U.S. The current conditions of Germany's prison can be directly traced to the death camps of Nazi Germany. "After Ten Years" and "Letters and Papers in Prison", the posthumous works of Dietrich Bonhoeffer, a German theologian imprisoned and executed by the Nazi Party, proffer an ethical vision for Germans in the post-war period. I apply

Bonhoeffer's writings and ethics to post-war discussions of the function of the prison system and punishment for crime, including the length of sentences and the status of the death penalty. I employ Bonhoeffer's theoretical writings to evaluate decisions regarding the carceral system in a post-war Germany, coupling his work with prisoner testimonies. By analyzing the post-war carceral transformation through Bonhoeffer's ethics, I contextualize Germany's contemporary approach to crime and punishment.

German II
1:30 pm – 2:15 pm
Briggs 119
Moderator: Erin McTigue

1:30 – 1:45 Cannibalism and Child Abandonment: Starving for Meaning in "Hansel and Gretel"
Clara Goebel
Faculty Sponsor: Katy Holihan, Department of Modern Languages
Fairytales have the unique ability to communicate values, morals, and lessons cross-culturally. Some fairytales and folklore evoke a direct and easily interpreted symbolism, positing an ideal to guide the moral behavior of the reader. Other tales contain meaning and symbolism shrouded in darkness, requiring closer analysis and historical context. One such example is the Grimm Brothers' "Hansel and Gretel", written in 1812 and revised in 1857. The fairytale is characterized by dark and off-putting themes: abandonment and cannibalism to name just a few. When placed within the historical context of the Great Famine of the 1300s, "Hansel and Gretel" is less a horror story, than a reflection the hardships of famine and familial struggles to survive. Comparing both the 1812 original tale and its later revision, I therefore historicize "Hansel and Gretel" to unearth its symbolism and uncover its moral directives to a 19th century audience.

1:45 – 2:00 On the Beauty of Dreams: Hermann Hesse's "An Hour After Midnight" at the Intersection of Nineteenth-Century Psychology and Aesthetics
Morgan Nydam
Faculty Sponsor: Katy Holihan, Department of Modern Languages
The understanding of dreams and their interpretations, has long captivated humanity. Though an interest in dreams extends back to the period of Enlightenment, German-speaking theorists such as Freud and Nietzsche sparked rekindled interest in the 19th century, approaching the nature of dreams through individual and psychological means. Coinciding with an interest in dream theory, was the development of German Expressionism, whose adherents meditated on themes of individual subjectivity and emotional expression. Fusing the psychological theories of his time with the elements of German expressionism, Hermann Hesse's "An Hour After Midnight" captures the societal connections between the concepts of dreaming, individuality, and beauty. My study examines the depiction of dreams in "An Hour After Midnight" as evidence of how the interconnection between psychology and expressionism, informed an understanding of beauty and the self in the late 19th and early 20th centuries.

2:00 – 2:15 Germany's Economic Backbone: Efficiency and Innovation in the Mittelstand
Noah Roland
Faculty Sponsor: Katy Holihan, Department of Modern Languages
As the third-largest GDP following the United States and China, Germany is an undeniable economic force. Yet, unlike economies dominated by large conglomerate corporations, Germany is uniquely comprised of small and medium sized enterprises (SMEs), also referred to as the German Mittelstand. Despite their moderate market capitalization, businesses within the Mittelstand achieve dominance within their market share by way of a combined specialization within niche industries, unique R&D cluster systems, innovation, and healthy work-life balance for employees. This paper explores how the German Mittelstand remains resilient in the absence of the myriad advantages that large-cap corporations possess like those within the United States. Looking specifically at SMEs within the real estate sector, I consider how Mittelstand companies forge their close-knit and customized relationships to suit the needs of their clients, driving customer loyalty and sustaining companies. I furthermore analyze the commitment of these companies to innovation and their treatment of employees, both of which allow SMEs to remain flexible in ever-changing environments and retain committed workers. In so doing, I question the logic of large-cap conglomerates, considering an alternative grounded in the German market that boasts a different model for industry success.

Turley Fellow Presentations
3:00 pm – 4:00 pm
Turley Memphis Center, West Campus
Faculty Sponsor: Dr. Natalie Person

Six Turley Fellows from the 2024-2025 academic year and summer scholars will be providing short descriptions of their community engagement work and research, followed by poster presentations. Each fellow will explain their research with photos, graphs, and main takeaways.

English
11:00 am – 12:00 pm
Southwestern 207
Moderator: Eleanor Ellsworth

11:00 – 11:20 "The Issues and Possibilities of My Double Existence:" Robert Louis Stevenson's The Strange Case of Dr. Jekyll and Mr. Hyde Through the Lens of Chronic Episodic Illness
Katherine Buikema
Faculty Sponsor: Gordon Bigelow, Department of English
Robert Louis Stevenson's The Strange Case of Dr. Jekyll and Mr. Hyde has been analyzed through the lens of disability, yet no scholar has taken into account that Robert Louis Stevenson's own life was defined by a disabling illness. When one takes this into consideration, it becomes apparent that Strange Case demonstrates the experiences of those who, like Stevenson himself, have chronic-episodic illnesses (CEI)— disabling conditions in which individuals suffer from fluctuating periods of ill and good health. Combining biography and ethnography, as well recent psychological research and disability theory, I identify five key facets of a life defined by a CEI: unpredictable cycles of change; duality of identity; isolation and social disconnection; the search for a cure; and the danger of suppression. All five of these features are extant in the life of

Dr. Jekyll. From this perspective, these five psychological experiences in the book demonstrate that Dr. Jekyll's story is an allegory for what happens when a chronically ill person does not cope with their illness. In illustrating how moral sickness defines, divides, and consumes Dr. Jekyll's identity, Strange Case shows those with CEI how to heal their mind, even if they can never heal their body.

11:20 – 11:40 Identity and Form in Olga Tokarczuk's "Flights"
Liam Patrick
Faculty Sponsor: Gordon Bigelow, Department of English
This project considers the 2007 novel *Flights* by Polish writer Olga Tokarczuk, winner of the Nobel Prize in 2018. *Flights* employs self-contained narratives and multiple perspectives spanning multiple centuries, features that made many readers question whether it could be classified as a novel or something else entirely. In examining this question, I returned to early scholars of the novel such as Georg Lukács, who theorized that the novel was part of an emerging modern understanding of the human, strongly linked to national identity and history. Primarily using the Marxist theorist Frederic Jameson's work, I found that *Flights* exemplifies a lack of historicity and loss of national identity, a clear departure from the ideas present in the novel as understood by Lukács and decidedly more in line with a fragmented, postmodern understanding of the world and thereby the self. Jameson's work illuminates Tokarczuk's message: that a postmodern narrative is neither pre-existing nor stable and must be constructed by a drawing together of distinct parts, or narrative mapping process.

11:40 – 12:00 "Satan is a Woman, Hell is a Vagina: *Paradise Lost* and the American Gothic"
Delaney Jackson
Faculty Sponsor: Gordon Bigelow, Department of English
This paper is an examination of *Paradise Lost* focusing on feminist critiques of the figures of Satan and Eve, and considering effect the epic has had on American Gothic writers of both genders. Using a feminist and structuralist lens, this reading considers the phallocentric symbols that pervade Western literature and how *Paradise Lost* and its character Satan subvert the assertion that masculine canonical texts use a disproportionate amount of phallic imagery. Focusing on the richness of Milton's language, the paper investigates how marginalized communities associate themselves with the heroic Satan and the seemingly defenseless Eve.

English Honors
12:30 pm – 1:55 pm
Southwestern 207
Moderator: Katherine Buikema

12:30 – 1:00 "Beware; For I am Fearless, and Therefore Powerful:" Queer Representation and Reappropriation in the Modern Gothic
Samantha Cooke
Faculty Sponsor: Seth Rudy, Department of English
Gothic literature emerged in the mid-18th century as a commentary on appearances and ways of living then considered monstrous. Though these texts end with the monsters being punished, queer audiences over the centuries have reclaimed them to voice their own insidious trauma. Queer writers like Horace Walpole, Oscar Wilde, Mary Shelley, and later Alison Rumfitt and

Bryan Fuller have explored the queer potential of the genre by creating a Queer Gothic language that is melancholic, traumatic, cathartic, and metamorphic. Contemporary works like NBC's Hannibal and AMC's Interview with the Vampire point to a future where the Gothic embraces queerness as redemptive and humanizing for monsters, and in which abjection can mean salvation for protagonists drawn to these monsters. By embracing its own past and subliminality, the Gothic has the potential to combine the death drive with a queer utopia where queer monsters can find a happy ending outside society's realm.

1:00 – 1:30 "Queens of Noise"
Zoë Dominguez
Faculty Sponsor: Caki Wilkinson and Amy Benson, Department of English
Music and poetry share formal elements: rhythm, meter, catharsis, and climax. Unsurprisingly, practitioners in one discipline often try their hand in the other. Despite the commonality between the two modes of expression, few works of poetry written by musicians reflect their experience as musicians. "Queens of Noise" offers a poetic exploration of musicianship, drawing on the author's six-year-long experience as a front woman for the all-female punk band of the same name. The sequence investigates performance and how it shapes gender identity, interpersonal relationships, and self-perception. At the same time that the collection dictates vulnerable moments of adolescent female friendship, it features visits from prominent figures such as Lita Ford, Karen Carpenter, Gloria Steinem, and Ani Difranco, thus blurring the line between truth and the fantastical. Combining the feminist poetic forms of confessional poetry and The Gurlesque, this collection interrogates the author's experience of a hyper-visible girlhood and asks broader questions about the direction of the contemporary feminist movement.

1:30 – 1:55 "Queer Violence in American Fiction and the Children (In)Capable of It"
Mimi Herren
Faculty Sponsor: Gordon Bigelow, Department of English
The pathologization of homosexuality in America, which began in the late nineteenth century and was not reversed until the early twenty-first century, caused a surge of queer literature that validated homosexuals' so-called deviancy and any potentially violent reactions to their oppression. This thesis analyzes three examples of literature that leans into the taboo status of homosexuality instead of opposing it, while still advocating for disruptive action against oppressive institutions. Willa Cather's short story "Paul's Case" (1908), Micah Nemerever's *These Violent Delights* (2020), and Thomas Savage's *The Power of the Dog* (1967) all function as power fantasies wherein the protagonists employ violence as a mechanism to renegotiate the heteronormative conditions of their existence. This thesis examines each of these stories through the lens of queer negativity, which theorizes that queer identities are always, only those that negate heterosexual ones and are therefore lack inherent or categorical meaning. As a result, it will demonstrate how each protagonist uses violence to rectify or embrace this inherent threat they pose.

Africana Studies / French
2:00 pm – 3:00 pm
Southwestern 207
Moderator: Katyanna Vason

2:00 – 2:20 Music: The Context of the Black Experience
Trinity Williams
Faculty Sponsor: Samson Ndanyi, Africana Studies
Music has long served as both a refuge and a powerful voice for the Black experience across the globe. This presentation explores how music reflects the duality of Black pride and struggle, acting as a cultural conduit for resistance, resilience, and identity. From the rhythms of the Africa diaspora to the beats of contemporary genres, the sounds of black music narrate stories of oppression, freedom, and triumph. By examining the music through a global lens, this exploration highlights the role of music in shaping collective memory and inspiring movements for social change

2:20 – 2:40 Black Youth Activism
Raven Sims
Faculty Sponsor: Samson Ndanyi, Africana Studies
The title of my presentation is "Black Youth Activism." It is about Barbara Rose Johns Powell. Mrs. Powell was just 16 years old when she led the Robert Russa Moton High School Strike that led to the desegregation of schools in the US. This strike was initiated because Barbara was frustrated with Prince Edward County School's poor facilities, shabby equipment, non-existent laboratories and separate gymnasiums. Her strike took place on April 23, 1951. She received help from her school's council members, in which they created signs, she prepared a speech expressing her concerns about the lack of resources in her school. Then, the principal was lured off campus, all 450 students were called into the auditorium, the council asked teachers to leave and there was a walkout to demand a new school be built. Ultimately, Barbara wanted to bring awareness to the poor conditions of her school, make her teachers proud, wanted students to learn more, and the school to receive new infrastructure. Her activism led to her case being one of the 5 cases in the Brown v. Board of Education of Topeka, and it was titled Davis v. Prince Edward. Despite her contributions, her activism has been unacknowledged.

2:40 – 3:00 Liberty, Equality, Melody: How Musical Theatre Unfolds in France
Teresa Lowry
Faculty Sponsor: Laura Loth, Department of Modern Languages
Musical theatre has previously been studied in the context of its expansion from the West End to Broadway, but there is a gaping lack in research on musicals in France. Few scholars have identified French musicals' characteristics. So, how has musical theatre unfolded in France, and what role does it play in modern French society? In order to answer these questions, I examine two cases of French musicals, and I demonstrate how they possess the power to critique and unite French society. While Les Misérables was received poorly by French audiences due to the anglicization of the beloved Hugo story, Notre-Dame de Paris was a breath of fresh air for French audiences who personally connected with this story. Musicals, though not as widely celebrated in France, persist in French minds and hearts. From a Notre-Dame de Paris actor performing a song from the musical at the reopening of the musical's namesake in December 2024 to a production of Les Misérables tailored to French audiences in late 2024 that finally established the musical in its home country. It is clear that the spectacle and the socio-political relevance of musicals are a rising star in France.

Meeman Center for Lifelong Learning
3:30 pm – 4:30 pm
Orgill Room, King Hall, West Campus
Moderator: Kosi Aneji

(F) 3:30 – 3:45 Psychological impacts of lifelong learning: cognitive and social approaches
Dana Potter
Faculty Sponsor: Lori Garner, Department of English
Learning into older age has a diverse set of benefits that span across multiple domains. Continuing the research I conducted in 2024 on general psychological benefits, this project expands on the cognitive and social aspects that are impacted from lifelong learning. Cognitive psychology research by Tatarenciva et al. (2018) and writings from Cropley (1977) emphasizes better cognitive reserve and "learning-to-learn" methods in older age. There is even theoretical research suggesting that cognitive functioning type impacts how one will continue learning into adulthood (Tatarenciva et al., 2018). Social psychology research by Goodwill (2021) also highlights the improved motivation as well as better relationship quality among lifelong learners. The Meeman Center for Lifelong Learning at Rhodes College focuses on adult education beyond the conventional age of learning through various class offerings spanning a variety of topics. Lifelong learning, described as the continuing development of knowledge and skills after formal education (Encarta, 2008), has been heavily emphasized at the Meeman Center. This project brings together my research in social and cognitive psychology and my observations in the Meeman center, in order to demonstrate the psychological importance of learning throughout the life span to the well-being for individuals of all ages.

(F) 3:45 – 4:00 Enhancing Lifelong Learning: Case Study of Adult Learning Theories in Practice
Naisha Chowdhury
Faculty Sponsor: Lori Garner, Department of English
Adult learning theories provide a comprehensive foundation for understanding how adults acquire and apply knowledge effectively. According to Mukhalalati and Taylor in "Adult Learning Theories in Context: A Quick Guide for Healthcare Professional Educators" (2019), behavioral, cognitive, experiential, humanistic, transformative, social, motivational, reflective, and constructivist theories are key paradigms that shape adult education and inform instructional design. This study examines the Rhodes College Meeman Center for Lifelong Learning as a case study to explore the significance of these educational approaches. It identifies strengths to be maintained and opportunities for further integration and development, both within the Meeman Center and in adult learning programs more broadly. Courses at the Meeman Center, taught by Rhodes professors across disciplines in the humanities, natural sciences, social sciences, and fine arts, reflect diverse teaching styles, methods, and strategies. While centered on the Meeman Center, the findings have broader implications for lifelong learning programs, highlighting effective strategies and opportunities for deeper integration of adult learning principles. By bridging theoretical frameworks with real-world applications, this study demonstrates how implementing adult learning theories in lifelong learning settings can foster more inclusive and effective educational experiences across diverse disciplines.

(F) 4:00 – 4:15 The Importance of Intergenerational Learning in Adult Education Programs
Campbell Boyd
Faculty Sponsor: Lori Garner, Department of English
Intergenerational learning allows a way for people of different ages to share and learn from one another. In "Intergenerational Learning and Its Impact on the Improvement of Educational Processes," Trujillo Torres (2023) highlights the benefits of intergenerational learning: increased social skills, fostering community, bridging the gap between different generations, etc. Unlike other adult learning programs that are specifically restricted to senior adults, the Meeman Center for Lifelong Learning has no such limitations for the students. The Meeman Center provides classes taught by Rhodes Professors for the greater community. Students include working adults, retirees, recent college graduates, and more. The classes that stick with me are the ones that include students from a wide variety of ages. For my project, I plan on interviewing students who have been a part of intergenerational classes, as well as the professors who taught them. I also plan on highlighting the specific classes geared towards intergenerational learning. This project draws from interviews with faculty and students as well current scholarship on intergenerational learning. My goal is to understand the benefits of intergenerational learning and how we can highlight and uplift it as a part of the Meeman Center!

(F) 4:15 – 4:30 Accessibility in Lifelong Learning
LeeAnn Fincher and Jozalyn Houser
Faculty Sponsor: Lori Garner, Department of English
Inaccessibility or accessibility in lifelong learning can impede or aid students' participation and comfort. Using the Meeman Center for Lifelong Learning as a case study, this project examines accessibility issues of physical disability and inaccessibility, such as the need for accessible spaces, ways to promote learning, and the psychological effects regarding accessibility. Examining how the societal standards of the social model and the identity erasure of the functional model of disability affect lifelong learners through a combination of interviews with instructors and attendees and Procknow's research theories outlined in "Disabilities in Adult Education," this study recognizes the challenges many learners face due to inaccessibility as well as strategies that have led to greater accessibility in adult education programs like the Meeman Center. This research raises awareness of accessibility needs and the disabilities that many lifelong learners experience, leading to a more welcoming and beneficial environment for students and teachers.

NATURAL SCIENCES ORAL SESSIONS

Physics
11:00 am – 12:00 pm
FJ-B
Moderator: Muna Ogwo

11:00 – 11:15 Characterizing AXOL1TL's Trigger Efficiency
Ada Collins
Faculty Sponsor: Brent Hoffmeister, Department of Physics, Dr. Jannicke Pearkes, University of Colorado Boulder
The Compact Muon Solenoid (CMS) detector at the Large Hadron Collider (LHC) captures a staggering 40 million proton-proton collisions every single second. The large volume of data cannot be stored on modern servers, necessitating a "trigger system" to filter the data and eliminate 99.8% of captured events. One of these data-filtering algorithms is AXOL1TL, a novel neural network that is trained to flag events as anomalous. A consequence of AXOL1TL's black-box design is that we do not know how the algorithm is flagging events, just that it is doing so. Using Python, I designed the framework to determine trigger efficiency, which represents the probability that an algorithm chooses to keep an event, given certain criteria. Trigger efficiency can give us an insight into what AXOL1TL deems interesting enough to save. I will present preliminary results demonstrating AXOL1TL's preference for high multiplicity events with low transverse momentum.

11:15 – 11:30 Ultrasonic Characterization of the Transmural Structure of Human Scalp Tissue
Catherine N. Prabish, Blake C. Lawler, Thomas H. Conroy, and Cecille Labuda
Faculty Sponsor: Brent Hoffmeister and Ann Viano, Department of Physics
Interest in transcranial ultrasound has motivated numerous ultrasonic studies of the skull and brain; however, the ultrasonic properties of the scalp are relatively unknown. The goal of this study was to ultrasonically characterize the transmural structure of scalp tissue. Specimens of human scalp were scanned in a water tank to create parametric images of the speed of sound (SOS), frequency slope of attenuation (FSA), and integrated attenuation coefficient (IAC). Images revealed a dermis/epidermis layer, a subcutaneous layer, and a connective tissue layer. Measured values for the dermis/epidermis layer were SOS = 1546 ± 28 m/s, FSA = 2.49 ± 0.75 dB/cm/MHz and IAC = 52.8 ± 9.49 dB/cm. Measured values for the subcutaneous layer were SOS = 1515 ± 20 m/s, FSA = 2.54 ± 0.62 dB/cm/MHz and IAC = 33.7 ± 7.97 dB/cm. Measured values for the connective tissue layer were SOS = 1515 ± 24 m/s, FSA = 1.09 ± 0.59 dB/cm/MHz and IAC = 24.7 ± 7.63 dB/cm. Results showed no statistical difference between the dermis/epidermis layer and the connective tissue layer in FSA, or between the subcutaneous layer and the connective tissue layer in SOS. All other results showed a statistical difference between the specimen layers.

11:30 – 11:45 A theoretical model for estimating errors in ultrasonic backscatter measurements of bone

Keith Hoffmeister, Kate Hazelwood, Layla Lammers, and Hugh Ferguson

Faculty Sponsor: Brent Hoffmeister and Ann Viano, Department of Physics

Ultrasonic backscatter measurements are being developed to detect changes in the porosity of cancellous bone caused by osteoporosis. One source of error in measuring the backscattered power may be power loss effects caused by the cortical bone layer that overlies the cancellous bone tissue. The errors range from approximately from 5 to 15 dB depending on the angle of incidence of the ultrasonic wave on the bone surface. These errors are much larger than changes caused by osteoporosis (approximately 5 dB). A theoretical model finds that the observed errors in backscatter measurements of cancellous bone are consistent with reflection and attenuation losses caused by the cortical layer.

11:45 – 12:00 Novel Ultrasound Method Using Slope Phase Analysis to Measure Bone Density

Hugh Ferguson

Faculty Sponsor: Brent Hoffmeister and Ann Viano, Department of Physics

Quantitative ultrasound (QUS) has emerged as a promising and cost-effective method for assessing bone health. Traditional QUS parameters such as broadband ultrasound attenuation and speed of sound are valuable; however, they are difficult to measure at central skeletal sites such as the hip and spine where most osteoporotic fractures occur. This study introduces a novel QUS method derived from the instantaneous phase of the backscattered ultrasound signal. Backscatter techniques use a single ultrasonic probe which allows access to more skeletal locations. By leveraging the unwrapped phase information extracted from the Hilbert transform, the slope of the phase accumulation was measured as a function of time. The slope correlated strongly ($R > 0.9$) with the density of specimens of human cancellous bone measured in vitro with a 3.5 MHz transducer. These results suggest that phase accumulation measurements obtained from the Hilbert transform of backscatter signals may detect osteoporotic changes in cancellous bone.

Biology / Biochemistry & Molecular Biology (BMB)

12:30 pm – 1:30 pm

FJ-B

Moderator: Dylan Morris

(F) 12:30 – 12:45 Targeted Degradation of Adrenergic Core Regulatory Circuit Transcription Factors in Neuroblastoma using the dTAG system

Anna Tassou

Faculty Sponsor: Mary Miller, Department of Biology, Dr. K. Elaine Ritter and Dr. Adam Durbin, St. Jude Children's Research Hospital

Neuroblastoma is the most common extracranial solid tumor of childhood and leading cause of cancer-related death. Neuroblastoma tumors are populated by distinct adrenergic (ADRN) and mesenchymal (MES) cells. ADRN cells are more chemo-sensitive than MES cells, but the molecular mechanisms underlying this phenomenon are unknown. Previous work in the lab has identified the master transcription factors (mTFs) comprising the core regulatory circuit (CRC) driving the ADRN cell state: HAND2, ISL1, PHOX2B, GATA3, TBX2, ASCL1, and TFAP2β. This study aims to interrogate how each mTF is involved in controlling neuroblastoma chemosensitivity. Using Kelly ADRN cells, we generated a panel of isogenic clones in which a

dTAG construct has been added to each mTF. The dTAG system enables protein degradation by genetically fusing each mTF to a mutated FKBP12 protein that the dTAG ligand binds to, in addition to cereblon, an E3 ubiquitin ligase. Our results show complete PHOX2B degradation after two hours of treatment with 500 nM dTAG-13. Preliminary chemosensitivity data suggest PHOX2B degradation induces resistance to retinoic acid. Future work includes RNA-sequencing to identify changes in gene expression following mTF degradation. Understanding the unique functions each mTF in the ADRN CRC will reveal insights into the vulnerabilities of neuroblastoma cells.

12:45 – 1:00 Feasibility and Safety of Endovascular Interventions via Percutaneous Access to the Axillary Artery

Caleb Alterman

Faculty Sponsor: Jonathan Fitz Gerald, Department of Biology

Abstract: Background: Endovascular treatment of peripheral arterial disease requires safe and reliable arterial access. Upper extremity access can help overcome various procedural challenges. This retrospective case study evaluates the feasibility and safety of percutaneous trans-axillary artery access for intervention in lower extremity peripheral arterial disease. Methods: Medical records of patients undergoing axillary artery percutaneous access from December 2021 to August 2024 were reviewed. Demographic data, procedural details, technical success, perioperative and postoperative complications were assessed. Clinical outcomes were analyzed via follow-up clinic records. Results: A total of 79 axillary artery access procedures were performed in 64 patients, 55% of whom were male, with common vascular comorbidities such as hypertension (87%) and hyperlipidemia (68%). Axillary access facilitated peripheral endovascular procedures, such as iliac (55) and femoral (44) interventions. A 6F sheath and ultrasound-guided Angio-Seal closure device were utilized with no major complications or reoperations. Minor bruising and edema occurred in 14% of patients, with no other minor complications reported. Conclusions: Percutaneous axillary artery access is a safe and effective alternative for complex endovascular arterial interventions. Advantages include avoidance of unfavorable femoral anatomy, improved working length compared with radial access, and enabling comprehensive lower extremity therapy in a single procedure.

1:00 – 1:15 Identification of Susceptibility Loci and Candidate Validation Using a Novel Model for Triple Negative Breast Cancer

Logan G. McGrath, Zeid T. Mustafa, Samson Eugin Simon, Naveed Pervaiz, Emily W. Grey, Minjeong Kim, Sydney C. Joseph, Emily Korba, Sandesh J. Marathe, Margaret S. Bohm, Arvind V. Ramesh, Sidharth S. Mahajan, Casey J. Bohl, Pjotr Prins, Robert W. Read, Jeremiah R. Holt, D. Neil Hayes, Lu Lu, Robert W. Williams, University of Tennessee Health Science Center, Laura M. Sipe, University of Mary Washington, David G. Ashbrook, University of Tennessee Health Science Center

Faculty Sponsors: Qian Shen, Department of Biology and Liza Makowski, University of Tennessee Health Sciences Center

Breast cancer (BC) is the second most common cancer and cause of death in U.S. women. Risk factors, environmental exposures, and genetic predispositions have been studied; however, prior research lacks models of diverse genetic variables. We posit that uncovering novel populational variance will further our molecular understanding of BC. Identifying genetic modifiers will enable novel therapeutic targets to enhance clinical interventions. To examine genetic variation

in BC traits, we developed a transformative approach bridging bench to bedside. We created a novel murine model with robust phenotypic and genomic variation. The FVB C3(1)-Tantigen ("C3Tag") genetically engineered mouse model (GEMM) develops spontaneous triple negative BC (TNBC), an aggressive BC subtype lacking estrogen, progesterone, and HER2 receptors, leading to poor prognosis. To model human genetic heterogeneity, we crossed the C3Tag GEMM into the BXD family, the largest genetic reference population. The new "BXD-BC" model has reproducible genomes. We hypothesize that genetic modifiers drive differences in tumor onset and progression. TNBC traits were heritable across 100+ BXD-BC hybrids. We mapped modifiers of TNBC, identifying quantitative trait loci on chromosomes 16 and 10 linked to tumor multiplicity and latency. Utilizing systems genetics and molecular validation, we identified cross-species genetic modifiers to prioritize clinically relevant targets.

1:15 – 1:30 Depletion of Gram-Positive Gut Microbiota Associated with Reduced Metastatic Burden in Breast Cancer
Zeid T. Mustafa, Margaret S. Bohm, Liza Makowski
Faculty Sponsor: Larryn Peterson, Department of Chemistry, Liza Makowski, University of Tennessee Health Science Center
Breast cancer (BC) is the most frequently diagnosed cancer in women worldwide with metastasis being associated with >90% of BC-related mortality. BC preferentially metastasizes to the lung. The gut microbiome mediates anti-tumor immune responses by altering the bile acid pool, which modulates key immune cell signaling pathways. Elevated expression of the primary bile acid receptor FXR is associated with improved triple negative BC survival. We hypothesize that gut microbiome alteration to elevate primary bile acid levels may suppress BC metastasis to the lung and improve anti-tumor immunity. Albino C57BL/6J female mice were treated with water containing Vancomycin to deplete Gram-positive, anaerobic microbiota, which convert primary bile acids to secondary, prior to cancer cell injections. Mice were injected retro-orbitally with E0771-LMB BC cells metastasizing to the lung. Metastasis was monitored *in vivo* using luciferase-based bioluminescence. At endpoint, splenic flow cytometry and cecal content microbiome analysis were conducted. Fewer Vancomycin-treated mice developed metastases compared to the controls. Gram stains showed reduced Gram-positive staining in cecal content from vancomycin-treated mice while flow cytometry showed Vancomycin amplified the anti-tumor immune response of key immune cells (CD4+, CD8+, and NKT cells). Herein, we demonstrate that Vancomycin is efficacious at suppressing metastatic BC burden.

Chemistry
2:00 pm – 2:45 pm
FJ-B
Moderator: Anna Tassou

(F) 2:00 – 2:15 Solvatochromic Complexes of Group 6 Metals
Arjun Feist
Faculty Sponsor: William Eckenhoff, Department of Chemistry
Solvatochromism is a phenomenon in which solvent interactions with a compound affect its absorbance spectrum, which causes it to display a wide variety of colors when dissolved in different liquids. While some organic solvatochromic complexes are known to science, fewer solvatochromic transition metal complexes are known, despite their applications in sensor

technology and in dye-sensitized solar cell (DSSC) design. We report the synthesis of three as-of-yet unpublished solvatochromic complexes, with both tungsten and molybdenum metal centers. Efficient syntheses were developed for each compound, and were characterized via infrared spectroscopy, elemental analysis, and X-ray crystallography. Additionally, all three complexes were also examined computationally with density function theory, using Gaussian 16 software, and the results were compared to experimental values for infrared spectroscopy and for cyclic voltammetry.

2:15 – 2:30 Synthesis of DHHCA Analogues to Further Characterize the Substrate Space of L-DOPA Dioxygenases

Jennifer D. Bui, Hannia E. Antunez, and Emma G. Gruss
Faculty Sponsor: Larryn Peterson, Department of Chemistry

Catechols, an ortho isomer of benzenediols, are characterized by their profoundly stable aromatic rings. L-3,4-Dihydroxyphenylalanine (L-DOPA) dioxygenase is an extradiol dioxygenase that breaks down the stable aromatic rings of both endogenous and human made catechols. The ability of L-DOPA dioxygenase to cleave these otherwise very stable aromatic rings has applications in bioremediation and breakdown of biomolecules, such as lignin. Lignin is an abundant plant woody tissue polymer that could be valorized into useful and beneficial compounds by L-DOPA dioxygenase. L-DOPA is the primary substrate for L-DOPA dioxygenase enzymatic cleavage; however, the powerful potential applications of this is not well realized. Further, the substrate tolerance of L-DOPA dioxygenase has yet to be fully elucidated. The uncertainty of this enzyme's substrates has motivated the synthesis of various catechol analogues substituted at the 6-position. We have previously investigated the importance of an ethylamine tail and are now investigating the necessity of a carboxylic acid tail for enzymatic cleavage, which has steered the focus of this work on 3,4-dihydroxyhydrocinnamic acid (DHHCA). This work details the ongoing synthesis of 6-bromo-DHHCA and 6-cyano-DHHCA. These catechol analogues provide key insights into the promiscuity and chemistry of L-DOPA dioxygenase that can be harnessed for further applications.

2:30 – 2:45 Solid and Solution State Structures of Nickel Complexes with Substituted Thiosalen Ligands

Nick Parker
Faculty Sponsor: William Eckenhoff, Department of Chemistry

As energy sources become more scarce across the globe, the search for a renewable energy supply becomes increasingly important. A relatively new energy source is the use of proton reduction catalysts to produce hydrogen gas to be used in fuel cells. One potential proton reduction catalyst is Nitsalen, however previous studies in our research group have shown that the reduction potentials are too negative to be used as an effective catalyst. By experimenting with various -CF_3 groups on Nitsalen ligands, we are able to compare the reduction potentials of our complexes to find the most efficient catalyst. Accomplishments in the synthesis and characterization with NMR and X-Ray Crystallography have been achieved over the past year.

Computer Science / Mathematics
11:00 am – 12:00 pm
Robertson 110
Moderator: Ryan Kennelly

11:00 – 11:15 CheckPoint Web: Equipment Reservation Software for College Students
William Gagnet, AJ Kovach, Son Nguyen
Faculty Sponsor: Sean Kugele, Department of Computer Science
CheckPoint is a software designed to facilitate the management of computer science department resources. It enables students to check out and return equipment while maintaining a personal usage history for accountability. Checkpoint is split into two separate parts CheckPoint Web and CheckPoint-Core. Through CheckPoint-Web we can ensure that valuable technological resources remain accessible to students while allowing the department to monitor and regulate their usage. The platform supports two types of users: regular users and administrators. Regular users can browse available equipment, check items in and out, and track their borrowing history. Admin users have enhanced capabilities, including managing the inventory by adding or removing equipment, overseeing user activity, and sending notifications to borrowers. Additionally, admins can generate reports on past and current equipment usage and reserve resources for classroom needs. We implemented CheckPoint-Web's functionalities by using Python, HTML, CSS, Flask as the framework, and contact with CheckPoint-Core via API calls.

11:15 – 11:30 Checkpoint Core: Application Logic for Equipment Borrowing
Enkhee Gantulga, Jules Hall, Dimash Zhanbyrshy
Faculty Sponsor: Sean Kugele, Department of Computer Science
Checkpoint Core is the database and application logic backend of the Checkpoint equipment check-out web service. It provides secure storage and hosting for essential equipment and user data to allow seamless check-out and check-in for equipment held by the computer science department for use by students and faculty, such as robotics equipment and computers. Via requests from Checkpoint Core's counterpart Checkpoint Web, equipment can be reserved for pick-up and assigned to individuals. Administrator users can retrieve and store equipment status such as current user assignment and degree of wear-and-tear for the purpose of equipment refresh and replacement, to ensure the Rhodes community has access to the best available materials. Checkpoint Core, alongside its counterpart, Checkpoint Web, allows the Computer Science department faculty to more easily manage, maintain, and update its cache of equipment. Checkpoint Core runs as a containerized microservice that was built using Python, the FastAPI framework, and Docker. It is hosted using the uvicorn web server and uses a PostgreSQL database.

11:30 – 11:45 LynxUp Catbot - AI assisted Chatbot
Eddie Puebla, Harper Kolehmainen, JD Willis
Faculty Sponsor: Sean Kugele, Department of Computer Science
LynxUp Catbot — an innovative AI-powered platform designed to enhance the transition experience for incoming Rhodes College students. This interactive chatbot serves as a comprehensive knowledge center for all aspects of campus life, providing instant access to essential information and resources. The system offers guidance on various categories such as campus navigation, academic resources, student organizations, dining options, residential life

policies, and many more. By employing a dual-approach interface: a structured menu system for common queries and a flexible free-form interaction mode, the platform guides users through pre-compiled fixed content information and direct links to Rhodes online resources, functioning as an interactive FAQ page. Meanwhile, the free-form query system leverages an AI Language Learning Model that generates contextually appropriate responses for its users. The LynxUp Catbot functions as a standalone user interface or potentially as an incorporated feature for multiple Rhodes applications. By combining rapid information retrieval, AI-powered assistance, and user-driven improvement, LynxUp Catbot aims to become an indispensable resource for new students navigating their new home at Rhodes College.

11:45 – 12:00 Exploring How Educational Math Videos Affect Student Motivation
Sam Lippe
Faculty Sponsor: Erika Parr, Department of Mathematics
YouTube content creators such as Kahn Academy, 3Blue1Brown, Veritasium, Numberphile, The Organic Chemistry Tutor, VSauce, and blackpenredpen (to name just a few) have contributed to a growing online math community by creating videos to support students through their math courses and inspire them to continue learning math. Although researchers have begun to examine how such videos can aid students in learning content, we seek to investigate how these videos could increase student motivation in undergraduate mathematics. To this end, we have conducted exploratory interviews with several undergraduate students with varied mathematical experience. The interviews were designed to evoke student thoughts about math in general and gauge students' interest in learning math through a variety of questions before, during, and after watching two different videos from popular math YouTube channels. This talk will describe the interview process and the theoretical background guiding data collection and analysis. The talk will also describe findings from the analysis and implications for incorporating such videos into classroom settings with a goal to increase student motivation.

Computer Science I
12:30 pm – 1:45 pm
Robertson 110
Moderator: Grant Grabowski

12:30 – 12:45 VeriTag: A More Disciplined Media Website for Vetting Popular News Outlets
Martin Maxim, Jud Turner, Nick Bilotti, and Peter Halvorsen
Faculty Sponsor: Sean Kugele, Department of Computer Science
VeriTag is a web-based news feed and information verification platform. VeriTag™ retrieves news stories and other informational content like “Op-Eds” from a wide variety of news venues and presents it to users in a customizable (filterable) stream.
The platform supports two types of users:
• basic users that are primarily interested in consuming content and filtering that content based on their preferred “tags”, and trusted representatives that vet and “tag” content with badges (visual icons) based on their take on that content. Trusted representatives can also add short comments (e.g., 200 words or less) about each story that briefly summarizes their opinions about those stories.
When a story is identified as highly divisive (based on tags), VeriTag will provide an article-specific discussion board that can be accessed by all sets of users, but only trusted

representatives can debate (post) on these boards. However, regular users will be able to give feedback (using simple emojis, like thumbs up and thumbs down). Regular users will also be able to rate trusted representatives, for example, using an out-of-five, star-based review system.

12:45 – 1:00 CourseWise: The Wise Way to Choose Courses
Ashleigh Edwards, Sanaa Singleton, Lily Smith, Alison Stewart, and Tailyn Tipler
Faculty Sponsor: Sean Kugele, Department of Computer Science
CourseWise will address the challenge of course demand prediction in academic settings. Currently, faculty and staff lack tools to accurately predict course enrollment needs, leading to either overcrowded courses or underutilized resources. The system will solve this by creating a web-based platform that analyzes historical Workday enrollment data to predict future course demand and present these insights through intuitive visualizations and reports. The website will offer five key functionalities: predicting course enrollment likelihood based on a student's year and preferences, providing information about class demand and difficulty, generating personalized class suggestions, enabling interactive course exploration with instant predictions, and displaying degree requirements alongside course availability to facilitate graduation planning. Built using Python with Django/SQLite, CourseWise emphasizes performance for concurrent users, cross-device accessibility, and clear data visualization. The system follows a three-tier architecture with a user-friendly frontend, robust API backend handling prediction logic, and database storage for historical data. By transforming enrollment data into actionable insights, CourseWise will help optimize academic resource allocation and improve the course selection experience for all stakeholders.

1:00 – 1:15 Tubify: Social-Powered Music Discovery
Mohid Tanveer, Will Foster, and Evan Devine
Faculty Sponsor: Sean Kugele, Department of Computer Science
Tubify is a music discovery platform that connects users through shared music tastes. Unlike traditional recommendation systems that rely on industry-driven algorithms, Tubify focuses on community-driven curation. Users sign in with their Spotify account, where Tubify analyzes their liked songs to build a personalized music profile. They can then add friends, see shared favorites, and receive song recommendations based on what their friends are listening to but they haven’t discovered yet. Beyond recommendations, Tubify enhances the listening experience by integrating YouTube, allowing users to watch music videos and live performances for their recommended tracks, filling the niche MTV dominated during the 80s/90s. Users can also create Tubify playlists that compile their recommended songs alongside their existing Spotify favorites, bringing back a curated, music-driven social experience. Tubify is built with Python, React.js, and PostgreSQL, leveraging Spotify’s API for user music data and YouTube’s API for video content. By prioritizing social connection and human-curated discovery, Tubify brings back the joy of experiencing and sharing music together.

1:15 – 1:30 Lynx Lifts: Lynx on the Road
Crosby McMahon, Billy Manishimwe, Nalvi Tran, and Matthew Zhang
Faculty Sponsor: Sean Kugele, Department of Computer Science
Memphis is a car dependent city, and Rhodes College is situated at least ten minutes away by car and an hour by foot from the closest grocery store. As a result, students require access to a vehicle for daily transportation needs. However, not every student has a car on campus. Therefore, transportation is a concern for many students at Rhodes College, requiring a solution that can be affordable and efficient. Lynx Lifts is a mobile application that is designed to connect student passengers with student drivers, providing a secure and convenient ride-sharing platform for the campus. The app is built with React Native (frontend), Node.js (backend), and PostgreSQL for data storage. The system will be exclusive to Rhodes by using students' Rhodes email for account registration to ensure a secure user environment. Drivers can accept ride requests based on their availability and service areas, while passengers can post request rides for specific times and distances. Additionally, the application will offer students features such as in-app real-time messaging and notifications, secure payment options via third-party application services, and a reporting system to maintain a safe online environment.

1:30 – 1:45 Lynx Up AR: A Guided Augmented Reality Tour of Rhodes College
Anas Matar, Kamil Yousuf, and Nickolaus Jackoski
Faculty Sponsor: Sean Kugele, Department of Computer Science
Lynx Up AR is an iOS application that allows users to explore Rhodes College through augmented reality. This app enables students, prospective students, and visitors to learn about the campus by scanning plaques on buildings to discover fun facts and historical insights. Users can also earn experience points, making the augmented reality experience both educational and engaging. Through the game aspect of the application, users can compete with their peers by gaining experience points as they explore new buildings, visit different areas of campus, and find hidden augmented reality items.

Computer Science II
2:00 pm – 3:00 pm
Robertson 110
Moderator: Mohid Tanveer

2:00 – 2:15 Picobytes Core: Cutting C into Small Bytes for Rhodes Students
Will Falk, Eli Hebert, Jack Morin, Ryan Kennelly, and Kelly Vu
Faculty Sponsor: Sean Kugele, Department of Computer Science
PicoBytes is a web application that allows students to test themselves on the essential skills for the COMP 251 class in an entertaining fashion. With its simple user interface, students can quiz themselves with question types such as multiple choice, true/false, code blocks, and free response code with immediate feedback. Students can follow lesson plans picked out by their professor or choose to test themselves on topics they need to review. Email notifications and a leaderboard help encourage students to use the service often. Professors are able to log in and with a seamless click of a button, access an admin dashboard that allows them to add and remove questions from the database, review student performance, and see question analytics. Using Flask, React, and Node, Picobytes breaks down C into byte sized chunks.

2:15 – 2:30 MediViz
Ivy Collins, Ariyanna Donley, Mei McCullough, and Clara Sullivan
Faculty Sponsor: Sean Kugele, Department of Computer Science, Stu McAfee, St. Jude Children's Research Hospital
Posterior Fossa Syndrome (PFS) is a neurological disorder caused by injuries (or "lesions") to specific areas of the cerebellum during tumor removal surgery. Patients with posterior fossa syndrome often experience debilitating symptoms such as paralysis, motor coordination problems, or speech and language difficulties. So, how can neurosurgeons identify crucial areas to spare in surgery, in order to decrease PFS incidence moving forward? The answer is MediViz. MediViz–a standalone desktop application that was developed using Python, QT, and Pandas–analyzes historical data of lesions and diagnoses to identify cerebellar subregions consistently involved in PFS. Additionally, MediViz allows users to validate algorithmic performance through controlled data simulations–an innovative new approach to ensure reliable localization. The application prompts the user to either upload or generate lesion location data. Lesion data are then processed using a supervised machine learning algorithm that highlights high risk coordinates after training, allowing MediViz to predict PFS risk in new patients. To allow for advanced visualization of high risk areas, the highlighted coordinates are displayed in the form of a heat map that can be saved to the user's file system. This secure and easy-to-use platform will ultimately help medical professionals formulate outstanding surgical treatment plans for their patients.

2:30 – 2:45 Picobytes Execute and Test: A Compile and Test Service for C Programs
DeWitt Colvin, Liam Kressin, Shishir Shrestha
Faculty Sponsor: Sean Kugele, Department of Computer Science
Picobytes Execute and Test is an API backend subservice of the larger Picobytes web application that allows for the safe and secure execution and testing of a user-proposed C program. Execute and Test takes a C program from the user, and compiles and runs the program along with any provided test cases. Feedback includes but is not exclusive to different forms of errors and information on successfully run code. Given the nature of the application, users are allowed to submit any possible C code for feedback, including many harmful or unstable programs. To prevent the execution of potentially destructive programs, the execute and test service uses a virtual container application to create a separate, safe environment to run programs without giving them access to the host system. We used Python and GCC compiler to handle the code compilation and running process, an application called docker builds the containers, a system called Kubernetes manages a group of containers for multiuser functionality and FastAPI allows each process to communicate.

2:45 – 3:00 Proving a programming language halts
Ryan Kennelly
Faculty Sponsor: Matt Superdock, Department of Computer Science
Restricting what a programming language can do gives us more certainty of what it can do. A famous example of this in theoretical computer science, is adding typing (saying what type of thing something is) as a requirement to the language 'λ-calculus' (a language of only functions), we know that any expression that can be typed halts (it doesn't repeat itself forever). These restrictions can be restrictive, so there are many languages that aim to expand what can be done in them. One such expansion is 'λ-2' which adds polymorphic types (types that depend on

types). We formalized a proof that ‘λ-2’ halts, and hope to further expand this into more complex and novel systems.

SOCIAL SCIENCES ORAL SESSIONS

Economics I
11:00 am – 12:00 pm
Ohlendorf 225
Moderator: Jaqueline Oliveira

11:00 – 11:15 Bipartisanship in the Face of Tragedy: The Impact of 9/11 Inside Congress
Cami Lowry
Faculty Sponsor: Jaqueline Oliveira, Department of Economics
The United States is more politically divided today than it has been in decades, with ideological polarization in Congress reaching unprecedented levels. However, moments of national crisis have the power to reshape political dynamics, bringing members together in ways that defy the usual partisan divide. This study examines whether the September 11, 2001, terrorist attacks served as one such unifying event by analyzing how they impacted bipartisanship in the U.S. House of Representatives. Using roll call vote data from 1989 to 2025, this study applies a Difference-in-Differences approach to compare changes in partisanship on defense-related bills and tax policy bills before and after 9/11. The analysis incorporates member and time fixed effects, various bill specific controls, and a robustness check to assess whether high-profile security legislation, like the USA Patriot Act, disproportionately drives bipartisanship. By isolating the causal effect of 9/11 on congressional voting behavior, this study seeks to determine whether the attack fostered genuine bipartisan cooperation or simply altered the nature of partisan conflict in the House.

11:15 – 11:30 High Stakes: Marijuana Legalization and Crime
Madelyn Bertsch
Faculty Sponsor: Jaqueline Oliveira, Department of Economics
The legalization of recreational marijuana is a major and controversial policy change in the U.S., with 24 states enacting laws despite ongoing federal prohibition. Opponents argue legalization fuels petty crime, DUIs, and broader drug use, while proponents claim it reduces crime by shrinking the black market and freeing up law enforcement resources. However, limited and conflicting research leaves its true impact on crime unclear. This study uses a fixed effects model with city-level data from the FBI's Uniform Crime Reporting System to examine the relationship between legalization and crime. The model accounts for political affiliation, tax rates, and the share of the population aged 18–25, with controls for both city and time fixed effects. Preliminary findings show no significant impact of legalization on crime, offering important evidence for policymakers evaluating marijuana laws.

11:30 – 11:45 You Are What You Read: Menu Labels and Obesity Outcomes
Megan Propp
Faculty Sponsor: Jaqueline Oliveira, Department of Economics
Obesity rates in the U.S. have risen significantly over the past three decades, prompting the adoption of menu labeling laws to promote healthier eating. This study evaluates the impact of state-level menu labeling laws on obesity rates using a difference-in-differences approach with two-way fixed effects. The analysis relies on Behavioral Risk Factor Surveillance System (BRFSS) data from 1990 to 2017, supplemented with economic and demographic data from

federal sources. By comparing obesity trends in states with and without menu labeling laws, this study assesses the effectiveness of these policies in reducing obesity rates.

11:45 – 12:00 Policing in Focus: The Crime Effects of Body-Worn Camera Adoption
Weatherly Spence
Faculty Sponsor: Jaqueline Oliveira, Department of Economics
This study examines the impact of body-worn cameras on crime counts across U.S. counties from 2009 to 2019. Utilizing a panel dataset and a difference-in-differences methodology, this research isolates the effect of body-worn cameras on crime count, specifically, property and violent crimes. The analysis incorporates crime data from the FBI Crime Data Explorer (2025a) and body-worn camera implementation records from the Atlas of Surveillance (2025b). Previous studies have shown that body-worn cameras reduce police use-of-force incidents and citizen complaints. Previous research suggests body-worn cameras may deter crime and reduce arrests due to increased scrutiny of officer misconduct. Unlike prior studies, this research examines property and violent crime counts at the county level, providing a more comprehensive view of public safety. The study evaluates two hypotheses: that body-worn cameras will reduce property crime counts but have no effect on violent crimes, in line with deterrence, self-awareness, and cost-benefit criminology theories. The second hypothesis is that body-worn cameras may increase property and violent crime counts due to over-deterrence or improved reporting accuracy.

Economics II
12:30 pm – 1:30 pm
Ohlendorf 225
Moderator: Jaqueline Oliveira

12:30 – 12:45 Exploitation or Enrichment?: The Effect of Subminimum Wage Laws on Employment Outcomes for the Disabled Community
Amelia Thalhammer
Faculty Sponsor: Jaqueline Oliveira, Department of Economics
This study examines whether banning subminimum wages under Section 14(c) of the Fair Labor Standards Act (FLSA) affects employment outcomes for disabled individuals. Section 14(c) allows employers to pay disabled workers below the federal minimum wage, a policy debated for its potential to either exploit workers or expand job opportunities. Economic theory suggests that banning subminimum wages could reduce employment by imposing a higher wage floor. Using a difference-in-difference-in-differences model and U.S. Census data from IPUMS USA, this study estimates the impact of state-level subminimum wage bans on disabled workers. The hypothesis predicts a negative employment effect due to reduced employer demand and potential workforce exits linked to benefit eligibility. Findings from this analysis contribute to the policy debate on wage regulations and labor market accessibility for disabled individuals

12:45 – 1:00 Courts and Crime: Evidence from Memphis and the Grizzlies' Game Outcomes
Paxon Dewett
Faculty Sponsor: Jaqueline Oliveira, Department of Economics
The city of Memphis has experienced high crime rates for years, yet the notion of the Grizzlies as a crime determinant has been largely unaddressed. Using by-the-minute NIBRS crime

incident data and independent NBA game outcomes between 2019 and 2024, this analysis utilizes a Poisson pseudo-likelihood model to determine the effect of the Grizzlies winning games on local reported crime. Results suggest that Grizzlies' home wins are associated with increases in property crime and crimes against persons at varying significance levels, while away wins are associated with decreased property crime at a 1% level. These findings aim to provide local authorities with actionable insights to support future policing efforts on Grizzlies' game days.

1:00 – 1:15 The Impact of TANF Policy Restrictiveness on High School Graduation
Rebekah Rath
Faculty Sponsor: Jaqueline Oliveira, Department of Economics
This study examines the impact of Temporary Assistance for Needy Families (TANF) policy restrictiveness on high school graduation rates across U.S. states from 2004 to 2016. Using individual-level data from the American Community Survey (ACS) and state-level TANF policy data, it analyzes whether stricter work requirements and benefit sanctions reduce high school completion. A two-way fixed effects model isolates the effect of TANF variation while controlling for demographic and economic factors. The study hypothesizes that stricter TANF policies lower graduation rates by increasing financial strain and diverting youth into the workforce. These findings contribute to the broader discussion on welfare policy and its unintended effects on educational attainment.

1:15 – 1:30 How Industry Tax Credits Impact Workers' Wages.
Molly Hirner
Faculty Sponsor: Jaqueline Oliveira, Department of Economics
This study examines the impact of Georgia's 10% film tax credit on film industry workers' wages. While the policy has driven industry growth since 2005, its effect on labor earnings remains unclear. Using pooled cross-sectional data from the American Community Survey, this analysis applies a three-way difference-in-differences model, comparing film industry workers in Georgia to those in other states. The model controls for state fixed effects to isolate the policy's impact. Findings from this study contribute to the broader discussion on the effectiveness of tax incentives in shaping labor market outcomes.

Economics III
1:30 pm – 2:00 pm
Ohlendorf 225
Moderator: Jaqueline Oliveira

1:30 – 1:45 Balancing Work and Love: The Effect of Hours Worked on Marital Outcomes
Alexandros Dragatsis
Faculty Sponsor: Jaqueline Oliveira, Department of Economics
This study examines whether weekly hours worked influence marital stability in the U.S., using data from the National Longitudinal Survey of Youth 1979 (NLSY79). A fixed effects model with an event study approach addresses reverse causality by analyzing events in which there is a significant change in the number of work hours. The analysis also explores gender differences to determine whether work hours affect marital stability differently for men and women.

1:45 – 2:00 Do Sons and Daughters Change How Parents Spend Their Time?
Ellen Fox
Faculty Sponsor: Jaqueline Oliveira, Department of Economics
This paper examines whether the gender of a firstborn child influences how parents allocate their time across childcare, housework, and labor market activities. Using data from the American Time Use Survey (2003–2023), and exploring the random variation in gender of the first-born child, I estimate a linear regression model to analyze these effects while accounting for parental gender differences in time use. The study is grounded in the theory of comparative advantage, which suggests that parents may specialize in household tasks differently based on their child's gender. By comparing mothers and fathers, this paper investigates whether parental responses to child gender contribute to gendered divisions of labor in the household.

Advanced Research Methods in Psychology
3:00 pm – 4:15 pm
Robertson 110
Faculty Sponsors: Katie White and Kailey Lawson, Department of Psychology
Moderator: Kailey Lawson

This session will include presentations of final research projects conducted by teams of students enrolled in two sections of Psychology Advanced Research Methods. In the section focused on psychological assessment, students designed novel self-report measures on a variety of constructs (school satisfaction, student-athlete motivation, pettiness) and examined the validity evidence for these new measures. In the other section, which focused on human language processing, research projects involved word- and discourse-level analyses of spoken and written language production. In addition to further developing research skills, students learned how to conduct data analyses in the statistical software R Studio.

Social Sciences
11:00 am – 11:40 pm
FJ-D
Moderator: Laura Taylor

11:00 – 11:20 Lainoff Fellowship Reflection: International Justice Mission (IJM) Internship
Anna Yates
Faculty Sponsor: Stephen Wirls, Department of Philosophy
International Justice Mission (IJM) is a nongovernmental organization that works against human trafficking and violence across the globe. Through the Lainoff fellowship program, I completed an internship working in Advocacy Communications under the U.S. Corporate & Government Partnerships division of IJM. Work for the internship included drafting press releases, social media language, and a summer-long research project synthesizing IJM's submissions and language from the 2024 U.S. Department of State's annual Trafficking in Persons (TIP) Report. The internship included presenting this research to country field offices in Africa, Southeast Asia, and Eastern Europe. Other components of the internship included attendance at IJM's semi-annual Prayer Retreat and meeting weekly with a small group of other interns. Reflections from this experience include the role of faith-based organizations in foreign aid programs, developments in anti-trafficking work learned from research, and questions moving forward for

the status of IJM and other NGOs considering recent reductions in federal foreign aid funding. Working with attorneys across the organization also motivated my decision to attend law school and consider legal work with nonprofits in the future.

11:20 – 11:40 Black Spaces at a Place Like No Other: How Black Students Transform and Create Space at Rhodes College
Hope Robinson
Faculty Sponsor: Laura Taylor, Department of Educational Studies
Drawing from Black placemaking theory, the research explores how Black students navigate and redefine spaces to foster community, resist systemic oppression, and affirm their identities. Employing interviews and mental mapping, the study identifies three pillars of Black spaces: Black presence, intentionality, and the freedom to engage in culturally significant or mundane activities. Findings reveal that Black spaces emerge through student-led initiatives, events, and leadership, exemplified by traditions such as Black Joy Day and the activities of the Black Student Association. Additionally, the research highlights the role of Black affective networks (BANs) in providing temporary emotional support and solidarity. Despite systemic challenges, these efforts underscore the resilience of Black students in reshaping campus culture. The study concludes with recommendations for institutional support to sustain Black spaces and enhance inclusivity within higher education.

Politics and Law
2:00 pm – 3:20 pm
Buckman 200
Moderator: Tanner Chapman

2:00 – 2:20 Media Framing and Bias: President Joe Biden's Withdrawal from the 2024 Presidential Race
Mary-Hunter Brown
Faculty Sponsor: Erin Dolgoy, Department of Politics & Law
Through this talk, I convey how CNN, Fox News, and MSNBC differ in their framing of President Joe Biden's decision to withdraw from the 2024 presidential race in the 24 hours following his official announcement on July 21st, 2024. Using transcripts of the broadcast news coverage from the selected media outlets that aired from 8pm-9pm EST on the day that President Biden made his withdrawal announcement, I developed a codebook that grouped together the frames used by the broadcasters to determine if there were any differences in how the networks presented this event to their audiences. In addition, I ran an automatic sentiment analysis using a coding software program to see if there were notable differences between the three media outlets regarding the tone of their sentiment.

2:20 – 2:40 How TikTok Reinforces the Existence of Echo Chambers in Politics
Annie Bly
Faculty Sponsor: Erin Dolgoy, Department of Politics & Law
Since 2015, the United States has seen an unprecedented increase in political polarization (McCoy et al., 2022). This polarization has heavily manifested itself online. Twitter is an example with an earlier influence that is comprised of tweets and retweets fueled by charged language (Bail et al., 2018). Many politically interested citizens derive their political knowledge

from social media, especially young people (Newman, 2021). Social media algorithms amplify "echo chambers" by producing content for users that affirm their political beliefs. This prevents exposure to opposing viewpoints, naturally increasing polarization (Levy, 2021). This paper will discuss one of the most nuanced influences, TikTok.

2:40 – 3:00 The Evolution of Polarizing Views of the Supreme Court Through the Lens of Bush v. Gore, Obergefell v. Hodges, and Dobbs v. Jackson Women's Health Organization
Dylan Farley
Faculty Sponsor: Erin Dolgoy, Department of Politics & Law
Throughout the 21st century, public perception of the Supreme Court has become increasingly polarized. This study investigates the role major Supreme Court decisions may have in contributing to this trend. My research includes three of the more compelling decisions released since 2000, Bush v. Gore, Obergefell v. Hodges, and Dobbs v. Jackson Women's Health Organization, and analyzes public opinion data before and after these decisions to assess what impact, if any, these decisions have on public perception of the Court. My research suggests a significant shift in the structure of support following these decisions, though not necessarily in overall support, indicating public perception of the Court has become increasingly polarized along political lines.

3:00 – 3:20 Comparing FOX News and CNN: Iraq War Broadcasting
Itamar Almalem
Faculty Sponsor: Erin Dolgoy, Department of Politics & Law
How do CNN and Fox News differ in their televised coverage of five pivotal events in the Second Gulf War (2003-2007)? The five events are the opening day of the war (March 20, 2003), President Bush's USS Lincoln Speech (May 1, 2003), David Kay's testimony to Congress about the absence of WMD's in Iraq (January 24, 2004), Saddam Hussein's death (December 30, 2006), and President Bush's announcement of his 'New Way Forward' Plan (January 10, 2007). These five moments in the war were selected because they all mark a critical moment in the conflict that reflects key changes in military strategy and government messaging. The purpose of this research is to see how these two networks reported the same key events in the Second Gulf War and how these reports diverged. Each transcript is similar in nature and style to one another. Each network's live televised coverage of an event that is examined in this study will have occurred on the same day or within 25 hours of each other. I conclude that while many things were consistent between Fox News and CNN's coverage of the Second Gulf War, CNN covered more news regarding protests to the war and civilian impact. I find that Fox News's coverage presents President Bush and the Second Gulf War in a more just and positive light. They did this by omitting certain details of the war pertaining to civilian impact and dissent while presenting more coverage of the reasons the U.S. began the war, such as frequently mentioning the war on terror and weapons of mass destruction.

POSTER SESSION #1

Multi-Sports Forum, Bryan Campus Life Center
1:00 – 2:30 pm
Poster numbers are listed with the title

#1 Age-based Stereotypes in the Workplace
Sophia Abraham, Gabrielle Gavin, and Allie Oliver
Faculty Sponsor: Matthew Weeks, Department of Psychology
Research on ageism in the workplace has found that older workers experience stereotyping and discrimination based solely on their age. These stereotypes relate to traits such as competence, timeliness, and the ability to learn new skills, which are all important features of a successful employee. We are testing these stereotypes through the Shifting Standards lens which relates to how judgement standards are set differently based on the group being judged. Past work has found that stereotyped groups are held to lower minimum and higher confirmatory standards when assigning traits that contradict their stereotypes which shows how difficult it is to overcome them. Based on this work, we are testing whether stereotypes related to older employees lead to a difference in the minimum and confirmatory standards that are set when evaluating the requirements to receive a raise. Based on past research, we predict that older employees will be held to lower minimum standards or less will be required of them to be considered for a raise, but higher confirmatory standards, or higher performance will be required to actually receive a raise. Our research will shed more light on how age-based stereotypes affect workplace decisions.

#2 Examining the Christian-science Conflict through the Shifting Standards Model
Sophia Abraham and Jane Golden
Faculty Sponsor: Matthew Weeks, Department of Psychology
In STEM, Christians are underrepresented compared to their prevalence in the American population. Previous research has examined this discrepancy, calling it the Christian-science conflict stereotype, which reflects findings that Christians are perceived as incompatible with science and science-related skills. We are examining this stereotype through the Shifting Standards Model. This model states that stereotypes are reflected differently depending on whether an objective or subjective scale is used to measure responses where objective scales conform to the stereotype and subjective scales show reverse or null effects. In our experiment, we are looking into how Christian students are rated on objective and subjective scales when assessing their scientific reasoning ability compared to nonreligious students. Based on the Shifting Standards Model, we predict that Christians will be perceived as worse in scientific reasoning when rated on objective scales, but seen as equally skilled as nonreligious students when rated on subjective scales. This research expands the application of the Shifting Standards Model and provides a new lens for examining the Christian-science conflict.

#3 Program Evaluation of Dialectical Behavior Therapy Skills Training Emotion Problem Solving for Adolescents (DBT STEPS-A): An Examination of Emotion Regulation Outcomes
Esther Ballesteros, Anthony Bruce, Jane Golden, and KK Sowers
Faculty Sponsor: Amanda Hasselle, Department of Psychology

Adolescence is a developmental period characterized by significant changes and an increased risk of mental health difficulties, yet access to mental health resources to support adolescents remains limited. School-based social-emotional learning (SEL) programs, which foster students' emotional intelligence, behavioral regulation, and interpersonal skills, represent one strategy for addressing the gap in available services. The current study explores the effectiveness of the SEL program "Dialectical Behavior Therapy Skills Training for Emotion Problem Solving for Adolescents (DBT STEPS-A)" among high school students. Few studies have examined the effects of DBT STEPS-A on racially diverse populations, and past research has yielded mixed results on this intervention's effects. This study examines whether a racially diverse sample of high school students participating in DBT STEPS-A demonstrate improved emotion regulation from pre-intervention to post-intervention. This study employs a single cohort design, where all participants completed a nine-week program, implemented in their Lifetime Wellness classes, guided by the DBT STEPS-A manual. Emotion regulation was measured using pre- and post-test self-report questionnaires. We plan to analyze changes using a paired-sample t-test. Findings will help elucidate the effectiveness of a DBT STEPS-A intervention with racially diverse adolescents, which could inform future implementation of SEL programs in educational settings.

(F) #4 An Analysis of 42 Pediatric Neurosurgical Readmissions at Le Bonheur Children's Hospital

Alex Walcott and Willow Blythe, Paul Klimo, MD, Nir Shimony, MD, Brandy Vaughn, RN, BSN , Kim Giles, James Wheless, MD, Tracee Ridley-Pryor, DNP, Le Bonheur Children's Hospital

Faculty Sponsor: Jonathan Fitz Gerald, Department of Biology and Katie White

Surgical readmission rates are an established benchmark that is crucial in determining the quality of patient care. The purpose of this research is to analyze the pediatric neurosurgery readmission rates at Le Bonheur Children's Hospital over the past year, as neurosurgery is a pediatric surgery subspecialty that consistently has the most unplanned readmissions and highest mortality rate compared to other kinds of pediatric surgery. Out of the 338 patients, 42 of them were readmitted to the hospital within thirty days, and 14 of the readmitted patients returned to the operating room. Out of the 42 who were readmitted, 29 were unplanned readmissions. This means that 8.6% of the pediatric neurosurgery patients had unplanned hospital readmissions, which is both reasonable given previous studies and is a lower rate than at other hospitals previously studied. This provides Le Bonheur with a baseline from which to make goals and improve overall patient quality of care.

(F) #5 Microbial Metabolism Within the Gut Microbiome May Drive Inflammatory Signaling After Bone Marrow Transplant

Naisha Chowdhury

Faculty Sponsors: Qian Shen, Department of Biology, Marygrace Duggar, Dr. Ellie Margolis, St. Jude Children's Research Hospital

Bone marrow transplants are the only curative treatment for several blood cancers and severe immunodeficiencies, but they often lead to graft-versus-host disease (GVHD), a significant complication driven by inflammatory immune responses. Emerging research suggests that the gut microbiome plays a crucial role in modulating post-transplant inflammation, potentially contributing to GVHD pathogenesis. A study of pediatric bone marrow transplant patients at St. Jude Children's Research Hospital and several centers in Italy found that increases of bacterial

genes related to arginine biosynthesis at or just before transplant correlated with the development of moderate to severe GVHD later. We hypothesize that microbiome-derived arginine is taken up by patient immune cells and promotes proinflammatory responses that exacerbate GVHD. To investigate this, we cultured T cells and activated them in the presence or absence of arginine and biologically relevant precursors involved in bacterial arginine synthesis. Flow cytometry was used to assess T-cell activation, proliferation, and cytokine production. We found differences in T cell activation and inflammatory cytokines between groups, which may explain why an abundance of arginine production correlated with development of GVHD. This research contributes to the understanding of how the gut microbiome impacts inflammation in transplant patients.

#6 Behind the Specimens: Uncovering Women's Contributions to the Rhodes College Herbarium

Luke Antesberger
Faculty Sponsors: Kathryn LeCroy, Department of Biology, Bill Short, Associate Director of Library Services; Mimi Salazar, Director of Alumni Relations

The Rhodes College Herbarium (ID: SWMT) contains some of the oldest botanical specimens in the state of Tennessee, boasting a collection of 5,373 specimens collected as far back as 1845 by men and women alike. We sought to uncover the histories of women contributors to the herbarium. This project seeks to illuminate the stories of the women whose work and specimens have been vital to the herbarium's growth, to the Rhodes Biology department, and to conservation efforts in the Memphis community. Using the SWMT Herbarium collection, the Barret Library Sternberg Collection, and with assistance from Alumni Relations, I examined records, databases, and conducted interviews with some of the women contributors. This research not only reconstructs the histories of these women and their essential contributions to the herbarium and the Rhodes community but also underscores the value of paying closer attention to the "hidden figures" that patriarchal constraints often devalue in their contributions to science. By highlighting their stories, this project aims to honor their legacy and emphasize the importance of preserving often overlooked, historical narratives. Through this work, the herbarium becomes both a repository of plant specimens and a testament to the enduring impact of women in science.

#7 Stress mindset moderates the association between stress appraisals and snack food intake.

Emilia Schwenk, Sarah Bradford Seawright, Georgia Davis, and Aadhya Arkalgud
Faculty Sponsors: Rebecca Klatzkin, Department of Psychology

Food preferences tend to shift towards comfort foods following acute stressors, but do not ubiquitously increase the amount of food consumed. Many individuals overeat in response to stressors, yet other decrease or do not change their food intake. Individual differences in factors related to stress and eating, such as stress mindset (i.e., perceptions regarding the nature of stress) and stress appraisals (i.e., evaluation of a stressful situation as either a challenge or a threat) may explain this variability in stress eating. We conducted a study to investigate whether stress mindset moderated the effect of stress appraisal on snack intake post-stress. Participants were 86 women between the 18 and 22 years old, with a mean body mass index of 24 kg/m2. On the first visit, participants completed an assessment of stress mindset and on the second visit underwent a stress mindset manipulation followed by an acute social stress task (i.e., TSST) and a snack

food taste test. Results indicate that greater threat appraisals were associated with more M&M intake only for women with greater stress is debilitating mindsets. Therefore, a stronger stress-is-enhancing mindset may protect against increases in stress eating following threat stress appraisals.

#8 Accuracy and Temporal Precision of Open-Source Machine Learning Models for Lick Detection

Georgia Davis
Faculty Sponsors: Rebecca Klatzkin, Department of Psychology, Mia Fox, Dr. John Boughter, Dr. Max Fletcher, University of Tennessee Health Science Center

We focused on the precision and accuracy of lick detection through video analysis from machine learning models trained via open-source software. We used DeepLabCut (DLC), a pose-estimation software that is supported by Simple Behavioral Analysis (SimBA), to classify orofacial behaviors using metrics derived from pose information. Head-fixed, water restricted mice were placed trained to lick a spout after a brief tone. Videos of the ventral aspect of the face were acquired either at 30, 60, or 160 fps; respiration was detected with an external thermistor wire placed in front of one nostril. Lick detection accuracy was determined by comparing the output of a capacitance circuit to DLC pose estimation and a region of interest (spout), and a behavior classification model trained in SimBA on spout licks. Temporal precision was determined through the respiratory phase preference of licks using data collected at 25k Hz and 2000 Hz. While the accuracy of lick counts appears unaffected by frame rate, temporal precision of lick detection decreases as frame rate decreases. Behavioral analysis performed on videos acquired at 160 fps yields a similar respiratory phase preference, suggesting its temporal resolution is sufficient for detailed analysis of electrical signal acquired at 25k Hz.

#9 Examining the Relationship Between Chromatin State and Lifespan in Drosophila melanogaster

Logan Deutschmann, Emma Clark, and Ray Leung
Faculty Sponsor: Liam Hunt, Department of Biology

Loss of heterochromatin, a chromatin state associated with gene silencing, has been implicated in aging and increased heterochromatin levels are correlated with extended lifespan. To explore this relationship we investigated whether mosaic red and white eye phenotypes, due to Position Effect Variegation (PEV) caused by variable heterochromatin mediated silencing of the white gene, can correlate heterochromatin levels with lifespan in the fruit fly Drosophila melanogaster. By breeding long-lived, short-lived, and mutant genetic backgrounds with the white mottled locus that causes PEV, we could assess both PEV eye phenotype and aging simultaneously. Eye color analysis revealed that long-lived strains exhibited whiter eyes, suggesting increased heterochromatin, while short-lived strain exhibited redder eyes, suggesting reduced heterochromatin. Coincident with these PEV phenotypes, flies with increased heterochromatin had delayed signs of aging including reduced loss of locomotor function with age and decreased mortality in old age. These results support our hypothesis that heterochromatin loss is associated with aging, and that genetic variants modifying the epigenetic chromatin state may influence lifespan. Because heterochromatin structure is conserved across species, understanding its role in regulating lifespan may provide insights into human aging and age-related diseases, with heterochromatin maintenance being a possible means for improving health in old age.

#10 Quantitative Analysis of the Purity and Composition of Lavender Essential Oils
Leven Greene, Mandy Cassius, and Areej Khan
Faculty Sponsors: Kim Brien, Department of Chemistry
Essential oils are intended to be used topically or in diffusers, but they are often misused as flavor additives. As these oils are not designed for consumption, nor potential medicinal properties, the FDA does not monitor their production. As such, they might contain harmful volatile organic compounds (VOC) that are not suitable for human ingestion. This experiment was conducted to evaluate the purity and composition of essential oils by comparing data obtained from three different brands all listed as pure Lavandula angustifolia oil. Samples were distilled and analyzed using 1H-NMR and GC-MS, and the data was compared between samples, as well as to literature references to prove or disprove the purity of each essential oil sample.

#11 Older Adult Cognition and Wellbeing are Differentially Related to Walking, Other Exercise, and Employment Status
Mae Anderson, Frances Himsl-Fenz, Claire Price, and Maya Ihling
Faculty Sponsor: Geoffrey Maddox, Department of Psychology
Exercise and cognitive engagement promote cognition and wellbeing in later adulthood. The current study examined the relationship between different forms of exercise, cognition, and wellbeing as a function of retirement status (i.e., cognitive engagement). 336 older adults completed an online survey which asked them to rate their cognition (e.g., episodic and semantic memory, attention) compared to five years ago and their wellbeing (e.g., happiness, burdensomeness). Participants also reported their forms of exercise, which were dichotomously coded for the presence or absence of "walking" and "other exercise". Results revealed that regardless of exercise form, cognition differed across retirement status such that employed respondents reported higher cognition. In contrast, wellbeing differed as a function of retirement status and exercise form: Walkers reported higher wellbeing than non-walkers regardless of employment status. Non-walkers who engage in other forms of exercise reported higher wellbeing than those who do not exercise but only if they are employed. Discussion will focus on factors affecting older adult's choice of physical activities and how those factors may modulate cognitive and wellbeing outcomes.

#12 Cognitive Health and Personal Resources Differ across White and Underrepresented Older Adults
Claire Price and Frances Himsl-Fenz
Faculty Sponsor: Geoffrey Maddox, Department of Psychology
There has been an increased emphasis in research to better support community-based aging in light of the growing population of adults over 65 years old. Despite this, many past studies have typically examined the priorities and goals of predominantly White samples (Ahn et al., 2017), often neglecting the priorities and goals of other racial and ethnic communities. Our initial research examined factors that contribute to healthy, community-based aging experienced by White and Underrepresented older adults. Participants self-reported their capacities across eight domains (i.e., physical health, health access, cognitive health, residence, neighborhood, psychological health, social resources, and financial resources). We utilized confirmatory factor analysis to examine the structure underlying community-based aging. Results indicated a satisfactory fit for an eight-factor structure that was statistically equivalent across groups. Notably, intercepts differed in follow-up tests, indicating significant between-group differences

in cognitive health. To further explore this group difference, the current study seeks to replicate and expand upon the previous findings and further examine the discrepancies across groups in self-reported cognitive health. The discussion will consider possible explanations for the observed group differences in cognitive health while also examining the consistency in factor structure across groups.

#13 Evaluating the Impact of DBT STEPS-A as a Social-Emotional Learning Curriculum: A Pre-Post Study on Coping Skills in High School Students
Kathryn Dressel, Reilly Morgan, Sophia Nappi, Sarah Jane Richey
Faculty Sponsor: Amanda Hasselle, Department of Psychology
Adolescent mental health difficulties have risen over the past decade, yet individual therapists are insufficient to meet the demand. Schools are implementing social-emotional learning (SEL) interventions to bridge this gap and support well-being. However, previous research has yielded mixed findings, with racially diverse youth underrepresented. This study evaluates the effectiveness of Dialectical Behavioral Therapy Skills Training for Emotion Problem-Solving for Adolescents (DBT STEPS-A), an SEL curriculum designed to enhance coping skills and emotion regulation in a diverse population. The primary outcome is changes in students' coping skills. A single cohort pre-post intervention study was conducted with high school students who completed a slightly adapted DBT STEPS-A curriculum. Before and after the intervention, students completed the Dialectical Behavioral Therapy Ways of Coping Checklist, measuring coping skills across four DBT modules. A paired sample t-test will compare scores, assessing DBT STEPS-A's effectiveness in fostering adaptive coping. Findings will reinforce prior research and address gaps in program efficacy for racially diverse populations. This study contributes to understanding school-based SEL interventions' role in adolescent mental health, highlighting DBT STEPS-A as a potential solution to support students' emotional well-being.

#14 Metabolic Pathways Driving Antibiotic Tolerance in S. pneumoniae
Sophia Schieltz, Cydney Johnson, Haley Ecklin, Abigail McKnight, and Tyler Simmons
Faculty Sponsors: Qian Shen, Department of Biology, Dr. Jason Rosch, St. Jude Children's Research Hospital
The rapid increase in infections caused by antibiotic-resistant bacteria contributes to clinical treatment failure, a challenge exacerbated by Gram-positive pathogens like Streptococcus pneumoniae, which easily acquire resistance to clinical antibiotics. Antibiotic resistance is partly driven by transient cellular states conferring resistance: persistence, where a subset of bacteria become dormant under antibiotic stress, and tolerance, where populations fail to grow in the presence of antibiotics but resume growth upon removal. Preliminary transposon sequencing (Tn-Seq) of S. pneumoniae identified mutations in metabolic pathways that confer antibiotic tolerance and serve as potential indicators of resistance. Challenging these populations with sublethal concentrations of antibiotics may halt bacterial growth and identify the relevant cellular pathways to the development of full-blown resistance. One key mutation identified in the screen occurs in the ppc gene of S. pneumoniae serotype 4 (TIGR4), which encodes the phosphoenolpyruvate carboxylase enzyme. The Δppc mutant strain demonstrates several noteworthy features: 1) reduced susceptibility to RNA synthesis inhibitors, 2) altered drug susceptibility under both CO2-deficient and CO2-rich conditions, 3) changes in transformation efficiency, and 4) differential activation of stress response pathways. These findings offer

insights into the bacterial metabolic network and the pathways that may contribute to the development of antibiotic resistance.

(F) #15 Emotional Labor and Intersectionality: Differences in Display Rule Expectations for Race and Gender

Dana Potter and Nolan Colladay
Faculty Sponsors: Kelly Weeks, Department of Business, Nicolina Taylor, University of Wyoming; Myrtle Bell, University of Texas- Arlington

Emotional labor is the practice of managing one's emotions to meet workplace expectations, often seen through enacting display rules (e.g. "service with a smile"). The concept of intersectionality has been shown to impact workplace experiences, especially for Black woman who face racialized and gendered expectations. We conducted a study that investigated how expectations to suppress negative emotions/express fabricated positive emotions would vary based on if the perceived individual was a white man/woman or Black man/woman. Participants were given positive and negative scenarios regarding four different employees with stereotypical Black/white male or female names to test this idea. Our results demonstrated that white women and BIPOC men expected Tanisha (Black female employee) to express more true emotions than BIPOC women expected. BIPOC women still expected Tanisha to express more true emotions than they expect Kevin (white male employee) to express. Regarding display rules, we found that all participants believed that Tanisha should resist expressing emotions more than Kristen (white female employee) should. Lastly, the expectations of BIPOC participants showed that BIPOC male participants believed Tanisha should pretend more than white male participants did, and that BIPOC women participants believed Jamal (Black male employee) should pretend more than White women participants.

#16 Determinants of a Good Neighbor: The Minimum and Maximum Standards of Moral Judgements of Immigrants

Camille Chase, Tyler Lanier, and Dana Potter
Faculty Sponsor: Matthew Weeks, Department of Psychology

In the United States, many common discriminatory stereotypes that are held regarding immigrants are often reinforced under the guise of morality concerns. However, these stereotypes tend to disproportionately impact beliefs about immigrants of Latinx ethnicity over immigrants of other ethnicities, particularly those of European descent. We explored the beliefs about morality that Americans (specifically, politically conservative individuals) possess surrounding immigrants of Latinx descent using the shifting standards model. We hypothesized that based on the greater negative stereotype of immorality of Latinx immigrants, the minimum standards of judgment to deem both Latinx and European immigrants as moral would be similar due to reduced expectations emanated from the stereotype. Conversely, we expected that the confirmatory standards of judgment would be significantly more stringent regarding Latinx immigrants compared to European immigrants, in alignment with the stereotype. To achieve this, we asked participants to rate the morality of certain behaviors, then prompted them to list the number of behaviors the individual would have to exhibit to either get a sense of perception of morality (minimum) or determine the individual’s morality (confirmatory).

#17 Development of a Parent Navigation Program for Caregivers of Children with Pediatric Cancer

Muna Ogwo and Kayla Wynja
Faculty Sponsors: Kelly Diamond, Department of Biology, Dr. Dylan Graetz, St. Jude Children's Research Hospital

Clinical trials are essential for improvement in the treatment and survival of pediatric cancer. Despite known benefits, multiple barriers to clinical trial enrollment exist. These barriers include confusion around clinical trials, lack of time, and financial limitations, creating disparities in enrollment and care. Parent navigation can be implemented to combat barriers to clinical trial enrollment. Our aim for this project was to create a mentor-like, parent navigator program for parents and caregivers of newly diagnosed children with cancer. A training workbook and education session were developed to train parent navigators to support clinical trial decision making during the first 6 weeks after cancer diagnosis. As a result, 11 parent navigators were trained across 8 affiliate sites. This parent navigator program will be used to assess the acceptability and feasibility of a navigation within the St. Jude Affiliate network. Parent navigation will aid us in understanding what decision making around enrollment in clinical trials.

(F) #18 Investigating the Synergy Potential of HDAC6 inhibitor ACY-738 with AKT, MEK, and ALK Inhibitors in the Treatment of High-Risk Neuroblastoma

Emerson Kleis
Faculty Sponsors: Mary Miller, Department of Biology, Dr. Jun Yang, St. Jude Children's Research Hospital

The aggressive nature and poor prognosis of high-risk neuroblastoma (HR-NB) are associated with genetic alterations in key signaling pathways, including PI3-Kinase/Akt and RTK-RAS, which are promising targets for treatment. Histone Deacetylase 6 (HDAC6) plays a role in regulating the MAPK and PI3K/Akt signaling pathways, influencing tumor growth, development, and disease progression. Consequently, HDAC6 inhibitors (HDAC6i) are emerging as potential therapeutic candidates for neuroblastoma, particularly when combined with other pathway inhibitors. In this study, we aim to explore the potential synergy between the HDAC6 inhibitor ACY-738 and inhibitors of AKT (MK-2206), MEK (Trametinib), and ALK (Lorlatinib). To optimize the experimental design, we determined the IC50, GI50, and LC50 values of each drug in neuroblastoma cell lines via PrestoBlue analysis. Preliminary crystal violet assays suggest potential synergistic interactions between the drug combinations, while ZIP, Loewe, and Bliss synergy models indicate primarily additive effects between ACY-738 and MK-2206 in ALK-mutated cells. Ongoing western blot analysis is focused on elucidating the mechanisms of action of ACY-738 both alone and in combination with pathway inhibitors. If synergetic, future studies will investigate the effects of these drug combinations in vivo using xenograft models to evaluate their therapeutic potential and clinical applicability.

(F) #19 Optimization of time-sensitive and light-activated assay of receptor-arrestin interaction confirmed by reporter gene expression

Evan Reeder, Katarina Nemec, Nicole Luthcke, and Vikas Trivedi
Faculty Sponsors: Liam Hunt, Department of Biology, Dr. M. Madan Babu, St. Jude Children's Research Hospital

The study of protein-protein interactions (PPIs) is a strategy used to aid in our understanding of cellular signal transduction mechanisms and outcomes in G-protein-coupled receptors (GPCRs). More than a third of FDA-approved drugs target GPCRs, but most have undesirable side effects. The current assay will help the overarching goal of developing a platform to screen for unbiased drugs. We are particularly interested in assays that monitor β-arrestin activity and recruitment to the β2-adrenergic receptor (β2AR), which is especially relevant for cardiovascular and pulmonary pathologies. The SPARK (Specific Protein Association tool giving transcriptional Readout with rapid Kinetics) assay allows for real-time monitoring of arrestin activity, requiring simultaneous receptor-arrestin PPI and light activation to reveal a tobacco etch virus cleavage site (TEVcs) cleaved by a modified arrestin to free a transcription factor that translocates to the nucleus to drive reporter gene expression. We are utilizing the SPARK model to optimize β-arrestin screening by reducing dependence on the transient transfection of numerous constructs at once to reduce expression variability and minimize background signaling.

(F) #20 Does Sonic hedgehog signaling regulate interneuron production and survival?
Logan Wu
Faculty Sponsors: Larryn Peterson, Department of Chemistry, Dr. Kris Olesen, Dr. Young-Goo Han, St. Jude Children's Research Hospital
The neocortex is a brain structure crucial for higher-order functions including sensory perception, cognition, and motor control. Unlike the dramatically folded human neocortex, mice exhibit a smooth neocortex. Basal radial glia (bRGs) are essential for neuron population expansion and cortical folding in humans but are scarce in mice. Mice with enhanced Sonic hedgehog (Shh) signaling show amplified production and self-renewal of bRGs. This increases upper-layer excitatory neuron populations and cortical volume, causing folding in the cingulate cortex. Interneurons are inhibitory neurons essential for excitatory-inhibitory balance in the brain, necessary for normal cognitive function. Recent research suggests they depend on excitatory input for survival and can derive from the same progenitors that produce excitatory neurons. This study investigates whether Shh signaling alters cortical interneuron production and survival. We hypothesize that the increased cortical progenitor pool in mice with increased Shh signaling will boost interneuron populations and that elevated excitatory neuron populations will enhance interneuron survival. We examined interneuron populations in infant wild-type mice and mice with increased Shh signaling to determine total interneuron numbers and whether cortical progenitors can produce interneurons in this model. This research provides insights into interneuron production and survival, contributing to a further understanding of brain development.

(F) #21 Best Practices for Eliciting Patient and Caregiver Preferences for Prognostic Communication
Calliope Reeves, Caroline Christianson, MD, Harmony Farner, MA, Shoshana Mehler, BA, Tara M. Brinkman, PhD, Justin N. Baker, MD, Pamela Hinds, PhD, RN, Jennifer W. Mack, MD, MPH
Faculty Sponsors: Tanushree Pandit, Department of Biology, Dr. Erica Kaye, St. Jude Children's Research Hospital
While patients with advanced cancer and their parents advocate for individualized prognostic disclosure, pediatric oncologists infrequently ask patients and parents about their preferences for receiving prognostic information. Presently, best practices to guide clinicians in sensitive

elicitation of prognostic communication preferences remain understudied. To address this gap, we conducted a qualitative study to explore patient, parents, and oncologist perspectives on high quality approaches to elicit communication preferences and personalize prognostic disclosure. Rapid analysis was used to synthesize interview data and generate themes.
Of the 85 participants (25 patients, 40 parents, 20 oncologists), nearly all wanted to receive prognostic information, emphasizing the importance of trust in medical experts and the need to stay informed. Most patients/parents, along with some oncologists, advocated for clinicians to elicit communication preferences in advance of prognostic disclosure to tailor information for a given family's needs and support their emotional well-being. Participants recommended 3 key strategies for eliciting prognostic communication preferences: ask questions, give options, and consider delivery/tone. These findings underscore the importance of individualized prognostic communication, and future work will center on collaboration with patients, parents, and multidisciplinary clinicians to codesign and test targeted interventions to improve person-centered prognostic disclosure in advanced pediatric cancer.

(F) #22 De-Fragmentation of Sickle Cell Disease Registries through Content Harmonization
Sara Almoazen, Jane Hankins, Ombeni Diassi, Katrini Lopes Bucoski, Ambroise Wonkam, Collin Whelley, Manu Pereira, Andrew Zapfel, Deepa Manwani, and Petros Kountouris
Faculty Sponsors: Katie White, Department of Psychology, Nicholas R. Faris, St. Jude Children's Research Hospital, Dr. Jane Hankins, St. Jude Children's Research Hospital
Registries in sickle cell disease (SCD) are crucial for characterizing the disease course and burden and informing strategies to improve care quality. Existing Global SCD data is fragmented due to a lack of standardization, language and geographic barriers to care, and limited technical and clinical resources. To maximize global impact of standardization, it is crucial to establish a unified registry platform that facilitates inter-registry communication and supports low-resource organizations. Data dictionaries were requested from principal investigators of SCD registries worldwide. Variables (data elements) were cataloged. After standardization of variables, the methodology and sorting were reviewed and refined. Thirteen SCD registries from Africa, Asia, Europe, the UK, and North and South America were cataloged, identifying 6,117 variables before harmonization. The number of variables per registry ranged from 36 to 2,446. Registries from Europe (INHERENT and RADeep) and the UK (National Haemoglobinopathies Registry (NHR)) had the highest similarity index scores of variables (60-80%). Except for SCDIC, registries in the USA had little similarity with European ones (0-40%), while INHERENT (Europe) had moderate similarity (60%) with SPARCO (Africa). This global registry will act as a central repository, ensuring interoperability with other registries and providing a resource for institutions through a federated data model.

(F) #23 A Global Demand for Multi-Level, Comprehensive Sickle Cell Disease Training: Preliminary Results from an International Health Care Provider Needs Assessment Survey
Catherine Barclay, Uma Athale, MD, Clarisse Lobo, MD, PhD, Ombeni M Idassi, MHS, Daniel Moreira, MD, Fair Berg, EdD, MS, Nicholas R Faris, M.Div, Catherine Barclay, Tessa Youngner, MS, Jane Hankins, MD, MS
Faculty Sponsors: Katie White, Department of Psychology, Dr. Jane Hankins, St. Jude Children's Research Hospital
Comprehensive care reduces mortality and morbidity in sickle cell disease (SCD). However, there is a shortage of healthcare professionals (HCP) trained in SCD care, especially in low- and

middle-income countries (LMIC), where SCD is most prevalent. To inform the design of a multi-level certificate training program on SCD comprehensive care, we conducted a needs assessment survey. An anonymous 19-item survey gathered data on HCP demographics, confidence in comprehensive SCD care, and training priorities. Of 273 respondents, 95% were from LMIC, with a slight majority from sub-Saharan Africa (52%). Results showed inequitable access to trained HCPs globally. More experienced HCPs were in higher economic strata, and experience correlated with confidence in delivering essential SCD care. However, HCP's reported confidence was generally low: 79% reported very low to moderate confidence in SCD care management, 54% reported very low to moderate confidence in managing acute SCD complications, and only 43% reported high confidence in patient education and counseling. This international survey identified the urgent need for enhanced multi-level SCD training for HCPs, particularly in LMIC and among non-specialist HCPs. These findings support the development of a comprehensive SCD training program that offers a free, modular curriculum to ensure accessibility for HCPs in LMIC.

#24 The Role of Kappa Opioid Receptors in Risky Decision-Making
Erin Riley and Zach Mikkelson
Faculty Sponsors: Jason Haberman, Department of Psychology, Dr. Nicholas W. Simon, University of Memphis
Risky decision-making is defined as the pursuit of reward despite the possibility of punishment. This behavior is a hallmark of many psychiatric disorders, such as substance use disorder and pathological gambling. Dynorphins are naturally occurring opioid peptides that activate kappa opioid receptors (KORs). They have been shown to play a key role in stress responses, punishment avoidance, and reward processing. However, their specific contributions to risk-taking behavior remain unclear. This study investigates KOR involvement in cost-benefit decision-making tasks using Long-Evans rats. We are using 2 tasks which assess choices between a larger reward paired with either an associated punishment (Risky Decision Task) or a delayed punishment (Delayed Punishment Task). Rats receive a selective KOR agonist (GR89696) and antagonist (LY2795050) via intraperitoneal (IP) injections to investigate systemic effects and intracranial infusions into the ventral pallidum, a region that is critical for reward and motivation, to investigate region-specific effects. Due to the role of KORs in punishment avoidance, we predict that KOR inhibition will reduce sensitivity to punishment, therefore increasing the frequency of riskier choices. By examining how KOR manipulation affects decision-making, we aim to provide insights into the neurobiological mechanisms underlying maladaptive risk-taking in psychiatric conditions.

#25 Priorities and Goals of Community-Based Older Adults
George Crouch and Lee Jones
Faculty Sponsors: Geoffrey Maddox, Katie White, Department of Psychology
Older adults frequently report a preference for aging in place. This preference is increasingly important as the population of adults aged 65 and older is increasing and is predicted to comprise a larger percentage of the U.S. population than children under 18 by 2034. Although it is often assumed that older adults prefer aging in place to maximize independence, recent research suggests a wide range of reasons for this decision. The current study extends on these recent studies by examining older adults' aging-related priorities and how those priorities are associated with self-reported capacities across multiple domains that influence the aging-in-place process

(e.g., physical health, health access, cognitive health, residence, neighborhood, psychological health, social resources, and financial resources). Results indicated that participants most frequently prioritized cognitive and physical health. Further, the analysis revealed that self-reported capacities across domains were similar across older adults who did and did not prioritize physical health, whereas differences were observed in multiple domains (e.g., cognitive health, financial resources) when comparing groups that did and did not prioritize cognitive health. The discussion will explore the role of independence in prioritizing physical health and examine factors that may influence older adults to prioritize cognitive health.

#26 SuRGE Lab: Meta Analysis on SEL Programs and Their Effectiveness on High School Students

Ava Janczak, Adrian Garcia, and Evan Meek
Faculty Sponsor: Amanda Hasselle, Department of Psychology

Research suggests that school-based social-emotional learning (SEL) programs can improve students' mental health, interpersonal skills, and intrapersonal skills. The primary aspect of our lab's research involves refining and updating a meta-analytic database of studies that evaluate the effectiveness of SEL programs conducted with high school students worldwide. Studies that meet inclusion criteria are coded by a team of six coders, with each article assigned to three coders who extract relevant data using a detailed codebook and record their codes via a Qualtrics survey. Discrepancies are resolved via consensus to determine the final codes. A secondary aspect of our lab's research involves conducting an updated systematic review of the literature to identify articles published since 2020 that meet the inclusion criteria for our meta-analysis. Finally, a related aspect of Dr. Hasselle's work involves local implementation and evaluation of a specific SEL program (i.e., DBT STEPS-A) with high school students in Memphis. This pilot study employs a quasi-experimental design to evaluate program effectiveness in a local, real-world setting. In sum, our lab's work includes a global meta-analytic review of primary literature examining the effectiveness of SEL programs while also supporting local program evaluation efforts.

(F) #27 Validation and Implementation of a Novel Tool for Predicting Pathogenicity of Variants of Uncertain Significance in Familial Hemophagocytic Lymphohistiocytosis

Emily Bingham
Faculty Sponsor: Qian Shen, Department of Biology, Dr. Lauren Meyer, University of Washington, Ritu P. Roy and Adam B. Olshen, University of California San Francisco, Mohiuddin Choudhury, Sabrin Albeitun, and Dr. Kim Nichols, St. Jude Children's Research Hospital

Familial hemophagocytic lymphohistiocytosis (fHLH) is a life-threatening immune disorder characterized by severe hyperinflammation. fHLH results from biallelic loss-of-function mutations in genes crucial for CD8+ T cell and natural killer (NK) cell cytotoxicity, including PRF1, which encodes the pore-forming protein perforin. Many patients with suspected fHLH carry variants of uncertain significance (VUS) in fHLH genes, which are challenging to interpret and can lead to diagnostic uncertainty and treatment delays. To address this challenge, we developed a computational model for predicting pathogenicity of VUS in fHLH genes. This model integrates eight computational predictors assessing sequence homology, putative structural impact, and conservation-based scores to generate a probability of pathogenicity for each variant. A collection of PRF1 variants has been generated and is now ready for validation

using an in vitro system. Retroviral transduction will be used to express wild-type or mutant PRF1 in Prf1-/- CD8+ T cells. Perforin expression and cytotoxic function will be assessed via flow cytometry and cytotoxicity assays. The results will then correlate with the computational predictions. Validating this model will help establish its clinical utility in reducing diagnostic uncertainty in fHLH.

#28 Unmotivated: Perceptions of Obese and Non-Obese Women Based on Weight Loss Method Through the Shifting Standards Perspective

Lilia Russell and Amelia Whitehead
Faculty Sponsor: Matthew Weeks, Department of Psychology

Obese individuals are stereotyped as lazy and unmotivated to lose weight. Similarly, non-obese individuals who take GLP-1 receptor agonist (GLP-1 RA) drugs to lose weight are also stereotyped as lazy and unmotivated as they are depicted as "cheating" in order to lose weight. For this present study, we will plan to utilize Biernat's shifting standards model (SSM)–which showcases the tendency to shift stereotypic judgment from stereotype-consistent views on objective measures to stereotype-reduced views on subjective scales–to analyze these weight-based stereotypes. This research encompasses participants viewing an image of a woman–who is either obese or non-obese, and either taking a GLP-1 RA to lose weight or not–and answering objective and subjective questions measuring the target's perceived weight loss motivation. We anticipate that standards will shift on the objective measures (more hours of exercise per week) for a non-obese individual who loses weight through exercise and inversely for the same individual using a GLP-1. Furthermore, we hypothesize that obese women who lose weight by using a GLP-1 will be more highly rated on objective measures than their non-obese counterparts with the inverse true for those losing weight through exercise.

#29 Can humans exhibit rapid olfactory perceptual learning?

Yasmeen Abunasrah, Lindsey Barnes, and Anthony Matejicka
Faculty Sponsor: Laura Shanahan, Department of Psychology

Odor perception is known to improve with experience, but there is limited knowledge of whether short-term, regimented training protocols can improve olfactory sensitivity. Our research aims to address this gap by exploring changes in the detection threshold for two odors, 1-butanol and phenethyl alcohol. Participants will complete a threshold detection task for both odors, composed of a series of trials where they smell three samples—two odorless and one containing a low concentration of a study odor—and will be asked to identify the scented sample. Their responses will determine their sensitivity threshold, or lowest concentration that can be identified correctly 50% of the time. Afterwards, participants will undergo olfactory training, where they repeatedly smell one of the study odors at concentrations near their detection threshold. The training will include feedback immediately after the response. Post-training, participants will complete a post-threshold task, identical to the pre-training task, to assess changes in their sensitivity threshold. We predict that training will lead to a decrease in the sensitivity threshold for the trained odor, while the detection of the untrained odor will be unchanged. By assessing the effectiveness of a new olfactory training protocol, our study will clarify questions surrounding olfactory perceptual learning.

#30 Associations Between Big Five Personality Traits and Mental Imagery
Isabella Caro, Naomi Sharp, and Hanna Hu
Faculty Sponsor: Kailey Lawson, Department of Psychology
Deficits in mental imagery (aphantasia) and very high levels of mental imagery (hyperphantasia) are associated with various forms of psychopathology (Carevon-Taylor, 2022). This study will extend research that has emphasized the association between mental imagery and psychopathology to understand connections between mental imagery and Big Five personality traits (Extraversion, Agreeableness, Conscientiousness, Negative Emotionality, Open-Mindedness), including how mental imagery might connect to specific item wording in a way that obscures associations at the domain and facet levels. We will examine correlations between mental imagery and Big Five personality domains, facets, and items across multiple personality measures (e.g., BFI-2, TIPI) to examine whether correlation patterns differ based on item wording. Data for this study will come from a nationally representative sample (N = approximately 600 adults) recruited via Prolific. Results from this descriptive research will inform how the use of different personality measures might impact associations between mental imagery and personality traits in future studies.

#31 Are Student Athletes Stereotyped as less Intelligent than Non-Athletes?
Makenna White, Gina Dudley, Olivia Barfield, and Rose Martin
Faculty Sponsor: Matthew Weeks, Department of Psychology
We investigated the stereotype of perceived intelligence differences between football players and non-athletes at Rhodes College. A prevalent belief suggests that football players are perceived as less intelligent than their non-athlete peers. To examine this, we measured perceived intelligence using both subjective and objective scales. Subjective ratings were assessed on a 6-point Likert scale (1 = not very smart, 6 = very smart), while objective ratings required participants to estimate a student's academic performance, such as their GPA or class standing. Our study began with an online pilot questionnaire, which confirmed the existence of this athlete-intelligence stereotype among students. In replicating the shifting standards model, we found a relationship between athletic status and perceived intelligence. We predict that our results will show a difference in shifting standards when football players are rated subjectively, as well as a reinforcement of the intelligence stereotype in objective assessments. Overall, our findings support the tendency for individuals to adjust their judgments based on athletic participation.

#32 Bitchwaffle or Asspalace: Predicting the Plausibility of Novel Taboo Compound Words
Julian McMillian
Faculty Sponsor: Katie White, Department of Psychology
A word's tabooness is predicted by emotional properties such as its valence or arousal. However, semantic and phonological characteristics of a non-taboo word can influence judgments about what makes a good curse word, evidenced by research with novel taboo compounds (Reilly et al., 2020). The present study investigated whether semantic and phonological characteristics of taboo and non-taboo words predict novel taboo compounds' frequency of use and plausibility. Frequency of use was assessed on Reddit, whereas plausibility ratings were obtained on Prolific using novel compound words of 50 taboo word prefixes paired with 50 non-taboo noun suffixes from five semantic categories. Analyses from Reddit revealed that the use of taboo compounds correlated with several linguistic characteristics of non-taboo suffixes. Analyses from Prolific explored a broader set of properties of the prefixes and suffixes, including word frequency and

word length, as well as semantic (e.g., category), phonological (e.g., neighborhood), and phonetic (e.g., voicing) characteristics. The results have implications for which combinations of words are likely to become established words in the lexicon.

#33 Modeling the probability of n clonal rosettes in a Bromeliaceae individual
Layla Lammers
Faculty Sponsor: Erin Bodine, Department of Mathematics and Statistics
Bromeliaceae, a neo-tropical plant family encompassing over 3,000 species, exhibit two modes of reproduction: sexual reproduction via flowers and seeds and asexual reproduction through the production of genetically identical clonal rosettes. The vegetative bodies of bromeliads form rosettes, with new leaves emerging from the center. Each clonal rosette initially remains attached to its parental rosette but may eventually separate, resulting in a single genetic individual consisting of the original seed-grown rosette and multiple iterations of clonal rosettes. This research aims to develop a mathematical model that predicts the probability that a single genetic individual will include at least n genetically identical rosettes. The equation for scenarios where each rosette produces at most one clonal rosette was derived through direct proof. The equation for scenarios where each rosette produces at most two clonal rosettes was derived by mapping unordered binary trees to Motzkin paths. Future work involves modeling iterative clonal generation within an agent-based framework, which will assess the impact of invasive predators and potential conservation measures of these populations.

#34 Lynx Lifts: A Student-Led Rideshare
Lexi Boateng, Trey Prather, Nalvi Tran, Crosby McMahon, Matthew Zhang, and Billy Manishimwe
Faculty Sponsor: Kayla Booker, Department of Business
Lynx Lifts is an initiative I developed to address the transportation needs of Rhodes College students. In February 2024, I conducted a survey to assess the demand for a student-run rideshare program. Using Microsoft Forms, I gathered responses from over 200 students, asking questions such as, “Do you have a car on campus?” and “Would you be willing to drive for a ‘student rideshare if compensated?” Based on the results, the average comfort level for students with carpooling was rated at 7.83 out of 10. To garner support, I pitched the idea to the Rhodes Student Government (RSG), which granted permission for me to table and collect further feedback. In Fall ‘24, Trey Prather, a fellow rideshare organizer, and I created two platforms on Facebook and GroupMe to facilitate community engagement. Currently, we’re working to formalize Lynx Lifts as a student organization to ensure its sustainability. Challenges we’re addressing include funding, reimbursement for drivers, and liability management. Additionally, a team of Computer Science Senior Seminar students is developing a Lynx Lifts app to streamline the rideshare process. This initiative aims to provide long-term, sustainable transportation solutions for Rhodes students, and we continue to explore ways to ensure its success.

#35 Impartial Row Terminus: A New Combinatorial Game and Its Equivalence to NIM
Dawood Khatana and Ismael Qureshi
Faculty Sponsor: Eric Gottlieb, Department of Mathematics and Statistics
In this Research Project, we explore Impartial Row Terminus (IRT), an impartial combinatorial game on Young Diagrams of integer partitions. Players alternately take turns removing parts of rows while maintaining a valid Young Diagram. We introduce a decomposition of the Young

Diagram into two distinct parts: the core and the remnant. We establish that the Sprague Grundy value of the remnant, when treated as a position in the classic combinational game NIM, is equal to the Sprague Grundy value of the game of IRT. This provides a direct equivalence between IRT and NIM.

#36 Pothole Distribution Based on Social Class
Jayden Baichu
Faculty Sponsor: Kate Shields, Environmental Studies & Sciences
I am relatively new to Memphis, but I did notice one major component of the city: the potholes. No matter where you'd drive, there will be a pothole ready to wreck a speeding car. However, I noticed that some areas, areas considered to denominate lower class levels, have more potholes compared to more higher-class areas. My research question is meant to confirm my decision: if the city of Memphis prioritize revitalizing wealthier areas through seeing how often the potholes are filled in various neighborhoods.

#37 Discerning Nest Architecture Differences Across Mason Bee Species
Madison Theodore
Faculty Sponsor: Kathryn LeCroy, Department of Biology
Bee species declines are alarming to the public as well as the scientific community due to their importance as crucial pollinators. There are many stressors of bee populations, and one understudied reason is the introduction of non-native bee species that may outcompete closely related native bee species. An example of this is in the mason bee community (Hymenoptera: family Megachilidae, genus *Osmia*) in Eastern North America. If rapid identification could be made in the field for mason bee species identification, then we could improve invasive species management plans. A historical data set for mason bee species captured primarily in Virginia in 2018 was used to evaluate nest architecture differences among two species of non-native mason bees (*Osmia taurus, Osmia cornifrons*) and two species of native mason bees currently experiencing regional declines (*Osmia lignaria, Osmia georgica*). We are investigating the quantity and size of nest "vestibules" constructed by each species as well as possible partition textures and quantity. These analyses will aid in more rapid identification in the field instead of waiting for an entire year for individuals to reach adulthood.

#38 Language, Immigration, and National Education: Two Portraits of Multicultural France
Eliza Fleming
Faculty Sponsor: Laura Loth, Department of Modern Languages
France today exists as a multicultural country due to many waves of immigration throughout its history, and the educational system in France should reflect that diversity. With an exploration into the importance of a multicultural curriculum, this report analyses different educational experiences in France through a discussion of the novel "Le gone du Chaâba" by Azouz Begag (1986), as well as the documentary "School of Babel", (2012) directed by Julie Bertuccelli. Finally, I discuss the necessity of a multicultural approach to French language instruction in France for all as well as the importance of identity in education. We will see that both Begag and Bertuccelli argue for multicultural education, and that different cultural identities must be integrated into the instruction of the French language and culture in order to reflect the demographic reality within France today.

#39 Narration, identity crisis, and the liberating power of writing in two novels by Maïssa Bey and Myriam Warner-Vieyra (La narration, la crise identitaire, et l'écriture libératrice dans deux romans de Maïssa Bey et Myriam Warner-Vieyra)

Maeve Harper
Faculty Sponsor: Laura Loth, Department of Modern Languages

Feminine identity is a central theme within Surtout ne te retourne pas by Maïssa Bey and Juletane by Myriam Warner-Vieyra. These novels illuminate the complexities of feminine identity during Algeria's "Black Decade" and in Senegal during the 1960s, the period directly following the nation's independence. Guided by historical context, this thesis does a detailed comparative analysis of each novel's narration. I argue that in both texts, the narration is both authoritative and unreliable. This ambiguous narrative style reveals the identity crisis of the leading female characters while it paradoxically establishes a space of identity liberation through the power of writing and memory.

#40 Navigating the Hybrid Regime: Challenges to Democracy and the Rule of Law in Guatemala

Dania Vanessa Verbena
Faculty Sponsors: Elizabeth Pettinaroli, Department of Modern Languages, Dr. Amy Risley, Department of International Studies

Guatemala's political landscape is characterized by a hybrid regime that blends democratic and authoritarian elements, challenging the rule of law and democratic consolidation. While the country has held elections since the 1980s, persistent issues such as corruption, impunity, and the dominance of economic elites undermine democratic governance. This paper examines Guatemala's political trajectory, from military rule and civil war to the fragile democracy of today, analyzing the role of elites, civil society, and international interventions in shaping its hybrid regime. Drawing on scholarly perspectives, it argues that Guatemala's democracy remains constrained by entrenched power structures that prioritize wealth and political influence over citizen representation. The paper highlights the continued erosion of democratic norms under recent administrations, linking these developments to broader historical patterns of repression and elite dominance. Ultimately, it underscores the urgent need for institutional reform, greater civic engagement, and accountability to strengthen democracy and prevent further democratic backsliding.

#41 Synthesis of 6-Substituted Dopamine Derivatives to Learn More About the Substrate Tolerance of L-DOPA Dioxygenase

Ella W. Petit and Lilia F. Fernatt
Faculty Sponsor: Larryn Peterson, Department of Chemistry

Catechols and catecholamines are compounds found in both animals and plants. These compounds contribute to overall homeostasis as well as structure. The enzyme that has the strength to cleave their aromatic structure is called L-DOPA dioxygenase. This enzyme is found in bacteria and it's substrate tolerance is critically understudied. Through the creation of novel catechol substrates, we can further understand L-DOPA dioxygenase and expand its applications. The syntheses of these derivatives help determine the enzyme's structural preferences. This research focuses on synthesizing dopamine derivatives in the sixth position. The synthesis begins with the readily available 3,4-dimethoxyphenylamine. Subsequent steps include a 5 to 6 step reaction scheme which has been performed resulting in good yields. Thin layer chromatography

(TLC) and 1H NMR spectroscopy was used to confirm the products and integrity of these compounds. The synthesis of these derivatives provides a way to further explore L-DOPA dioxygenase, which can lead to discoveries that aid bioremediation and the creation of novel therapeutics.

POSTER SESSION #2

Multi-Sports Forum, Bryan Campus Life Center
2:45 pm – 4:15 pm
Poster numbers are listed with the title

#1 The Pollen Library Project of the Rhodes College Herbarium
Maegan Baker, Camil Ferguson, GraceAnne Hodgson, Gwenaelle Monnet, Mackenzie Soldano, and Mallory Wenk
Faculty Sponsor: Kathryn LeCroy, Department of Biology
Rhodes College houses an herbarium containing some of the oldest herbarium specimens in the state of Tennessee, currently holding 5,373 specimens of preserved, pressed plants. This collection has been amassed due to the efforts of Rhodes collegians, faculty, staff, alumni, and friends of the College, with specimens recorded as early as 1845. With 83% (4,455) of specimens identified to the species level, we currently have 1,849 total species in the Rhodes Herbarium. We have been building a comprehensive pollen library based on these specimens, beginning first with the spring flora of Overton Park. This involves designing a minimally destructive pollen sampling protocol from preserved flowers, dyeing sampled pollen grains with basic fuchsin, and then visualizing the morphology of the pollen grains through light microscopy for photography, further measurements and categorization. These images and measurements will be used to build a research program exploring pollen collection by bees and other pollinators of Overton Park and beyond. We seek to highlight the enduring value of the Rhodes Herbarium and honor the legacy of its capacity to answer novel as well as long standing research questions.

#2 Medical Ethnobotany of Overton Park
Maegan Baker
Faculty Sponsors: Kathryn LeCroy, Department of Biology, Dr. Brad Lieb, Director of Chickasaw Nation Archaeology and Field Studies; Dr. Eric Bridges, Overton Park Conservancy
We sought to explore the medical ethnobotany of Overton Park, including plant species with important ethnobotanical connections to Native American tribes known to have lived and/or traversed through this region in western Tennessee. Based on information available, we specifically focused our study on the medical ethnobotany of the Chickasaw Nation and the Cherokee Nation. The aim of this research is to explore Overton Park plant taxa and their connections to medical research, drug discovery, and medical ethnobotany. We are doing this work by a) reviewing specimens collected from Overton Park that are housed in the Rhodes College Herbarium (SWMT); b) exploring Overton Park species checklists sourced by iNaturalist records; performing literature reviews of peer-reviewed articles as well as primary documents; d) discussing species of interest through interviews with Dr. Brad Lieb (Director of Chickasaw Nation Archaeology and Field Studies) and Overton Park Conservancy officials. This project will provide a frequently understudied perspective of medical ethnobotany on the place-based value of the flora of Overton Park.

#3 Rhodes College Arboretum Recertification Project
Dylan Morris, Camil Ferguson, and Audrey Griffith
Faculty Sponsors: Kathryn LeCroy, Department of Biology, William Eckenhoff, Department of Chemistry, Jeff McClain, Physical Plant, Rhodes College Arboretum Committee
The Rhodes College Arboretum serves as a vital collection of trees that enhances campus biodiversity, provides ecological benefits, and contributes to environmental education. An arboretum is a designated area for the cultivation and study of trees, playing a crucial role in conservation and sustainability efforts. Maintaining a Level 4 arboretum status is essential for preserving campus greenery, monitoring tree health, and promoting environmental stewardship. This study assesses the current condition of the Rhodes College Arboretum. We did this by using a previous dataset of 120 trees on campus, individually surveying each tree, measuring tree diameter at breast height (DBH), and accounting for interpretive signage. The collected data will be used to create an updated map of campus trees, which will be compared to historical arboretum maps to assess changes over time. The finalized map will provide a comprehensive overview of tree distribution and health, aiding in long-term arboretum management and recertification. Future steps include expanding the project to survey all trees on campus beyond the initial 120 cataloged species, ensuring a more complete assessment of tree diversity and health. This continued effort will further support Rhodes College's commitment to sustainability, conservation, and maintaining its arboretum designation for future generations.

#4 Analysis of Graph Rigidity Algorithms and their Place in Understanding Protein Dynamics
Joe Hane
Faculty Sponsors: Eric Gottlieb, Chris Mouron, Department of Mathematics and Statistics
Computationally modeling the movement of proteins by molecular dynamics simulations is incredibly informative but requires slow and costly computer techniques. The use of simple algorithms employing theorems and exercises foundational to combinatorial rigidity can greatly simplify these simulations. This project explores how the ideas of Laman's Theorem and the Henneberg Construction can be used with the pebble game on a graph to identify rigid substructures, induced subgraphs, to treat as individual units. Special focus will be given to a three-dimensional analogue of these ideas and to a study of their employment on graphical representations of proteins by pebble game rigidity algorithms.

#5 Synthesis of 6-Chlorodopamine as a Tool to Study Dopamine Metabolism
Connor Bronze, Alex B. LeBlanc, Joe Hane, Mia Farraday
Faculty Sponsor: Larryn Peterson, Department of Chemistry
Catecholamines, including dopamine, play critical roles in neural functioning with implications in the reward, motivation, and motor pathways. Dopamine analogs with a substituted 6 position can provide insight into enzyme mechanisms, such as catechol-O-methyl transferase, which are important for dopamine metabolism. Understanding how these dopamine derivatives might move through the metabolic pathways can help us understand the mechanisms for dopamine related disorders like Parkinson's disease. We focused on the synthesis of 6-chlorodopamine to explore novel biochemical properties. A 6-step synthetic approach was utilized. Significant progress was made in the initial reaction scheme; however, low yields necessitated optimization of each step. The successful synthesis of 6-chlorodopamine could provide valuable insights into dopamine metabolism, enzyme interactions, and other potential antibiotic applications.

#6 Building a toolkit of 6 substituted dopamine analogues: Progress toward 6-iododopamine and 6-thiocyanatedopamine

Suha Aslam and Mia Farraday
Faculty Sponsor: Larryn Peterson, Department of Chemistry

The enzyme L-3,4-dihydroxyphenylalanine (L-DOPA) dioxygenase catalyzes the cleavage of aromatic rings in catechols through metal chelation, producing natural products with antibacterial or antitumor properties. There is a lack of diverse substrates, which prevents the continued investigation of the utility of this enzyme. Our lab has developed a series of novel 6- substituted dopamine analogues that have diverse properties. This work describes the investigation of 6-iododopamine and 6-thiocyanatedopamine and determination of their physical properties and purity. Substantial progress in synthesizing these analogues has been made from a commercially available compound 3,4-dimethoxyphenethylamine. This toolkit of catecholamine derivatives provides access to investigate dioxygenases and the use of these novel compounds as enzyme substrates, inhibitors, or even in applications, such as bioremediation.

#7 Artificial Selection of PEV Phenotypes in Drosophila melanogaster to Identify Genetic Modifiers of Heterochromatin and Aging

Keith Adams, Yash Vyavahare, and Hoang Luu
Faculty Sponsor: Dr. Liam Hunt, Department of Biology

Heterochromatin plays a key role in silencing gene expression and Position-effect variegation (PEV) is a phenotype that reports on heterochromatic gene expression. Mosaic red and white eye phenotypes due to PEV vary based on the amount of heterochromatin formation; increased heterochromatin causes white eyes while a decrease causes red eyes. In this study, we use artificial selection of PEV phenotypes to identify novel genetic regulators of heterochromatin. These phenotypes were assessed by quantitative image analysis of fly eyes. First, we examined white mottled mutants (X chromosome) and found selection enriched for animals with increased heterochromatin formation. While second (KV00158) and fourth (118E-10) chromosome insertions could be enriched for populations that suppressed heterochromatin. By artificial selection based on PEV phenotypes, we have isolated genetic modifiers that impact heterochromatin dynamics. When combining multiple PEV phenotypes (white mottled and Y chromosome variegating Bar) selection for enhanced white mottled also enhanced variegation of the unselected Bar phenotype, indicating these genetic modifiers likely influence a range of heterochromatic loci. As reduced heterochromatin is linked to genomic instability and aging, understanding these modifiers could help pinpoint epigenetic mechanisms that influence longevity. Future studies will characterize the molecular basis of these heterochromatin modifiers.

#8 Interprofessional Perceptions Between Teachers and Speech-Language Pathologists

Lydia Flinn
Faculty Sponsor: Laura Taylor, Department of Educational Studies

The interprofessional perceptions between teachers and speech-language pathologists are characterized by difficulty implementing student speech services. This study investigates the opinions of teachers and speech-language pathologists and the challenges they experience. For my research, I conducted semi-structured interviews with five teachers and five school-based speech-language pathologists from a prominent Southern metropolitan area with varying

experience and grade levels. The study found that while teachers and speech-language pathologists overwhelmingly viewed one another's roles and communication as essential to the school environment, they also noted scheduling as a potential challenge. Professionals have suggested the implementation of the English Language Arts (ELA) standard or objective into language goals in speech therapy. Also, they proposed more time for collaboration outside of the typical school day, such as in professional learning community (PLC) meetings or teacher in-service days. This study has implications for future and current teachers, school-based speech-language pathologists, and school and district-specific speech therapy procedures.

#9 Horses as Teaching Assistants: The Role Equine-Assisted Services Can Have in Education
Bailey Santos
Faculty Sponsor: Laura Taylor, Department of Educational Studies
This study investigates the perspectives of EAS instructors and parents to understand the benefits these unique programs can have, especially in traditional educational environments. EAS programs create transformative learning experiences for participants from diverse backgrounds, and the researcher was interested in understanding how the benefits can translate into classrooms. In this study, the researcher conducted semi-structured interviews with four EAS providers and one parent from the Mid-South area. The interviews were transcribed from audio recordings. Then, a two-step descriptive and thematic coding analysis was used to identify important themes and categories that addressed the research question(s). These four main themes were produced: community, alternative learning strategies, psychological benefits, and social-emotional learning.

#10 Supporting and Understanding Biliteracy via Bilingual Book Clubs
Anna Rush
Faculty Sponsor: Laura Kelly, Department of Educational Studies
This qualitative research project seeks to support the biliteracy of Spanish-English bilingual elementary students and understand how they use their languages to make sense of bilingual texts. Groups of two to four students meet weekly with either Dr. Laura Kelly or an undergraduate student research assistant. About two thirds of each class period is dedicated to reading picture books or graphic novels aloud in Spanish while making cultural connections with the text, answering comprehension questions, and discussing vocabulary. The remaining fifteen minutes are dedicated to discussing and translating between English and Spanish sentences from the book. The transcripts and written translations from these sessions will allow us to explore and better understand students' metalinguistic awareness, how translanguaging supports comprehension, and how students think about their cultural and bilingual identities.

#11 Undergraduate Students' Positions and Interactions during Group Work in a Calculus Class
Anna Robicheaux
Faculty Sponsor: Erika Parr, Department of Mathematics and Statistics
Group learning in the mathematics classroom aims to encourage deeper individual learning through creating a sense of autonomy and making space to negotiate new ideas. When a student proposes a new idea to the group, they reposition themselves with increased authority and autonomy. Analyzing how students position themselves relative to each other and the content of their discussions can shed light on the overall group interaction and its success. Our research evaluates the dynamics within pairs of undergraduate students and its impact on individual

learning in the context of expressing distances within the Cartesian plane. We analyzed videos from groups of students working together on an in-class activity in a Calculus course. We identified significant interactions among groups and coded the interactional positions that students take on. We found that the most frequent positions that students take on were those of a primary knower (K1), secondary knower (K2), or uncertain primary knower (K1-U). We then identified four categories of types of interactions: Independently Working, Shared Understanding, Shared Uncertainty, and Single Understanding, which was the most common. These differences in interaction between groups indicate the complexities of mathematical learning within a group and the need for scaffolding to promote substantive interaction.

#12 The Local Fidelity Distribution of Parameterized Quantum Circuits
Triet Ha
Faculty Sponsor: Ibrahim Abdelrazeq, Department of Mathematics and Statistics
A quantum computer consists of quantum bits (qubits), quantum gates, and quantum circuits - sequences of quantum gates performing on a set of qubits. Parameterized quantum circuits (PQCs) are used to prepare trial solution states for optimization problems, and the goal is to find the best parameter values to minimize the problem's loss function. One way to predict the performance of a PQC is to investigate the state subspace by which it can accessed. In practice, we often investigate the PQC's fidelity distribution- a probability distribution of overlaps between two randomly chosen states from the circuit state space. In this presentation, I discuss the local version of the fidelity distribution- the fidelity distribution computed in the neighborhood of a reference point.

#13 Using Bayesian Model Averaging to Analyze Tactical Development in Professional Soccer
Hardy Smith
Faculty Sponsor: Ibrahim Abdelrazeq, Eric Gottlieb, Department of Mathematics and Statistics
At the highest levels of professional soccer, the role of defenders has changed drastically. From being the cornerstone of a team's defensive unit, to becoming catalysts in building a team's attack, the shift has been clear to both soccer players and watchers alike. We use the Bayesian statistical modeling technique Bayesian Model Averaging (BMA) to determine which player statistics most impacted defenders starting matches in the Top 5 European Leagues during the 2017-2018 and the 2023-2024 seasons, respectively, and compare our results. We create a regression model for every possible combination of predictor variables and use Markov Chain Monte Carlo (MCMC) methods to sample from the model space and assign each predictor with a posterior inclusion probability (PIP) and model-averaged regression coefficients.

#14 An exploration on the conservation applications of agent-based modeling and statistical machine learning methods for an endangered population of epiphytic bromeliads
David Cerkovnik
Faculty Sponsor: Erin Bodine, Department of Mathematics and Statistics
The epiphytic bromeliad, Tillandsia utriculata, has a historical range from the equator to the Tropic of Cancer and Florida, but has been labeled endangered in Florida since 2000. It is posited that populations are declining due to predation from an invasive weevil, Metamasius callizona. The weevil deposits eggs in the bromeliad, preferentially selecting larger plants, and once hatched larvae consume the plant's core, oftentimes leading to pre-reproductive death. This

is particularly devastating to T. utriculata populations because each individual only reproduces once, then perishes, and larger individuals at the time of inflorescence (flowering) produce more seeds. Some bromeliad populations in Florida are initiating inflorescence at smaller sizes, likely because of preferential weevil predation. This paper builds on previous work conducted by Bodine et al. in the construction and analysis of an agent-based model (ABM) informed by demographic data of a bromeliad population in Myakka State Park, Florida. The ABM simulates T. utriculata populations over many generations and programs heritable variations in inflorescence timing, presence of weevil predation, and variation in important parameters such as germination rate. Supervised machine learning techniques, including decision tree analysis with regression and classification principles, are explored for use in the area of conservation and ecology.

#15 Sensitivity of a new ultrasonic bone assessment technique to errors caused by the bone cortex

Asriyah Sisay and Hugh Ferguson
Faculty Sponsor: Brent Hoffmeister, Department of Physics

The slope of phase accumulation (SPA) is a new ultrasonic technique developed to detect changes in bone caused by osteoporosis. The technique measures frequency changes in ultrasonic pulses that are propagated through cancellous bone. Cancellous bone is surrounded by an outer layer of cortical bone that may produce errors in this measurement, especially if the angle of incidence is not perpendicular. Ultrasonic measurements were performed with a 3.5 MHz transducer at angles of incidence ranging from 0 to 30 degrees on a bone simulating polymer foam with one surface embedded in a thin layer of epoxy to simulate the cortex. The epoxy cortex caused SPA to decrease as the angle of incidence increased.

#16 Quantum Algorithms and Memory Games

Jackson Holley
Faculty Sponsor: Ann Viano, Department of Physics, Dr. Jean-François Van Huele, Brigham Young University

Previous work has shown that injecting quantum principles into game theory, as in the PQ penny flip game, introduces strategies with a quantum advantage over classical strategies [PRL 82, 1052 (1999)]. We consider the single-player game of Memory, where the player identifies matching pairs of face-down cards, and investigate how quantum algorithms provide a quantum advantage over the classical one. We focus on Simon's and Grover's Algorithms and search for the best-fitting versions of Memory that may yield a quantum advantage. We then compare these quantum strategies to the classical ones and identify the circumstances for which each strategy is optimal.

(F) #17 Using a Trained Machine Learning Algorithm for Microparticle Tracking on an Inhomogeneous Disk Array Background

Iesha Phillips and Chris Hoang
Faculty Sponsor: Gregory Vieira, Department of Physics

When analyzing motion of micro-scale objects on inhomogeneous backgrounds, traditional tracking methods may yield limitations in location determination and trajectory linking, relying on gap closing and other estimations to determine objects' trajectories. This research aims to improve upon particle tracking using machine learning techniques to address these challenges. In

particular, these algorithms train on images of microspheres whose appearance changes with location due to the inconsistency of the image background. Using superparamagnetic microparticles transported on a grid of permalloy disks by weak, time-varying magnetic fields as an example, we compare tracking using TrackMate in ImageJ and the LodeSTAR method for machine learning detection, highlighting the strengths and limitations of each approach. By implementing the Crocker-Grier algorithm for particle linking, we observe improvements in particle detection and tracking reliability, and we discuss circumstances where these improvements would be especially advantageous.

#18 Imaging the Transmural Tissue Structure of Scalp with Ultrasound
Brayden Pallera
Faculty Sponsor: Brent Hoffmeister, Department of Physics
in transcranial ultrasound have generated interest in the ultrasonic properties of the scalp and skull. While the skull has been studied extensively, little is known about the ultrasonic properties of the scalp. The goal of this study was to characterize the transmural tissue structure of human scalp using an ultrasonic imaging system. 32 specimens of human scalp were prepared from four donors and mounted in acrylic frames in a water tank. An imaging transducer was mechanically scanned across each specimen to acquire three-dimensional data. Ultrasonic images revealed three distinct layers in scalp tissue identified as the dermis/epidermis layer, subcutaneous layer and connective tissue layer. The subcutaneous layer appeared darker in the images indicating that this layer is less echogenic than the other two layers due to less ultrasonic scattering.

#19 Housing Vacancy and Crime Presence in Shelby County 23/24
Mitchell Leander
Faculty Sponsor: Shaolu Yu, Department of Urban Studies
In Memphis, Tennessee, housing vacancy and crime continue to be persistent challenges. “Eyes on the street” as Jane Jacobs coined can be instrumental in preventing crime, but this implicit protection is greatly weakened by vacancy, blight, and empty properties. This project utilizes GIS to explore these spatial relationships within Shelby County. In other studies, vacant properties seem to contribute to neighborhood decline while also spiking crime rates, as seen within B. Fox’s analysis of crime hotspots and vacancy within St. Louis. By visualizing crime hotspots and patterns of housing vacancy in Memphis, I aimed to uncover potential associations that can assist urban policy and community revitalization efforts.

#20 Disinvested and Divided: Understanding How Living Conditions Impact Education for Memphis
Emily Briggs
Faculty Sponsor: Austin Harrison, Department of Urban Studies
Many young students in segregated and disinvested communities are not being set up for success. Education is the foundation for your future, and when negative factors such as environmental health challenges are stacking up against you, it is hard to excel educationally. In Frayser, a neighborhood in Memphis, Tennessee, there is a landfill near Whitney Elementary. The landfill company tried to expand its site moving closer to the school. Landfills create an abundance of pollution that can be harmful when exposed to people. Media analysis will be the main way that data gets collected in this case study. I expect that Memphis Wrecking Company is profit motivated and is not considering the long-term health impacts they are leaving on the

students and the community. Researching this case can help one dive deeper into the question 'How do living conditions impact the education of children affected by residential segregation and disinvestment in Memphis, Tennessee?' With a large focus on exposure to pollution in under-resourced neighborhoods, my research will contribute to the gap in knowledge on how a child's living conditions are a large determinant in their educational outcomes in Memphis, Tennessee.

#21 Redox Titrations Using Microfluidic Ceramic Titrators
Saanya Srivastava and Gage Weidman
Faculty Sponsor: Dhammika Muesse, Department of Chemistry
This study explores the use of ceramic reactor wells as microfluidic titrators for semi-quantitative and efficient chemical analysis. Ceramic titrators offer a reusable and easily cleaned alternative to traditional methods, significantly reducing chemical waste in teaching laboratories. Previously, we successfully employed ceramic microfluidic titrators for acid-base and complexometric titrations. In this work, we extend the microfluidic titrator technique to redox titrations, specifically investigating redox reactions involving ascorbic acid. This approach provides development in the rapid and semi-quantitative method of determining vitamin C content in various products, demonstrating its potential as an effective analytical tool.

#22 Investigation of a Nickel Thiophene Artificial Photosynthetic Catalyst
Daniel Graham
Faculty Sponsor: William Eckenhoff, Department of Chemistry
As the population grows, the need for energy grows as well. A common issue is the lack of sustainable energy sources to account for the increase in population. A promising alternative source is light-driven hydrogen production. Research has already shown the effectiveness of a Ni(^{EtPy}PDI) complex (Py=Pyridine) as a catalyst in the process. A new goal is to try and optimize the process through the use of new complexes, including Ni(^{EtTh}PDI) (Th=Thiophene) which could prove to be a more effective version of the Ni(^{EtPy}PDI) complex.

#23 Protein interactions involved in polarized growth and cell wall integrity in Aspergillus nidulans
Thomas Leon Ashton, Abinaya Venkatarama, Ian Nutting, Faith Mwango
Faculty Sponsors: Loretta Jackson-Hayes, Department of Chemistry, Terry Hill, Department of Biology
The long-term goal of this project is to understand hyphal growth and cell division in filamentous fungi. Previously, we showed that the Aspergillus nidulans orthologue of protein kinase C (PkcA) is involved in cell wall integrity, that it localizes to hyphal tips and the contractile actomyosin ring, and that PkcA complexes with SepA at localization sites via the putative Rho-type GTPase binding domain of PkcA (HR1A) and SepA's FH2 (formin homology) domain. Sequence analysis of the FH2 domain revealed a Rho-like sequence motif encompassing amino acids 377-408 having 43.3% sequence identity with RhoA. This result suggests that the sufficiency of the HR1A domain of PkcA for interacting with SepA is due to its affinity for the Rho-like motif within FH2. We observed that when PkcA was overexpressed in Rho4-null mutants, colony diameter and sporulation increased, and here we report results of recent mutant phenotype complementation studies using Rho genes in PkcA and SepA mutant strains.

#24 Synthesis of Antimicrobial Peptide Analogs Lactobacillus pentosus Venom
Maja Elssner and Anne Ross Hope
Faculty Sponsor: Roberto de la Salud Bea, Department of Chemistry
Resistance of pathogenic organisms to traditional drugs is a growing problem for the treatment of infectious diseases. Thus, there is an interest to find new active compounds with novel modes of activity for the treatment of infections. Animal and plant venoms contain a variety of active molecules with useful and potential medicinal applications. In this work, we will present a library of synthetic analogs of the natural sequence a of a peptide, we have called LBA1, that is found in the Gram-positive bacteria Lactobacilus pentosus. This peptide is already reported to have antiviral properties and our goal is to create those analogs with the idea of reducing toxicity and to test them for toxicity, antimicrobial, antifungal and even anticancer activity. The design of the peptides includes modifications on specific positions of the amino acid sequences making the analogs to have increased amphiphilicity, that is, higher difference in polarity and hydrophobicity, a property that is common for these type of antimicrobial peptides.

#25 Zinc Metalloenzyme Bonding
Jonas Hostetler
Faculty Sponsor: William Eckenhoff, Department of Chemistry
LpxC is essential to the survival of Gram-negative bacteria due to its role in the production of lipid A, a major component of the outer cell membrane. Gram-negative bacteria are historically resistant to antibiotics and can defensively produce endotoxins when their outer membranes are disturbed. These bacteria cause sepsis, infections of the blood and surgical wounds, pneumonia, cholera, and meningitis. My research project involves the chemical synthesis of [Zn($Tp^{Ph,Me}$)(BP-His-HA)], a model of an active site of a zinc metalloenzyme called LpxC [UDP-3-O-(R-3-hydroxyacyl)-N-acetylglucosamine deacetylase], common to Gram-negative bacteria. This inhibition of LpxC could lead to cell death, because it is responsible for the bacterial cell wall synthesis, its main defense from antibiotics. My goal is to explore the ways in which various potential inhibitors can bind to this enzyme mimic, which will help us understand how to best design inhibitors to maximize their specificity and efficacy.

#26 Production of Hydrogen using Substituted Thiosalen Nickel Complexes
Emma McHale
Faculty Sponsor: William Eckenhoff, Department of Chemistry
A higher demand for clean energy has become more and more prevalent with the increasing population and use of nonrenewable energy sources. Artificial photosynthesis to produce hydrogen gas is a new possibility for a clean energy source. In our lab, we've explored the potential of nickel complexes paired with thiosalen ligands to serve as catalysts in this process. Unsubstituted thiosalen complexes show proton reduction to occur electrocatalytically at ~-2.0 to -2.5V vs Fc^{+}/Fc, however, adding of electron withdrawing substituents can lower the overpotential. The Ni(II) thiosalen (tsalen) and thisalphen (tsalphen) complexes with 4-CF_3 groups were synthesized and examined to analyze their effectiveness in hydrogen production.

#27 Investigation of Ni(EtFuPDI) as a Catalyst for Light-driven Hydrogen Production
Kathleen Modder
Faculty Sponsor: William Eckenhoff, Department of Chemistry
There is an ever-increasing need for renewable energy sources. Light driven hydrogen production via artificial photosynthesis is one of these vital new sources. Therefore, the development of more active and robust catalysts is necessary in order to make artificial photosynthesis a viable method of hydrogen generation. Recent studies have shown that metal complexes with redox non-innocent ligands and pendant base groups are highly active for proton reduction. ^{EtPy}PDI has shown to be a promising catalyst by producing hydrogen gas using $Ru(bpy)_3^{2+}$ and ascorbic acid generating turnover numbers of 1400. Because the activity of this catalyst is in part due to both the pKa and hemi-lability of the pendant base, substitution of this group may lead to improved activity. In this project, the pyridine rings were replaced with furan rings to synthesize ^{EtFu}PDI. The ligand was then coordinated to nickel and evaluated for its activity in catalysis.

#28 Investigation of the Catalytic Capabilities of Co(^{EtFu}PDI) for Hydrogen Production
Hieu Nguyen
Faculty Sponsor: William Eckenhoff, Department of Chemistry
Movements towards a more sustainable development of the world requires new approaches towards energy production. Hydrogen production methods, particularly through artificial processes, has been a promising take on renewable and clean sources of energy. Based on recent studies, metal complexes with PDI ligands are particularly useful as catalysts for this process as they are highly active for proton reduction. In this research project, ^{EtFu}PDI was synthesized with Cobalt to form Co(^{EtFu}PDI)2+. The Furan group differs from the Pyridine group by the pKa values and the overall binding to Co. Hence, the project aims to synthesize Co(^{EtFu}PDI)$^{2+}$ and compare its catalytic activity with Ni(^{EtPy}PDI)$^{2+}$.

#29 Generation of Aza-Crown Ethers Using 2,6-bis-hydrazinopyridine
Peyton Cely, Will Constantine, Javian Parks
Faculty Sponsor: Kim Brien, Department of Chemistry
Hydrazinopyridines are chemical compounds that can facilitate the synthesis of further compounds. The synthesis of 2,6-bis-hydrazinopyridine (BHP) is a studied mechanism that can further lead to synthesizing aza-crown ethers. Aza-crown ethers are intermediate molecules between all oxygen-crown ethers and fully nitrogen cyclams. This intermediate state allows for complex interactions through a variety of different uses. Aza-crown ethers can be synthesized using metal compounds and BHP to form a complex ring stabilized by a metal ion.

#30 Synthesis of Ni(3,6F-tsalen) for Proton Reduction
Meredith White
Faculty Sponsor: William Eckenhoff, Department of Chemistry
Renewable energy efforts are influenced by the development of a hydrogen economy. Proton reduction catalysts push forward this hydrogen economy by producing hydrogen gas more economically and increasing solar energy conversion. Previous research has established disulfide compounds to function as effective proton reduction catalysts. Nickel thiosalen complexes are potentially active catalysts for proton reduction but are too reducing to be practical. Substituting them with electron withdrawing groups like fluorine can help make them more efficient. In this

work, we will describe the synthesis and characterization of a fluorine tetrasubstituted nickel thiosalen complex, Ni(3,6F-tsalen) for use in proton reduction.

#31 Synthesis of 6-substituted dopamine derivatives to investigate monoamine oxidase B inhibition and soft tissue contractility
Trinity L. Liaw, Joshua J. L. Morris, and Malcolm M. Oliver
Faculty Sponsor: Larryn Peterson, Department of Chemistry
Dopamine has a multitude of biological and physiological implications, and 6-substituted analogues may prove useful in elucidating these mechanisms. For instance, as monoamine oxidase B (MAO-B) degrades dopamine and leads to the production of harmful oxygen radicals in the brain in Parkinson's disease, these analogues offer potential as MAO-B inhibitors. Furthermore, 6-nitrodopamine and 6-cyanodopamine have recently been found in the body to act as major mediators of tissue contractility in the rat and human vas deferens and as a positive chronotropic agent in the heart. This work details the synthesis of the dopamine derivatives 6-nitrodopamine, 6-cyanodopamine, and 6-carboxydopamine through a series of reactions. While 6-nitrodopamine was made in one step with a yield of 60.6%, 6-cyanodopamine (25.2% yield in total) and 6-carboxydopamine (in progress) were synthesized in five or six steps starting with the commercially available 3,4-dimethoxyphenethylamine. When completed and fully characterized, these dopamine derivatives, along with others, will be sent to collaborators where they will be used to determine their biological relevance and serve as standards to quantify them in the body.

#32 Assessing Age Dependent Loss of Heterochromatin Through PEV Phenotypes
Sesley Tedeschi, Talia Takahashi, and Kat Stanley
Faculty Sponsor: Liam Hunt, Department of Biology
Heterochromatin plays a crucial role in gene silencing and stability. One phenomenon that reflects heterochromatin dynamics is Position Effect Variegation (PEV), where a gene that is placed near heterochromatin exhibits varying silencing. This study explores the use of PEV phenotypes as biomarkers for heterochromatin changes with age to determine whether heterochromatin loss predicts aging. We hypothesize that across different PEV lines, aging will be accompanied by heterochromatin loss, leading to increased white gene expression and a corresponding rise in red eye pigmentation. To assess this, we utilized multiple PEV lines with insertions on all chromosomes (excluding third chromosome), allowing us to examine whether age-related changes in heterochromatin are consistent across different genomic contexts. Results showed that X chromosome (In(1)wm4), Y chromosome (KV00590), second chromosome (KV00158) and fourth chromosome (118E-10) white genes exhibited an increase in red eye pigmentation with age. However, Ph-p.812-w did not show this trend. Ph-p.812-w is a variegating white gene due to Polycomb regulatory elements (PRE). The other tested PEV lines are sensitive to changes in H3K9 methylation but this PRE is sensitive to H3K27 methylation, meaning that H3K9 methylation is more likely to be lost with age in comparison to H3K27 methylation.

#33 Reverse Sexual Dichromatism in Golden Rocket Frogs
Piper Dedek
Faculty Sponsor: James Tumulty, Department of Biology
Sexual dichromatism is a relatively common characteristic of animals, where males typically display brighter colors than females as a tactic to attract mates. Reverse sexual dichromatism,

where the females display brighter colors is extremely rare, and more difficult to explain in terms of function. Golden rocket frogs (Anomaloglossus beebei) are an example of reverse sexual dichromatism, as females have a golden coloration, and the males are brown. In addition, golden rocket frogs appear to display conventional sex roles, with males competing for females, suggesting the function of this reverse sexual dichromatism may lie beyond mating. The focal point of this research is to determine how color differences are perceived by potential predators and conspecifics with differing visual systems. To do this we used the MICA toolbox to model photos of frogs according to different visual systems. By exploring how conspicuous these frogs are to other frogs or predatory species such as birds and snakes in their natural habitat among bromeliad leaves, we can test several hypotheses about the function of this color variation. Our preliminary results confirm that sexual dichromatism is likely perceptible to conspecifics, and that females are conspicuous to avian predators.

#34 Comparing Canine Tooth Morphologies Across Domesticated Dog Breeds
Henry Hobbs Brown
Faculty Sponsor: Kelly Diamond, Department of Biology
Over the millennia, humans have bread dogs for many purposes, such as hunting, sporting, working, or toy dogs. The goal of this study is to determine if the breeding group and the body size of dog are correlated with the shape of the canine tooth. The canine tooth is used for tearing the flesh of prey; we decided to focus our study on it because it is one of the largest and most recognizable teeth in dogs. To test this, we created models of the right canine tooth from CT scans using 3D Slicer of 33 different dog breeds. We performed a Generalized Procrustes Analysis on pseudolandmarks representing geometric tooth shape of the models. We then compared geometric tooth shape across our breeding groups and size classes of the dataset. Preliminary results show that there is no significant correlation between breed and canine tooth shape, however, we are currently analyzing the impact of head length and tooth length on tooth shape. These studies may produce significant results, as head size and body size do not scale isometrically in dogs.

#35 Segmenting super sniffers: A method of digital segmentation of canid nasal structures for morphological analysis
Lorenzo Martinez
Faculty Sponsor: Kelly Diamond, Department of Biology
Domestic dogs (Canis familiaris) have been employed by man for many purposes such as tracking, fighting, herding, and companionship. While breeds such as bloodhounds or beagles are considered scent hounds, the physiological mechanisms allowing for superior olfactory abilities compared to other breeds are not yet known. The canid snout houses thin and complex turbinate bones that support the mucous covered epithelium where particle filtering occurs, and olfactory transduction begins. These two functions can be attributed to structurally distinct subdivisions of the turbinals, the maxilloturbinals and the ethmoidal turbinals, respectively. Increasing relative investment into ethmoidal turbinals may in turn increase olfactory receptor neuron counts allowing for a wider range of chemosensitivity. We are using μCT scans of dog skulls to investigate this, but segmentation of thin turbinate bones can be difficult and time consuming. Here, we present a standardized method of accurately segmenting out nasal turbinals with minimal manual input. Due to the low threshold values of the turbinals, small manual inputs can be grown into full segmentations distinct from the outer skull. This method is currently being

used to quantify turbinal surface area differences and may be applied to other studies regarding mammalian olfaction.

#36 The role of superoxide dismutases (SODs) in Salmonella Typhimurium during nitric oxide stress

Sunay Srivastava and Yihan Li
Faculty Sponsor: Elaine Frawley, Department of Biology

Salmonella Typhimurium is an intestinal pathogen that causes diarrheal disease. One way mammalian immune systems defend against infection is by producing nitric oxide (NO) to promote bacteriostasis. While the precise mechanism is unclear, previous studies have shown that nitrosative stress can damage iron and zinc-containing metalloproteins, disrupting metal homeostasis. Following nitric oxide exposure, Salmonella exports iron and zinc and imports manganese. This suggests that switching from iron and zinc metalloproteins to manganese metalloproteins is a key part of the stress response. Superoxide dismutases (SODs) are antioxidant metalloenzymes that catalyze the conversion of damaging superoxide radicals into O2 and H2O2. In S. Typhimurium, two cytoplasmic SOD enzymes function during active growth: manganese-dependent SodA and iron-dependent SodB. To investigate their roles in the nitrosative stress response, we created sodA and sodB deletion mutants in both wild-type and manganese import (mntH sitA ΔzupT) backgrounds. We measured mutant growth spectrophotometrically under NO stress using Spermine NONOate, quantified total SOD activity via nitroblue tetrazolium (NBT) assays, and analyzed SodA and SodB expression via qPCR. Our data suggest a role for SodA in the nitrosative stress response and that both SodA and manganese import may contribute to total SOD activity under both stress and non-stress conditions.

#37 Mass Spectrometry Quantification of APOE and Co-Expressed Proteins of 28 Alzheimer's Patients

Audrey Heidbreder, Meghan McReynolds, and Zhen Wang
Faculty Sponsors: Tanushree Pandit, Department of Biology, Dr. Junmin Peng, St. Jude Children's Research Hospital

Alzheimer's disease (AD), a progressive neurodegenerative disease, is the primary cause of dementia among the elderly. Among the genetic factors contributing to the risk and progression of AD, apolipoprotein E (APOE) alleles stand out due to their differential impact on disease susceptibility. APOE3, the most common allele in the general population, is considered neutral regarding AD risk. In contrast, APOE2 is associated with a reduced risk of developing AD and has a protective effect against the disease's onset. APOE4 is recognized as the strongest genetic risk factor for sporadic (non-familial) AD. The mechanisms through which APOE4 elevates the risk of AD and how APOE2 exerts its protective influence remain largely unknown. To enhance our comprehension of the contribution of APOE alleles to Alzheimer's disease (AD), we are conducting a quantitative analysis of APOE in 28 AD patient plasma samples, encompassing APOE2, 3, and 4 genotypes, utilizing mass spectrometry (MS). This analysis will both verify the APOE genotypic classification of the samples and facilitate the identification of proteins that co-express with APOE. This endeavor aims to uncover potential proteins that may interact synergistically with APOE, thereby elucidating their collective role in the pathophysiology of AD.

#38 Developing a modular expression system for the seed endosperm in Arabidopsis thaliana.
Hannah Schweiger and Peyton Rohrig
Faculty Sponsor: Jonathan Fitz Gerald, Department of Biology
The CHR23 and CHR7 genes of Arabidopsis thaliana play critical roles during endosperm and embryonic development. CHR23 is one of two MINUSCULE2-associated SWI/SNF ATPases. Double minu1/2 mutants result in embryonic lethal phenotypes leading to defects within the maintenance of root and shoot apical meristems. CHR7/PKR2 is a paternally expressed CHD3 type chromatin remodeler found in the syncytial endosperm. CHR7 mutants suppress the defects associated with loss of Polycomb histone methyltransferase activity, resulting in reduced seed abortion and a return of endosperm cellularization. Our previous work suggests that CHR7 and CHR23 have an epistatic interaction in seed size. Using a synthetic biology approach, we are developing a reusable, modular system for creating reporters to ultimately characterize the interaction between CHR7 and CHR23. First, a red fluorescent seed coat protein was developed to mark plant transformation. Next CHR7 and CHR23 promoters were assembled with H2B-Scarlet and H2B-GFP fusion proteins to visualize nuclear specific gene expression in the syncytial endosperm. This localization data will be used to complement seed morphology and whole genome expression data.

(F) #39 Neurocranial Variation in Canids: Insights on Artificial Selection from Geometric Morphometrics
Stella Venn, Nicholas Hebdon, and Sophia Kessler
Faculty Sponsor: Kelly Diamond, Department of Biology
Artificial selection in modern dogs (Canis lupus familiaris) has radically altered their cranial anatomy compared to their Canid ancestors. Previous studies concentrated on rostral traits, focusing on the relative shortening (brachycephalic) or lengthening (dolichocephalic) of the rostrum. We are interested in quantifying how selective breeding influences skull morphology beyond the rostrum. We use landmark-based 3D geometric morphometrics of 139 individuals representing 48 dog breeds and 10 additional Canid species. 3D Slicer was used to create models and place traditional landmarks. Then, we used a generalized Procrustes analysis followed by a principal component analysis on these landmarks to quantify neurocranium shape. Finally, we compared principal component axes across species and American Kennel Club-associated breeding groups. In our dataset, the variation was most extensively along the sagittal crest and in the relative width of the zygomatic arch. Across the morphospace, the clearest separation in the toy breeding group from other associated breeding groups. The toy group has a wider zygomatic arch, and a shorter, broader sagittal crest positioned more superiorly, indicative of their retention of a paedomorphic forehead. This study highlights the impact of human-driven breeding practices on cranial anatomy beyond that of the aspect of the rostrum.

#40 The Impact of Zoo Visitor Presence on Suricata suricatta Social Behavior
Sarah Heckmann
Faculty Sponsor: Kelly Diamond, Department of Biology
Meerkats (Suricata suricatta) live in packs and interact with each other regularly, but how might zoo visitor presence affect captive meerkat social behavior? Wild meerkats have been observed interacting with one another using various behaviors including play, foraging, safety, and comfort. Little is known about how human presence may influence social behaviors and cohesion. This study aimed to examine how play might impact social cohesion in a captive

population of meerkats and how zoo visitor presence might play a role in their behavior. We used a camera to film the 6-meerkat pack at the Memphis Zoo in 45-minute increments while counting the visitors passing by the exhibit on different days and times to capture different levels of visitor activity. The footage was analyzed by calculating the amount of time each individual spent performing different behaviors. Results suggest that at times of increased visitation, the meerkats displayed lower activity. This indicates that meerkats may decrease social behaviors when larger groups of people are present, but human presence might not impact how the individuals behave towards each other.

#41 Investigating the Role of Rap1 during Embryonic Nervous System Development
Maia Vong, Lila Saunders, and Jacob Musicante
Faculty Sponsor: Tanushree Pandit, Department of Biology
The spinal cord gives rise to the somatosensory system, consisting of distinct populations of interneurons and motor neurons. These neurons enable organisms to detect stimuli such as pain, temperature, and touch while generating motor responses. Therefore, proper generation and positioning of these neurons during development is essential for a functional somatosensory system. Rap1, a small GTPase protein, has been shown to play key roles in cellular proliferation, neuronal migration, and post-mitotic neuron generation in tissues like the developing cerebral cortex. However, Rap1's role in generating neurons in the spinal cord is not well-understood. Our research aims to define the spatiotemporal expression of Rap1 within the embryonic spinal cord at key developmental stages when neurons are formed and migrate. We analyzed Rap1 protein expression using immunofluorescence in chicken embryo spinal cords at various developmental stages. Our preliminary results indicate that Rap1 is expressed across the spinal cord, with strong expression in neuronal progenitors and migrating post-mitotic neurons. Our findings suggest that Rap1 promotes neuronal differentiation in the developing spinal cord. Future work will examine Rap1's role by knocking down its expression and assessing its effects on post-mitotic neuron generation. Understanding Rap1's role may provide insights into molecular mechanisms regulating CNS development.

#42 Developing a Model to Characterize Position Effect Variegation at the Single-Cell Level in Fission Yeast
Hanna Bengten and Romi Klein
Faculty Sponsor: Bayly Wheeler, Department of Biology
The centromere contains domains of heterochromatin in which DNA and proteins are densely packed, leading to gene silencing. Heterochromatin is important for cell division; it recruits proteins that hold sister chromatids together and thus ensures that each daughter cell inherits the appropriate number of chromosomes. Heterochromatin can spread to nearby genes, causing them to be silenced, but the silencing is not uniform. This phenomenon, where silencing is variable across genetically identical cells, is called position effect variegation. Previously, our lab used ade6 as a reporter to study silencing in fission yeast Saccharomyces pombe. However, this approach is limited to determining colony phenotype and not individual cell expression. When ade6 is juxtaposed with heterochromatin, colonies adopt a pink phenotype, which could result from consistent low levels of ade6 expression or the presence of both ade6-ON and ade6-OFF cells. To distinguish between these two possibilities, we created plasmids containing different fluorescent reporter genes, GFP and mKO2, with different promoters to induce high, medium, and low expression. We then transformed them into S. pombe near heterochromatin domains.

The level of fluorescence will be analyzed using FACS to characterize gene expression in genetically identical single cells.

(F) #43 Identification of a Highly Metastatic Osteosarcoma Cell Line Derived from Spontaneous Lung Metastases: Implications for Understanding Metastatic Mechanisms
Lauren Shang, Myriam Labelle, and Olivia Travis
Faculty Sponsor: Tanushree Pandit, Department of Biology
Osteosarcoma, the most common primary bone malignancy, normally has a 78% five-year survival rate. However, it drops to only 20% in those with metastasis. The precise mechanisms that contribute to osteosarcoma metastasis are not fully understood, thus identifying the specific biological factors driving metastasis is crucial in developing targeted therapies. To better understand the mechanisms of osteosarcoma metastasis, we generated 3 related osteosarcoma cell lines. To do so, we implanted the AX osteosarcoma cell line in mice via orthotopic tibial implantation and then isolated two cell lines generated from the spontaneous lung metastases that arose from AX tumors. These cell lines, (AX4LM1 and AX5LM1) along with the parental AX line, were analyzed via several in vitro and in vivo assays. Proliferation studies showed similar rates between the three cell lines. However, there was a substantial increase in migration and invasion of the AX4LM1. Furthermore, increased in vivo lung seeding of the AX4LM1 cell line was observed 48-hours after tail vein injection. Thus, our data suggests that AX4LM1 has a higher metastatic potential than the two other cell lines. We plan to further examine the transcriptional differences that drive this mechanism and increased metastatic behavior from the AX4LM1 cell line.

#44 Identification and characterization of a second chromosome genetic variant affecting development and heterochromatin formation in Drosophila Melanogaster
Alina Sikandar, Mo Murshed, Hallie Schiff, and Anna Perry
Faculty Sponsor: Liam Hunt, Department of Biology
Position-effect variegation (PEV), caused by transposition of the white gene in Drosophila melanogaster with variable mosaic red and white eye phenotypes, acts as an indicator of heterochromatin, a tightly packed form of DNA that functions in gene silencing. Artificial selection enriched for a population of flies with low pigmentation eye phenotype associated with increased heterochromatin. This population was also found to live longer and we sought to identify the mechanism behind these traits. Through genetic crosses and quantitative assessment of eye phenotypes in the progeny, we observed the low pigmentation phenotype appeared to be inherited in an autosomal dominant manner, was linked with the second chromosome, and was strongly influenced by maternal phenotype. The phenotype required heterochromatin promoting genes Su(var)3-9, HDAC1 (histone deacetylase 1) and Su(var)205. The low eye pigmentation phenotype was phenocopied by low temperature or low nutrient conditions that slow the rate of development, while the low pigmentation population had slower rate of development at standard temperatures. Altogether this identifies a second chromosome modifier of developmental growth that indirectly influences heterochromatin formation and is associated with longer lifespan. Genetic complementation assays will be used to more precisely identify the nature of this variant.

#45 Importance of *nrdEF*, an Alternative Class I Ribonucleotide Reductase, in Nitrosative Stress Response of *Salmonella* Typhimurium

Yihan Li and Taylor M. Albrecht
Faculty Sponsor: Elaine Frawley, Department of Biology

Ribonucleotide reductases (RNRs) are essential enzymes that synthesize deoxyribonucleotides. *Salmonella* Typhimurium encodes two Class I RNRs: NrdAB that uses an iron co-factor, and NrdEF that utilizes manganese. This difference may be important under nitric oxide (NO) stress released by the host immune system, since NO is known to disrupt metalloproteins that use iron or zinc, and it also chemically modifies NrdA. Increased expression of *nrdEF*, coupled with *S.* Typhimurium's increased manganese uptake and iron/zinc export during NO stress, suggest a potential shift from iron-dependent NrdAB toward manganese-dependent NrdEF under these conditions. This study examined the physiology, expression, and chemical modification of class I RNRs under NO stress. Growth patterns of *nrdEF* deletion strains were compared in both wild-type and manganese-import mutant backgrounds following NO treatment and expression of *nrdAB* and *nrdEF* were monitored by qPCR. Chemical modification of NrdA, NrdB, NrdE, and NrdF by NO will be assessed using the biotin switch assay. Our current results show that under NO stress, deletion of *nrdEF* delays *S.* Typhimurium's recovery. The wild-type strain upregulates *nrdEF* in response to NO, while *nrdAB* expression remains unchanged. We also expect to observe differences in NO modifications between NrdA/NrdB and NrdE/NrdF.

#46 Engineered CHP212 Cell Line for Studying Double-Minute Chromosomes

Bernadette Truong, Ashish Verma, Rupesh Shrestha, Changlei Zhu, and Jake Friske
Faculty Sponsor: Qian Shen, Department of Biology, Dr. Hai T. Dao, St. Jude Department Children's Research Hospital

Double minutes (DMs), also known as extrachromosomal DNA, are circular minichromosomal structures observed in half of human cancer types and one-third of cancer patient samples. Furthermore, tumors harboring DMs are typically more aggressive and result in worse patient prognosis and relapse rates, thus establishing their critical role in tumorigenesis and proliferation. While they're known to contain amplified oncogenes (e.g., MYC, MYCN) and drug-resistant genes, specific mechanisms governing their generation, maintenance, and contribution to tumor malignancy are still unclear. As such, structural and behavioral investigations could help advance our understanding of DMs and develop novel therapeutic strategies specifically targeting them. Our approach involves engineering DMs with Tet operon (TetO) tags and expressing Tet repressor protein (TetR) fusions to facilitate biochemical studies of DM chromosomes in cellular models. To this end, we have successfully performed Cas9-mediated knock-ins of TetO repeats into the DM chromosomes of the neuroblastoma CHP212 cell line. Following this, we developed PCR-based assays that guided our selection for cells with a higher percentage of engineered DMs. Currently, we are expressing TetR fusion proteins tagged with fluorescent markers (e.g., GFP, mCherry) and labeling proteins (e.g., mSOG) in knock-in cells to enable live-cell imaging and proteomic studies.

#47 Investigation of paxillin function and subcellular localization in the filamentous fungus Aspergillus nidulans through gene truncation

Carson Page

Faculty Sponsor: Terry Hill, Department of Biology, Loretta Jackson-Hayes, Department of Chemistry

The purpose of this study is to identify the determinants of subcellular localization and participation in cell division of the paxillin orthologue PaxB in the filamentous fungus Aspergillus nidulans. Paxillins are a family of scaffolding proteins that play a variety of roles including cytoskeletal organization and contain one or more LIM domains. There is one paxillin in A. nidulans, PaxB, which has three LIM domains at the C-terminal end of the protein. We have previously demonstrated that PaxB is essential to septation and that the GFP-tagged protein localizes to the contractile actomyosin ring (CAR) during cytokinesis and the growing hyphal apex. We have carried out a series of gene truncations that progressively eliminate PaxB's LIM domains, and the GFP-tagged truncations were transformed into a PaxB-deletion strain of A. nidulans. Surprisingly, even when all three LIM domains have been deleted, the protein constructs continue to localize normally and septation is restored. We conclude that, despite the fact that LIM domains are defining characteristics of the paxillin family of proteins, these domains in the A. nidulans orthologue are involved in functions other than subcellular localization and regulation of septation. We are carrying out further deletions from both the C-terminal and N-terminal directions.

#48 Investigation of protein-protein interactions of the Rho-family GTPase RhoA in Aspergillus nidulans.

Jen Long, David Jackson, and Serena Williams

Faculty Sponsor: Terry Hill, Department of Biology, Loretta Jackson-Hayes, Department of Chemistry

The purpose of this study is to identify protein-protein interactions between small GTPase proteins and binding partners in the filamentous fungus Aspergillus nidulans. The genome of A. nidulans encodes five GTPase proteins, and work in our lab has demonstrated subcellular localization patterns for all of these. Our particular interest in this project is in the potential interaction between the Rho-family GTPase RhoA and the A. nidulans orthologue of Protein Kinase C (PkcA). We demonstrate that down-regulation of rhoA gene expression exactly replicates the distinctive growth-morphology phenotype seen when the pkcA gene is down-regulated, though deletion or down-regulation of genes encoding the other GTPases has no such effect. We conclude, therefore, that there is a high likelihood that PkcA is regulated by RhoA. In order to investigate this interaction further, we have cloned the cDNA copy of the RhoA gene into pGAD-T7 plasmids for use in yeast-two-hybrid (Y2H) studies. The cDNAs for potential binding candidates, including PkcA, have been cloned into the complementary Y2H plasmid pGBK-T7. Transformation of an appropriate Y2H yeast strain with full-length cDNA and membrane-localizing CAAX sequence truncated copies for the rhoA and pkcA genes is currently underway.

#49 Investigating the role of manganese in Fe-S cluster repair during nitrosative stress in Salmonella Typhimurium

Hai Nguyen

Faculty Sponsor: Elaine Frawley, Department of Biology

Salmonella Typhimurium is a bacterial pathogen that causes diarrheal disease. Nitric oxide (NO), produced by mammalian immune cells, defends against infection in part by binding to the metal cofactors or ligands of metalloproteins, disrupting their structure and function. Among these targets is aconitase, an iron-sulfur (Fe-S) cluster containing enzyme in the TCA cycle. NO also disrupts metal homeostasis; iron and zinc mobilized from metalloproteins are pumped out of the cell while manganese is imported. This raises the question of whether manganese can help protect either Fe-S cluster or protein structure, allowing for faster repair following NO damage. We observed that wild-type Salmonella completely lost aconitase activity within 5 minutes post-NO treatment, followed by about 60% recovery in activity by 30 minutes. A mutant incapable of importing manganese recovered more slowly, suggesting that manganese has a protective role during nitrosative stress. We are using a combination of mutants, metal supplementation, in vitro repair studies, and manipulation of protein synthesis to investigate the mechanism behind the prolonged recovery in manganese import mutants. Our goal is to determine whether manganese directly stabilizes the Fe-S cluster, protects against infiltration of metals like zinc, or protects the cluster from oxidative damage by activating SodA.

MEDIA STUDIES SHOWCASE[1]

Media Studies Showcase
7:00 pm – 8:00 pm, 5/4/25
Barret 034
Moderator: Sarah Monroe
Faculty Sponsor: Joy Brooke Fairfield and Dave Mason, Department of Media Studies
Media Studies Departmental Showcase

Join the Media Studies program for a screening of short films, video essays, digital art, and more. These examples of MST student work across the 2024-25 academic year tell powerful stories and offer diverse perspectives on which the world depends. Talkback following approximately an hour of curated presentations.

RHODES COLLEGE VENTURE CHALLENGE FINALS

Student Competition
5:30 – 7:30 pm, 5/1/25
Blount Auditorium, Buckman Hall
Faculty Sponsor: Eric Mathews, Entrepreneur-in-Residence
The Rhodes College Venture Challenge Finals is the culminating experience of our campus-wide entrepreneurial programs, spotlighting the exceptional talent and innovative spirit of our student body. This event invites faculty, students, alumni, and the broader community to witness the culmination of months of hard work, where the most promising ventures, developed by our brightest minds, are presented to a panel of judges. Finalists will pitch their new business models to a distinguished panel of alumni judges, competing for significant prizes and the opportunity to bring their business dreams to fruition. Beyond the competition, the showcase serves as a vibrant platform for networking, learning, and celebrating the entrepreneurial journey, offering all attendees a glimpse into the future of business innovation driven by Rhodes College's aspiring entrepreneurs.

URBAN STUDIES & HEALTH EQUITY
SENIOR SEMINAR CAPSTONE RESEARCH PROJECTS

Cut off from Equality: Disparities in Amputation Rates among Black and White Patients in Memphis, TN
Izabella Arsenault
Faculty Sponsor: Kelly Jo Fulkerson, Department of Urban Studies
This research paper examines the structural barriers and healthcare perspectives that contribute to significant racial disparities in lower extremity amputations (LEA's) in Shelby County, Tennessee. Non-Hispanic black patients are disproportionately affected by non-traumatic amputations, with rates of amputation three times higher than that of their white counterparts, which lead to profound negative and permanent impacts of economic opportunities, quality of

[1] These events take place prior to the Rhodes Symposium

life and overall health outcomes. Shelby County is a noteworthy case study for this research because of its location within The Diabetes Belt, it's status as one of the few majority black metropolitan areas in the United States, and it's prolonged history of socioeconomic barriers to health equity such as food deserts and elevates rates of obesity and diabetes mellitus. Despite this, there is a notable gap in the literature addressing these disparities and their causes at the local level. This research examines the interplay between structural and perceived barriers to amputation equity within Shelby County by employing a multivariate analysis with regression modeling and semi structured interviews to explore the relationship between socio-economic status, race and amputation rates. Results reveal an inverse relationship between amputation rates and socio-economic status, as well as proportional relationship between socio-economic status and access to preventative treatment for vascular care, the number one precipitating factor for LEA amputations. These findings suggest that Shelby County's infrastructure such as preventative health care exacerbates the risk of amputation in underserved communities, where higher rates of obesity and diabetes persist. The study recommends targeted policy interventions to increase the availability of vascular treatment centers to low income areas within Shelby County as well as enhanced educational outreach to school's on nutritious eating and early intervention strategies to prevent amputations.

40 Years Later: Examining the Evolution of Discriminatory Marketing in Memphis Real Estate

Julia Davis

Faculty Sponsor: Kelly Jo Fulkerson, Department of Urban Studies

Decades after the passing of the Fair Housing Act in 1968 that prohibits discrimination in the sale, rental, and financing of housing based on race, color, religion, national origin, sex, familial status, and disability, Americans still live in a hyper-segregated metropolitan landscape. Real estate practices are one major way segregation is reinforced in the United States. Memphis has a longstanding history of housing segregation. According to data from the U.S. Census Bureau's American Community Survey (2015–2019), the city has 17 neighborhoods where at least 98% of residents are Black and five neighborhoods where 90% or more of residents are white (Steimer, 2021). Memphis's historical legacy of segregation, combined with ongoing gentrification and economic disparities, makes it a critical case for studying how today's real estate practices influence neighborhood makeups. This quantitative study looks into real estate marketing and how discriminatory practices can further perpetuate residential segregation in Memphis, TN. Specifically, it analyzes the advertising of 5 of the most prevalent real estate agencies in Shelby County, TN. Tracking the presence of open houses, school notations, agent photo with a listing, agent advertisements and favorable area descriptions across different zip codes by racial composition, the researcher evaluates how these practices have either increased or slowed with the rise of new technologies in a racially diverse area like Shelby County. The combined real estate marketing of the five most prevalent agencies in Memphis reveals that discriminatory marketing practices are still widespread in Shelby County. To increase residential integration, planners, enforcement agencies, and real estate professionals should conduct larger-scale studies in Shelby County that integrate online advertising data with fair housing audits and complaints to proactively identify and prevent discrimination (Collins and Galster 1995). In addition, brokers serving Black communities should gain access to referrals and cooperation with other agents serving majority-white suburban communities (Massey & Denton, 2018.)

How do relationships between neighborhood environment, social class, and individual health outcomes affect physical and mental wellbeing?

Samantha Ducey
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This study explores how repeated exposure to violent crime and a constant concern for safety by living within or near violent urban areas, can heavily contribute to an individual's anxiety and subsequent depression. While violent crime can be described in a multitude of ways, this paper draws from databases that describe high crime as murder and aggravated assault. Challenges caused by repeated exposure to high crime, with implications such as affected fear regulation and emotional processing ability can lead to poor mental health outcomes. This analysis examines how the lack of safety in these areas is what creates an environment of isolation for citizens living in high crime areas, which in turn amplifies their respective mental health challenges. This study further contributes to debates surrounding the social determinants of health and the role of structural inequality in urban contexts. This case study uses a methods-based approach and compares findings between two urban cities, Memphis, Tennessee and Baltimore, Maryland. Using quantitative data to compare these two cities, illustrates how each of the two have high crime environments, and subsequently often lead to its residents having poor mental and physical health. These two cities were chosen, from their history of redlining and highly segregated neighborhoods. These two cities were also chosen that are nationally recognized as high-crime cities. Preliminary findings suggest that historically redlined neighborhoods and long-term disinvestment contribute to high crime rates and poor mental health outcomes. Memphis and Baltimore, with deep histories of redlining, continue to experience elevated crime rates, which, in turn, fuel widespread anxiety and depression among residents. Ultimately, this research creates a broader understanding of how environmental and systemic factors influence mental health outcomes. This paper highlights the fact that many citizens experience an over exposure to crime and impacts their emotions which have been identified as chronic anxiety and depression

Buried Under Restrictions: Decisions in Deathcare Throughout the COVID Crisis

Mairead Kearns
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This study investigates the accessibility of death care during the COVID-19 pandemic. Death care refers to the industry of services and arrangements that provide support following a death, such as funeral homes, crematories, and cemeteries. The literature points towards significant operational changes in health care and highlights the moral implications of treating the dead. The pandemic's daily surges of death presented an entirely new set of problems for the death care industry that have not been considered in depth. This research explores the perceptions of deathcare workers when balancing efficacy with ethics during the peak of the pandemic in New York City. In particular, it analyzes their decision-making process considering a lack of guidance from government officials. Data will be collected through a combination of archival research on pandemic policies and semi-structured interviews with death care providers. A guiding principle of this paper is that death care is an essential aspect of processing grief and central to society's cultural practices. Ensuring everyone has access to appropriate death care maintains dignity in death and restores people's ability to grieve healthily. The pandemic highlighted inequities in many areas of life; by exploring access to death care, there is potential to identify areas of improvement for our death systems, thus improving our overall response to death.

Enhancing Health Literacy in Tennessee: Examining the Role of Communities, Policies, and Healthcare Providers in Improving Health Outcomes

Khalid Khalafalla
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Several federal policies have aimed to improve health literacy and nutrition in schools. While these policies are well-intentioned, their implementation has been uneven. Studies have shown that disparities persist in the quality of school nutrition environments, particularly in low-income and rural areas. For example, schools in Memphis often struggle to meet the new nutrition standards due to budget constraints and lack of resources. This qualitative study examines the impact of federal and state policies on health literacy in K-12 education, focusing on Tennessee, particularly underserved communities like Memphis. Using policy analysis, stakeholder perspectives from existing research, and a comprehensive literature review, the research identifies key themes such as funding challenges, policy implementation gaps, and the long-term benefits of improved health literacy, analyzed through thematic analysis. Some recommendations include increasing funding for health education programs, integrating health literacy into the curriculum, and fostering partnerships between schools, communities, and healthcare providers. By addressing health literacy in K-12 education, we can break the cycle of poor health outcomes and create a brighter future for children in Memphis and across the U.S., empowering the next generation to make informed decisions, achieve their full potential, and lead healthier, more fulfilling lives.

Roots of Relief: Exploring Effective Food Access Programs

Sareen Mirza
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Food insecurity is one of America's most prevalent public health issue that affects children and their families in life-changing ways. Children lacking nutrition from an early age become more at risk for poverty, health issues, and deficits in academic and emotional learning. More recently, a various degree of community-based interventions have been implemented in communities suffering from food insecurity, which has helped support the children and their families and has allowed them to not worry about where their next meal will come from. This study analyzes 4 different types of community-based intervention programs which have been implemented in the US South, which is known for its high food insecurity rates. This study will be conducted using analysis of community partner data and interviews with their respective administrations. The goal is to conduct a comparative analysis that will allow us to evaluate the programs through their goals and their achievements. Preliminary findings reveal that community-based intervention programs have been effective at reducing immediate food insecurity in individuals, children, and families. Findings also reveal that program success depends on funding, accessibility, and community engagement to sustain long-term growth and benefits. This research further addresses the gaps that these organizations suffer from and how they can be potentially alleviated through collaborative projects.

Once Upon A Bias: Disney's Decades of Disciplined Discrimination

Astoria Moore
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From Dumbo to The Aristocats, Walt Disney is known for his prejudice against minorities. The movies released from his studio are enjoyed by children everywhere, while teaching them

detrimental discrimination practices. Scholars recognize the impact that on-screen entertainment has on viewers, particularly children, but the gap in the research resides in understanding how the movies have impacted how young adults, who's childhoods were shaped by these films, see and understand the world around them. This study highlights how college students, those who are anticipated to be "world-changers," are pigeon holed into world perspectives based on media portrayals and are forced to learn to deconstruct those worldviews on their own accord. When considering how Disney movies have shaped people's mindsets about varying worldviews, young adults (ages 18-25) are rarely utilized in that research; which is my research will exclude individuals outside of that age range. Utilizing qualitative surveys and focus groups that ask participants of their personal experiences with Disney movies from their childhoods. Participants are asked of the implicit and explicit biases that are portrayed in the film and had the capacity to impact their world view. Preliminary findings suggest that individuals who watched and self-reportedly enjoying the Disney that contain detrimental discrimination practices are not recognized as having such imagery. The biases that viewers are more easily able to pick out of the film are those that relate to their own identities. This research addresses how Disney movies have "normalized" discrimination of minorities and how individuals have to confront and change these constructed biases in real life circumstances.

Societal Reentry for Formerly Incarcerated Women: Essential Program Components Needed for Success

Anna Noelke
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Societal reentry for formerly incarcerated women has many different components that need to be considered and provided for successful societal re-entry. Community, employment opportunities, residential programs and transportation, and both mental and physical healthcare all play huge roles in women-specific needs that need to be met in order to ensure formerly incarcerated women have a fair chance to successfully reenter society. Even after these facets of life are addressed, there is no such thing as guaranteed successful societal re-entry due to many personal circumstances such as past trauma, however, it should be a societal responsibility to make sure formerly incarcerated women have the best chance of societal re-entry as possible. The objective of my study will be an autoethnographic reflection on personal experiences with Thistle and Bee, a Memphis Nonprofit that supports women who have been formerly incarcerated and are survivors of sex trafficking and prostitution. Thistle and Bee provides all of the services previously mentioned to program participants, while also cultivating a positive environment, leading to optimal opportunities to become readjusted into society. Research supports the idea that many different components are needed to support formerly incarcerated women as they re-enter society. This study confirms it is possible to have an amazing life after being incarcerated, but that in order to have a fair chance a few things need to be addressed.

Bridging Gaps and Building Resistance: The design and implementation of Community Health Worker (CHW) programs in Memphis, TN

Virginia Rostick
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Scholars argue that the rise of global empire—particularly driven by US neoliberal policies—has exacerbated health disparities and contributed to the commodification of healthcare, making equitable access increasingly difficult. As a result, methods to make healthcare more community

based and rectify racial health disparities have emerged in the US. The Black Panther Party (BPP) exemplified this approach by viewing healthcare as both a necessity and a method of liberation for Black communities in the United States, establishing The People's Free Medical Clinics. These efforts laid the groundwork for community-based models of healthcare, such as Community Health Worker (CHW) programs, which rely on trained laypersons to provide culturally responsive care. However, there is not a large volume of research that exists on the integration of CHW programs in the US, particularly in the city of Memphis. Utilizing qualitative interviews with CHWs, this research explores the role of community-based programs in improving healthcare access and rectifying racial health disparities in Memphis and the Mid-south. It utilizes Huey Newton's theories of intercommunalism and the BPP's view of healthcare as a human right to frame interview questions and "evaluate" programs that exist in Memphis. Preliminary findings suggest that CHW programs in Memphis serve as critical intermediaries between marginalized communities and the healthcare system, addressing barriers such as cost, access to transportation, as well as help to improve trust between patients and providers. Overall, CHW programs in Memphis align with the BPP's legacy by emphasizing self-determination and health justice. However, their potential is often constrained by lack of funding and lack of integration into the formal healthcare sector. Further research is needed to develop strategies to scale up these initiatives so they can reach a wider population.

Health and Recovery Disparities in Houston Residents Post-Hurricane Harvey

Winifred Tardy

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Across the world, hurricanes and natural disasters are increasing as climate change reshapes our environments. In 2017, Hurricane Harvey devastated the Houston area, damaging over 200,000 homes and displacing thousands. Harvey disproportionately impacted already at-risk neighborhoods, exacerbating vulnerabilities and disparities. While there is existing research focusing on the immediate aftermath of Harvey, there is a need to examine how healthcare, neighborhood preparedness, and emergency communication are all experienced differently across diverse populations, and how they impact long-term recovery. This project examines the long-term health and social impacts of Hurricane Harvey on Houston residents, focusing on neighborhood-level impacts of Hurricane Harvey. Using a neighborhood-based lens allows for the exploration of social, political, economic, and geographic vulnerabilities. The collection of qualitative and quantitative data through an online survey are used to gather data from Houston residents, who have resided in a Houston neighborhood since at least August 2017. While the survey includes both quantitative and qualitative questions, it prioritizes qualitative data and personal narratives to provide deeper insight into Houston residents' long-term recovery. Preliminary findings suggest that recovery timelines and experiences are significantly impacted by pre-existing social vulnerabilities within neighborhoods. Houston neighborhoods with higher poverty rates have faced more severe recovery challenges in the aftermath of Hurricane Harvey, worsening long-term recovery disparities. Research shows that systemic inequalities continue to shape recovery experiences in neighborhoods, even seven years since Hurricane Harvey devastated Houston. To address these disparities, policymakers should introduce targeted interventions to strengthen neighborhood infrastructure, expand access to healthcare and emergency services, and support existing community-led initiatives. These actions are critical to fostering more equitable outcomes in both storm impacts and recovery experiences.

Yard-to-Table: Generating Agrarian Principles of Agri-Culture and Affection for Land through Urban Edible Landscaping

AC Tilley

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The industrial agricultural boom of the mid-21st century phased out the agrarian culture of small-to-mid sized farms. Critical to this agrarian culture was subsistence agriculture– household gardens were the predominant, seasonal food source of rural communities. Agrarian author Wendell Berry pushed against this shift, arguing for rural farmers to reinforce their agri-Culture based on affection for, knowledge of, and intimacy with the land. This agri-Culture has yet to be studied or applied to urban agricultural practices of edible landscaping. Small-scale homestead gardening is similar to subsistence agriculture, but heavily researched. Edible landscaping, a burgeoning field of gardening that incorporates food into exclusive-ornamental landscapes, is a similar but understudied practice. This study uses interviews to explore the agrarian motivation of urban residents, nonprofits, and city governments for installing edible landscapes. Archival research of Wendell Berry's writings and speeches provides the framework within which this data is coded. Qualitative data from the interviews is sorted according to Berry's principles of affection for, intimacy with, knowledge of, the land. Recommendations are aligned with Berry's principle of imagination. Preliminary findings about urban edible landscaping suggest its long-standing practice fosters an intimate and knowledgeable connection with food systems. There are strong agrarian motivations that drive edible landscaping. Edible landscapes are a significant tool used by the participants of this study to generate food sovereignty while aligning themselves within their native environment. Motivations to create edible landscapes did not materialize from thin air– they were borne from lifelong careers or hobbies within environmental sectors. City governments should work with nonprofits to createinstall edible landscapes on public land– parks, buildings, curb medians– with proper educational material that motivates more residents to harvest from or install edible landscapes.

Riding the Bus in Search of Fresh Foods

Alex Torres

Faculty Sponsor: Kelly Jo Fulkerson, Department of Urban Studies

The MATA transportation system in Memphis, TN has continuously been underfunded year after year and it will be laying off a number of drivers and employees in 2025 following a "death spiral" trend that will inevitable leave Memphis residents with no public transportation. This research analyzes the MATA route cuts and how the decline of public transportation affects established food deserts in Memphis. This study focuses on adults in North and South Memphis who have been affected by MATA transportation and Memphis' lack of walkable infrastructure. Public transportation has been investigated in Memphis and has been found to be subpar compared to other cities of similar size. The lack of public transportation can worsen food scarcity in certain households in North and South Memphis which further sustains food deserts in already marginalized areas. Income, mobility, and time constraints together limit the range of destinations within reach of low-income households. Additional budget cuts to MATA are threatening the routes citizens take to get to healthy, fresh foods. Through semi-structured interviews, MATA bus riders speak to their experiences in this study in regards to their personal access to grocery stores, and how budget cuts will impact their future commute. This study shows that MATA budget cuts are jeopardizing people's health, specifically the already marginalized communities of North and South Memphis.

Examining Factors Contributing to College Students' Human Papillomavirus Vaccination and Awareness

Sheela Vasan
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HPV is the most common sexually transmitted infection in the US, contracted by almost all sexually active people at some point. HPV is associated with several cancers, most commonly cervical cancer, which is the fourth most common cancer among women globally. Despite the availability of an HPV vaccine, college-aged students make up one of the most at-risk demographics for HPV, while also boasting a less-than-ideal HPV vaccination rate, far below the national average for adolescents. This mixed methods study examines the factors that contribute to HPV awareness and vaccine uptake at a small liberal arts college in the Mid-South, a region with significantly more vaccine disparity than the rest of the country. Collection of qualitative and quantitative data through a cross-sectional online survey and voluntary in-depth dyadic interviews, respectively, are used to gather data surrounding sociodemographic information, along with measuring perceived risk of HPV, HPV vaccination status, HPV vaccination knowledge, beliefs, hesitancy, and influences. Preliminary findings suggest that major barriers to HPV vaccination in college aged students has to do with lack of knowledge surrounding HPV and perceived risk. Findings show that perceived barriers to vaccination and misinformation about HPV play a role in the disparities seen in college aged adults, along with disparities that exist between genders. Potential interventions that emphasize college community health and patient provider relationships could help to mitigate disparities seen in college aged students. Additionally, more readily available and widespread information about HPV, the risks associated with it, and steps for catchup vaccination could minimize the spread of misinformation, along with empowering college-aged adults to take ownership of their health decisions.

The coin flip of Memphis and its duality: Examining the dichotomy between the rise of black political representation and the rise of violence onto black life

Trinity Williams
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This research applies Black feminist and socialist theories to examine policing as a systemic issue that disproportionately harms Black people. In recent decades, Black political representation has been on the rise. Despite this increase in Black political representation, Black communities remain largely over-policed and subject to stigmatized media coverage. This paper explores this juxtaposition between increased Black representation and the racist nature of policing in America through an analysis of the murder of Tyre Nichols in Memphis in early 2023. This case in specific was chosen because Memphis is home to a black mayor, predominantly black city council, and a black police chief, yet the federal government was brought to tame Memphis Police Department's excessive force, biases, and over policing within its blackest communities. Traditional understandings of policing are often rooted in capitalist ideologies that thrive on Black suffering, normalizing state violence against Black communities. This study challenges that norm by analyzing the aggressive nature of policing within an ideological framework that prioritizes Black life, rather than one that upholds structural oppression.

Social Determinants of Health and Asthma in Marginalized Populations in Memphis

Deenat Yusuf

Faculty Sponsor: Kelly Jo Fulkerson, Department of Urban Studies

Urban health disparities remain a pressing issue, particularly in economically disadvantaged neighborhoods where chronic illnesses like asthma disproportionately affect residents. Memphis, Tennessee exemplifies this challenge, with systemic inequities contributing to heightened asthma prevalence and severity. Despite existing literature on urban health, there remains a gap in understanding the combined influence of healthcare accessibility, environmental stressors, and socioeconomic conditions on asthma outcomes in Memphis. Addressing these disparities is critical for promoting health equity and creating policy interventions. The study investigates the impact of socioeconomic inequalities on urban health outcomes. focusing specifically on the disproportionate burden of asthma in economically disadvantaged neighborhoods within the Memphis Medical District. The objective is to analyze the relationship between socioeconomic factors and asthma prevalence. A quantitative approach was employed, analyzing public health datasets to examine the relationship between socioeconomic status and asthma outcomes. Key variables included asthma hospitalization rates, healthcare accessibility, and delays in care. The research reveals that asthma disparities in Memphis are driven by inadequate healthcare access, high pollution exposure, and systemic inequities that limit preventative care. The findings highlight a direct correlation between socioeconomic disadvantage and increased asthma hospitalizations, illustrating how structural factors contribute to poor health outcomes in urban settings. Socioeconomic inequalities significantly exacerbate asthma prevalence in Memphis, reinforcing broader urban health disparities. Addressing these issues requires systemic policy changes that enhance healthcare access, improve environmental conditions, and reduce economic barriers to medical care. The study highlights the need for equitable healthcare policies, targeted public health interventions, and community-drive advocacy to combat asthma disparities. Policy makers should implement strategies that expand healthcare accessibility, reduce environmental pollutants, and support economically disadvantaged communities in achieving better health outcomes.

Reimagining the Relationship Between Reproductive Health Professionals and the Black Female Population

Anna Grace Albritton

Faculty Sponsor: Peter Hossler, Department of Urban Studies

Premature death through maternal mortality is threatening the lives of Black women in the Midwest. While maternal mortality is a rising threat to American woman of all racial and ethnic groups, Black women see an increased risk. In 2015, the United States average for maternal mortality was roughly 16/100,000 live births while the average maternal mortality rate for White women was 13/100,000 live births and the average maternal mortality rate for Black women was an astronomical 41/100,000 live births (Geronimus, 2023). Through examination of the systemic disparities faced by Black women in American healthcare it is found that the intersectionality of genetic predisposition (Lister, 2019), environmental racism (Geronimus, 2023), and lack of provider trust in healthcare (Tobin, 2022) (Timmermans, 2020) are the leading causes for this disparity. Personal testimonies from women who have experienced healthcare bias illustrate the need for reform. The study explores the relationship between healthcare provider interventions and patient outcomes to understand: In what ways do health professionals address and work to repair health disparities in care for Black women in the Midwest? Focusing on the Midwest, this

study uncovers discrepancies between the health system's stated commitment to equity and the actual practices observed in the field. Along with patient testimony and regulatory requirements from hospital systems accessible through literature, this study completes the puzzle by voicing the experiences of reproductive healthcare professionals exploring solutions for addressing systemic health disparities in a targeted and actionable way. This research will operate to bridge the divide between institutional rhetoric and received care. Find out what policies and practices are in place to repair these disparities and improve health outcomes for Black women today.

Gender Disparities in Clinical Research: Impact on Cardiologists' Practices

Grace Cooper
Faculty Sponsor: Peter Hossler, Department of Urban Studies

Women are disproportionately underrepresented in clinical studies (Bierer 2022). As a result, women often experience negative health outcomes due to drug and treatment ineffectiveness and inaccurate diagnosis (Weisman 1999). My research seeks to bridge the gap between academic discussions regarding clinical research and real-world medical practice in the context of cardiology, a field where women are disproportionately affected by the exclusivity of clinical research (Woodward 2019). My research seeks to understand (1) if healthcare providers are aware of this gap in medical understanding and (2) what, if any, adjustments do they make in their daily practice to combat the fact that their knowledge and method of treatment may be built upon incomplete data. These adjustments will be measured in comparison to standard practice that each participant learned in their medical education as well as differences in their treatments of male and female patients. This study will utilize qualitative and quantitative methods through the use of surveys and interviews. I will contact small-medium sized cardiology clinics in Tennessee by email to request interest in participation. This research may be able to show how clinical research influences medical practice as well as identify medical educational gaps, opening the door for curriculum reforms and patient education tools. Additionally, I hope to strengthen trust between cardiologists and their female patients as well as empower women to engage in their healthcare by asking questions and trusting their bodies. While cardiology is merely a segment of the healthcare sphere, I aim to use the field of cardiology as an illustrative example that perhaps more broadly reflects trends, problems, and solutions that all healthcare providers and patients experience. Regardless of the result of the study, the findings will assist both cardiologists and patients in understanding the barriers to cardiology care when it is guided by women-deficient clinical studies.

The Personal Effects of Expungement: A Qualitative Study of Formerly Incarcerated Individuals in Memphis

Zoë Dominguez
Faculty Sponsor: Peter Hossler, Department of Urban Studies

One in three Americans—approximately 70 to 100 million people—are haunted by a criminal record. The confluence of mandated background checks and the widespread availability of criminal legal data pose barriers to housing, employment, and government assistance for the previously incarcerated. As a result, people released from prison are often driven toward the same behavior that resulted in their arrest. To mitigate these challenges and reduce the risk of recidivism, every state except Alaska, Florida, Hawaii, and Wisconsin has instituted criminal record expungement policies. By sealing a criminal record, expungement returns the individual to their original legal status prior to charges, thus promoting social and economic mobility. As a

secretive process, past research on expungement has largely relied on quantitative data, often excluding the personal testimonies of those who have achieved it. This study seeks to explore the personal, social, and emotional effects of expungement from the perspective of individuals who have undergone the process. Data was gathered through semi-structured interviews with those who have successfully achieved expungement, encouraging open storytelling. The sample was constructed using expert and purposive sampling, drawn from a database provided by a Memphis-based criminal justice nonprofit specializing in expungement. The coding of interviews focuses on how expungement affects self-perception, community relationships, and employment. This research aims to humanize a process often reduced to empirical analysis, providing participants with narrative agency and highlighting expungement's importance as a "non-reformist reform" and a tool for lessening the scope of the prison industrial complex.

Evaluating Transitional Living Programs for Homeless Young Adults: A Case Study of Memphis

Abigail Fletcher
Faculty Sponsor: Peter Hossler, Department of Urban Studies

This paper offers undergraduate research related to young adult transitional living programs in Memphis, Tennessee. Transitional living programs (TLPs) are temporary housing initiatives primarily for young adults to transition from unstable living situations, such as homelessness and foster care, into stable independent living. These programs combine safe housing with a series of holistic services supplementing the housing that equips participants with skills associated with maintaining stable housing. Despite the existence of programs such as these, there are still existing barriers, such as funding limitations, gaps in service delivery, and inadequate long-term support mechanisms, stopping these programs from reaching full effectiveness. Semi-structured interviews and open-ended surveys were chosen to capture the lived experiences of key stakeholders— nonprofit leaders who design TLPs, direct-contact workers who implement them, and youth who navigate these programs. Thematic coding of interviews was completed for analyses and comparison of responses. Preliminary findings suggest greater access to case management services is correlated with post-program housing stability. Findings from this study will provide actionable insights such as best practice standards for TLPs to enhance service delivery and improve long-term housing outcomes for vulnerable young adults. The research question asks "What challenges and opportunities do young adults and nonprofit organizations experience in implementing transitional living programs, and how do these experiences impact housing stability outcomes."

Data for All: Enhancing Civic Data Accessibility in Disinvested Communities

Ella Janigan
Faculty Sponsor: Peter Hossler, Department of Urban Studies

Civic data is vital for fostering transparency, empowering communities, and promoting equitable policy engagement. However, its inaccessibility often marginalizes disadvantaged populations, limiting their ability to participate in governance and advocacy. My study focuses on Memphis, a city with significant socioeconomic disparities, to explore the barriers to civic data accessibility and develop strategies for creating an inclusive data system. Using a mixed-methods approach with observations, archival research, and interviews, this research documents existing challenges in Memphis, evaluates user experiences, and generates actionable recommendations based on other cities' successes but tailored to addressing the specific needs of the diverse community in

Memphis. By leveraging these methods, my study provides a nuanced understanding of both systemic barriers and practical solutions, ensuring its findings are grounded in real-world applicability. The findings aim to address broader gaps in the literature on equitable data practices in under-resourced cities. By emphasizing transparency and user-centric design, my study seeks to bridge the gap between technical innovation and community empowerment, contributing to more inclusive urban governance.

"Where are we now: A Deep Dive of the Current State of HIV Prevention and Harm Reduction Resources in Tennessee"

Stuart Keen
Faculty Sponsor: Peter Hossler, Department of Urban Studies

In 2023, there have been over 105,000 overdose-related deaths that have been documented (CDC,2024). In 2022, there have been over 19,000 people who have died from HIV in the US (HIV.gov, 2025). These statistics paint a picture of the urgency of providing resources and treatment for people with substance abuse disorder and HIV. To combat these deaths, resources, and treatment such SSPs (Syringe Service Programs), where people injecting drugs can exchange used needles for clean ones, and ART and PrEp access (antiretroviral therapy) which protect and treat HIV, are vital in communities struggling. With government discourse surrounding providing these resources, my research project aims to explore the resources currently available for Harm Reduction and HIV Prevention in Tennessee and how government decisions impact the resources community members so desperately need. With Tennessee rejecting federal funding for HIV Prevention in 2023, this project highlights the necessity of the resources state and federal government often aim to limit (Health Affairs, 2023). Through this project, I have conducted semi-structured interviews with nonprofit staff and people with lived experience. Through these interviews with nonprofit experts and people with lived experience my project aims to qualitatively assess the current state of resources being provided, are the resources meeting the needs of the population, and how, if any, do government policies play a role in the allocation of these resources.

The Narrative in Medicine

Isabelle Logsdon
Faculty Sponsor: Peter Hossler, Department of Urban Studies

Palliative care (PC) doctors need effective communication strategies for understanding patients' needs and desires about their care. Modern American medicine emphasizes the biomedical model, separating patients from their care needs. Born from Foucault's "medical gaze," the biomedical model causes miscommunication between patient and provider, creating lower patient/provider satisfaction and worse health outcomes (Kaplan, 2003; Engel 1992; Makivić, et. al. 2016). This problem is especially acute in PC where full recovery is deemed impossible. PC doctors must be directed towards tools that draw out how a patient wants to be cared for in their final days to improve satisfaction and health outcomes for all parties involved. Narrative Medicine (NM) coined by Dr. Charon, is one of the most effective frameworks for patient-provider collaboration and facilitating emotional connection (Charon, 2006). Centering narrative theory, narrative medicine encourages PC providers to genuinely engage with their patients' story. Narrative theory suggests that all effective human communication happens through stories. When PC doctors are trained to listen to and interpret patients' stories, health outcomes and patient/provider satisfaction dramatically improve. Literature suggests that NM skills allow

doctors to better collaborate with each other as NM frames conversation about difficult patients and taxing work-life as a collective struggle rather than adversarial relationship. My project will reveal how Memphis PC doctors deal with emotional difficulties in their practice, if PC doctors already use NM in their practice, and if so, how does using NM impact relationships with their patients. Interviews conducted will illuminate PC doctor patient-engagement methods, and how closely those methods do or do not already align with NM. Results from this study should illuminate the healing power of narrative, showing that PC providers utilizing NM soften the burden of death through open communication and collaboration with their patients.

The Effects of ACES on Neurodevelopment and Mental Health: What strategies do we have to minimize them in adolescents of Memphis, Tennessee?

MaCaelan Rahn
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Adverse Childhood Experiences, or ACEs, are traumatic or stressful events ages 0-17. The early years of childhood represent a critical period for brain development, with neurobiological processes such as synaptogenesis, myelination, and the development of neural circuits occurring rapidly (Shonkoff et al., 2012). ACEs can disrupt these processes in the stress response system, genes, and brain structures. The environment that genes are exposed to affects which ones are turned on and off, creating a genetic predisposition to different mental disorders. A groundbreaking study in 2002 showed the correlation between the number of ACEs and negative outcomes in life. *Felitti et al* determined three main categories of ACEs, which include physical and emotional abuse, neglect, and household dysfunction. The focus of this paper is to find specific therapies that focus on adolescents who experience ACEs in Memphis, Tennessee Data will be gathered through peer-reviewed literature analysis of upcoming and current therapies to help adolescents with ACEs. A professional interview will be completed with an individual who has extensive knowledge and personal experience helping children who have experienced ACEs. This project is limited to mental health and neurodevelopmental therapies, while ACEs have negative consequences on all outcomes of life such as physical health, socioeconomic problems, and an increase in risky behaviors. Collected data suggests that trauma-informed cognitive behavior therapy has the most promising results, regarding mental health and further neurodevelopment. Although not completed yet, this project adds to the literature that if left untreated, ACEs are detrimental to mental and physical health, and if left untreated will cause premature death.

Exploring the Feasibility of an Electric Bicycle Rebate in Memphis: Barriers and Pathways Forward

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This paper explores the feasibility challenges and necessary conditions for the implementation of an electric bicycle rebate in Memphis, Tennessee. Crucially, I will frame Memphis as a case study with the aim of offering insights that will inform rebate programs in similar urban contexts which face green transportation challenges. I first will identify the negative externalities of car dependency and autonormativity and show how these impact Memphis, identify the power of the electric bicycle as a car replacement to combat car dependency and autonormativity, and then I will highlight existing electric bicycle rebate programs and demonstrate that they are powerful policy levers to improve traffic safety and lower greenhouse gas emissions. It is a widespread

assumption that electric cars effectively remove the negative externalities of car dependency, and I will demonstrate not only that this is not the case, but also that the electric bicycle is far more effective at achieving this aim. Electric bicycle rebates have been shown to remove barriers for people to purchase electric bicycles and lower their Vehicle Miles Travelled (VMT) in cars. The data will come from qualitative interviews with professionals, policymakers, and advocates from various sectors involved in transportation policymaking or planning in Memphis. Each interview will focus on the feasibility challenges and necessary conditions for the implementation of an electric bicycle rebate in Memphis. There is no existing literature on such a program in Memphis. With this paper, I hope to contribute to the discussion of climate and transportation justice in Memphis and similar cities, and catalyze further research into the implementation of an electric bicycle rebate program in Memphis.

The Role of Property Management vs Ownership Companies in Subsidized Housing

Mischa White

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Many Americans pay over 1/3 of their of their income on rent (Joint Center for Housing Studies of Harvard University, 2019) and more than two million households report having been at risk of being evicted every year (Collinson and Reed, 2018), despite housing playing a fundamental role in shaping various aspects of people's lives, influencing both individual and community outcomes. While housing affordability and stability is a major concern, the role of property management companies in eviction processes remains overlooked, despite their strong influence in shaping tenant outcomes. In previous policy, HUD directly oversaw property management companies and ensured they followed a set of regulations, but now local public housing authorities are in charge of monitoring the local property managers and allocating subsidies (Rockett, 2021). To address the gap, I analyzed eviction rates to compare the influence of property management companies versus owner groups using varying statistical models. I use Memphis, Tennessee, referred to as the "eviction capital of the United States", as my case study due to its rich history with public housing and recent changes in policy that has paused distribution of affordable housing subsidies (Melton-Fant et al., 2022, p. 785). My research can help policymakers develop regulations targeting the practices of property management companies, addressing a previously overlooked driver of evictions, especially given the current changing landscape.

The Local Impact of Pediatrician Shortages in Texas: Investigating the Impact on Rural versus Urban Communities

Suzanne Baxter

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This paper investigates how the pediatrician shortage is impacting local communities in Texas, with a focus on the differences between urban and rural areas. Access to pediatric health care, and pediatricians in particular, are vital to children's development and well-being. This paper contributes to the growing body of literature on health disparities by addressing the gap in understanding how geographic pediatric care disparities manifest in Texas, a state with both large urban and rural populations. Previous research has established that disparities in access exist between rural and urban areas due to geographical and transportation-related barriers. Using qualitative methods, this study involves interviews with parents/guardians in Texas with children. Around half of the interviews will be conducted with families living in an urban area of

Texas (the Dallas-Fort Worth [DFW] metroplex), and the other half with families living in rural areas (outside the DFW metroplex). Interview questions investigate challenges families face in accessing a pediatrician, including geographic barriers, transportation challenges, experiences with providers, and health outcomes. By localizing the national pediatrician shortage to Texas and focusing specifically on urban versus rural differences, this study aims to fill a gap in the literature on the impact of this shortage. This research will contribute to ongoing discussions about health equity, particularly for children, by identifying specific challenges Texas families face when trying to access pediatric health care. Findings may inform future policy efforts to mitigate disparities by identifying specific challenges Texas families face when attempting to access pediatric care.

Food Sovereignty Amongst Young Adults

Annie Bly

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We often take for granted the grueling work that is carrying our bags of groceries from the car to the kitchen in our house. This, however, is not a universal phenomenon. Many have to travel miles just to get to their nearest grocery store, which they cannot afford. Food sovereignty can be defined as the people's right to healthy and culturally appropriate food produced through ecologically sound and sustainable methods and their right to define their own food and agriculture systems. We are no longer self-sustainable in the way we access food; we have traded our gardens in for produce aisles, our homecooked meals for packaged convenience, and food abundance for profit-based controlled systems. Through a qualitative survey, this essay will explore how young adults are affected by this phenomenon, exhibiting their loss of independence, culture, and well-being.

Increased Cervical Cancer Rates Amongst Black Women: What are the driving factors and hesitancy behind declined HPV Vaccination

Shanteise Bonds

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Cervical cancer has been one of the most preventable forms of cancer in America for almost two decades. The Human Papillomavirus (HPV), a sexually transmitted disease from skin-to-skin contact, causes almost all cervical cancer cases globally. The persistence of the infection over time leads to abnormal changes in cells of the cervix. Since 2006, the HPV vaccine is recognized as a breakthrough for cervical cancer prevention in the healthcare community. Despite a national decline in cervical cancer incidence and mortality rates, Black women continue to have a higher mortality rate than White women. Current literature proves that the inequities between these two demographic groups lead to late-stage diagnosis and, ultimately, higher deaths in women of color. Studies further support the revelation that women, who receive the HPV vaccination at a younger age, have a lower cervical cancer incidence rate. This policy content analysis focuses on exploring the underlying social, economic, and cultural factors that contribute to declined HPV vaccination rates and increased cervical cancer mortality in Black women. Through a critical reading of current political dialogue, we unpack the way healthcare mistrust, cultural beliefs, vaccination attitudes, accessibility, and systems shape vaccination hesitancy. These factors, along with hesitancy, create barriers to prevention that leave Black women exposed to a higher risk for cervical cancer. By understanding the experiences of Black women, our research aims to

fill the critical gap in HPV vaccination knowledge and accessibility to guarantee that every woman has the chance to protect herself and right to live a healthy life.

Environmental Health & Education - What Happens When a Landfill Expands Closer to an Elementary School?

Emily Briggs
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The purpose of this research that dives deeper into the question 'How do living conditions impact the education of children affected by residential segregation and disinvestment in Memphis, Tennessee?' is to understand how many young students in the community are not being set up for success. Education is the foundation for your future, and when negative factors such as living conditions stacking up against you, it is hard to excel educationally. Within one's living conditions, pollution, redlining, neighborhood safety, residential segregation, and disinvestment are strong determinates of one's education. In Frayser, a neighborhood in Memphis, Tennessee, there is a landfill near one of its public schools, Whitney Elementary. The landfill company tried to expand its site which meant it would get even closer to the school. Landfills create an abundance of pollution that can be harmful when exposed to people, yet this company is pushing to expand its landfill, with no thought about the lifelong effects they are having on the students and faculty. Looking at pollutants as a larger determinant of educational outcomes and then other aspects such as redlining, neighborhood safety, residential segregation, and disinvestment as leading reasons why this landfill is located in a low-income neighborhood. This would lead me to look at articles, blogs, and other online posts about this situation and the advocating that has occurred to keep this landfill from expanding its site. Reaching out and discussing this problem with those who have and are advocating for the site to not be expanded could be another way I will collect data. With a large focus on exposure to pollution in under-resourced neighborhoods, my research will contribute to the gap in knowledge on how a child's living conditions are a large determinant in their educational outcomes in Memphis, Tennessee

Justice Denied: Addressing the Legal Representation and Eviction Crisis in Memphis, Tennessee–How the Lack of Legal Representation in Housing Court Impacts Eviction Rates and Tenant-Landlord Power Dynamics

Mary Esten Brown
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The right to counsel, or Civil Gideon in eviction court is a critical but often overlooked component of housing justice. This study examines the impact of legal representation for tenants by analyzing existing eviction court watch data and comparative case studies of Baltimore, Maryland and Cleveland, Ohio, both cities that have implemented Civil Gideon legislation. Using a mixed-methods approach–including the analysis of existing court watching data, interviews with housing justice organizations/advocates, and policy analysis–this research assesses how the legal right to counsel affects case outcomes for tenants facing eviction, housing stability, and systemic power dynamics between landlords and tenants. By highlighting disparities in civil legal representation, and their effect on eviction outcomes, this research proves insight into how right-to-counsel programs influence tenant protections and health, housing stability, economic stability, and broader housing inequities. Additionally, this study interprets these findings in the context of legal and social frameworks, considering the potential for Civil Gideon policies to be expanded while noting the potential roadblocks and

counterarguments for nationwide implementation. These findings aim to contribute to ongoing discussions on expanding legal protections for tenants and ensuring fairer eviction proceedings.

Evaluating the Adoption of Local Affordable Housing Strategies Against Displacement in Revitalizing Cities of the Mid-South: A Study of Memphis, Tennessee

Millie Dorman
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As our cities age and face the challenges of disinvestment, neighborhood revitalization becomes an increasing priority. With the reinvestment of funds into these neighborhoods comes gentrification, outpricing the existing residents and displacing them from their communities. This paper examines the case of Memphis, Tennessee, a city experiencing revitalization despite stable population growth, to explore their use of existing affordable housing programs and how local policies address housing affordability to mitigate displacement. The effects of gentrification on neighborhoods and how it contributes to unequal development and economic fragmentation have been extensively studied, but few have analyzed the efforts cities are taking to combat these effects, especially in smaller, southern urban areas. This study examines the efforts Memphis is taking to combat displacement based on their adoption of existing affordable housing plans and a spatial analysis of existing subsidized properties among various levels of gentrification. The findings of this study contribute to understanding how smaller cities can employ affordable housing policies to reduce displacement and promote more equitable urban development.

Menstruation Experience

Jordyn Ebert
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This study adds to the current body of research on the topic of how metals in menstrual products effect our bodies. By gaining some personal stories on how women are effected by different types of menstrual products it allows researchers to start making inferences on what problems these toxins in the products could be causing. The current research doesn't have much about how these metals might effect the body but rather the research just shows which metals have been found. I am interested in learning about what these products have been doing to the bodies of the females who use them and this survey intends to provide some insight of that. The benefits of conducting this research allows women to have a voice and speak their truth on a topic which is often considered 'taboo' and I hope to also bring light and awareness to the topic through this research.

Filling in the Gaps: Memphis Organizations Addressing Maternal Health Inequities

Ella Petit
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Statewide maternal health outcomes are greatly impacted by federal and state level restrictive reproductive rights policies as well as Medicaid's ability to provide accessible care. States such as Tennessee have fallen victim to both the implementation of the overturning of Roe V. Wade, as well as the lack of implantation in federal Medicaid expansion acts such as the Affordable Care Act. Subsequently, Tennessee is ranked as one of the lowest states for positive maternal health outcomes in the United States. This research aims at bridging the gap between the policies at play on the state level as well as local community organization's ability to navigate those policies and provide quality care for their patients in the city of Memphis. Two community-

based organizations were interviewed and then thematically analyzed. The results of this research found valuable information about the models of community organizations aiding maternal health inequities in Memphis. Not only can these findings serve as a blueprint for cities in the United States also facing restrictive state level policies, but it also was able to determine the impacts on access to maternal health of the two organizations analyzed.

Medicalization of Menopause: An Analysis of the Portrayal of Menopause on Pharmaceutical Companies' Websites for Bioidentical Hormones

Adrienne Rivera
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This paper analyzes the relationship between the medicalization of menopause and the portrayal of menopause on pharmaceutical companies' websites for bioidentical hormones. To examine this correlation, I will employ a thorough qualitative content analysis approach to identify patterns, themes, and concepts surrounding the medicalization of menopause on seven pharmaceutical companies' websites. I will then use this information to interpret and derive meaning from these companies' messages. I hypothesize that most of the websites will present a medicalized view of menopause and depict the menopausal experience in a more negative light. Expected results will show that many pharmaceutical company websites indeed promote a medicalized perspective of menopause, emphasizing symptoms and treatment options that underscore necessary medical intervention. Pharmaceutical websites frame menopause within a context of discomfort and health risks, positioning bioidentical hormones as a solution to alleviate this issue. These potential findings suggest that the medicalization of menopause, as reflected in pharmaceutical marketing, may contribute to societal perceptions of menopause as a condition to be managed or treated, rather than a natural life stage. This research highlights the influence of pharmaceutical companies in shaping public understanding and responses to menopause, which could potentially affect women's attitudes toward aging and health.

Adaptive Reuse Impacts in Memphis, TN: Power Dynamics between Surrounding Communities and Developers

Qari Silva
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In this research study, I will be conducting a case study on the adaptive reuse project, Northside Square, in the Klondike neighborhood in Memphis, Tennessee. Even though I will be looking at the adaptive reuse project, it will be focused on the power dynamics between real estate developers and the surrounding neighborhood. Previous studies have shown that there is a lack of community involvement from developers in adaptive reuse projects. If the power dynamics do not change, we see neighborhoods face high rates of gentrification leaving residents displaced. Leaving room for newer, wealthier residents and high property values that are not affordable. In addition to power dynamics, I will also mention the challenges of maintaining abandoned properties, environmental impacts, and economic impact as adaptive reuse has benefits. My hope for this study is to 1) inform the communities and developers that are faced with demolishment to look at the alternative, adaptive reuse and 2) show that developers are open to work with community members, but they are not extremely proactive with the surrounding community to use the development to benefit them.

Balancing Patient Outcomes and Rights: Effective Strategies for Hospital Administrators in Implementing New Data-Driven Healthcare Technologies in Rural and Urban Settings

Caroline Uprichard

Faculty Sponsor: Austin Harrison, Department of Urban Studies

This paper contains research on integrating artificial intelligence (AI) and big data-driven technologies in healthcare, specifically focusing on rural and urban health systems. This study examines the rising influence of technology-driven healthcare on protecting patient data and rights and obstacles within rural and urban hospitals' legal and executive teams. With the growing integration of big data, artificial intelligence, and data analytics, healthcare teams are experiencing transformative changes in their workflows and decision-making processes. To gain deeper insights into how these technologies are reshaping healthcare delivery, interviews were conducted with administrators of one rural and one urban hospital. They focused on their experiences with technological integration in daily operations to conclude differences in healthcare advancements and resources. Semi-structured interviews set the stage for structured discussions exploring emerging themes from the administrator's responses. This study's findings disrupt the standard stereotype of the urban and rural disparity gap, with one hospital providing a blueprint of how rural hospitals can bridge the disparity gap for their patients. The study implies that rural and urban settings affect the quality of care and patient outcomes.

Roadway Redlining: How I-40 Enforces Segregation and Dictates Health Outcomes

Meredith White

Faculty Sponsor: Austin Harrison, Department of Urban Studies

This paper investigates the effect of residential proximity to interstate highways on health outcomes. Racially discriminatory legislation surrounding the construction of interstates across the United States created majority Black neighborhoods in the corridors of many major roadways. These communities became isolated from substantive nutrition due to the proliferation of food swamps and food deserts. Additionally, the disproportionate nearness of Black residents to highways created health disparities related to exposure of pollutants dispersed by car traffic. North Memphis, Tennessee was recreated after the construction of Interstate 40 and currently experiences food insecurity and pollutant exposure. Specifically, Klondike and Smokey City lie on the eastern and western corridor of I-40. I aim to investigate the effects of I-40 on Klondike and Smokey City, analyzing subsequent health outcomes in response to this construction. I conduct a quantitative panel study of community data obtained from National Historical Geographic Information System and the Center for Disease Control – Population Level Analysis and Community Estimates datasets. North Memphis, specifically Census Tracts 19 and 112, have not been critically analyzed regarding economic trends or health outcomes. This paper aims to inform urban planners on more careful construction of future expansive roadways and urges legislators to carefully consider the inevitable negative health outcomes associated with close residential proximity to highways.

Shaping Cities, Shaping Lives: How the Foundations of Memphis’s and Barcelona’s Planning Define their Modern-Day Communities

Claire Wise

Faculty Sponsor: Austin Harrison, Department of Urban Studies

This paper poses the question of what key policy decisions have hindered social and physical connectivity in Memphis, and how can scalable solutions from Barcelona’s urban planning be

adapted to address these challenges? Analyzing the planning foundations of both Barcelona and Memphis leads to their similar struggles with city-wide illnesses; however, while Memphians chose to flee the city, Ildefons Cerdà was producing his superblock plan to decrease the frequency of illnesses. Each city was at a pivotal fork in its history; yet –arguably– Barcelona persevered while Memphis continued to struggle. Barcelona and Memphis both have their modern-day struggles, but the disparities are those that were knowingly created versus accidental. Using ethnography from my journal kept while living in Barcelona, literature, and interviews with Memphis planners and engineers, I hypothesize that I can produce a list of smaller-scale projects or recommendations to improve connectivity in Memphis.

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