

— CELEBRATE THE — LIBERAL ARTS



RHODES SYMPOSIUM
MAY 1, 2026

rhodes.edu/symposium



Rhodes College

MAY 1 EVENTS

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

ACKNOWLEDGEMENTS AND SPECIAL THANKS

- Laura Jacobsen, Department of History
- Elizabeth Houck, Department of International Studies
- Golam Hisham, Rhodes Student Associate
- Office of Marketing and Communications

RHODES SYMPOSIUM PLANNING COMMITTEE

- Rashna Richards, Associate Provost
- Brooke Schedneck, Associate Professor of Religious Studies
- Jacob Sunshine, Assistant Professor of Music
- Greg Vieira, Associate Professor of Physics
- Matt Weeks, Associate Professor of Psychology

RELATED EVENTS

- Rhodes College Venture Challenge: April 30, 5:30 pm, Blount Auditorium
- Lavender Celebration: May 1, 5:00 pm, King Hall

SCHEDULE BY DIVISION

FINE ARTS

TIME	ROOM	SESSION TITLE	DEPT/PROGRAMS
11:00 – 12:00	Hassell 100	Music and Art	Music / Art and Art History
1:00 – 2:00	Tuthill Performance Hall	Songs of Women Recital	Music
2:30 – 3:30	Tuthill Performance Hall	The Cauthen Competition	Music

HUMANITIES

TIME	ROOM	SESSION TITLE	DEPT/PROGRAMS
11:00 – 12:00	Southwestern 206	German	German Studies
11:00 – 1:00	Buckman 200	History	History
12:00 – 12:45	Southwestern LLC	English	English
12:00 – 1:20	Southwestern 210	Chinese Studies	Chinese Studies
1:00 – 1:45	Southwestern LLC	Spanish I	Spanish
1:30 – 2:30	Southwestern 206	Philosophy and Ancient Mediterranean Studies	Philosophy / Ancient Mediterranean Studies
2:00 – 2:45	Southwestern LLC	Spanish II	Spanish
3:00 – 3:45	Southwestern LLC	Spanish III	Spanish
3:30 – 4:30	Orgill, King Hall	Meeman Center for Lifelong Learning Fellowship	Meeman Center for Lifelong Learning

NATURAL SCIENCES

TIME	ROOM	SESSION TITLE	DEPT/PROGRAMS
11:00 – 11:45	Briggs 119	Computer Science and Data Analytics	Computer Science / Data Analytics
12:00 – 12:45	Briggs 119	Computer Science I	Computer Science
1:00 – 1:45	Briggs 119	Computer Science II	Computer Science
12:30 – 1:30	Robertson 110	Chemistry and Biology	Chemistry / Biology
2:00 – 2:45	Briggs 119	Computer Science III	Computer Science

SOCIAL SCIENCES

TIME	ROOM	SESSION TITLE	DEPT/PROGRAMS
11:00 – 11:30	Buckman 105	International Studies	International Studies
11:00 – 11:40	West Campus Education 102	Urban Studies and Ed Studies	Urban Studies / Educational Studies
11:00 – 11:45	Buckman 103	Economics I	Economics
12:00 – 1:00	Buckman 105	Politics and Law	Politics and Law
12:00 – 12:45	Buckman 103	Economics II	Economics
1:00 – 1:45	Buckman 103	Economics III	Economics

INTERDISCIPLINARY

TIME	ROOM	SESSION TITLE	DEPT/PROGRAMS
11:30 – 12:45	Southwestern 208	Media Studies	Media Studies
11:00 – 12:15	Buckman 110	Environmental Studies and Sciences I	ENVS
12:30 – 1:45	Buckman 110	Environmental Studies and Sciences II	ENVS
2:00 – 3:30	Buckman 110	Environmental Studies and Sciences III	ENVS
3:30 – 4:45	Barret 034	Media Studies Showcase	Media Studies

POSTERS

TIME	ROOM	SESSION TITLE	DEPT/PROGRAMS
1:00 – 2:30	BCLC	Poster 1	Multiple Departments
2:45 – 4:15	BCLC	Poster 2	Multiple Departments

TABLE OF CONTENTS

<i>FINE ARTS ORAL SESSIONS</i>	6
Music and Art	6
Songs of Women Recital	7
The Cauthen Competition	7
<i>HUMANITIES ORAL SESSIONS</i>	8
German	8
History	9
English	12
Chinese Studies	13
Spanish I	14
Philosophy and Ancient Mediterranean Studies	15
Spanish II	17
Spanish III	18
Meeman Center for Lifelong Learning Fellowship	19
<i>NATURAL SCIENCES ORAL SESSIONS</i>	22
Computer Science and Data Analytics	22
Computer Science I	23
Computer Science II	24
Chemistry and Biology	25
Computer Science III	27
<i>SOCIAL SCIENCES ORAL SESSIONS</i>	28
International Studies	28
Urban Studies and Ed Studies	29
Economics I	29
Politics and Law	31
Economics II	32
Economics III	33
<i>INTERDISCIPLINARY ORAL SESSIONS</i>	35
Media Studies	35
Environmental Studies and Sciences I	36
Environmental Studies and Sciences II	38
Environmental Studies and Sciences III	39
Media Studies Showcase	41
<i>POSTER SESSION #1</i>	42
<i>POSTER SESSION #2</i>	60

(F) Rhodes Fellowship

FINE ARTS ORAL SESSIONS

Music and Art

11:00 am – 12:00 pm

Hassell 100

Moderator: Carole Blankenship

(F) 11:00 – 11:15 Community Connections Through the Arts at the Refugee Empowerment Program

Grady Bryant, Anna McNeese, Nisse Danforth

Faculty Sponsor: Vanessa Rogers, Music & Lainoff Fellowship; Memphis Refugee Empowerment Program

Through the support of the community-engaged Lainoff fellowship program, three Rhodes College fellowship students have partnered with the Memphis Refugee Empowerment Program (REP) to expand fine arts and music education for children of immigrant and refugee families. At the Refugee Empowerment Program, we created a weekly, in-person music and art club for middle to high school-aged students. This community-engaged fellowship addresses the disparities that many school-aged children face in the greater Memphis area, like the lack of fine arts opportunities during the school day. Our goals have been to teach children to be musically literate and to help them discover how to express themselves both through art and music, as the arts deeply touch communities and shape lives. With the music and art club, we promote the REP's (and Rhodes College's) goals of assisting our community, building ties between different groups, and creating a culture of "Health Equity, Human Flourishing, and Well-Being through the Public Humanities". This presentation will examine the practical successes and hurdles of our fellowship this year, offering insights into the impact of community-based arts education and ways we believe will improve our mission and efforts in the future.

(F) 11:15 – 11:30 Fonts of Inspiration: Vessels in the Voynich Manuscript

Madeleine Magilow

Faculty Sponsor: Victor Coonin, Art History

The mysterious Voynich Manuscript has drawn interest across disciplines for over a century. The medieval work's esoteric illustrations and indecipherable writing currently have no widely accepted explanation, which has determined views of it as a truly unique work of visual art and written language. The many striking features of this manuscript have caused many researchers to largely divorce it from the wider cultural context it was produced within, and thus posit it as a unique object without precedent. Building on last year's presentation, which was centered around the Manuscript's botanical imagery and different artistic hands, I focus on its depictions of vessels and demonstrate their similarities to various forms of art production from the 15th century and prior. This indicates that the Voynich artists drew inspiration from diverse cultural and artistic influences in their depictions of objects in the Manuscript. I encourage a complex view of the Voynich Manuscript's creators, and demonstrate the ways this piece of art is firmly a product of its culture, rather than an anomaly.

11:30 – 12:00 Acknowledging Cross-cultural Music Healing Traditions and the Importance of Cultural Competency in Clinical Music Therapy

Sunni Jo Shelton

Faculty Sponsors: Carole Blankenship, Music; Courtenay Harter, Music; Kailey Lawson, Psychology

Music therapy is a constantly growing, evidence-based approach to healing that uses musical interventions to accomplish client goals in the settings of medicine, psychotherapy, and rehabilitation, among many others. While American music therapy found its start in the mid 20th century on combat veterans, musical healing interventions have been used outside of clinical settings for centuries across various global cultures and traditions. When comparing traditional music healing to clinical music therapy, many parallels are found between the two processes, with some practices being directly traced to cultural traditions. Since there is such an extensive history of traditional musical healing, it is important that American music therapy acknowledges these histories to avoid appropriation and the erasure of cultural contexts from musical practices. It is also necessary for music therapists to be aware of how clients' individual cultural relationships to music influences the applicability and efficacy of music therapy. This paper aims to provide a brief synthesis of traditional musical healing examples and draw similarities between these processes and clinical music therapy, while also providing emphasis and suggestions for cultural competency within clinicians in the field as a whole.

Songs of Women Recital

1:00 pm – 2:00 pm

Tuthill Performance Hall

This recital is a program of songs for voice and piano, featuring works exclusively composed by women. The voice students will perform music that spans classical art songs, contemporary theatre music, and even original works. The performance celebrates not only the musical contributions of women composers but also works that center women's perspectives and lived experiences. The students will be joined by collaborative pianist Dr. Alex Benford. Together, the performers offer an hour of music that honors the creativity, resilience, and brilliance of women in music and storytelling through song.

The Cauthen Competition

2:30 pm – 3:30 pm

Tuthill Performance Hall

The Gladys Cauthen Solo Competition provides students who are taking applied 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 2026-2027 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

German

11:00 am – 12:00 pm

Southwestern 206

Moderator: Nina Morais

11:00 – 11:15 Ich erinnere mich: Germany's Monuments to the Shoah

Molly Butler

Faculty Sponsor: Nina Morais, German Studies

This research partly traces the development of Germany's Erinnerungskultur, or "Remembrance Culture." A recognized term for describing the unique reverence with which Germans treat Shoah education and memory, this ethos has been carefully and lucidly maintained. To best understand this continuity-how, exactly, Germany bound its monstrous past to its present-this research examines certain relevant works of German art and media. Specifically, it examines artworks completed and released during Germany's postwar period: a time during which Germans avoided the simple fact that the Shoah was carried out. Functioning as "little monuments" themselves-touchstones that defiantly and quietly protested Shoah denial as unthinkable-the research relates such artworks to Germany's dedicated Shoah monuments. That is, this research suggests these monuments function as acknowledgements of the country's past and as psycho-physical "barriers": they do not, on physical and mental levels, permit ignorance. Germany's history asserts itself. In this way, not only does Germany acknowledge the Shoah, it also acknowledges that within its past crimes lies part of its identity. Ultimately, the research is guided by this question: what does it mean and do for a country and its people to remember their contexts in full, as they totally-and not selectively-are?

11:15 – 11:30 Cultural and Political Conceptions of Child Welfare: Germany as a Case Study

Hannah Greenway

Faculty Sponsor: Nina Morais, German Studies

German child welfare policy developed in tandem with the country's shifting understandings of family, authority, and social obligations. Ideas about state intervention in private life took shape in the unstable Weimar Republic, were distorted and weaponized under the Nazi Regime, and were later rebuilt in an effort to restore Germany to a democratic society. Not only did these shifts have real policy implication, but they also reshaped cultural assumptions about parental rights, state power, and the meaning of protection. Modern child welfare law reflects the political and social tensions Germany has endured in the past century. Its emphasis on prevention, supportive services, and subsidiarity suggests a system designed to intervene early while remaining cautious of overreach. Rather than treating policy as neutral or purely bureaucratic, examining it through cultural and historical context highlights how collective memory, democratic reconstruction, and long-standing debates about authority continue to structure child welfare practice in Germany today.

11:30 – 11:45 Elke Erb's Poetry: Contemporary German Women Writers and the Challenges of Literary Translation

Erin McTigue

Faculty Sponsor: Nina Morais, German Studies

While twentieth century works of German-speaking female poets such as Nelly Sachs and Ingeborg Bachmann are widely translated, there are still many contemporary women writers who are often ignored in favor of works from male writers. In this capstone essay, I translate a work of contemporary

German poetry from Elke Erb into English. Alongside the translation, I will explore the development of translation and poetry writing techniques over the course of the twentieth century and identify how these techniques have been used to navigate difficult linguistic, rhythmic, and rhetorical differences between the two languages. And in the process of navigating both languages' distinctive idiomatic expressions, I will also explore the greater historical literary context in terms of gender. By placing translation into practice throughout this project, I aim to identify the challenges and nuances of such an exchange between English and German, especially when the form of the work diverges from poetic tradition. This capstone project explores how literary translation can allow English-speaking audiences to access the rich and relevant themes of a German woman writer's contemporary work, and how the history of translation illuminates the impact of such choices on how such literature is received internationally.

11:45 – 12:00 Nietzsche and the Third Reich

Bella Slankard

Faculty Sponsor: Nina Morais, German Studies

The history of Germany is inextricably linked to National Socialism and the Third Reich, as well as German philosophy, such as that of Friedrich Nietzsche. This paper addresses how the National Socialists successfully appropriated Nietzsche's work as a foundational theory despite his documented critiques of Anti-Semitism and Nationalism. While previous research has long identified the role of his sister in the cooption of his work, it often overlooks the broader, state-sponsored mechanisms used to misappropriate Nietzsche's philosophy. This research clarifies the relationship between German history and philosophy, specifically the relationship between Nazi propaganda and Nietzsche's works. This analysis involves close readings of Nietzsche's works to identify specific concepts and themes that the National Socialist regime distorted to support their ideology. The National Socialist appropriation of Friedrich Nietzsche occurred through three main vehicles: literary distortion and selective editing, redefinition of philosophical concepts to align with party ideals, and rebranding that turned an infamous critic of nationalism into a paragon of what it meant to be German during the Third Reich. These findings demonstrate that the Third Reich regime did not innocently misinterpret Nietzsche, but rather engineered a version of his philosophy to function as a political weapon.

History

11:00 am – 1:00 pm

Buckman 200

Moderator: GraceAnne Hodgson

11:00 – 11:15 Love Spells and Fallen Women: The Gendered Transformation of Medieval Magic to Witchcraft

Cate Barclay

Faculty Sponsors: Sarah Ifft Decker, History; Jeffrey Jackson, History

During the early modern witch hunts, thousands of women across Europe were tortured and executed for alleged crimes of witchcraft, yet the roots of these accusations lay in simple love charms that medieval authorities had once treated as ordinary sins. Medieval love magic, including charms, potions, and rituals intended to attract lovers or strengthen marital affection, was practiced by both men and women, as reflected in early confessional manuals and court records. By the fifteenth century, however, female practitioners of such modest, domestic magic were increasingly associated with diabolical pacts and intrinsic female inferiority. As witchcraft was defined as demonic power operating through everyday household practices, women's love magic was recast as a privileged site of diabolical cooperation. Drawing on ecclesiastical court records, necromancy manuals, witchcraft treatises, and literary depictions of love spells, the feminization of witchcraft fused older stereotypes about women's domestic

techniques and spiritual weakness with new anxieties about demonic pacts and the violation of free will. A skilled, male model of demonic magic thus shifted to a feminized domestic model in which women's everyday actions were reimagined as channels of diabolical agency, helping to explain their emergence as primary scapegoats in the early modern witch hunts.

11:15 – 11:30 The Insanity of the System: How Psychiatry Became a Carceral Tool for Black Americans

Daniel Blaich

Faculty Sponsor: Sarah Ifft Decker, History; Charles McKinney, History

Across the twentieth century, American psychiatry increasingly blurred the boundary between treatment and confinement for Black Americans. This paper demonstrates how psychiatric institutions and diagnostic frameworks helped criminalize Black mental illness, transforming spaces of care into mechanisms of racialized control. Drawing on the scholarship of Martin Summers, Jonathan Metzler, and Kira Pumphrey, it situates psychiatric theory within broader histories of racial governance and social discipline. At institutions such as St. Elizabeths Hospital, Black patients were segregated into neglected wards and diagnosed through frameworks rooted in scientific racism. By the 1960s, definitions of schizophrenia shifted dramatically, recasting the illness as one characterized by aggression and hostility—traits increasingly associated with Black men during the era of civil rights protest. These changes reframed political dissent and psychological distress as medical pathology. The paper concludes by showing how deinstitutionalization relocated rather than resolved this dynamic, as prisons and jails emerged as the nation's largest mental health institutions, perpetuating the criminalization of Black psychological suffering.

11:30 – 11:45 The Legacies of Lynching: Ell Persons Historical Site Reimagined

Lily Grace Richey

Faculty Sponsor: Sarah Ifft Decker, History

After spending a semester researching the legacy that lynching has left behind in the Southern United States, our class was tasked with reimagining or redesigning lynching sites in a way that would best facilitate community education, discussion, and commemoration. This paper does so by creating a script for an educational tour of the Ell Persons Lynching Site on Summer Avenue. This script allows audiences to learn about Ell Persons' death, as well as the overall impact that lynching has left on Memphis and on the American South, in a way that goes beyond reading a historical marker or an essay.

11:45 – 12:00 Medieval Intersections Between Love and Politics

Sienna Collier

Faculty Sponsor: Sarah Ifft Decker, History

This paper examines the relationship between political strategy and emotional attachment in medieval and early modern royal marriages. While marital unions in Europe have traditionally been understood as tools for consolidating power, this paper argues that genuine emotional bonds could develop within these politically motivated relationships. Through studies of the marriages of Richard II and Anne of Bohemia, and Henry VII and Elizabeth of York, this paper explores how companionship emerges from alliances originally intended to secure political stability. Contemporary accounts of Richard II's grief following Anne's death, as well as Henry VII's documented admiration for Elizabeth and sorrow at her passing, suggest that emotion did play a meaningful role in these marriages, even if they were built on politics. In contrast, the marriages of Henry VIII, to Catherine of Aragon and subsequently Anne Boleyn, demonstrate the reverse dynamic: a situation in which desire reshaped political strategy. Henry's letters to Anne reveal how the language of love functioned as both emotional expression and political justification for dissolving his first marriage. In all, this paper illustrates that medieval political marriages

cannot be understood solely as strategic alliances, but rather as human relationships in which love and politics were deeply intertwined.

12:00 – 12:15 Resistance, Rebellion, and Realism: Shaping Ostpunk from British Punk

Jason Gray

Faculty Sponsor: Tait Keller, History

Ostpunk, the punk movement that emerged in East Germany and other parts of Eastern Europe, developed from the influence of British punk while adapting to the political realities of life under communist rule. British punk in the 1970s expressed youth frustration with consumerism, unemployment, and social stagnation through provocative music, fashion, and satire. However, its critiques occurred within a society that still allowed space for dissent. Punk culture in East Germany evolved in a far more restrictive environment where the state tightly controlled youth culture, expression, and political activity. Drawing on song lyrics, historical accounts, and scholarship on punk culture, this paper argues that Ostpunk transformed the rebellious ethos of British punk into a more urgent form of political resistance. While British punks used the idea of "no future" metaphorically, East German punks experienced it as a literal condition shaped by surveillance, predetermined life paths, and repression by state institutions such as the Stasi. Through music, fashion, and refusal of conformity, Ostpunks challenged authoritarian control and exposed contradictions within the socialist system, turning punk from a subculture into a form of dissent.

(F) 12:15 – 12:30 English Translation of Pierre Schoendoerffer's *La 317e Section*

GraceAnne Hodgson

Faculty Sponsors: Tait Keller, History; Jeffrey Jackson, History

Through the Ruyl Family Fellowship, I prepared an English translation of Pierre Schoendoerffer's 1963 novel, *La 317e Section (The 317th Platoon)*. Schoendoerffer, a French writer, acclaimed filmmaker, and a veteran of the First Indochina War, used his novels and films to reflect on France's colonial conflicts in Southeast Asia. *La 317e Section* draws on his own experiences during the siege of Dien Bien Phu in 1954. The novel's 1965 film adaptation debuted at the Cannes Film Festival and later inspired American movies on the Vietnam War like *Apocalypse Now* (1979) and *Platoon* (1986). For as much attention as Schoendoerffer's film received, his novel remains largely unknown outside of France because it has never been translated. Support from the Ruyl Family Fellowship allowed me to conduct research on the First Indochina War for writing a new introduction with historical notes for my English version of the novel. Standing in contrast with Hollywood films that typically focus on the absurdity and brutality of the war, a translation of *La 317e Section* is important for offering American audiences a new, more nuanced reflection of their own imperialistic past in Vietnam.

12:30 – 1:00 Sonic Lattices: Sampling as Historiography in Hip-Hop, 1973-1998

Camille Carleton

Faculty Sponsors: Charles Hughes, History; Jacob Sunshine, Music; Charles McKinney, History

My thesis project argues that sampling in hip-hop functions as a form of historiography: a sonic practice that preserves, reinterprets, and transmits Black historical experience. Emerging in the South Bronx in the 1970s amid urban disinvestment, racialized policing, and economic abandonment, hip-hop developed techniques that reworked fragments of earlier Black musical traditions-including blues, funk, soul, and jazz-into new compositions. Sampling therefore operates not only as a musical technology but also as a method of historical narration, linking past and present through the recombination of sound. To analyze this process, the project employs the concept of rupture, drawn from the work of Tricia Rose and James Snead, to describe recurring breaks in Black social and political life produced by slavery's afterlives, segregation, state violence, and mass incarceration. I argue that sampling responds to these ruptures by transforming fragments of earlier recordings into new sonic narratives that document and

reinterpret historical experience. This thesis demonstrates how sampling between the 1970s and 1990s became a practice through which marginalized voices reassemble cultural memory and assert historical agency. In doing so, sampling produces a layered musical archive in which sound operates as both historical record and mode of resistance.

English

12:00 pm – 12:45 pm

Southwestern LLC

Moderator: Stephanie Elsky

12:00 – 12:15 "The Nymph of Ayr": Speculative Nonfiction and Lady Anne Clifford's Performances

Erin McTigue

Faculty Sponsor: Stephanie Elsky, English

In 1610, twenty-year-old Anne Clifford danced in a court performance, a masque called Tethys' Festival, as one of the Queen's nymphs. The name of her character, the "Nymph of Ayr," refers to the river near her birthplace, and the name was given to her by Samuel Daniel, her childhood tutor and the writer of Tethys' Festival. This speculative nonfiction essay investigates how the performance, her character, and the space in which she performed might have reflected her intense legal battle over her estate and her own architectural projects later in life, which outlasted the palace in which she danced. I investigate her relationships with the important figures in her life, such as her child Margaret, Samuel Daniel, and her connections to other women, which are refracted through the lens of theatre and women's writing. Clifford's life is extraordinary because of her resilience and unwillingness to perform to the patriarchal notions of legacy which caused her to be disinherited. In this work of creative nonfiction, I imagine her role in this masque as a part of the historical tapestry Anne Clifford weaves through her memorials, architectural feats, clothing, and diaries.

12:15 – 12:45 "Motherlove was a killer:" Examining Patterns of Violence between Mothers and Children in Toni Morrison's *Beloved*, *Sula*, and *A Mercy*

Laurel Phillips

Faculty Sponsors: Katherine Bassard, English; Gordon Bigelow, English; Marshall Boswell English; Rebecca Tuvel, Philosophy

In her novels *Beloved*, *Sula*, and *A Mercy*, author Toni Morrison invites her audience to consider acts of violence in mother-child relationships as they exist beside and live among expressions of love. Through close readings of these three novels, I identify a pattern of violence between mothers and their children, tracing this pattern as it manifests across generations in the lives of those children and beyond. While each novel attends to its own unique set of questions at a specific moment in US history, each features maternal violence in a way that necessarily probes at our moral intuitions about the justifications of violence, particularly those acts of violence which seem inextricably tied to expressions of love between mothers and their children. In this way, Morrison prompts her audience to question a system of morality which promotes violence as a tool for white oppression, while simultaneously reexamining acts of maternal violence by black women. Through characteristic narrative and stylistic choices, Morrison encourages us to suspend our automatic moral judgements about these women, inviting us instead to understand their violent actions in the context of the violent systems which oppress them and of which they are a product, and even to empathize with them.

Chinese Studies

12:00 pm – 1:20 pm

Southwestern 210

Moderator: Han Li

12:00 – 12:20 "Migration and Memory: An Exploration of Chinese American Identity in Amy Tan's The Joy Luck Club"

Sophie Cracraft

Faculty Sponsor: Han Li, Chinese Studies

Authors often use their writing as a space where personal identity can be explored or actualized, transforming their life experiences into literature that is universally resonant. Amy Tan's 1989 novel *The Joy Luck Club* is a semi-autobiographical account of her relationship with her mother that examines Asian-American identity and the degree to which family can influence self-perception. In *The Joy Luck Club*, four women immigrate from China to San Francisco in hopes of starting a new life, but their attempts to pass down traditional Chinese cultural values to their American-born daughters are met with surprising resistance. This paper offers an analysis of Amy Tan's mythical descriptions of China, language's significance in the text, and interacts with a critique of the novel's self-Orientalism. I recount each mother and daughter's story to trace how Tan's argument unfolds: she simultaneously contends that parental support is powerful and necessary, while also remaining critical of the mutual sacrifice that this Chinese parenting style requires. Finally, I briefly draw on my own experience being the American daughter of a Chinese-speaking mother as a response to *The Joy Luck Club*'s thesis and affirmation of its cultural impact.

12:20 – 12:40 Beef Noodles and Milk Tea: "Traditional" Food, Popular Drink and Taiwan's Global Cultural Symbols

Lydia Gold

Faculty Sponsor: Han Li, Chinese Studies

Taiwan's culinary identity is often represented by two iconic foods: beef noodle soup and bubble tea, which serve as both local staples and global cultural symbols. These everyday Taiwanese foods are embodiments of Taiwan's social and cultural changes in the second half of the 20th century. The first half of the paper explores the formation of the "tradition" of beef noodle soup. After the 1950s, the retreat of the Nationalist Party (KMT) to Taiwan, combined with the American soldiers stationed in Taiwan, contributed to the creation of this Taiwanese culinary staple. The second half examines the rise of bubble tea in the 1980s, a product of Taiwan's rapid urbanization and the rise of youth culture. By the late 1990s, bubble tea had expanded globally, and now, bubble tea shops can be found in all regions of the world. Together, these foods show how Taiwan's cuisine tells a story of cultural blending and growing global visibility.

12:40 – 1:00 China's "Rust Belt"? The Historical Trajectory of Industrial Development in Northeast China

John Seabolt

Faculty Sponsor: Han Li, Chinese Studies

China's Northeast region, formerly known as Manchuria, has experienced many ups and downs in the 20th century. My paper explores the unique development of the Northeast's economy beginning from the early 20th century, looking at how its characteristics gave it such an important role in the development of the Chinese economy. In the early part of the 20th century, Japan's colonization led to industrial and railroad investment into the region, promoting development in the region at the expense of local Chinese

interests. Later, because of its legacy as a Japanese colonial state, its natural resources, and the preservation of its industrial sector after the Chinese Civil War, as the Republic's "Eldest Son," the region played a most significant role during the socialist period of the Chinese economy. My paper will then look into the privatization of the Chinese economy in the 1980s and the effect it had on the Northeast's economic status in China. Finally, I will explore its similarity with the United States' Rust Belt region, with both regions sharing a previous golden age of industrial development and importance, suffering from changing economic conditions, and efforts made to revitalize the area.

1:00 – 1:20 From Public Park to Family Home: The Transformation of Queer Spaces in Taiwanese Cinema (1980s-2020s)

Robin Sullivan

Faculty Sponsor: Han Li, Chinese Studies

Taiwanese queer cinema began with the release of *Outcasts* in 1986, based on Bai Xianyong's novel *Crystal Boys*. Set during Taiwan's martial law period, it depicts the lives of gay men who have been exiled from their homes and forced to gather in a public park. However, as queer rights have expanded in Taiwan, so have the spaces that queer people inhabit in cinema. Using *Outcasts* (1986), *Blue Gate Crossing* (2002), *Who Loved Him First* (2018), and *Marry My Dead Body* (2023), I explore how queer spaces in Taiwanese films have changed over time, from the public park of *Outcast*, high school of *Blue Gate Crossing*, home of *Who Loved Him First*, and the total freedom of movement in *Marry My Dead Body*, a film released after the legalization of gay marriage in Taiwan. As queer acceptance has increased in Taiwan, so too has the variety of spaces that queer people in Taiwanese cinema are allowed to occupy.

Spanish I

1:00 pm – 1:45 pm

Southwestern LLC

Moderator: Catherine Sundt

1:00 – 1:15 Across Genres and Borders: Rediscovering the (Hi)Stories of Lost Children

Emma Henager

Faculty Sponsor: Catherine Sundt, Spanish

Valeria Luiselli is a Mexican American author who employs multiple genres and languages to comment on real-world issues. One of the issues she engages most deeply with is the crisis of migrant children, which reached a critical point in 2014, marked by the arrival and detention of more than eighty thousand undocumented children at the southern border of the United States within a six-month period. Motivated by economic hardship and violence in their countries of origin, these children travel alone and endure numerous hardships along their journeys. Many do not arrive, and their stories are often lost; those who do reach their intended destination frequently continue to experience adversity rather than the “better life” they anticipated. This paper examines how Luiselli employs fiction and nonfiction in both similar and divergent ways to recuperate the histories of immigrant children in her novel *Lost Children Archive* and her essay *Tell Me How It Ends*, arguing that both genres allow for the representation of the cultural, linguistic, and experiential capital these children develop throughout their journeys.

1:15 – 1:30 From One Party Stability to Fragmented Democracy: Evaluating the Consequences of Mexico's Post-PRI Transition

Spencer Kawalek

Faculty Sponsor: Catherine Sundt, Spanish

This paper examines whether Mexico's transition from long-term one-party rule under the Institutional Revolutionary Party (PRI) to competitive electoral democracy produced better or worse outcomes for Mexican society, with particular attention to institutional stability, trends in criminality, and access to essential services. Rather than treating democratization as either a success or failure, the essay argues that the political transition redistributed power without fully consolidating state capacity, generating uneven consequences across different sectors of national life. To explore this argument, the paper combines political theory, empirical research, and Mexican literary analysis. *La muerte de Artemio Cruz* by Carlos Fuentes is used to interpret PRI-era corruption as a centralized and politically managed system in which institutions remained structurally coherent despite ethical compromise. In contrast, *Trabajos del reino* by Yuri Herrera illustrates how weakened institutional authority in the democratic era allowed criminal organizations to function as parallel systems of governance. These literary frameworks are paired with evidence on cartel expansion, instability in medical systems, economic inequality, and social mobility. The paper concludes that while democratization expanded electoral pluralism and public discourse, it also exposed an extensive history of structural weaknesses, particularly in regions where criminal organizations filled the vacuum left by fragmented state authority.

1:30 – 1:45 Comparisons in Thematics and Structure in "Ollantay" and Modern Quechua Oral Tradition (Comparaciones temáticas y estructurales en "Ollantay" y las tradiciones orales de la cultura quechua moderna)

Catherine Tanner

Faculty Sponsor: Catherine Sundt, Spanish

This study examines the relationship between "Ollantay," a Quechua play that was first documented in 18th-century Peru with content origins tracing back to the Incan Empire. Quechua has existed and proliferated without what is conventionally understood as a writing system for most of its history and is closely linked to oral tradition. This means that written copies did not emerge until Spanish colonization, which also offered preliminary translations for Western audiences. Because of the complicated history of the play, there is much debate in other scholarship interpreting and examining the work about its true origins, despite the abundance of evidence pointing to its ties to Incan and Quechua culture. To strengthen this perspective, as well as to offer an underrepresented perspective in this debate from modern oral traditions in Quechua communities, this work interprets and analyzes the content and structure of "Ollantay" alongside those of more recent examples of Quechua storytelling in order to effectively establish the legitimate Quechua-origin of the drama.

Philosophy and Ancient Mediterranean Studies

1:30 pm – 2:30 pm

Southwestern 206

Moderator: Laurel Phillips

1:30 – 1:45 Why Epistemology is Central to the Legal System

Ella Coleman

Faculty Sponsor: Daniel Cullen, Philosophy

Questions about evidence, belief, and justification lie at the heart of the legal system. Legal standards of proof appear to track degrees of probability. For instance, civil liability requires proof by a preponderance of the evidence, often interpreted as showing that a claim is more likely than not. Criminal conviction calls for proof beyond a reasonable doubt, which demands a much higher probability of guilt. Yet proof-paradox cases expose a conflict between probability and proof. Purely statistical evidence can produce high probabilities of guilt while still leaving open a significant possibility that the defendant is innocent. I argue that criminal proof cannot be understood in terms of

probability thresholds alone. Instead, criminal conviction requires evidence that distinguishes guilt from innocence in the defendant's case. I begin by explaining why legal standards of proof are often interpreted probabilistically and why this interpretation appears attractive. I then introduce proof-paradox cases showing how high probability can coexist with unresolved possibilities of innocence. Next, I propose that criminal conviction is justified only when the evidence rules out relevant innocence possibilities and thereby supports knowledge of guilt. Finally, I illustrate the account with cases observed during my internship at the Shelby County District Attorney's Office.

1:45 – 2:00 References to Female Medical Practitioners in Pliny the Elder's Natural History **Willow Blythe**

Faculty Sponsor: Susan Satterfield, Ancient Mediterranean Studies

What we do know about female medical practitioners in ancient Greece and Rome comes primarily from funerary inscriptions and the works of male medical writers. My senior thesis focuses on both, comparing the depiction of women in epitaphs to how they appear in the works of Pliny the Elder, Soranus of Ephesus, and Galen of Pergamon. In this presentation, I will focus on the women mentioned in Pliny the Elder's Natural History. While Pliny was not a doctor, he devotes a number of books of his encyclopedia to cures and remedies from the natural world. He names his sources for this information, some of whom were women. I will explore these references and what they suggest about Pliny's views on female medical practitioners and their cultural context.

2:00 – 2:15 The Promises We Don't Make: A Hybrid Consequentialist-Normative View of Promissory Theory and Our Duty Not to Promise

Laurel Phillips

Faculty Sponsor: Daniel Cullen, Philosophy

Though we might generally think of them as merely expressions and offhanded commitments, promises play an essential role in fostering social and political unions, and have real power in shaping our intimate relationships between friends, family, and community members. In this paper, I consider seriously what makes keeping our promises morally significant and why breaking them is morally impermissible. Through a hybrid consequentialist-normative view of promissory theory, I argue that promises are morally significant insofar as they commit the promisor not to harm others and to honor the moral equality between promisor and promisee. Given the voluntary nature of promises and their unique ability to generate moral obligations, I argue that there are certain kinds of promises which are morally impermissible to make. First, we ought not make promises that harm others, and second, we ought to avoid making promises that we know we will not be able to keep. I conclude by addressing several objections to my argument, and to the practice of making promises more broadly. Ultimately, I argue that the voluntary nature of promises and their ability to generate moral obligations requires us to be intentional about when we make promises and, in some cases, avoid making them at all.

2:15 – 2:30 "It's Just a Joke": Humor and Moral Encroachment

Ella Coleman

Faculty Sponsor: Connor Kianpour, Philosophy

"I was just joking." People often say this to assure listeners they do not fully endorse what they say. If speakers do not fully endorse what they say, it might seem inappropriate to hold them morally accountable for it. Yet this defense sometimes fails, since claiming one was "just joking" is not always enough to escape moral criticism. This paper explains when and why by bringing into conversation two philosophical literatures that have rarely been connected. In philosophy of humor, scholars examine how jokes relate to truth and endorsement. Thomas Wilk argues that jokes communicate shared presuppositions through what he calls "kinda-sorta endorsement," a hedged endorsement that allows speakers to withdraw responsibility by appealing to the joking context. In epistemology, philosophers

have developed the theory of moral encroachment, according to which moral stakes can affect whether a belief is rationally justified. The view I defend explains a common tension in our moral reactions to humor. While joking often provides speakers with plausible deniability, that deniability breaks down when the presuppositions a joke trades on risk wronging others. Moral encroachment therefore helps explain why the defense that one was "just joking" sometimes works -- and why, in other cases, it does not.

Spanish II

2:00 pm – 2:45 pm

Southwestern LLC

Moderator: Catherine Sundt

2:00 – 2:15 Embodied Spaces and Objects in *El cuarto de atrás*

Isabella Boyd

Faculty Sponsor: Catherine Sundt, Spanish

This project centers around Carmen Martín Gaité's semi-autobiographical novel *El cuarto de atrás*, which explores Gaité's memories as a child during Francisco Franco's oppressive dictatorship in Spain through a fluid, surrealist form that blurs the lines between reality, dream, and fantasy. Though disconnected in origin, the book's non-linearity and subversiveness bear similarities to features of *écriture féminine*, a style of embodied writing proposed by feminist theorist Helen Cixous in "The Laugh of the Medusa" that challenges traditional patriarchal literary structures. Furthermore, examining the novel through Cixous's theoretical lens reveals that Gaité does not simply write about feminine subjectivity but embodies it in the text's structural spaces, transforming domestic spaces and objects into somatic extensions of the female body that disrupt the linear phallogocentric order. This argument develops by analyzing the back room itself as a metaphorical womb and Gaité's childhood and adult homes as well as objects within them as reflections of the porous and sensing system of the female body. Further, by applying Cixous's theory to *El cuarto de atrás*, it becomes evident that Gaité turns a site of ideological confinement for women under Franco into a site of production and destabilizes genre boundaries in a manner revolutionary for the time of the novel's publication.

2:15 – 2:30 "Siempre hay algo dentro de la nada": Attachment, Intercultural Communication, and the Complexity of Long-Distance Bonds through the lens of Carmen Laforet's *Nada*

Caroline Hasty

Faculty Sponsor: Catherine Sundt, Spanish

This thesis utilizes the frameworks of attachment theory, along with contemporary studies on intercultural communication, to examine the psychological and literary aspects of emotional attachments formed in cross-cultural contexts. The theoretical outline is based primarily on Manuel Hernández Pacheco's "Apego y psicopatología: la ansiedad y su origen", in combination with foundational attachment theory work by Bowlby, Mikulincer, Shaver, and Panksepp in order to explore how perceived unavailability can cause emotional instability and distress. Alongside the psychological elements, a literary analysis of Carmen Laforet's *Nada* serves to situate the main character Andrea's experience of displacement and emotional ambiguity within the broader theory and its applications. Laforet's work constitutes a literary representation of absence and emotional fragmentation, reflecting the dynamics of longing and internalized loss. By positioning a lived experience within psychological and literary frameworks, the thesis examines how intercultural dynamics can intensify attachment activation, particularly when physical separation or relational ambiguity are also present. Ultimately, this research argues that "nothingness" (la "nada") in both literature and lived experience is rarely

empty, but rather it contains complex emotional histories that shape how an individual experiences love and belonging.

2:30 – 2:45 Who legitimizes culture? Power, Politics, and Cultural Hierarchy in the Spanish-Speaking World

Christopher Timm

Faculty Sponsor: Catherine Sundt, Spanish

This project examines the construction and legitimization of culture within the Spanish-speaking world, arguing that culture is not fixed, but rather a dynamic process of symbolic validation controlled by institutions of power. Centered around the historical and political role of Madrid, the study explores how the city functions as a "symbolic authority" and an "infrastructure of the canon." Incorporating academic institutions, alongside major publishing houses, Madrid acts as a filter that distinguishes "legitimate culture" from all else, often subordinating Latin American expressions of culture. The research incorporates Pierre Bourdieu's concept of cultural capital to analyze how social hierarchies are maintained through "taste" and institutional behaviors. It also employs Quijano and Mignolo's "coloniality of power" to explain the persistent intellectual dependence on the European center. Another portion of the analysis focuses on the "autocritica" (self-criticism) by Mariano Jose de Larra. Drawing on his essay "Vuelva usted mañana," the paper illustrates how systemic inaction and bureaucracy became cultural identifiers that determine the "legitimate" rhythm of Spanish life. Ultimately, the paper demonstrates that the literary realm -from the myth of Don Juan to Larra's criticism- serves as a site of ongoing dispute over who possesses the power to facilitate and rank cultural production.

Spanish III

3:00 pm – 3:45 pm

Southwestern LLC

Moderator: Catherine Sundt

3:00 – 3:15 "An indigenous retelling of the border culture's (hi)story: Continuous change through waves in Gloria Anzaldua's "The Homeland, Aztlan/El otro Mexico"

Olivia Alejandre

Faculty Sponsor: Catherine Sundt, Spanish

The boundary-breaking author Gloria Anzaldua explores border cultures, specifically the US-Mexican border, in *Borderlands/La Frontera: The New Mestiza* and posits them as their own fluctuating entities, as opposed to a land divided. In "The Homeland, Aztlan/El Otro Mexico," the book's first essay, Anzaldua weaves poetry and prose, historical events and familial stories, her own words and the words of others together that reflects the intersectionality of herself and the border consciousness. The theory *agua-cuerpo-territorio* (water-body-territory) (Zaragocin 2018) is used to frame the conceptualizing of the border and its history throughout "The Homeland, Aztlan/El Otro Mexico," as indigenous and cyclical in nature. Through the continuous presence of ocean waves and tides in the diction, form, and movement of the essay, Anzaldua breaks down the colonial understanding of border territories through her an indigenous retelling of the mestiza history as a way of *auto-definicion* (self-definition) that rewrites the collective story and points to the inevitability of change.

3:15 – 3:30 The Feminist Fantastic and Female Identity: A Critique of Patriarchy and Colonialism in Rosario Ferre's "La muñeca menor" and "La bella durmiente"

Suha Aslam

Faculty Sponsor: Catherine Sundt, Spanish

Throughout the twentieth century, many Latin American writers used literature to critique social

inequalities and restrictive gender roles. Puerto Rican writer Rosario Ferre emerges within this context as an important feminist voice whose work reflects the complex political and cultural realities of Puerto Rico. This project examines Ferre's short stories "La muñeca menor" and "La bella durmiente" to explore how she critiques both patriarchal authority and colonial domination. Using the concept of the feminist fantastic, alongside ideas from theorists of the fantastic such as Tzvetan Todorov, as well as feminist theories from feminists such as from Simone de Beauvoir, this study analyzes how fantastical elements challenge traditional representations of women and expose the cultural mechanisms that shape female identity. In Ferre's narratives, the symbolic use of dolls to expose the commodification of women, the transformation of female protagonists as they resist socially imposed roles, and the parallels between patriarchal domination and colonial subjugation reveal how patriarchal structures reduce women to passive roles while simultaneously reflecting Puerto Rico's colonial condition. Ultimately, this analysis demonstrates how Ferre uses the fantastic as a literary strategy to challenge both patriarchal and colonial systems of power while imagining new possibilities for female agency and identity.

3:30 – 3:45 Where Literature and Testimony Meet: Literary Voices and Social Reform in Contemporary Argentina

Audrey Heidbreder

Faculty Sponsor: Catherine Sundt, Spanish

This essay analyzes how Argentine literature has functioned as a reflection of social and political violence and as a catalyst for public awareness and institutional reform. Studying 20th-century violence, from the ideological conflicts preceding the dictatorship to the National Reorganization Process, this essay examines the emergence of hybrid literary forms that combine testimony, investigative journalism, and experimental fiction. Works such as Rodolfo Walsh's *Operacion Masacre* and Alicia Partnoy's *La Escuelita* consolidated testimonial writing as a new archive in the face of state censorship, rehumanizing victims and documenting human rights violations. Subsequently, Luisa Valenzuela's *Aqui Pasan Cosas Raras* and Mariana Enriquez's *Las Cosas Que Perdimos en el Fuego* extended this tradition to the representation of structural and gender-based violence. Through the grotesque, the fantastical, and horror, these narratives contribute to reshaping the social perception of femicide and institutional impunity, contributing to the cultural climate that fueled the *Ni Una Menos* movement, the Micaela Law, and the legalization of abortion in Argentina. Thus, the essay argues that, while politics often influences art, in Argentina testimonial fiction has also shaped politics by transforming horror into collective action.

Meeman Center for Lifelong Learning Fellowship

3:30 pm – 4:30 pm

Orgill, King Hall

Moderators: Karis Chung and Dakota Willey

3:30 – 3:45 Goals and Motivations of Modern Adult Learners

Naisha Chowdhury

Faculty Sponsor: Lori Garner, English

While continuing education is often framed as a tool for professional advancement, adult learners frequently seek out "abstract" or humanities-driven subjects that offer personal enrichment over career utility. This study explores the various motivations of adult learners in Memphis, specifically at the Rhodes College Meeman Center for Lifelong Learning. Using a multicenter survey-based approach, this research examines how factors such as age, career stage, and institutional setting influence course selection and definitions of success. Drawing on the work of Sharan Merriam (2014) regarding the self-directed nature of adult learning and Jack Mezirow's (2000) theory of transformative learning, this study

investigates why professional development offerings see lower engagement at liberal arts institutions compared to reflective, creative programs. Data was collected via an anonymous survey distributed to Meeman Center students from the past two years to identify patterns in how retired learners, mid-career professionals, and creative seekers balance personal growth with professional goals. Understanding these distinct learner profiles allows for more responsive curriculum design. By identifying what draws participants to specific learning spaces, institutions can better foster community and support the specific reflective needs of the modern adult learner.

(F) 3:45 – 4:00 Barriers to Lifelong Learning and Equitable Access

Dana Potter

Faculty Sponsor: Lori Garner, English

Lifelong Learning (LL) has multiple social and cognitive benefits across various aspects of a person's being (Eubank et al., 2022). However, systemic issues such as socioeconomic status and social challenges remain issues of concern (Chin et al., 2024; Parker et al., 2022). Continuing my previous analyses of lifelong learning through psychology, I expand now on the breadth of LL research by addressing some of the pitfalls of accessibility as well as other systemic, and social challenges. Research conducted by Boeren (2017) suggests that socioeconomic challenges limit access to formal settings of LL, which proves to be a problem for equality goals of broadening every individual's cognitive abilities. In addition to this issue, Boeren also finds results that indicate gender differences among those who pursue adult education in formal classroom settings. At the Meeman Center for Lifelong Learning, which offers unique classes that are beneficial socially and cognitively, some of these challenges still impact Meeman students. This project merges my research in the systemic and social challenges of lifelong learning and my observations at the Meeman Center, in order to demonstrate the importance of addressing challenges to accessible lifelong learning and thus ensure more equitable chances for individuals well-being.

(F) 4:00 – 4:15 Lifelong Learning as a Facilitator of Community Health

Kosi Aneji

Faculty Sponsor: Lori Garner, English

This research seeks to explore the ways in which lifelong learning facilitates community health. According to research conducted by neurologist Douglas Scharre (2026), adult education courses offered in college settings benefit older adults by keeping them knowledgeable of information in the digital world, empowering them with skills that can help them serve their communities, providing socialization, and maintaining/improving fine motor skills. His findings, based on data from a program at the Ohio State University, corroborate many of the benefits I have observed at the Rhodes College Meeman Center for Lifelong Learning. Research also shows that learning in community prevents and mitigates many health issues. Most notably, community engagement wards off loneliness, which has recently been recognized as an emerging public health crisis. For an increasing number of students, educational experiences in spaces of higher education serve as a pilot for how they navigate life. The quality and frequency of social engagement throughout one's life are thus crucial for alleviating feelings of loneliness (Azghari et al., 2026). By engaging with their community, students of all ages can facilitate community health (Goodman, Bunnell, Posner 2018).

(F) 4:15 – 4:30 Lifelong Learning to Foster Outreach and Community

LeeAnn Fincher and Jozalyn Houser

Faculty Sponsor: Lori Garner, English

An individual's racial and social identity is the foundation of their understanding of society and self. By looking at racio-social identity development across generations through approaches found in Beverly Tatum's *Why do all the Black Kids sit Together* (2017) alongside models from the field of educational

psychology, such as Bronfenbrenner's Ecological Systems Model and Erikson's Stages of Psychological Development, this presentation provides a framework for recognizing identity within continuing education. Using the Rhodes College Meeman Center for Lifelong Learning as a case study, we outline a pedagogical approach to honoring students' racial and social identities. By bridging theoretical frameworks with real-world applications, this study demonstrates how recognizing students' racial and social identities in instruction can create a more inclusive and effective educational experience. In keeping with our goal of centering learners' identities, we also examine advertising approaches and theories to broaden and strengthen the Meeman Center's community. Through this process, we aim to localize these concepts and outreach approaches we analyze to the Meeman Center while also understanding their applicability to other lifelong learning programs.

NATURAL SCIENCES ORAL SESSIONS

Computer Science and Data Analytics

11:00 am – 11:45 am

Briggs 119

Moderator: Sean Kugele

(F) 11:00 – 11:15 Lynx Lifts Web - A Web-Based Ride Sharing Platform for Rhodes

Lexi Boateng and Aimen Farooq

Faculty Sponsor: Sean Kugele, Computer Science

Many Rhodes students do not have access to cars, and Memphis has limited options for public transportation. As a result, students often rely on expensive ride-sharing services such as Uber and Lyft, frequently traveling alone and limiting their ability to access groceries, internships and social activities. "Lynx Lifts Web" was developed, in conjunction with the Turley Memphis Center and dedicated student stakeholders (including Lexi Boateng), to help address these ongoing transportation issues. It is a campus-based ride coordination platform designed to connect Rhodes student drivers with student passengers in a safe and affordable way. Drivers can accept ride requests based on their availability and service areas while passengers can post ride requests for specific times and destinations. The platform includes messaging, notifications, secure payments and reporting features to maintain a safe user environment. It was built using React, Python and MongoDB.

11:15 – 11:30 Young Voters in the 2024 Presidential Election

Wyatt Mutchler-Lee

Faculty Sponsor: Phil Kirlin, Data Analytics; Casey Shin, Politics and Law

One of the largest contributing factors to the result of the 2024 presidential election was the shift in attitudes among young voters, aged 18-29 years old. When examining changes in voter attitudes from the 2020 to the 2024 presidential election, the 18-29 age group shifted the furthest by far to the politically right. This is particularly notable when considering how the Democratic Party advertised and targeted young people in their presidential campaign. In this project, I examine what factors led to this significant and unexpected change in voter attitudes specifically within young people. By examining these factors, I aim to identify the disconnects that occurred between the Democratic Party's campaign strategies and the topics that actually mattered to young people.

(F) 11:30 – 11:45 Examining the Canonical Babbling Ratio in Early Infant Vocalizations

Adaugo Nwachuku, Aaliyah Flake-Dockery, Edina Bene

Faculty Sponsor: Betsy Sanders, Computer Science; Dr. Tanjala Gipson, UTHSC College of Medicine- Pediatrics- Peds Child Development

Early vocalizations provide important insight into the development of speech and language. One key milestone in this process is the emergence of canonical babbling, characterized by clear consonant-vowel syllables such as "ba" or "da." This presentation examines the Canonical Babbling Ratio (CBR), a measure comparing the number of canonical syllables to the total number of syllables produced by an infant. Through the UT/Rhodes Neuroscience Research Fellowship this summer, I coded and analyzed infant vocalization recordings collected in home environments as part of Dr. Tanjala Gipson's Baby Talk Project. Analyzing these recordings helps reveal patterns in early vocal production and contributes to understanding how infants progress from exploratory vocalizations to speech-like syllables.

Computer Science I

12:00 pm – 12:45 pm

Briggs 119

Moderator: Matt Superdock

12:00 – 12:15 LynxHealth: Simplifying Health Center Scheduling

Cecilia Bailey, Agda Laakso, MacKenzie Roach, Daniel Villamil, and Ava York

Faculty Sponsor: Matt Superdock, Computer Science

LynxHealth is a comprehensive health center scheduling platform designed to streamline appointment management and enhance access to campus healthcare services. The system provides a centralized, web-based interface where students can view real-time availability, schedule appointments, and manage their bookings with ease. By integrating scheduling, provider management, and resource coordination into a single platform, LynxHealth creates a seamless experience for both students and administrative staff. The website offers many key functionalities: viewing available appointments through an interactive calendar interface, booking and modifying appointments with automated conflict validation, managing provider schedules and service offerings, accessing detailed information about healthcare resources, and maintaining secure authentication for both students and administrators. The platform emphasizes clarity, responsiveness, and intuitive navigation to ensure accessibility across devices. LynxHealth is built using Angular for the frontend, FastAPI for the backend API layer, and PostgreSQL for relational database management. The system follows a three-tier architecture consisting of a dynamic client interface, a robust backend handling scheduling logic and data validation, and a structured database ensuring consistency and scalability. Designed with performance, security, and concurrent users in mind, LynxHealth delivers a modern, reliable solution for campus health center scheduling and resource management.

12:15 – 12:30 Bloom Garden: Interactive & Secure Cycle-Tracking

Sarah Taylor, TezJioh Knox, Yesica Trejo, Malik Waters

Faculty Sponsor: Matt Superdock, Computer Science

Bloom is a menstrual cycle-tracking platform designed to provide accurate insights while fostering positive, reflective engagement for users. Unlike many existing cycle-tracking applications, Bloom prioritizes data privacy and security without compromising personalization or user experience. When users first log in, they may enter information about their most recent cycle and average cycle length. However, the platform is intentionally flexible as users are not required to provide this information and can begin using Bloom immediately. To improve prediction accuracy and provide more personalized insights, Bloom encourages consistent tracking through daily check-ins and symptom logging. Bloom also incorporates a gamification layer to support long-term engagement and data consistency. Through milestone tracking, progress visualizations, and streak systems, users receive positive reinforcement for maintaining regular interaction with the platform, which helps improve predictive reliability over time. Built using Python with the Flask framework and a PostgreSQL database, Bloom emphasizes clear visualizations, reliable cycle predictions, and supportive feedback. Ultimately, Bloom aims to help individuals better understand their bodies, recognize patterns over time, and feel more connected to their personal health journey.

12:30 – 12:45 Combet: Turning Friendly Wagers into Community Competition

Sophia Zamora, Abril Unda, and Karen Zheng

Faculty Sponsor: Matt Superdock, Computer Science

Combet is a social betting platform built for real-life friend groups, making everyday wagers organized, trackable, and easy to participate in. Friendly bets happen constantly, whether it is about games,

deadlines, inside jokes, or daily challenges, but they often get lost in group chats or forgotten entirely. Unlike traditional betting platforms that focus on sports and market betting, Combet is centered around closed social circles and friendly wagers using in-app currency ("Combet Coins") and non-monetary wagers. Combet allows users to create bets with other users, create circles and communities, and accept or decline bets, all while keeping the experience social, simple, and fun. Four key functionalities include users can join and create circles and communities, and bet within them, view their home feed showing incoming bets from circles or friends, view the inbox that delivers friend and circle requests, and exchange coins or small non-monetary stakes. Combet is built using TypeScript, using Expo/React Native on the frontend and Express and Node.js on the backend with a PostgreSQL database. The system follows a client-server architecture with the client's side providing a user-friendly interface to make bets and the server's side enabling API logic to the database.

Computer Science II

1:00 pm – 1:45 pm

Briggs 119

Moderator: Matt Superdock

1:00 – 1:15 Timeline Followback Calendar

Megan Bass, Umer Tahir, Trung Mai, and Kadin Harris

Faculty Sponsor: Matt Superdock, Computer Science; Rory A. Pfund, Associate Professor at The University of Tennessee Health Science Center

The Timeline Followback (TLFB) calendar is a structured, retrospective assessment tool widely used to measure patterns of addictive behaviors, particularly among individuals with gambling disorder and alcohol use disorder. We created a web application that implements the TLFB method, in which individuals systematically track their gambling and alcohol-related behaviors over the previous 90 days. Having a digital TLFB calendar provides an easier way to record and manage data while also making it more convenient for researchers. The calendar format incorporates holidays and other significant personal events, which serve as memory cues to enhance recall accuracy and improve the reliability of day-by-day reporting. This project was built using JavaScript, Python, HTML, CSS, Flask, and PostgreSQL.

1:15 – 1:30 CadetLinks

Julia Hutchison, Adaugo Nwachuku, Ellen Ouyang, Camren Stevenson

Faculty Sponsor: Matt Superdock, Computer Science

Air Force Reserve Officers' Training Corps (AFROTC) Detachment 785 currently uses multiple apps to function: Google Drive for most document storage, Google Sheets to track attendance, Canvas for distribution of resources, and GroupMe for announcements. They also lack ways to do many of their operational tasks efficiently, such as the absence of a shared calendar for event planning and sign up. CadetLinks aims to consolidate the core operational functions of Detachment 785 into a single multiplatform app, while also introducing new functionalities, to reduce "app overload" and streamline cadet tasks. CadetLinks is built with ReactNative, Expo, and Firebase for easy database management. With CadetLinks, cadets at Detachment 785 will work more efficiently and leave less room for error, increasing their operational performance.

1:30 – 1:45 RSG Voting System

Trevor Williams, Enoch Ibarra, Oluwaferanmi Bamikole, Zach Johns

Faculty Sponsor: Matt Superdock, Computer Science

RSG-Voting is a campus-wide election management system designed to help stakeholders accurately and efficiently determine election results while reducing human error. Our goal is to create a sustainable tool that can continue to be used beyond our involvement, simplifying the election process for future administrators. The system aggregates multiple ballot CSV files into a single validated dataset, ensuring compatibility before merging to maintain data integrity. It supports standard candidate races as well as additional ballot questions, such as yes/no referenda, and accurately calculates their results. We intentionally aligned our tabulation logic with the voting method currently used by stakeholders to ensure familiarity and reliability. Built using Electron for the user interface and JavaScript for backend processing, the application provides a clean, organized results dashboard that emphasizes clarity and usability.

Chemistry and Biology

12:30 pm – 1:30 pm

Robertson 110

Moderator: Joshua Morris

12:30 – 12:45 Studying the L-DOPA Dioxygenase Substrate Space Through the Synthesis of L-DOPA and DHHCA Analogues

Jennifer D. Bui, Larryn Peterson

Faculty Sponsor: Larryn Peterson, Chemistry

Catechols, an ortho isomer of benzenediols, are characterized by their profoundly stable aromatic ring core. 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. L-DOPA is the primary substrate for L-DOPA dioxygenase enzymatic cleavage; however, the powerful potential applications of this is not well realized. Further, its substrate tolerance has yet to be fully elucidated. Our previous work has shown that 6-substituted dopamine analogues, despite their lack of a carboxylic acid tail, are tolerated as a substrate for L-DOPA dioxygenase. This has motivated the expansion of various catechol analogues substituted at their 6-position. The syntheses of L-DOPA and 3,4-dihydroxyhydrocinnamic acid (DHHCA) analogues substituted with either a bromine, nitrile, or nitro substituent at their 6-position will be discussed here. Analysis of dopamine and DHHCA analogues have shown they are viable substrates for L-DOPA dioxygenase, and performance appears to depend on oxidation potentials, pKa, and substrate size relative to active site. While DHHCA analogue synthesis has been completed, the synthesis of L-DOPA analogues presented synthetic challenges and is still ongoing. This work provides key insights into the promiscuity and chemistry of L-DOPA dioxygenase that can be harnessed for further applications.

12:45 – 1:00 Novel Synthesis of 6-chlorodopamine and 6-bromodopamine as Probes to Investigate the Activity of L-DOPA Dioxygenase

Lilia F. Fernatt, Connor M. Bronze, Alex B. LeBlanc

Faculty Sponsor: Larryn Peterson, Chemistry

The synthesis of dopamine derivatives has been vital to better understanding the mechanism and substrate selectivity of L-3,4-dihydroxyphenylalanine (L-DOPA) dioxygenase. The discovery that dopamine functions as a substrate for L-DOPA dioxygenase allows us to further investigate the binding preferences of the enzyme. The synthesis of these analogues allows us to determine the enzyme's ability to break down specific substrates and structural preferences of the enzyme, which may allow the development of novel therapeutics and bioremediation. The project specializes in creating 6-chlorodopamine and novel scheme for 6-bromodopamine. A scheme has been executed beginning with an acetylation of the commercially available 3,4-dimethoxyphenylamine. A more efficient scheme

where the starting material is instead first reacted with Boc anhydride was also investigated. Thin layer chromatography and ^1H and ^{13}C NMR spectroscopy were used to confirm the synthesis and purity of the compounds. The new scheme has the potential to increase yields and efficiency by reducing the quantity of reactions necessary, allowing further exploration of dopamine derivatives. The synthesis of these analogues supplements our understanding of L-DOPA dioxygenase.

(F) 1:00 – 1:15 Positional Deviations in Pediatric Cancer Patients Receiving Image-Guided Extracranial Proton Therapy

Kate Hazelwood, Jinsoo Uh, Chia-ho Hua

Faculty Sponsor: Mary Miller, Biology; Dr. Chia-ho Hua, St. Jude Department of Radiation Oncology and Dr. Jinsoo Uh, St. Jude Department of Radiation Oncology

Accurate patient positioning is essential in pediatric proton therapy, where small setup deviations can compromise target coverage and increase dose to healthy tissues. To verify positional accuracy and identify opportunities for workflow improvement, this prospective study analyzed positional deviations in pediatric patients with extracranial tumors who received image-guided proton therapy. Between 2020 and 2024, 124 pediatric patients (median age, 10 years; 52% under anesthesia) were enrolled under an institutional research imaging protocol. Daily cone-beam CT (CBCT) was acquired for image-guided setup corrections, followed by post-correction CBCT to quantify residual positional deviations. Weekly post-treatment CBCT assessed intrafraction motion. In 34 patients, paired orthogonal radiographs and CBCT were obtained once per course. CBCT-guided correction reduced mean positional deviations from 6.5 mm (pre-correction) to 1.2 mm (residual) across treatment sites. However, intrafractional motion varied by site and patient condition. Awake patients exhibited larger deviations than anesthetized patients, particularly for thoracic, abdominal, and pelvic sites, where 95th-percentile post-treatment deviations exceeded 5 mm. In the paired-imaging subgroup, radiograph-based corrections differed from CBCT-derived corrections by >1 mm in 35% of cases. CBCT-based image guidance improves accuracy in extracranial proton therapy. These findings support site- and patient-specific workflow refinements and enhanced immobilization strategies to mitigate positional deviations.

1:15 – 1:30 Synthesis and potential of 6-nitrodopamine and 6-cyanodopamine as potentiating chronotropic regulators of the heart, independent of MAO inhibition

Joshua Morris, Gilberto De Nucci, & Larryn Peterson

Faculty Sponsor: Larryn Peterson, Chemistry

Dopamine has a multitude of biological and physiological implications, and 6-substituted analogues have proven useful in elucidating these mechanisms. Both 6-nitrodopamine and 6-cyanodopamine have been detected in vivo in rats, and further research has highlighted their roles as positive inotropic and chronotropic agents in the heart. Moreover, this effect is stronger than that of classical catecholamines such as dopamine, adrenaline, and noradrenaline. Notably, these actions are likely independent of their potential as monoamine oxidase inhibitors, an enzyme known to be overactive in Parkinson's disease. Here, the syntheses of 6-nitrodopamine and 6-cyanodopamine were accomplished, respectively, through a one-step reaction giving a 60.6% yield and a six-step synthesis with a 25.5% overall yield. Various techniques have been honed and adapted to maximize the return of these syntheses. Once completed, the dopamine derivatives, among others, are fully characterized and sent to collaborators to deepen understanding of these biological mechanisms and serve as standards to quantify their natural occurrence in the body. The syntheses and relevant biochemical properties of these potent compounds will be discussed as well as various problem-solving fixes to inadvertent complications along this process.

Computer Science III

2:00 pm – 2:45 pm

Briggs 119

Moderator: Matt Superdock

2:00 – 2:15 Focus Flow: An Accessibility Dashboard

Lizzy Cronin, Riley Schutt, Jordan Henderson

Faculty Sponsor: Matt Superdock, Computer Science

Focus Flow is an accessibility dashboard designed to help students, especially those with learning disabilities, better manage and understand their assignments. The platform allows students to import assignments and use features such as text-to-speech, automatic summarization, and step-by-step breakdowns of complex instructions. A built-in library stores generated audio files and assignment materials for easy access, while an integrated calendar helps students organize deadlines and plan their workload ahead of time. By simplifying instructions and organizing tasks into manageable steps, Focus Flow reduces the stress of keeping track of coursework and helps students stay focused, confident, and on schedule throughout the semester.

2:15 – 2:30 Chomped: A Community-Driven Restaurant Discovery App

Max Gorman, Jack Seigerman, Paul Fridman, and Allen Osoinach

Faculty Sponsor: Matt Superdock, Computer Science

Chomped is a restaurant discovery platform designed to provide users with more meaningful recommendations rather than traditional review and map services. While existing platforms often prioritize sponsored listings or aggregate ratings that blur important distinctions, Chomped emphasizes detailed, user-created feedback to help people find restaurants that match their specific preferences. Instead of relying on a single rating, users evaluate restaurants across multiple variables including food quality, service, and overall experience. Beyond general restaurant reviews, Chomped enables users to review individual menu items, providing deeper insight into what a restaurant does best. This item feedback allows users to discover standout dishes while also encouraging exploration of new foods and restaurants that may otherwise be overlooked in a traditional system. The platform also incorporates user profiles and social features that allow individuals to share their favorite meals, track the dishes they have tried, and engage with the recommendations of friends and users nearby. By focusing on transparent, community-driven reviews and detailed feedback about both restaurants and their menus, Chomped aims to create a more reliable and engaging way for users to share their desire to discover great food.

2:30 – 2:45 RhOKPY: A Grading Platform for Jupyter Notebook Projects

Golam Hisham, Muhammad Aleem Azhar, Suh Joon Kim, Colin Farley, Aidan Lonien

Faculty Sponsor: Matt Superdock, Computer Science

RhOKPY is a grading software for Jupyter Notebook based projects. It is intended to be used primarily for intro level computer science, COMP 141, though has the capability of being used for any class. RhOKPY is fully OneLogin integrated, meaning students no longer need to make a new account just for one class. It's also fully synchronized with Canvas, allowing professors to grade assignments in RhOKPY's code-friendly interface without having to regrade the assignment in Canvas. Additionally RhOKPY features an embedded Jupyter node, allowing for easy coding for any users. RhOKPY prioritizes ease-of-use, making the general workflow easier for students and professors alike. RhOKPY is a custom modification to UC Berkeley's OKPY software. OKPY is outdated and not being maintained, RhOKPY seeks to provide a streamlined version of the OKPY service.

SOCIAL SCIENCES ORAL SESSIONS

International Studies

11:00 am – 11:30 am

Buckman 105

Moderator: Victoria Hibbs

(F) 11:00 – 11:15 Policing Borders, Abandoning Rights: The Human Cost of EU Frontier Policy and Civil Society's Response

Abena Afrakomah Afriyie

Faculty Sponsor: Amy Risley, International Studies; Dr. Victor Tricot, Academic Director Spain: Social Movements, Democracy, and Cultural Identity, School for International Training

This research examines the human rights consequences of recent shifts in the European Union and Spain's immigration policies, which prioritize deterrence, externalization, and securitization over human rights protection. These policies, framed as measures to reduce irregular migration, include outsourcing border control to third countries such as Libya and Morocco and criminalizing organizations engaged in search and rescue operations. By transferring border enforcement to states with weak human rights frameworks, European nations offload their care responsibilities. These strategies push migrants into perilous transit routes, where they face heightened risks of violence, deprivation, and exploitation. Drawing from a comprehensive literature review, expert interviews, and peer-reviewed sources, this study analyzes the externalization and criminology frameworks embedded in the upcoming EU Pact on Migration and Asylum. It also examines the allocation of development aid for border control and the creation of "shadow borders" that extend European enforcement beyond its physical boundaries. The research highlights civil society organizations as whistleblowers, challenging narratives that dehumanize migrants from the Global South and exposing the dissonance between the Union's professed humanitarian values and its border practices. The findings underscore the need to reevaluate EU migration policies to prioritize human rights, address root causes, and foster equitable global partnerships.

11:15 – 11:30 A Smile and a Gun Will Take You Far: Explaining the Transnational Reach of Organized Crime Groups

Victoria Hibbs

Faculty Sponsor: Esen Kirdis, International Studies

What factors explain the varying transnational reach of organized crime groups (OCGs)? Why do some OCGs, such as the Almighty Latin Kings and Queens Nation (ALKQN), operate solely in the US, while the Russian Mafia operates in multiple countries worldwide? This study will examine three factors that, when combined, can explain why some OCGs expand transnationally while others do not. These three factors are the politicization of OCGs, state capacity, and regional opportunities. A high politicization of OCGs, low state capacity, and high regional opportunities, combined, explain why some OCGs have high transnational reach, as studied through the case of the Russian Mafia. The contrary is also proved true through the study of the ALKQN by their low politicization, high state capacity, and low regional opportunities. Russia and the United States are both world superpowers with strong economies and state systems; however, OCGs originating in each country differ greatly. This study will use Social Movement Theory to enhance the argument of how and why some OCGs can expand while others cannot, through finding that OCGs expand their transnational reach when they take advantage of regional opportunities, have a high politicization, and weak state capacity to respond to them.

Urban Studies and Ed Studies

11:00 am – 11:40 am

West Campus Education 102

Moderator: Laura Kelly

11:00 – 11:20 The Power of Pain Narratives on Reproductive Decision-Making

Ainsley C. Hay

Faculty Sponsor: Peter Hossler, Urban Studies

After a long history of women's pain in healthcare settings being ignored or dismissed, women are turning to social media to share their pain narratives on commonly painful procedures, like intrauterine devices (IUDs). These narratives are gaining traction at a moment when reproductive rights in the United States are increasingly restricted, raising questions about how fear of unmanaged pain during IUD insertion may influence contraceptive decision-making. This study examines the extent to which online pain narratives shape women's perceptions of IUDs and their willingness to pursue this form of contraception, as well as how these fears intersect with anxieties about limited reproductive autonomy. Using a mixed-methods approach, this research combines qualitative semi-structured interviews with quantitative survey data to capture both the prevalence of these concerns and the lived experiences that give rise to them. This triangulated design provides a more comprehensive understanding of how exposure to online pain stories influence women's contraceptive choices, while also exploring political reproductive decisions in a way that prior research has not covered. Findings from this research make clear that believing and adequately treating women's pain is essential for ensuring that all contraceptive options remain safe and free of fear.

11:20 – 11:40 Prager Who? An Analysis of Conservative Educational Content

Olivia Mack

Faculty Sponsor: Laura Kelly, Educational Studies

This study examines how the Black history content produced by PragerU operates as conservative educational material in K-12 schools. PragerU is a conservative nonprofit media organization that produces short videos promoting "traditional American values," many of which are distributed to schools through its PragerU Kids platform. Using document and discourse analysis, I analyze three PragerU videos on Frederick Douglass, Ida B. Wells, and Booker T. Washington, alongside key texts from The Heritage Foundation, including The Critical Classroom and Project 2025. Grounded in Critical Race Theory and the concept of Hidden Curriculum, this project asks what "traditional American values" mean within PragerU's educational content. The study responds to ongoing debates about curriculum politics and growing efforts by conservative advocacy groups to reshape how race and U.S. history are taught in schools. I argue that PragerU presents Black history through a colorblind, meritocratic lens that downplays slavery, racism, segregation, and systemic inequality. Rather than highlighting how Black historical figures navigated and resisted structural oppression, the content reframes their lives as evidence that individual hard work and good choices alone lead to success.

Economics I

11:00 am – 11:45 pm

Buckman 103

Moderator: Jaqueline Oliveira

11:00 – 11:15 Does Policy Design Matter? Advertising Restrictions and Arrest Rates Under Marijuana Legalization

Abby MacLean

Faculty Sponsor: Jaqueline Oliveira, Economics

I examine the effect of recreational marijuana legalization on arrest rates in the United States and how state-specific advertising restrictions shape this effect. While previous research has explored the general effects of legalization on crime rates, the role of specific regulatory policies remains unexamined. I will address this gap. First, I use a two-way fixed effects model to estimate the overall impact of legalization on crime rates. Next, I assess how state-by-state advertising restrictions shape the effect of legalization on arrest rates. The analysis relies on agency-level crime data from the FBI's Uniform Crime Reports (UCR) from 2009 to 2022 and policy data from the Network for Public Health Law. This methodology allows me to investigate the social costs and benefits of recreational marijuana legalization, and how they can be mitigated or enhanced with policy making. I find an overall statistically significant increase in disorderly conduct rates and a decrease in non-marijuana drug offense rates following legalization. These findings suggest, on average, that legalization may lead to an increase in public disorder, but that other illicit drug use may decrease. States with more strict advertising restrictions experienced a smaller legalization effect.

11:15 – 11:30 The Impact of the xAI Colossus Data Center on Housing Prices in Memphis, TN

Astrid Balink

Faculty Sponsor: Jaqueline Oliveira, Economics

Using the construction of the xAI facility in Memphis, commonly referred to as Colossus, I analyze the effect of this AI supercomputer on housing prices in the greater Memphis area. Given the speed at which the facility was built, it provides an early look at the potential benefits and drawbacks of data centers that power Artificial Intelligence (AI). These competing environmental and economic impacts of the facility provide the motivation for my research. I hypothesize that the Colossus facility will suppress housing prices, particularly for homes closer to the facility that experience higher levels of pollution from the natural gas turbines that power it. Using a difference-in-differences model with well-defined distance bands for each housing distance, I run my regression with data from the Assessor of Property of Shelby County, spanning from January 1, 2023 to May 1, 2025. Using houses further than 25 miles from the facility as a reference group, my results show a significant and negative impact for houses within 3 miles of the facility, suggesting that after the announcement, homes within 3 miles experienced a 22.1% decrease in prices relative to the pre-treatment period compared to homes beyond 25 miles. This impact is not seen uniformly across housing markets further away; results for houses between 3 and 12 miles show an insignificant but positive impact of the facility, possibly explained by the increase in job opportunity for residents in areas that might not experience an environmental impact from the facility.

11:30 – 11:45 The Effects of Generative AI on Labor

Ben Eagleton

Faculty Sponsor: Jaqueline Oliveira, Economics

With the introduction of Computerized Large Language Models, many firms have integrated these agents into their infrastructure, since the commercial introduction of these GPT's in late 2022. This study estimates the effects of this implementation on workers' wages and employment status by using a difference-in-differences technique, with occupations more exposed than median to AI as treatment and less exposed as control. Wages are expected to increase and employment is expected to decrease amongst workers in exposed industries because AI models simultaneously augment and replace workers, both boosting productivity and value added for existing workers, while lowering firm needs for workers that can be replaced. Though high-exposure workers are correlated with higher wages, results show there are no significant differences in wages after the introduction of AI. Employment results show a

decrease of employment probability for high-exposure workers after AI, but these must be carefully interpreted given a weak parallel trends assumption.

Politics and Law

12:00 pm – 1:00 pm

Buckman 105

Moderator: Marina deCordre

12:00 – 12:15 Pre- and Post-Tea Party Influence in the GOP: A Comparison of the 2010 Contract from America and the 2008 and 2012 Republican Platforms

Abena Afrakomah Afriyie

Faculty Sponsor: Erin Dolgoy, Politics and Law

This study identifies which ideological elements of the Tea Party Movement's 2010 Contract from America appear most prominently in the 2012 Republican platform. It asks: How did the Tea Party's policy agenda and rhetorical framing shape the issue conceptualization and ideology of the 2012 Republican Party platform? Using comparative content analysis of the Tea Party Movement's Contract from America (2010), coding 2008 and 2012 Republican Party platforms for key concepts derived from the policy pillars of the Contract from America, I assess the coverage of key Contract themes and interpret the changes over time, between the 2008 and 2012 platforms. The findings suggest the Tea Party's Contract from America had a moderate impact on the 2012 Republican Platform's issue coverage. Although the Contract's ten policy pillars were present in the 2008 platform, the GOP's fusion with the Tea Party did not result in greater coverage of these issues. Specifically, the convergence suggests that the Tea Party may have had a less significant role in shaping the 2012 platform and influencing internal ideological shifts than is commonly suggested.

12:15 – 12:30 The Shadow Docket: Implications of Power on a Partisanly Poisoned Court

Marina deCordre

Faculty Sponsor: Erin Dolgoy, Politics and Law

This paper examines the United States Supreme Court's increased use of the emergency 'shadow docket' in the 21st century. It examines competing narratives about the constitutionality of the shadow docket through the views of Justice Sonia Sotomayor and Justice Samuel Alito, who have served on the Supreme Court since 2009 and 2006, respectively. Their competing opinions reflect growing ideological polarization within the Court and suggest the shadow docket has evolved into a tool through which policy is advanced without the traditional merits process. Historically, the shadow docket addressed urgent procedural matters and emergency applications. However, scholars argue it has been used to adjudicate politically salient disputes pertaining to constitutional rights without full briefing or signed opinions. Combining Martin-Quinn ideological scores and analyses of the Supreme Court Database, this study analyzes research showing that approximately 76% of emergency applications produced conservative-aligned outcomes as judicial blocs align with partisan-appointed preferences. This is drastically incomparable to the merits docket. Justice Sotomayor criticizes this as a dangerous increase in judicial power lacking transparency, while Justice Alito defends the shadow docket as constitutionally necessary and brutally targeted. These competing perspectives raise concerns of constitutional abuse of constitutional power as the court becomes partisanly poisoned.

12:30 – 12:45 Split Ticket Voting and Modern Polarization

Emma Taylor

Faculty Sponsor: Erin Dolgoy, Politics and Law

Polarization is defined as the division of a large group into two contrasting groups with strong, unwavering belief systems. The following paper is about the fact that polarization, rather than a division that drives voters deeply into two different sides, is instead a situation so intense that some voters are wanting to stray away from feeling as if they have to be categorized into certain groups, which can lead to split-ticket voting. This paper examines voter data from North Carolina, Oklahoma, and Virginia between the years of 2016-2024 to see how many voters were using either the split-ticket voting method, which is the use of a ballot to vote for multiple different parties, or the "under-vote" method, which is when a voter skips an election category on their ballot but still votes on other sections. The research results reflect that not only are voters splitting their tickets between the two major parties, but some voters are also leaving election categories blank on their ballots. This research can help political scientists understand the differences in how voters express their opinions on political issues and candidates, and how parties can restructure their argument to capture more support.

12:45 – 1:00 Polarization and Technocratic Framing in U.S. Cybersecurity Policy (2015-2024)

Margaret Wakefield

Faculty Sponsor: Erin Dolgoy, Politics and Law

This study examines polarization in U.S. congressional cybersecurity policymaking from 2015 to 2024, a period marked by growing threat recognition but slow and inconsistent legislative progress. Drawing on ten major cybersecurity bills, five enacted and five failed, the paper combines quantitative and qualitative analysis to assess both partisan voting trends and rhetorical framing. Using NVivo 14, bill texts were coded across five linguistic frames: adversarial, civil liberties, collaborative, punitive, and risk/compliance. The results reveal that cybersecurity discourse is largely bipartisan and technocratic, centered on technical expertise, compliance frameworks, and procedural management rather than ideological conflict. Polarization, however, emerges structurally - through jurisdictional overlap, fragmented committee authority, and competing institutional priorities. While Democrats show a relative emphasis on civil liberties and oversight and Republicans lean toward punitive and deterrence-based framing, these rhetorical differences are marginal compared to the procedural and institutional divides that shape legislative outcomes. This paper ultimately argues that cybersecurity polarization is not a product of language, but of Congress's institutional and cognitive fragmentation, which produces a paradox of bipartisan consensus in rhetoric alongside persistent partisan gridlock in implementation. These findings have implications for how scholars and policymakers diagnose and address legislative dysfunction in national security domains.

Economics II

12:00 pm – 12:45 pm

Buckman 103

Moderator: Jaqueline Oliveira

12:00 – 12:15 Tariff Announcements and Stock Market Returns

Zach Gilmore

Faculty Sponsor: Jaqueline Oliveira, Economics

This paper examines the impact of tariff announcements on U.S. stock market returns across trade-exposed versus insulated sectors. The data consists of historical stock price panel data from Stooq for 180 U.S. technology and real estate firms, combined with 13 tariff announcement dates from the Peterson Institute for International Economics and the Harvard Pricing Lab Tariff Tracker over the dates January 20, 2017, to February 27, 2026. Using a stacked event study, the results show that tariff announcements are associated with weaker stock returns, with technology firms generally experiencing larger negative returns than real estate firms within the specified event windows. In the more controlled

model specification, the results point to a delayed negative response for the technology sector in the days after the tariff announcement rather than an immediate effect on day 0.

12:15 – 12:30 Medium Matters: The Gender Price Gap Across Different Artwork Media

Caroline Johnson

Faculty Sponsor: Jaqueline Oliveira, Economics

Do artworks by female artists sell for less than equivalent works by male artists and does the magnitude of the gap depend on what kind of artistic medium it is? This paper investigates whether a gender price gap exists in the fine art auction market, and whether that gap is larger in some artistic media than others. Using sale records from Christie's Art Auction House, the world's largest auction house, I analyze lot-level sale data from US live auctions. I apply this to a hedonic regression model, a method that isolates the effect of characteristics, here, artist gender and artwork medium, on price while holding all other observable factors constant, including artwork size, date of creation, and date of sale. My focus is specifically on photography, painting, and sculpture, and testing whether the realized price gap is smaller for photography, where works tend to follow more standardized formats that make quality easier to assess, compared to paintings and sculptures, where greater material variation leaves more room for subjective and potentially biased judgment. Preliminary results demonstrate a gender price gap at Christie's, but contrary to the quality uncertainty theory, photography emerges as the medium with the largest penalty for female artists, while female painters command a premium over male painters once medium and size are held constant.

12:30 – 12:45 Altitude and Home Court Advantage in NCAA Division I Basketball

Drishti Bhatia

Faculty Sponsor: Jaqueline Oliveira, Economics

Home court advantage is a persistent feature of collegiate basketball, yet the mechanisms driving its magnitude remain debated. This paper examines how both social and environmental factors—specifically crowd density and elevation differences—affect individual player performance. Using player-level panel data from all Mountain West Conference games between 2013 and 2020, this paper estimates nested fixed-effects regression models with player and game fixed effects. Player performance is measured using Player Efficiency Rating (PER), a composite metric capturing overall per-minute productivity. The Mountain West provides substantial elevation variation (80 to 7,196 feet), allowing for analysis of moderate altitude differences within a single conference. The results show that elevation differences do not have a consistent or robust effect on player performance across specifications. In contrast, crowd density has a strong and statistically significant impact: higher crowd density reduces performance for away players, while home players are partially insulated from these effects. These findings suggest that psychological and social factors associated with crowd presence play a more important role than environmental conditions such as altitude in determining player performance. This paper contributes to the economic literature on home court advantage by providing player-level evidence that distinguishes between social and environmental mechanisms.

Economics III

1:00 pm – 1:45 pm

Buckman 103

Moderator: Jaqueline Oliveira

1:00 – 1:15 Examining the Effect of Income Tax on NHL Players' Decision to Sign with a Team

Lucy Fornetti

Faculty Sponsor: Jaqueline Oliveira, Economics

This project examines the effect of state and provincial income tax rates on the signing decisions of National Hockey League (NHL) unrestricted free agents (UFAs) during the salary-cap era (2005–2023). Because the NHL salary cap limits teams' ability to offset tax burden costs with higher salaries, the variation in top marginal income tax rates across team locations can account for a meaningful difference in players' after-tax earnings. Using an alternative-specific conditional logit model where each free agency event generates a choice set of all thirty-three NHL teams, I estimate the effect of the destination's tax rate on the probability that a player signs there, controlling for player age, position, nationality, draft status, and destination-specific intercepts, GDP growth rate, and liberal governments. The choice set was expanded from player-signing events scraped from the NHL Statistics API and then matched with tax data drawn from the Tax Foundation (U.S. states) and Canada Revenue Agency (Canadian provinces). Preliminary results indicate that the destination tax rate coefficient is positive but statistically insignificant, while the origin-team indicator is large and highly significant, suggesting that the tendency to re-sign with one's current team overwhelmingly dominates the free agent decision. These findings do not support the hypothesis that higher destination tax rates reduce signing probability, though future models may reveal important tax sensitivity relative to other controls.

1:15 – 1:30 Heterogeneous Effects of Changes in the Federal Funds Rate on "Enthusiast" Car Auction Prices

Harrison Stewart

Faculty Sponsor: Jaqueline Oliveira, Economics

Do changes in the federal funds rate causally affect enthusiast car prices at auction, and does this effect differ across price segments? To answer this question, I gathered auction data from carsandbids.com and bringatrailer.com from July 2020 to February 2026. Using this data, coupled with records of the Effective Federal Funds Rate, I utilize k-means clustering to group cars into natural price segments and run quantile OLS regressions to both estimate the overall relationship between the federal funds rate and price and to look for heterogeneity in this relationship. I find a relationship that is both economically and statistically significant when the data is formatted as a panel or repeated cross-sectional. Additionally, there is significant heterogeneity in this effect across different price clusters, with the magnitude increasing as the price of the car increases.

1:30 – 1:45 The Sound of Death: Effect of Death on a Music Artist's Salience

Kai Virani

Faculty Sponsor: Jaqueline Oliveira, Economics

Does an artist's death still spark a "scarcity shock" in an age of infinite digital access? This study examines how the death of a musician impacts digital popularity using a staggered Difference-in-Differences framework to analyze daily Spotify streaming metrics for 90 artists between 2017 and 2022. Main findings suggest that, post-death, artists will have an increased number of songs that appear on Spotify's top ranking charts (Top50 and Top200). Event study coefficients show a sharp, vertical jump at the time of death that remains elevated for over a dozen periods, suggesting that there is a mechanism that results in increased attention for artist's goods following their death.

INTERDISCIPLINARY ORAL SESSIONS

Media Studies

11:30 am – 12:45 pm

Southwestern 208

Moderator: Simran Kumar

(F) 11:30 – 11:45 Intervices Television Series Pitch

Everett Embry

Faculty Sponsor: Joy Brooke Fairfield, Media Studies; Shaolu Yu, Urban Studies

Intervices is Everett's original Science Fiction television series made for streaming: On a mega-earth in an alternate universe, a young prodigy is called to action when crypt-ids, volatile interstitial beings that defy every rule of physics, disrupt the status quo of his academy life. At a camp that his counselor refers him to for PTSD, Tane (tah-nay) meets other troublemakers who share in his indifference to society for its interconnected human vices. Everett sees the power of storytelling, when rich with urban and sociological themes, as a form of mediation that bridges educational gaps for the public in ways that traditional academia does not. He regards entertainment as a tool to foster audience-to-character relatability, allowing viewers to rationalize and reconcile their personal experiences by growing with their favorite characters in his stories. The nature of Everett's works as Afro-Centric and Futurist answers long-standing questions about ethical solutions to minority representation in the entertainment industry and how it can evolve for the better.

11:45 – 12:00 Trial by TikTok: How the Social Media Reception of Depp v. Heard (2022) Turned a Woman's Sexual Abuse Testimony into a Global Punchline

Simran Kumar

Faculty Sponsor: Joy Brooke Fairfield, Media Studies

Depp v. Heard (2022) was a trial that lived and died under the microscope of social media commentators. Before the emergence of social media, court cases were broadcast to the world through one-way channels which did not warrant participation. But in 2022, hundreds of influencers were born out of their publicized reactions to the case. The pool camera system in the courtroom gave everyone a look into the dynamics of the trial itself, turning Amber Heard's domestic violence testimonies into memes and TikTok trends. Heard's body language was subjected to intense scrutiny online, forming the basis of widespread claims that she did not "look" like an abuse victim, while her visible distress on the stand was dismissed as exaggerated or manipulative. Within the digital sphere, these contradictory accusations coexisted comfortably, reinforcing a narrative in which Heard's testimony was always already illegitimate. This case is critical not only because it exposes how media coverage and journalism shape public understandings of legal proceedings, but also because it demonstrates how these systems reinforce cycles of oppression imposed by the justice system upon women who report abuse.

12:00 – 12:15 Russia's Digital Sovereignty: A Myth or Reality?

Den Shestakova

Faculty Sponsor: Sasha Kostina, Russian Studies & Media Studies

Digital sovereignty—a state-controlled, independent, and self-sufficient digital ecosystem—has long been a pursuit for the Russian government. At first glance, Russia seems capable of achieving such pursuits, considering the nation's strong economy as well as successful governmental supervision over mass media and moderate success in digitizing the financial and service sectors of the Russian economy. However, there are certain concerns and obstacles to realizing these ambitions, including tightening state

control of the internet, dependence on China for chips, and so on. This presentation will contextualize the issue and will discuss Russia's political climate and economic limitations that the state faces in pursuit of digital sovereignty.

12:15 – 12:30 Dog Whistles on Twitter: White Supremacy in the Modern Age

Cyanne Tate

Faculty Sponsor: Joy Brooke Fairfield, Media Studies

This video essay is an analysis of disinformation tweets that use white supremacist dog whistles, revealing how these posts intentionally paint minority races as inferior or violent and appeal to fears about white people becoming a minority group while using covert language and symbols to make their arguments more agreeable. This project examines how the revenue and engagement these posts earn then encourage and increase the spread of disinformation at the expense of minority groups, showcasing how the failure of Twitter's community notes, removal of guidelines, and verification subscriptions present a dangerous future regarding the spread of harmful disinformation on the platform. This project features historical context that explains the relationship between disinformation, white supremacy, and dogwhistles before and during the rise of social media. Using semiotic analysis and close readings, this video essay then analyzes tweets from right-leaning accounts, breaking down the hidden dogwhistles and revealing how disinformation is used to amplify these tweets.

12:30 – 12:45 Changing The Game: Creative Development at Rhodes

Jade West

Faculty Sponsor: Ricardo Martins, Media Studies; Joy Brooke Fairfield, Media Studies

Over the course of my previous semesters at Rhodes, my studies have intertwined with my professional work. The classes I've taken particularly in the media studies department and independent study with the aid of professors have produced projects related to film, TV, and Game Design. My proposal is a PowerPoint presentation showcasing how these projects were made by guiding the audience through pre-production, production, and post production with a heavy emphasis on how my studies and the resources at Rhodes have aided in their creation. The agenda of this presentation is: Remnants of The Past - a fictional horror podcast; Levels of Fear - a 3D video game; and Perennial Echoes - an animated series. Each of these showcases a different aspect of my studies corresponding with different courses ranging from audio production to screenwriting to directing. Additionally, this discussion would cover how different Rhodes resources - such as the Curb Lodge, Motion Capture Lab, and Media Labs - have aided in their production and can be used for student development. This would end with a discussion on networking and the range of talents present at university and how their skills can be applied to the field of media production.

Environmental Studies and Sciences I

11:00 am – 12:15 pm

Buckman 110

Moderator: Kate Shields

11:00 – 11:15 Overton Park through story: Preserving care through video oral histories

Olivia Alejandre

Faculty Sponsor: Kate Shields, ENVS

Memphians walk, run, and play beneath the 160-foot-tall Poplar tree, explore the forest trails, swing on the playground, observe nature, and host family gatherings in the 342 acres of Overton Park. There is an abundance of love and care that surrounds the park and is evident in the in the stories and memories that each and every visitor holds. By leveraging the power of storytelling to build community, this project

aims to preserve these stories, imbued with the care for and multiple understandings of Overton Park, through video, oral histories shared in the form of a multi-media exhibition. Oral histories were chosen as a way to preserve a glimpse of Overton through its users centered around the personal and emotional. As a publicly accessible resource, the videos will show how the Park has been and is used and understood through storytelling.

11:15 – 11:30 Seagrasses, Satellites, and Subsidies: A Story of Seagrass Services, Shifting Shorelines, & Sustainability in the Salish Sea

Lorenzo Martinez

Faculty Sponsor: Kate Shields, ENVS

Seagrasses form an order of marine flowering plants, commonly seen growing in meadows. These meadows provide a range of ecosystem services, such as carbon sequestration, habitats for marine fauna, and improve water quality. Despite this, seagrass meadows have seen declines in recent decades due to eutrophication, disease, ocean acidification, and other factors contributable to anthropogenic climate change. Further losses will have profound human and ecosystem implications as all seagrass species have been evaluated for the IUCN Red List of Endangered Species. My previous research used remote sensing classifications that suggested declines in seagrass meadows throughout the Salish Sea between 2017 and 2022. As seagrasses are intertidal, previous studies have shown that land use changes on the shore, such as shoreline development, also impact seagrasses. The Salish Sea sits between major urban cities like Seattle and Vancouver, in addition to many Indigenous peoples such as the Coast Salish peoples. This study will show how land usage around the Salish Sea has changed throughout the 21st century, provide in-depth historical context for how different policies and actions have affected seagrasses and local shareholders, and produce recommendations for sustainable future seagrass meadow management.

11:30 – 11:45 Traditional Chinese Medicine Ingredient Research Review

Kate Robinson

Faculty Sponsor: Kate Shields, ENVS

Traditional Chinese Medicine (TCM) has its continued use even after approximately twenty-three centuries of refinement and study. TCM typically incorporates spiritual and scientific theories to treat illnesses and promote healing. My objective is to compile the typical uses of TCM herbal medicines, their science, and relevance in the modern world. Western medicine ultimately arises from the practice of traditional healing methods, and so, studying the foundations of modern medicine points us back towards the past. In an age of misinformation online, many consumers are unaware of the supplements or ingredients that they are ingesting. Understanding the causes and effects, as well as the history, of TCM can better educate consumers into making more informed choices about their health. The use of TCM has been found to have some effectiveness, and research has demonstrated a need for further development of TCM. This review will focus on specific ingredients that are commonly used in TCM, and incorporate earlier research done, to create a basic guide to some of the misconceptions and facts regarding TCM.

11:45 – 12:00 What Lick Creek Reveals About Urban Stream Channelization

Jack Whitten

Faculty Sponsor: Kate Shields, ENVS

Urban stream channelization is frequently presented as a technical fix for flooding, sanitation, and city growth, but I argue that it also reflects community values and historical priorities that continue to shape metropolitan environments. In this project, I use Lick Creek in Overton Park as a case study to explore how past decisions to control and engineer waterways have produced long-term ecological and social tradeoffs in Memphis. Drawing on scientific research on stream channelization, local history,

journalism, and conservation humanities scholarship, I show that channelization is not just an engineering choice. It is a lasting environmental decision shaped by public health concerns, development pressures, and cultural ideas about nature. Ecological studies document habitat loss, altered hydrology, and reduced biodiversity, while contextual analysis helps explain why these outcomes were accepted or overlooked. By combining environmental, historical, and social perspectives, I aim to help the public better understand Lick Creek as both a natural system and a cultural artifact, and why interdisciplinary thinking matters when managing modern urban ecosystems.

Environmental Studies and Sciences II

12:30 pm – 1:45 pm

Buckman 110

Moderator: Kate Shields

12:30 – 12:45 Projected Water Stress in Oklahoma: A Geospatial Analysis of Sectoral Demand and Data Center Impact

Katelynne Crider

Faculty Sponsor: Kate Shields, ENVS

Water demand in Oklahoma is projected to increase over the coming decades, driven primarily by agricultural and municipal demand. Although previous studies have analyzed sectoral water consumption trends, few have spatially mapped projected supply-demand dynamics, demonstrated possible water shortages, or factored in emerging sources of demand such as data centers. This study aims to fill these gaps by integrating data from the Oklahoma Water Resources Board (OWRB), the United States Geological Survey (USGS), and data center specifications to model future water use across the state. Sectoral water demand projections are aggregated across sectors and spatially allocated to counties from regional datasets. Data center water demand is estimated using available information on facility size and cooling requirements. I develop a time series of projected water surplus and shortage patterns for 2020, 2030, and 2045, and estimate the potential impact associated with 38 existing or planned data centers in Oklahoma. By incorporating these projections into a GIS-based framework, I evaluate how data center expansion may influence regional water stress across the state. My results visualize future challenges for Oklahoma's water resources and offer a foundation for sustainable long-term water management and planning.

12:45 – 1:00 Exploring Underlying Moral Attitudes Regarding Zoos

Audrey Griffith

Faculty Sponsor: Kate Shields, ENVS

My project aims to bridge philosophical animal ethics and environmental science by examining ethical frameworks in a real-world institutional context. While zoos and aquariums defend captivity through conservation, research, and education, little research has examined how diverse social groups interpret and evaluate these justifications. Some have argued that zoos are unethical and undermine animal morality (Norton and Jamieson). Acampora goes as far as comparing zoos and aquariums to pornography, which carries a negative connotation in our society and carries specific moral implications. Others, though, argue there is an ethical basis to keeping animals in captivity for education and research purposes, and it is in the best interest of animals for their longevity (Hutchins et al.) My project will contribute to debates on animal autonomy and conservation ethics, and perhaps shed light on the hidden intuitions humans have about animal captivity. I intend to do this through the use of interviews transformed into a podcast to provide an array of different perspectives based on exposure and social positions.

1:00 – 1:15 The Language of Science

Alice Hale

Faculty Sponsor: Kate Shields, ENVS

This project will be an exploration of misused terminology in the natural sciences. Our understanding of modern science is dependent on the usage of precise language that can accurately convey the meanings of scientific concepts. And yet some ideas are still subject to debate. For example, the cladistic interpretation, now widely accepted as taxonomical fact, proposed that "fish" is not a real biological classification. But despite the acceptance of cladistics, fish persist as a scientific and cultural phenomenon. Other examples include the subjective existence of the savanna biome or the concept of the Anthropocene. Through this project I will examine the critiques both for and against these ideas of our natural world and whether or not we should continue to hold on to them.

1:15 – 1:30 Shared Boundaries: The Reality of Human-Wildlife Conflict

Vivian Kalb

Faculty Sponsor: Kate Shields, ENVS

Any interaction between humans and animals has risks for both humans and animals. Actions need to be taken to protect both parties, considering those with monetary stakes and those whose livelihoods lie within this land. This study focuses on the impacts of animals on human life as well as the impact of humans on animal life in Namibia, Belize, and the United States. In Namibia, the conflict between the local peoples and the elephants and big cats has led to significant declines in both of those animal populations as well as loss of many crops and water sources. In Belize, an increase in provisioning tourism has led to the betterment of the Belizean economy but has also been detrimental to the nurse shark population and the already struggling coral reefs in the area. As for the United States, the misunderstanding of the true danger of animals like bison and bears to camping communities leads to injuries and death of both the people and the animals. By addressing the negative impacts of human activity on animals while also understanding the stakeholders, a further understanding of human-wildlife conflict can be gained, and communities can learn to live harmoniously with wildlife populations.

Environmental Studies and Sciences III

2:00 pm – 3:30 pm

Buckman 110

Moderator: Kate Shields

2:00 – 2:15 Landscapes of Risk: Human Choices and the Disaster Impacts of Hurricane Harvey in Houston

Jason Gray

Faculty Sponsor: Kate Shields, ENVS

The disaster impacts of Hurricane Harvey in Houston were caused by human choices. In 2017, Hurricane Harvey produced devastating floods in the Houston metropolitan region, damaging infrastructure, housing, and local economies. The severity of Harvey's flooding was shaped by long-term human decisions about land use, urban expansion, and environmental management in Houston. Houston developed alongside bayous, wetlands, and flood-prone landscapes, and while Indigenous land-use practices adapted to these hydrological conditions, twentieth-century urban development transformed the region's natural drainage systems through rapid growth, zoning regulations, channelization of bayous, and the widespread paving of floodplains. These changes heightened flood risk, particularly in heavily developed and low-lying areas. Flood disasters are not purely natural events, but are shaped by planning choices. By linking historical ecology, spatial analysis, and lived experience, this project

contributes to debates on climate adaptation, environmental justice, and urban resilience in rapidly growing cities.

2:15 – 2:30 Climate Anxiety: The Mental Health Inequities of our Changing Climate

Ainsley C. Hay

Faculty Sponsor: Kate Shields, ENVS

As the climate of Earth continues to worsen, and advances in media allow for people to be more aware of it than ever, a phenomenon known as climate anxiety is emerging. Climate anxiety is the distress humans experience when faced with how climate change will impact our lives, including fears such as food insecurity, loss of housing due to natural disasters, or decreased access to clean air and water. Reports show these fears have substantially worsened in the last decade. Chronic stress, caused by stressors due to our rapidly changing climate, are known to increase inflammation and suppress our immune systems, leading to a higher chance of developing autoimmune or cardiovascular diseases. Climate anxiety more often affects minority groups, such as people of color, meaning climate anxiety has widened the health gap and Black Americans have a greater likelihood of experiencing negative health outcomes. Current research is starting to tackle this disparity, but our climate may be changing faster than scientists can discover how to mitigate its effects. This paper will act as a literature review to condense our current understanding of this issue, which I will use as context to create graphs and maps to better visualize the issue.

2:30 – 2:45 Patterns of Environmental Injustice in Memphis Through the Evaluation of Air Pollution

Hilde Medovich

Faculty Sponsor: Kate Shields, ENVS

Memphis has long faced issues of environmental injustice, with industries targeting predominantly black communities in Southwest Memphis. Memphis is home to a high concentration of industries that have released toxic pollutants into the environment, negatively impacting residents' health. This project analyzes current air pollution data in Memphis, along with residents' testimonies, to show how industry presence has created disproportionate levels of air pollution in the city. This project contributes to current knowledge about how industrial air pollution disproportionately impacts communities of color and lower socioeconomic statuses. The issue of pollution continues to worsen with the introduction of new industrial plants that further contribute to high levels of air pollution.

2:45 – 3:00 Urban Nature and Inequality: Comparing Green Space in Memphis and Louisville

Mac Salley

Faculty Sponsor: Kate Shields, ENVS

Urban nature, such as parks, tree canopies, riparian corridors, and other "green" features, affects the health, heat exposure, recreation, and quality of life in neighborhoods, but it is not evenly spread out across cities. I am using data of Memphis in this project to compare the amount and accessibility of urban nature in Memphis to that of Louisville, which has more nature overall and is of similar size. I am also testing whether wealthier neighborhoods have more green space and canopy than poorer ones. I will ask, "How does Memphis's urban nature (tree canopy/green cover and proximity to parks) compare to Louisville using the same measures?" and "How closely are tree canopy and park access linked to wealth indicators in Memphis neighborhoods?" I will use the National Land Cover Database (NLCD) and/or local tree canopy layers, city park boundaries, and U.S. Census/ACS socioeconomic variables (like income) to make similar measurements of green cover and park access (buffers/network distance) and see how they relate to wealth in neighborhoods. The results will show how "nature in the city" can be an environmental benefit that is affected by inequality, which has effects on environmental justice and city planning.

3:00 – 3:15 Adaptive Resource Allocation Under Climate Change: Using Computational Modeling with Malaria Vaccination Coverage as a Case Study

Sarah Taylor

Faculty Sponsor: Kate Shields, ENVS

Climate change is altering environmental conditions that influence the transmission of vector borne diseases, raising concerns about how limited resources should be allocated in an increasingly uncertain future. Malaria remains one of the most significant global health challenges, with the majority of cases and deaths occurring in sub-Saharan Africa. As climate change progresses, the geographic ranges, seasonal transmission patterns, and abundance of malaria spreading mosquitos may shift, increasing the need to evaluate strategies that can prevent future outbreaks and deaths. Although recent vaccine implementations represent an important advancement, vaccination coverage remains constrained by socioeconomic barriers. This study presents computational frameworks for adaptive resource allocation under climate change using malaria vaccination coverage as a case study. Reinforcement learning and agent based modeling are used to simulate environmental conditions along with socioeconomic factors known to influence malaria prevalence. Within these simulated environments the models explore how vaccination and testing strategies may adapt under uncertainty and resource constraints. The models are intended as conceptual tools meant to demonstrate the potential of computational approaches to support climate responsive public health planning. This research highlights the importance of interdisciplinary approaches that integrate environmental change, socioeconomic constraints, and epidemiological dynamics when addressing emerging global health risks.

Media Studies Showcase

3:30 pm – 4:45 pm

Barret 034

Join the Media Studies program for a screening of short films, music videos, digital art, TV scenes and more. These examples of MST student work from across the 2025-26 academic year tell powerful stories and offer diverse perspectives. Short talkback to follow.

POSTER SESSION #1

1:00 pm – 2:30 pm

BCLC

(F) #1 Dynamic EZH2 Phosphorylation Controls Developmental Genetic Programs in Human Stem Cells

Muhammad Arshad, Matthew So, and Jamy Peng

Faculty Sponsors: Tanushree Pandit, Biology; Dr. Jamy Peng, St. Jude Department of Developmental Neurobiology

The Polycomb Repressive Complex 2 (PRC2) is a key epigenetic regulator of gene expression that trimethylates histone H3 at lysine 27 (H3K27me3) during early embryonic development. EZH2, an enzymatic subunit of PRC2, is dynamically regulated by post-translational modifications, including phosphorylation. Our lab has shown ATM kinase, a key DNA damage response regulator, is crucial for the development of forebrain cortical organoids, and its loss results in a reduction of EZH2-T487 phosphorylation. The function of EZH2-T487 phosphorylation in gene regulation remains incompletely understood. To address this, phospho-deficient (EZH2-T487A) and phospho-mimetic (EZH2-T487D) human embryonic stem cells (hESCs) were generated. RNA-seq analysis revealed opposing gene expression patterns between T487A and T487D mutants in proliferation, pluripotency, and differentiation. Immunofluorescence (IF) assays determined pluripotency was preserved in phospho-deficient clones, while Fluorescence-Activated Cell Sorting analysis of EdU incorporation and further IF studies revealed increased S-phase in T487A mutants. In addition, mitotic progression was reduced, indicating disrupted cell cycle dynamics. Seeding T487A hESCs into 3D cortical organoids revealed that mutants formed significantly smaller organoids with reduced neural organization, displaying similar cell cycle disruption. Our findings suggest phosphorylation of EZH2-T487 plays a key role in stem cell maintenance and differentiation during neural development.

(F) #2 Synthesis of 6-Substituted Dopamine Derivatives to Elucidate the Enzymatic Capabilities of L-DOPA Dioxygenase

Suha Aslam and Raksha Visvanathan

Faculty Sponsor: Larry Peterson, Chemistry

L-3,4-dihydroxyphenylalanine (L-DOPA) dioxygenase is a bacterial enzyme that catalyzes the breakdown of stable aromatic rings in catechols to produce natural products with antibacterial properties, such as lincomycin. The ability of this enzyme to cleave these otherwise stable aromatic rings suggests potential applications in bioremediation and in the degradation of biopolymers such as lignin, a major component of plant woody tissue. This powerful chemistry highlights the enzyme's potential relevance in the development of novel pharmaceuticals and environmental remediation strategies. However, the range and complexity of substrates that L-DOPA dioxygenase can act upon remain relatively unexplored. Therefore, developing a toolkit of enzymatic substrates is essential. This work focuses on the synthesis of novel dopamine derivatives, particularly those substituted at the 6-position of the catechol ring. Such modifications can significantly affect binding affinity, stability, and reactivity, ultimately influencing enzymatic recognition and catalytic turnover. These derivatives, along with other catecholic compounds, provide valuable tools for investigating enzyme function and uncovering new mechanistic insights. A deeper understanding of L-DOPA dioxygenase's enzymatic capabilities could open the door to developing antibiotics and bioremediation strategies, highlighting the enzyme's importance in pharmaceutical and environmental applications.

#3 Evaluating the function of CNTN4 Schizophrenia Risk Loci in Human Thalamic Organoids Modeling 22q11DS

Aigerim Azizbekova, Kristen Thomas, Kyle Newman, Shondra Pruett-Miller, Anjana Nityanandam, Stanislav Zakharenko

Faculty Sponsors: Liam Hunt, Biology; Kelly Ann Dougherty, Neuroscience; Dr. Kristen Thomas, Dr. Stanislav Zakharenko, St. Jude Department of Developmental Neurobiology

Schizophrenia-associated variants often fall in noncoding DNA, making it unclear which gene(s) they influence. Two intronic CNTN4 SNPs, rs163558 and rs149467, are associated with schizophrenia and psychosis symptoms in patients with 22q11 deletion syndrome. Human iPSC-derived organoids provide a human-genome model system to test whether these variants have measurable effects on gene expression. We hypothesize that rs163558/rs149467 genotype alters expression of CNTN4 and/or nearby locus genes. To test this, we used a human iPSC line carrying a hemizygous 22q11 deletion as the genetic background and applied CRISPR-Cas9 to generate isogenic clonal lines that are homozygous for the risk alleles at both SNPs or homozygous for the protective alleles at both SNPs. Each clone was differentiated into day-70 human neural organoids, and RNA was isolated. RT-qPCR is being used to quantify CNTN4 transcript abundance and transcript usage, and to measure expression of nearby locus genes (IL5RA, TRNT1, CRBN) normalized to stable reference genes. We expect risk-allele organoids to show genotype-dependent differences in CNTN4 and/or nearby gene expression, helping identify functional gene targets within this schizophrenia-associated locus.

#4 Biodiversity in Major Cities of Tennessee: Select Rare Amphibian Species by County

Lu Benedetto McNulty

Faculty Sponsor: Kate Shields, ENVS

Amphibians are excellent bioindicators of habitat health because of sensitivities created by their permeable skin and the significant parts of their lifecycles and daily movement patterns that implicate both terrestrial and aquatic environments. Rare species may be such because of these sensitivities, and their small populations mean that preserving their habitats is paramount to maintaining biodiversity in Tennessee. Rare amphibians and their specific environmental needs can also showcase regional differences in the state of Tennessee. This project highlights species sighted in the counties containing the three most populous cities in Tennessee by mapping their population using United States Geological Survey data, showcasing species found in Nashville's Davidson county, Memphis' Shelby County, and Knoxville's Knox County. The species mapped include the Eastern Hellbender, the Berry Cave Salamander, the Four-toed Salamander, the Southern Cricket Frog, and the Streamside Salamander. While the borders of these counties and the state are emphasized, the extent of the data includes the larger habitat of the amphibians shown to showcase regional connections beyond state and county lines. By showcasing the rare amphibians found in the most populous cities, this map provides a tool for comparisons that implicate human development in destruction or alteration of the natural environment.

#5 Comparing canine tooth morphology across domesticated dog breeds

Henry Hobbs Brown and Kelly Diamond

Faculty Sponsor: Kelly Diamond, Biology

Humans have bred dogs for many purposes, such as hunting, sport, work-related tasks, and companionship. This artificial selection has resulted in different breeding group classifications, defined by the desired functions of different breeds. In carnivorous mammals, the canine tooth is used for gripping prey. We decided to focus on the canine because it is one of the largest and most recognizable teeth. Our goal for this study was to determine if the shape of the canine tooth is correlated with the breeding group and the skull size. To test this prediction, we used the right canine tooth from 33 dog breeds, with one individual per breed. We compared canine tooth shape, using pseudolandmarks, and relative canine tooth size (tooth length: skull length), across 8 breeding groups and 7 size classes. We

found no relationships between canine tooth shape and breeding group or breed size. Canids in the wild and working groups had proportionally larger teeth than the other breeding groups and medium-large breeds had proportionally smaller teeth than the other size groups. These results suggest that domestication has a similar effect on most breeds' canine tooth morphology, as wild canids showed the largest morphological differences from any domesticated breed.

(F) #6 Time of Day and the Impact on Reticulated Giraffe's Feeding and Behaviors

Caroline Buendia, Kelly Diamond, and Memphis Zoo giraffe team

Faculty Sponsor: Kelly Diamond, Biology

Giraffes spend significant hours grazing for feed in the wild. Previous studies show that this behavior is not always typical for captive giraffes who are fed primarily through enrichment activities and feed stations. This study investigated how captive giraffe behavior and engagement with feed stations varies throughout the day. I hypothesized that due to limited space and stagnant feed, captive giraffes will engage less with feed stations in the evening versus the morning. To study this behavior the 5 reticulated giraffes at the Memphis zoo were filmed in their outside enclosure twice a day, four times a week, for four weeks. Filming took place in the morning and evening for 30 minutes and a DJI camera was used. Data on weather conditions, feed station and feed deck availability, and which giraffes were on exhibit was recorded. Footage was analyzed and behaviors and engagement with feed stations was quantified and compared between the times of day. Overall, the feed engagement and behavior did vary significantly throughout the day for the giraffe herd. Individual giraffes Maliki and Nik also showed this variation. Understanding these factors can inform improved husbandry practices and environmental enrichment strategies to enhance the welfare of zoo-housed giraffes.

#7 Synthesis of 6-Substituted Catechols

Amanda G. Cassius, Malcolm M. Oliver, Howie Eldridge, Larryn Peterson

Faculty Sponsor: Larryn Peterson, Chemistry

Catechol (1,2-benzenediol) is an important chemical scaffold used as an intermediate in pharmaceutical, agrochemical, and industrial synthesis. Catechol derivatives function as metabolic intermediates and participate in enzymatic oxidation pathways including dioxygenase-mediated aromatic ring cleavage reactions. Catecholamines are biosynthesized from the amino acid tyrosine through formation of L-DOPA followed by enzymatic conversion to dopamine and related neurotransmitters. Dopamine serves as a central catecholamine whose properties can be modified through structural substitution. Addition of a substituent to the 6-position of the benzene ring affects the stereoelectronic properties of the catechol and resultant biological function. This work focuses on the synthesis of 6-bromodopamine and replacement of the native ethylamine with a cyanoethyl substituent. Progress toward the synthesis and characterization of these novel catechols will be discussed.

#8 The Moderating Role of Entitativity on the Ensemble Perception of Social Status

Eli Crabtree, Maks Gutowski, and Catherine Ross

Faculty Sponsor: Matt Weeks, Psychology

Through ensemble perception, we can extract summary statistics about groups in under two seconds. Ensemble perception allows us to form judgments about a group's average emotion, attractiveness, and more. Ensemble perception also allows us to form judgments about a group's average social status in a brief glance. Entitativity, the extent to which groups are perceived as a cohesive unit, influences perception. Highly entitative groups tend to be perceived as more similar, and entitativity may lead group judgments to be more extreme across various traits. In this study, we investigate how entitativity influences social status ensemble perception. In our study, participants rated the social status of 60 individuals on a 1-10 scale. Then, participants were split into a low and a high entitativity condition and rated the average social status of random groups of 4 individuals. The high entitativity group read a

script that said the groups were "tight-knit" and "highly organized," emphasizing traits related to high entitativity. The low entitativity group's script said the opposite. We hypothesized that entitativity would amplify ensemble social status judgments, such that high entitativity groups would yield more extreme average ratings compared to individual ratings. Results will be presented addressing the key research question.

#9 The Effects of Skin Tone on Race-Based Strength Bias

Victor Camarena, Adaria Crutcher, Sophia Gregorovic, Trinity Lambert, Ashar Siddiqui

Faculty Sponsor: Julia Wefferling, Psychology

Black men are rated as physically larger and stronger than White men of the same size (Wilson et al., 2017). This has not been studied in conjunction with colorism. Colorism is prejudice or discriminatory treatment against individuals with a darker skin tone within the same racial or ethnic group (Moore et al., 2021). Previous research has shown that Black people with a darker skin tone face more negative stereotypes and harsher criminal sentences than their light skin counterparts (Kizer, 2017). The presented study aims to analyze the connection between colorism and race-strength perception. To study this, we recruited Black participants from Prolific. Participants were presented with pictures of Black and White faces, labeled with racially prototypic names and placed in safe or threatening environments. The participants were asked to rate how tall, heavy, and strong the individual was, along with a rating on the darkness of their skin tone quantified by a validated scale of skin tone. While we have not analyzed our results yet, we expect a positive correlation where darker skin tone leads to greater size and strength perception, and that Black men will be rated as larger and stronger than other groups.

#10 Importance of understanding the role of Mitochondria in muscle dysfunction among childhood acute lymphoblastic leukemia survivors

Sarah D'Souza, Kasturee Chakraborty, Saharsh Satheesh, Sabah Nisar, Seth Karol, Mandira Kundu, Peter McKinnon, Michael Temple, Hiroto Inaba, Melissa M. Hudson, Kirsten K. Ness, and Puneet Bagga

Faculty Sponsors: Tanushree Pandit, Biology; Dr. Puneet Bagga, St. Jude Department of Radiology

Despite an increase in survival rates in acute lymphoblastic leukemia (ALL), survivors face persistent challenges to their health, including impaired physical function, accelerated muscle wasting (sarcopenia), and frailty, all contributing to a reduced quality of life. Therapy-induced damage to muscle, myocardium, and the central nervous system drives long-term deficits in skeletal muscles, and understanding the drivers of sarcopenia and frailty is crucial for developing targeted interventions to address the muscle decline in survivors. Mitochondrial dysfunction especially plays a role in sarcopenia and frailty, contributing to decreased energy production, switching from oxidative phosphorylation to glycolysis, delayed recovery, impaired regeneration, and chronic disease. This review highlights mitochondrial disruption as a key mechanism to musculoskeletal decline in ALL survivors and explores diagnostics and interventions aimed at preserving muscle health and improving survivorship outcomes.

#11 How Race Impacts Amplification Effect of Ensemble Perception of Socioeconomic Status

Ava Dunn, Granville Lewis, Max Barcan

Faculty Sponsor: Matt Weeks, Psychology

Systemic racism in the United States continues to stereotype socioeconomic status, with black individuals attributed to a lower socioeconomic status than their white counterparts. Ensemble perception, the mean statistics rapidly taken on similarly grouped stimuli, creates an amplification effect where the perceived socioeconomic status of a group may be perceived as higher or lower than when perceived individually. The purpose of this research is to evaluate how race impacts the amplification effect of ensemble perception of socioeconomic status. We hypothesize that white ensembles will have

an amplified higher perceived socioeconomic status than individual white targets; in contrast, black ensembles will have an amplified lower perceived socioeconomic status than individual black targets. White participants will be recruited for the two-phase between-subjects research design. Phase 1 will establish individual participants' baseline of average perceived socioeconomic status per individual white or black target, using targets controlled for non-racial status cues. Phase 2 will evaluate racial impact on amplification effect by measuring average perceived socioeconomic status of shown all-white or all-black ensembles.

#12 Solid and Solution State Structures of Nickel Complexes with Substituted Thiosalen Ligands Sarah Folz and Will Eckenhoff

Faculty Sponsor: Will Eckenhoff, 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 CF₃ 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 of these complexes with NMR and X-Ray Crystallography have been achieved over the past year.

(F) #13 Sleep and Neurocognitive Performance in Patients with Sickle Cell Disease

Olivia Freeman, Aida Xue, Yunus Olufadi, Jennifer Longoria, Brian Potter, Jane Hankins, Parul Rai, Zachary Abramson, Guolian Kang, Andrew Heitzer

Faculty Sponsors: Katherine White, Psychology; Dr. Andrew Heitzer, Department of Psychology and Biobehavioral Sciences, St. Jude Children's Research Hospital

Objective: Risk for disrupted sleep is common among patients with sickle cell disease (SCD), which can compromise oxygen delivery, exacerbating disease severity and cognitive challenges. However, research on resulting cognitive and psychosocial difficulties for patients with SCD is limited. We aimed to examine how various sleep measures affect neurocognitive outcomes in the SCD population. Participants and Methods: Children with SCD were screened for neurocognitive functioning, irrespective of symptoms. Sleep studies were performed based on clinical concern. In total, 65 patients received a neurocognitive evaluation and sleep study. Sleep outcomes as measured via polysomnography were sleep efficiency, SpO₂, and Total Apnea-Hypopnea Index. Neurocognitive tests assessed IQ, memory, processing speed, and math. We conducted a separate multivariate regression analysis controlling for age, sex, socioeconomic status, and other covariates. Results: Sleep efficiency was positively associated with a measure of working memory. We did not observe any additional significant relationships between different measures of sleep variables and neurocognitive performance. Conclusions: The results suggest that decreased sleep efficiency negatively impacts working memory in patients with SCD. These findings highlight the importance of improving sleep efficiency in this population, and further research with a larger sample is needed to confirm these effects.

#14 Investigation of [Ni(^{Et}BzImPDI)]²⁺ as a Catalyst for Light-Driven Hydrogen Production

Jolie Gabriel and Will Eckenhoff

Faculty Sponsor: Will Eckenhoff, Chemistry

As the global population grows, the need for renewable energy grows with it. One source of energy that seems promising is artificial photosynthesis to produce hydrogen gas. The PDI ligand seems to be useful for light-driven hydrogen production because of the pK_a and hemi-lability of the pendant base. Research has been done using [Ni(^{Et}PyPDI)]²⁺ and [Ni(^{Et}ImPDI)]²⁺ as catalysts, revealing that the pK_a of the

pendent arm is critical to their catalytic activity. $[\text{Ni}(\text{EtPyPDI})]^{2+}$ showed high activity for proton reduction, but the structurally similar $[\text{Ni}(\text{EtImPDI})]^{2+}$ did not. By synthesizing $[\text{Ni}(\text{EtBzImPDI})]^{2+}$, we seek to expand our knowledge of the factors that influence catalytic activity. We have been investigating the synthesis of the new EtBzImPDI ligand and $[\text{Ni}(\text{EtBzImPDI})]^{2+}$ in this work.

#15 Financial Predictors of Aging In Place: Income Is Associated with Broader Priorities, Debt Signals Elevated Worry

George Crouch, Adrian Garcia, Geoffrey Maddox

Faculty Sponsor: Geoffrey Maddox, Psychology

Older adults frequently report a preference for aging in place (Wiles et al., 2012). In prior research (Maddox et al., 2022), middle-aged and older adults completed an online survey assessing their capacities across multiple domains relevant to aging in place (e.g., physical health, healthcare access, cognitive health) and ranked the importance of each domain for aging in place. Results suggested that priorities were shaped by financial security. The current study replicated and extended this work in three ways. First, we utilized a Likert scale, allowing respondents to assign equal importance to multiple domains. Second, participants also reported the importance of each domain for maintaining a high quality of life, how much they worry about each domain, and their confidence in maintaining their ideal situation with regard to each domain. Third, we collected separate measures of income, assets, and debt. The final sample consisted of 236 Prolific participants aged 50 or older residing in the United States. Analyses examined patterns in domain importance, worry, confidence, and their associations with indicators of financial stability. Results indicated that middle-aged and older adults value multiple domains equally; income broadens priorities; and worry and confidence capture distinct constructs.

(F) #16 Infralow Oscillations during Sleep in Long-Term Survivors of Pediatric Hodgkin's Lymphoma

Jack Goldstein

Faculty Sponsors: Tanushree Pandit, Biology; Dr. Miguel Navarrete, St. Jude Department of Psychology and Biobehavioral Sciences; Alejandro Osorio-Forero, Netherlands Institute for Neuroscience Department of Sleep and Cognition; Kevin Krull, St. Jude Department of Psychology and Biobehavioral Sciences

Infra-slow fluctuations (ISFS, ~ 0.02 Hz) of noradrenaline can be tracked by changes in arousal and EEG sigma power during NREM sleep. Adult survivors of childhood Hodgkin's Lymphoma (HL) have increased incidence of sleep disturbance and cognitive and autonomic dysfunction. Due to the role of locus coeruleus-noradrenaline signaling in cognition, we conducted exploratory analyses to evaluate the sleep dynamics of ISFS in HL survivors. Stage 2 (NREM2) sleep from home-polysomnography recordings was analyzed for HL survivors and community control participants of the St. Jude Lifetime Cohort Study. ISFS dynamics (bandwidth, peak frequency, peak power, and area under the curve (AUC)) were estimated and averaged using the power spectral density from 5-minute EEG sections for each participant. Linear regression models compared survivors and community controls, controlling for age, sex, race, and BMI. Compared to controls, survivors reported worse sleep quality (PSQI) and had higher ISFS peak power and AUC. Our findings suggest variable autonomic regulation during sleep in HL survivors, characterized by intensified ISFS potentially linked to increased spindle clustering. Based on the function of noradrenaline on sleep arousal regulation and memory consolidation, the role of ISFS peaks as a neurophysiological marker of cognitive function among survivors should be further studied.

#17 Hidden Cognitive Burden: Brain Dysfunction During Driving in Urea Cycle Disorder

Jasper Haimes, Andrea Gropman, Kosar Khaksari

Faculty Sponsor: Jason Haberman, Psychology; Dr. Andrea Gropman St. Jude Center for Experimental Neurotherapeutics; Dr. Kosar Khaksari St. Jude Center for Experimental Neurotherapeutics

We are studying brain dysfunction in patients with urea cycle disorder (UCD) using functional near infrared spectroscopy (fNIRS) during a simulated driving task. UCD is a rare metabolic disorder characterized by impairment in the urea cycle, which reduces body's ability to remove ammonia from the bloodstream. The buildup of ammonia can lead to mild cognitive impairment to severe and life-threatening neurological complications. This study is motivated by anecdotal evidence that patients with UCD experience difficulties while driving and may avoid it altogether. We hypothesize that these challenges are related to underlying disease-associated brain dysfunction that can be detected using functional neuroimaging. fNIRS is a noninvasive and portable functional brain imaging modality with wireless functionality, making it feasible for use during tasks that involve movement such as driving. In this work, participants perform a driving task using a simulator that replicates real-world driving challenges. Simultaneously, fNIRS is used to measure cortical brain activation. This combined approach allows us to examine differences in brain activation patterns between individuals with UCD and healthy controls during driving-related cognitive demands. This presentation may include example data from the driving simulator and representative fNIRS recordings.

#18 Beyond the enclosure: kinematics of captive vs. wild meerkats

Sarah Heckmann and Kelly Diamond

Faculty Sponsor: Kelly Diamond, Biology

Animals use different gaits depending on speed and environment. Accredited zoos attempt to replicate natural environments for captive animals, but there are limitations to how similar the environment can be to that of wild individuals. We were curious if gait kinematics differ between wild and captive individuals. One of the main differences in the environments of zoo-housed animals is the presence of zoo guests. Our prior research demonstrated that captive meerkats (*Suricata suricatta*) spent less time moving when visitor presence increased. In this study, we aimed to examine gait differences between captive and wild meerkats while walking and running. Footage was obtained for captive meerkats at the Memphis Zoo and for wild meerkats from online, open-access videos. We predicted that, because wild meerkats likely have increased space to move and must avoid predation attempts, the limb angles would be larger in wild individuals compared to captive meerkats. We compared the duty factors, the percentage of time that each foot is spent touching the ground in a gait cycle, and limb angles between our captive and wild videos. This study aims to serve as a foundation for future work concerning how welfare can be classified for captive animals.

#19 Food Insecurity and Cancer: A Scoping Review of Risk, Treatment, Survival, and Screening

Audrey Heidbreder, Natasha LaFrinere-Sandoval, and I-Chan Huang

Faculty Sponsors: Tanushree Pandit, Biology; Dr. I-Chan Huang, St. Jude Department of Epidemiology

Food insecurity, defined as inadequate or uncertain access to sufficient and nutritious food, is a social determinant of health that disproportionately affects low-income and racial or ethnic minority populations. To comprehensively characterize the literature, we conducted a scoping review of PubMed, Web of Science, and EBSCO covering CINAHL, APA PsychInfo, and APA PsychArticles from 2005 through 2025. We identified 132 included articles examining food insecurity or related constructs in relation to cancer risk, treatment, survivorship, or screening, with reports of associations across these domains. Food insecurity is a significant and underappreciated contributor to cancer burden across healthcare settings. The findings from this scoping review are expected to inform standardized screening in oncology, integration of nutritional support into cancer care, and policy-level interventions to address food access inequities.

(F) #20 Tridentate vs Bidentate Coordination: Synthesis and Analysis of BP-His-HA and BP-Ser-HA as LpxC Inhibitors and Modelling their Binding to a Zinc Enzyme Mimic

Jonas Hostetler

Faculty Sponsor: Will Eckenhoff, Chemistry; Larryn Peterson, Chemistry

Gram-negative bacteria present a persistent challenge in antibiotic development because their outer membrane, stabilized by lipid A, limits drug permeability and contributes to resistance. LpxC, a zinc-dependent enzyme that catalyzes the first committed step of lipid A biosynthesis, has become a central target for inhibitor design. I synthesized two amino acid variants of hydroxamic acid-based inhibitors, BP-His-HA and BP-Ser-HA, to investigate if tridentate coordination can be achieved. We evaluated this by binding these potential inhibitors to a standard zinc hydroxide scorpionate enzyme mimic and characterized their structure in both solution and solid states. Additionally, the binding of the inhibitors to the zinc mimic was examined through Gaussian16 modeling and to LpxC will be ChimeraXdocking studies.

#21 Analysis of Caffeine in Decaffeinated Green Tea using UV-Spectrophotometry and Gas Chromatography

Jozalyn Houser and Dhammika Muesse

Faculty Sponsor: Dhammika Muesse, Chemistry

Understanding the amount of residual caffeine in decaffeinated tea helps address concerns for caffeine-sensitive individuals, as caffeine has a significant impact on the human body. The preliminary experiments using ultra-violet spectrophotometry determined 126.9 ± 0.4 mg of caffeine per decaffeinated tea bag. Due to the presence of other ingredients in the tea, such as tannins, it can affect the caffeine signal at 273nm. Therefore, we are conducting gas chromatography (GC) analysis to unambiguously identify and quantify the residual caffeine content in decaffeinated tea.

(F) #22 Representing Taboo Words in Semantic Memory

Hana Jaber

Faculty Sponsor: Katherine White, Psychology

Semantic memory consists of vast networks of connected concepts, including knowledge of words and their meaning. A large body of research has explored the representation of concepts in semantic memory by defining the core features of a word's meaning (e.g., birds have wings and a beak). Research has yet to define the distinctiveness of taboo words, which are more socially inappropriate, offensive, and emotionally salient than non-taboo words. This study explored semantic memory representations for taboo words (and a control set of non-taboo words) using a feature production task: 240 participants produced at least five unique features of 72 taboo and 72 non-taboo cue words. Analyses will explore the number of shared and unique features reported for taboo and non-taboo words, as well as the semantic distance between cue words and each feature to determine the strength of their relationship. The results are expected to provide insight into the structure of taboo semantic networks as well as differences in how taboo and non-taboo words are represented in semantic memory.

#23 Weight Loss by Incretin Agonists Reduces the Risk and Progression of Obesity Associated Pancreatic Cancer

Areej Khan, Sandesh J. Marathe, and Liza Makowski

Faculty Sponsor: Qian Shen, Biology; Dr. Liza Makowski, University of Tennessee Health Science Center Department of Hematology and Oncology

Obesity is a well-established risk factor for pancreatic ductal adenocarcinoma (PDAC), a malignancy with a dismal 13% survival rate. Identifying strategies that reduce cancer risk and improve outcomes is therefore critical. Bariatric surgery-mediated weight loss significantly lowers cancer risk and improves

survival, but the impact of modern pharmacological weight-loss therapeutics on PDAC risk and progression remains poorly understood. In this pre-clinical study, we investigated pharmacological weight loss using GLP-1 receptor agonist Ozempic (semaglutide, SEMA) and triple incretin receptor agonist retatrutide (RETA) in obesity-associated PDAC. SEMA induced rapid but oscillatory weight loss (16-20%), which plateaued after two weeks, whereas vehicle-treated mice maintained stable weight. In contrast, RETA resulted in marked weight loss of ~40%. Because incretin agonists enhance insulin secretion, SEMA and RETA significantly reduced blood glucose concentrations compared to hyperglycemic vehicle controls. RETA significantly reduced gonadal white adipose tissue mass, an effect not observed with SEMA. Importantly, PDAC progression was significantly blunted with RETA, resulting in a 14-fold reduction in endpoint tumor volume, compared with a 4-fold reduction with SEMA. Tumor weights were also most significantly reduced in RETA-treated mice. Collectively, these findings suggest that incretin agonist-mediated weight loss may reduce PDAC risk and slow progression in obesity-associated pancreatic cancer.

#24 Investigation of Et^{Fu} PDI Ligand in Coordination with Abundant First Row Metals

Kathleen Modder and Will Eckenhoff

Faculty Sponsor: Will Eckenhoff, Chemistry

Recently, we have published Nickel complexes with Et^{Py} PDI [(1,1'-(pyridine-2,6-diyl)bis(2-(pyridin-2-yl)ethyl)ethan-1-imine)] and Et^{Im} PDI [1,1'-(pyridine-2,6-diyl)bis((2-(1H-imidazol-4-yl)ethyl)ethan-1-imine)] ligands for use in proton reduction. Based on the results of this study, we were interested in the effect of increasing the acidity of the pendent base moiety to increase its catalytic activity. This led us to investigate furans as pendent bases for the complex. Synthesis of $\text{Zn}(\text{Et}^{\text{Fu}}\text{PDI})^{2+}$ complex and the ligand [1,1'-(pyridine-2,6-diyl)bis(2-(furan-2-yl)ethyl)ethan-1-imine] through demetallation was successful. Synthesis of the respective Ni complex has proven to be unexpectedly challenging, so a switch was made to a Pd (II) complex to investigate applying the ligand for heterobimetallic systems.

#25 Color Perception: On-the-Go Saturation Discrimination

Milena Murov, Haniyah Ismail, Cameron Ogg

Faculty Sponsor: Cameron Ogg, Biology and Neuroscience

Color perception involves three components: hue, saturation, and luminance. Hue identifies the color (purple, yellow, etc.), saturation describes the intensity or vividness of the color, and luminance refers to the brightness of the color. Previous studies have established that saturation is harder to discriminate than hue and that saturation discrimination accuracy varies within established color quadrants (Danilova et. al 2016), Studies like these require a specialized lab set-up for testing and often have small sample sizes. We are interested in testing whether a mobile, open-source testing device (Visiomode) can support affordable, accessible data collection on color perception in a classroom setting. We plan to 1) test whether we can replicate previous findings on within-hue saturation discrimination and 2) investigate saturation discrimination accuracy when the comparisons are across-hue rather within-hue.

(F) #26 Neuroimaging characteristics in Maple Syrup Urea Disorder

Faith Mwangi, Andrea Gropman, Kosar Khaksari

Faculty Sponsors: Rebecca Klatzkin, Rhodes Summer Plus Program/Neuroscience; Dr. Andrea Gropman, St. Jude; Dr. Kosar Khaksari

Maple syrup urine disease (MSUD) is a rare inherited metabolic disorder caused by deficiency in branched-chain α -ketoacid dehydrogenase (BCKAD) complex. This defect leads to the accumulation of branched-chain amino acids (BCAA) and their corresponding ketoacids in the blood and brain. Elevated levels are neurotoxic and can result in neurological implications. Neuroimaging has played a vital role in diagnosis and management of MSUD by identifying affected brain regions and characterizing the injury. This review provides a comprehensive evaluation of the current literature on structural and functional

neuroimaging modalities used in MSUD including magnetic resonance imaging (MRI), magnetic resonance spectroscopy (MRS), diffusion tensor imaging (DTI), and electroencephalography (EEG). These modalities have demonstrated the brain stem, white matter, basal ganglia, thalamus, and other deep brain structures. In addition, MRS has contributed to the assessment of BCAA concentrations, which assists in guiding metabolic management. Furthermore, this review explores the role of functional near-infrared spectroscopy (fNIRS), a novel modality, as a complementary tool in MSUD evaluation. fNIRS offers lower cost, portability, and noninvasiveness, allowing for convenient assessment of cerebral oxygenation and hemodynamics. We propose that using fNIRS with established imaging modalities may enhance accessibility, address limitations, and improve monitoring and outcomes in patients with MSUD.

#27 Structural investigation of PDI ligand in coordination with abundant first-row metals

Hieu Nguyen, Will Eckenhoff

Faculty Sponsor: Will Eckenhoff, Chemistry

Recently, we have published Nickel complexes with ^{Et}PyPDI [1,1'-(pyridine-2,6-diyl)bis(2-(pyridin-2-yl)ethyl)ethan-1-imine] and ^{EtIm}PDI [1,1'-(pyridine-2,6-diyl)bis(2-(1H-imidazol-4-yl)ethyl)ethan-1-imine] ligands for use in proton reduction. Based on this study, we were interested in increasing the acidity of the pendent base moiety to potentially increase its catalytic activity, leading us to investigate furans as pendent bases for the complex. Synthesis of Zn(^{EtFu}PDI)²⁺ complex and the ligand [1,1'-(pyridine-2,6-diyl)bis(2-(furan-2-yl)ethyl)ethan-1-imine] through demetallation was successful. However, synthesizing respective Co, Ni complex has proven to be unexpectedly challenging. We decided to investigate applying this ligand for heterobimetallic systems with Pd(II) for potential applications such as asymmetric epoxide opening with carboxylic acids.

(F) #28 Determining the Role of PAX3:FOXO1 in the FP-RMS Cell of Origin

Muna Ogwo, Jack Hopkins, Bradley Stevens, Mark Hatley

Faculty Sponsors: Mary Miller, Biology; Dr. Jack Hopkins, St. Jude Department of Molecular Oncology; Dr. Mark Hatley, St. Jude Department of Molecular Oncology

Rhabdomyosarcoma (RMS) is the most common pediatric soft tissue sarcoma and is characterized by the hyperproliferation of undifferentiated muscle cells. The Hatley Lab identified that during endothelial cell differentiation, stem cells can become fusion positive RMS (FP-RMS) with the introduction of the oncofusion gene PAX3-FOXO1 (P3F). This suggests that FP-RMS can arise from multiple lineages, and calls into questions whether the lab standard patient-derived FP-RMS cell lines also have variable cell origins. It is likely that P3F has the ability to induce this change by altering the transcriptome. To determine the cell of origin, we tested several patient-derived FP-RMS cell lines under experimental conditions to find gene variations and determine endothelial nature. These experiments were inconclusive; endothelial gene expression was high in some lines and lower in others. Thus, we are employing an MS2 reporter system which will induce MS2 loops into P3F's mRNA that are visualized by fluorescent coat proteins. This allows us to track P3F transcription and from this, we hope to determine if P3F is contributing directly with gene expression which could trigger the endothelial cell fate to shift. Understanding the cell of origin provides insights into FP-RMS circuitry and can help us develop effective therapeutics.

#29 Task-Free Behavioral Flexibility

Misha Agrawal, Mira Berkey, Clara Park

Faculty Sponsor: Cameron Ogg, Biology

Behavioral flexibility, a core feature of adaptive decision making, is strongly shaped by neuromodulator systems, including dopamine and norepinephrine. Reduced flexibility has been linked to a broad range of conditions that affect learning and behavior, including autism spectrum disorder and attention-

deficit/hyperactivity disorder. Behavioral flexibility in animal studies is often summarized with a flexibility score calculated from performance in reversal learning tasks, which require the ability to adjust a learned strategy when the contingencies for reward change. While these tasks and scores provide important information, they offer limited insight into task-free behavioral patterns that may also reflect flexibility. Our goal is to develop an undergraduate-accessible method using free, open-source tools (e.g. DeepLabCut) to investigate behavioral patterns in video of naturalistic exploratory behavior. In the future, we will explore how task-free measures of behavioral flexibility correlate with traditional flexibility scores and neuromodulator measurements.

(F) #30 Applications of Computation in Biology

Victor Lopez Perez

Faculty Sponsors: Phil Kirlin, Computer Science; Dr. Xin Zhou, St. Jude Department of Computational Biology

Computational biology has become an essential component of modern biomedical research. Its origins trace back to the 1960s, when researchers began using computers to compare protein sequences and study evolutionary relationships, marking one of the earliest applications of computation in biological research. Today, advances in high-throughput sequencing generate massive genomic datasets that require sophisticated computational tools for analysis and visualization. At St. Jude Children's Research Hospital, I contributed to the development of ProteinPaint, an interactive web platform designed to visualize complex cancer genomics data. My work focused on improving the Disco plot visualization module, which displays genomic alterations such as structural variants, copy number variations, and single nucleotide variants across chromosomes. Using TypeScript and D3-based visualization frameworks, the Disco Plot presents sequence mutations, copy number variations, loss of heterozygosity, and structural variations and gene fusions using a circular layout, helping researchers identify chromosomal abnormalities and mutation patterns in pediatric cancer genomes. The plot integrates coding and noncoding mutational events obtainable from whole-genome DNA sequencing and whole transcriptome sequencing, and provides a powerful birds-eye-view of the integrative profile of individual cancer samples.

#31 Vertebral Variation in Juvenile Goby Fish, 'O'opu Nopili, in Relation to Escape Performance **Emily Pertuit, Marissa Maheu, Alexandria Johnson, Richard W. Blob, Heiko Schoenfuss, Kelly Diamond**

Faculty Sponsor: Kelly Diamond, Biology

Vertebral morphology can have important impacts on how animals move, especially for animals that rely on axial bending as their primary mode of locomotion. Differences in vertebral number and relative size can affect escape performance by influencing their ability to bend laterally to produce thrust. We studied juvenile goby fish, o'opu nopili (*Sicyopterus stimpsoni*), as a model system to test relationships between vertebral morphology and escape performance. We predicted that fish with longer, taller vertebrae and more distance between vertebrae would have more vertebral surface area for muscle attachment and, hence, would accelerate faster. Alternatively, fish with shorter and/or a greater number of vertebrae could increase the amount of bending possible, which could positively impact acceleration. To investigate this, we compared escape performance data, including minimum chord distance and acceleration, to 3D vertebral measurements along the vertebral column. Similar to adult o'opu nopili, metrics of juvenile vertebral morphology vary along the vertebral column. Intervertebral distance was greatest at the caudal end, while the opposite pattern was observed for vertebral height. Vertebral length was shortest in the mid-section. This study highlights how variation in vertebral size can influence fish bendiness, affecting acceleration and predator escape performance.

#32 Love Lost, Rival Found: Evolutionary vs. Social Explanations for Rebound Distress

Jessie Poulter, Sierra Peters, Eva Schillinger

Faculty Sponsor: Sierra Peters, Psychology

Breakups are painful, and they can feel even worse when an ex-partner starts dating someone new. This project tested whether affective, cognitive, and behavioral reactions to an ex-partner's rebound depend on sexual orientation and the rebound partner's gender. Evolutionary accounts of intrasexual competition predict greater distress when the rebound partner is a same-gender rival. Sociocultural accounts of heteronormativity predict greater distress when the rebound relationship is heterosexual because it is often viewed as more normative and legitimate; thus, for gay and lesbian individuals, distress should be higher when the rival is different-gender. We recruited 402 adults identifying as straight, bisexual, or gay/lesbian. In an online experiment, participants imagined an ex entering a new relationship and were randomly assigned a male or female rebound partner, creating heterosexual versus same-gender rebounds. Participants then reported affective distress, legitimacy-related cognitive appraisals, and behavioral intentions (e.g., monitoring, contacting, confronting). Results supported both perspectives in part. Affective distress was higher when the rebound partner matched participants' gender, but gay/lesbian participants reported high distress regardless of partner gender. Legitimacy concerns were stronger for heterosexual than same-gender rebounds, implying that perceived legitimacy depends on the relationship's gender composition. Overall, rebound distress reflects both rivalry and heteronormative legitimacy cues.

#33 Using Data Analysis and Statistics to Assess Zip18R Modification in C.TNC-CAR T cells

Riya Pramod

Faculty Sponsors: Erika Parr, Mathematics and Statistics; Erin Bodine, Mathematics and Statistics; Dr. Liqing Tian, St. Jude Department of Bone Marrow Transplantation & Cellular Therapy

Chimeric antigen receptor (CAR) T-cell therapy is a specialized immunotherapy, which engineers a patient's immune cells to effectively target cancerous tumors. Despite showing promise for pediatric hematological malignancies, CAR T-cell therapy has many barriers in the solid and brain tumor realm. To overcome these barriers, recent studies find improving the effector function of the CAR T-cells through a leucine zipper-based chimeric cytokine receptor (Zip R) allows the CAR T-cells to improve expansion and cytokine secretion. Specifically, oncofetal pediatric tumors express the C.TNC protein domain, and Zip 18R, a Zip R activating interleukin-18 signaling pathways, has shown to significantly improve antitumor activity of C.TNC-CAR T-cells. How does the (Zip18R) modification alter the gene expression and signaling pathways in C.TNC-CAR T cells following stimulation with tumor cells, and what specific transcriptional programs are induced or repressed by Zip18R that contribute to enhanced antitumor activity over time? To determine this, numerous data analyses using scRNA-seq, Linux, and R are used.

#34 Developing a modular expression system for the seed endosperm in Arabidopsis thaliana

Peyton Rohrig, Ella Myers

Faculty Sponsor: Jonathan Fitz Gerald, 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.

#35 Examining the Christian-Science Stereotype for Religious "Dones"

Lilia Russell and Matt Weeks

Faculty Sponsor: Matt Weeks, Psychology

In the US, there is a stereotype that Christians are neither as competent in nor as trusting of science as the general population. Formerly religious individuals (known as religious "Dones") show lingering intrapersonal effects of their former religious beliefs. Thus, we propose that the application of the Christian-Science stereotype could linger as an interpersonal "residue" on the religiously disaffiliated. Surveying 105 self-reported Christians and 74 Atheists/Agnostics, participants judged societal stereotypes (Descriptive) around Competence in Science, Trust in Science, and Analytical Thinking of three groups: Christians, Dones, and Atheist/Agnostics. Participants also provided their own endorsement of these stereotypes (Prescriptive) of the same groups. Results showed Atheists/Agnostics continued to hold and endorse the stereotype of lower competence and trust in science for the former Christian (Done) compared to the Never Believers (i.e., Atheists/Agnostics who never were religious). Christians were aware of and endorsed the stereotype about competence and trust in science. Future research needs to look into how these stereotypes affect real world applications, like hiring for a lab, as well as look into how other religious individuals and other countries look at this stereotype and if they hold it to the same degree Americans do.

#36 The Effect of Clothing Color On The Perception Of Social Status In An Ensemble

Liam Scarborough Jones, Rachel Gammill, and Payton Stevens

Faculty Sponsor: Matt Weeks, Psychology

Research studies in the past have investigated the extent to which people can determine a summary of a group's characteristics through ensemble perception, one such characteristic being social status. We found that there was not much research looking into the impact of the color of clothing in perceiving an ensemble, particularly in perception of social status. Our hypothesis is that the uniformity of grayscale images will lead to the average social status of a group being perceived more accurately. This is because the visual saliency of color in the ensemble will draw attention towards specific individuals within the ensemble rather than the ensemble as a whole, leading to a less accurate perception of the average social status of the ensemble. Our study is a between-subjects design, and the conditions will be colorized vs gray-scale images. The process of the study involves the participants being shown images of ensembles, each with 4 people, for approximately 2 seconds, followed by a ladder of 10 rungs which the participants use to rate the average social status of the ensemble they had just seen, with 1 being the lowest class and 10 being the highest class.

#37 An Exploration of Semantic Memory in Preschool-Aged Children's Narratives

Sydney Adams, Julia Schuetze, and Katherine White

Faculty Sponsor: Katherine White, Psychology

Semantic memory is a form of long-term memory that allows for the storage and retrieval of knowledge and concepts. Semantic memory develops rapidly during childhood, as children gain new knowledge of words. Previous research has shown children who shared stories in a dyadic context retrieved more additives, conjugations and told longer stories than with an adult. Independent of storytelling context, prior research has suggested that the coherence of children's narratives is influenced by the emotional content of the narrative. The present research explored how storytelling context influenced children's

emotional responses to stories by measuring the semantic relatedness between words ordered in the stories (i.e., semantic distance). 37 children enrolled in a summer kindergarten readiness program shared stories about sad, scared, and frustrating events in one of two contexts: with an adult or in story-sharing circles with their peers. Analyses measured the semantic distance between children's stories, which was then correlated with language measures, such as syntax (e.g., syntactic simplicity, referential cohesion). We predict that children's stories will include concepts with greater semantic connections when told in circles vs. with an adult, and that the semantic connectedness of stories will vary depending on the complexity of the emotional prompt.

#38 Convergent ensemble feature representation at the object level

Mikayla Shirley, Jason Haberman

Faculty Sponsor: Jason Haberman, Neuroscience

A prevailing question in the study of ensemble perception is whether it is supported by domain-general or domain-specific mechanisms. Evidence for domain-specificity comes from Haberman et al., 2015, which showed that error in low-level ensemble representation does not predict error in high-level ensemble representation. This raises another question: what happens to that relationship when high- and low-level ensemble features are embedded within a single object? We created stimuli in which two features, color and emotion, appeared within a single face. Dimensions could be manipulated independently, depending on the task. In separate blocks, observers ($N = 45$) adjusted the test stimulus to match either the average color or average expression of a set of faces. In expression blocks, the colors of the faces varied, but the color of the test stimulus was orthogonal to the average color of the set. The converse was true in color blocks. In contrast to previous work, preliminary results revealed a significant relationship ($r = .44$) between average color precision and average emotion precision, suggesting ensemble representations become entangled when combined within a single stimulus. While ensembles may be hierarchically organized, object-level combination may induce a connective link.

#39 A Trunkful of Enrichment: Studying Elephant Interaction with Feeding Devices

Alina Sikandar

Faculty Sponsor: Kelly Diamond, Biology; Memphis Zoo

Animal welfare in captive environments, where opportunities for natural movement can be limited compared to the wild, is an important area of research for organizations such as zoos and aquariums, which have historically focused on animal conservation. Environmental enrichment can help encourage more natural movement patterns and engage animals mentally and physically. For example, enrichment that requires elephants to reach upward for food may promote greater use of trunk, neck, and upper body muscles, while also requiring elephants to engage mentally to find openings to attain rewards. In this study, we examined how elephants interacted with enrichment items designed to promote reaching and active foraging. We analyzed zoo camera footage collected over several months. Footage was reviewed to identify when elephants began and stopped engaging with enrichment activities. Video segments were clipped and organized by enrichment type, hay nets and food-filled barrels, as well as by placement within the enclosure. Selected clips were processed using semi-automated tracking software (DeepLabCut) to track how long each item was engaged with by elephants. We then compared engagement times among elephants and across types of enrichment items. The Memphis Zoo animal welfare team could use these data to improve designs for future elephant enrichment activities.

#40 The Impact of Peer Context on Structural and Social Cognitive Features in Children's Narratives

KK Sowers, Dania Aljafari, Livy Freeman, Sophia Nappi, Sandy Mansour

Faculty Sponsor: Kiren Khan, Psychology

Oral storytelling is a social process that helps individuals make sense of their thoughts and emotions while also interpreting the mental and emotional states of others. Prior literature indicates narrative skills develop rapidly in early childhood and are most often assessed through one-on-one individual assessments, yet less is known about how peer-based story-sharing circles shape children's narrative performance. This study addresses this gap by examining how social context -adult-led individual assessments versus peer-based story-sharing circles - influence the structural and social-cognitive complexity of Black/African American preschoolers' narratives. Thirty-seven children (M = 4.91 years; 20 boys, 17 girls) enrolled in a summer kindergarten readiness program, shared stories in both contexts in response to three emotion-based prompts ("Tell me a true story about a time you felt sad, scared, frustrated"). Using a mixed-methods approach, findings showed narratives elicited in the peer-based storytelling context included more structural components (e.g., opening, closing, resolution) and social-cognitive features (e.g., internal state language, evaluatives, dialogue), with this advantage increasing by the second round of story-sharing circles. These findings suggest peer-based story-sharing circles may provide culturally-sustaining conditions that better elicit - and potentially scaffold - the depth and range of children's narrative abilities than traditional individual assessments.

(F) #41 New Treatment for Acute Myeloid Leukemia: Identification of Mini Protein Degradors of the Oncogenic Fusion Protein CBAF2T3-GLIS2

Kat Stanley and Yvan Campos

Faculty Sponsor: Liam Hunt, Biology; Dr. Alyssa Kennedy, St. Jude Center of Excellence for Leukemia Studies

In some pediatric patients with acute myeloid leukemia (AML), only oncogenic fusions are identified as the cancerous abnormalities. This suggests that these fusion proteins, driven by gene rearrangements such as CBAF2T3-GLIS2, are the main causes of AML. We focused on designing a targeted therapy for this specific oncogenic fusion, specifically on the GLIS2 domain of the protein to create a de novo PROteolysis TArgeting Chimeras (PROTACs) to degrade the fusion proteins. I used various strains of *E. coli* and plasmid constructs to express the GLIS2 protein in its region with the highest structural confidence prediction using standard molecular cloning techniques. The different constructs allowed us to ensure that the region of highest confidence of the protein was correctly folded. The different strains of *E. coli* used combated the toxicity of the protein and optimized protein induction. Once purified, the protein's GLIS2 domain will be used as a bait in designed yeast display libraries. We are collaborating with Nobel Prize winner Dr. David Baker, whose lab has designed a library of potential GLIS2 PROTAC binders. His lab will perform the yeast display experiments, and I will then work in mammalian cells to characterize protein degradation of top hits from the library.

(F) #42 Targeting CysLTR1-driven Neurovascular Dysfunction in Diabetic Retinopathy Using a Novel Montelukast Analog

Lamees Sulaiman, Amritha T.M. Seetharaman, Rajashekhar Gangaraju

Faculty Sponsor: Darlene Loprete, BMB; Dr. Rajashekhar Gangaraju, UTHSC Department of Ophthalmology

Diabetic retinopathy is a leading cause of vision loss worldwide and is driven in part by early neurovascular dysfunction, including endothelial inflammation, barrier breakdown, leukocyte transmigration, and progressive neuronal impairment. The risk of blindness is 25% higher in people with diabetes compared to those without. Prior work from our laboratory demonstrated that exposure of human retinal endothelial cells to hyperglycemic and inflammatory stress markedly upregulates cysteinyl leukotriene receptor one (CysLTR1), triggering inflammatory signaling, TNF- α -induced autophagy, loss of junctional integrity, and increased endothelial permeability. Additionally, CysLTR1 antagonist mitigated these effects, identifying this pathway as a promising therapeutic target for diabetic retinal disease. This study aims to develop and assess the effectiveness of new MON derivatives in

alleviating endothelial dysfunction and subsequent neurodegeneration in diabetic mice. Two MON analogs (MA-01, MA-02) were synthesized and evaluated through in silico docking, endothelial cell assays, and an STZ-induced diabetic mouse model. Both analogs demonstrated strong CysLTR1 binding and reduced inflammatory mediators (IL1 β , CXCL10, VCAM1, CCL2), leukocyte transmigration, and endothelial permeability in TNF- α and hyperglycemia-treated HREC cells. MA-01 showed sustained efficacy and provided sustained neuroprotection in diabetic mice over three months, supporting MON analogs as promising therapeutic candidates for diabetic retinopathy.

(F) #43 An Analysis of Modifiable Risk Factors for 30-Day Pediatric Seizure Readmissions at Le Bonheur Children's Hospital

Samuel Tan, Basanagoud Mudigoudar, MD, Brittany Williams, DNP, Kelly West, MSN, Lai Brooks, DNP, Tracee Ridley-Pryor, DNP, Kari Passafume

Faculty Sponsor: Qian Shen, Biology; Dr. Basanagoud Mudigoudar, Le Bonheur Children's Hospital

Pediatric epilepsy readmissions present a significant clinical issue for both families and the healthcare system, with national 30-day readmission rates ranging from 8% to 10.4%. While medical history or developmental conditions are non-modifiable risk factors, literature suggests that approximately 21.5% of these results are preventable through improved discharge procedures. This study analyzed seizure-related Emergency Department (ED) encounters at Le Bonheur Children's Hospital between May 2023 and May 2025. Following a systematic screening of 65 cases, 22 patients met the criteria for 30-day readmission. Categorization of these patients revealed that 59% (n=13) were unplanned returns due to uncontrolled seizures or complications, while the remainder were planned admissions to the Epilepsy Monitoring Unit or for neurosurgery. By separating data into non-modifiable demographic variables and modifiable hospital factors, such as rescue medication education and social work involvement, four primary causes of readmission were identified: unknown etiology, illness-related triggers, medication noncompliance, and lack of medication access. Because noncompliance and access can be targets for intervention, they are the primary focus for ongoing quality improvement. These findings provide Le Bonheur with a clinical baseline to improve standardized protocols, aiming to reduce avoidable ED return visits and enhance overall patient outcomes.

#44 The Effect of Race in the Ensemble Perception of Social Status

Shamiksa Thapa, Trinity Lambert and Ava Mackie

Faculty Sponsor: Matt Weeks, Psychology

Recognizing social class is a highly researched topic with multiple dimensions. Recently, research has increasingly examined how ensemble perception contributes to the formation of entitative group judgments. Prior studies suggest that an amplification effect exists when participants evaluate ensembles of racial out-group stimuli; however, these studies have been conducted primarily with White male participants, leaving limited research with participants of diverse racial backgrounds. The present study aims to examine the mechanism of the amplification effect by testing whether it is driven by in-group versus out-group dynamics. To investigate this, we will recruit two participant groups: White males and Black males aged 20 to 35. In Phase 1, participants will rate individual stimuli on perceived social class (using a 1-10 ladder scale), and the average rating for each individual set of four stimuli will be calculated. In Phase 2, participants will evaluate the ensembles themselves, allowing us to measure the amplification effect as the difference between ensemble judgments and the average of individual ratings. We hypothesize that participants will exhibit stronger amplification effects when judging racial out-group ensembles versus in-group ensembles, reflecting in-group/out-group biases and the tendency to perceive out-groups as more entitative.

#45 Modeling State-Dependent Neural Dynamics in Clinical EEG with HM-MINDy

Abril Unda and Maanasa Yepuru

Faculty Sponsor: Addison Schwamb, Computer Science

EEG recordings in clinical settings show brain activity changes over time as the brain moves between states. Detecting when these changes happen is important for understanding neural dynamics and improving how clinical brain data is interpreted. In this study, we test HM-MINDy (Hidden Markov Mesoscopic Individualized Neuro-Dynamics), a computational modeling framework that combines a Hidden Markov Model with a dynamical systems model of brain activity, on clinical EEG data. Unlike many traditional EEG analysis methods that rely on fixed time windows or known task labels, HM-MINDy tries to detect changes in brain states directly from the data itself while estimating how brain regions interact during those states. Previously, this modeling methodology has been validated on healthy subject data but not on clinical data. We now apply this model to clinical EEG recordings to see if it can identify meaningful transitions in neural activity and differences between brain states. So far, the results suggest that the model is able to detect distinct patterns of neural activity and capture changes in brain dynamics that might not be obvious when using standard analysis approaches. Overall, this suggests that HM-MINDy could be useful for studying complex and changing brain activity in clinical EEG data.

#46 Enhanced heterochromatin correlates with longevity, cold stress and starvation resistance, and altered feeding in *Drosophila melanogaster*

Yash Vyavahare, William May, Charlotte Hill, Sathvik Nath, and Liam Hunt

Faculty Sponsor: Liam Hunt, Biology

Position-effect variegation (PEV) describes the stochastic spread of heterochromatin, which transcriptionally silences adjacent genetic sequences. In *Drosophila melanogaster*, artificial selection for the PEV phenotype produced enhanced heterochromatin (ENH) variants that possessed greater longevity and survival during starvation. This study investigates correlations between starvation survival, heat and cold shock resistance, feeding behavior, and heterochromatin. We hypothesize that factors regulating physiological survival under these stressors also regulate heterochromatin function. Flies subjected to heat selection at 32°C for multiple generations will be assessed to determine if enhanced heat resistance indicates altered heterochromatin formation in the PEV phenotype. Similarly, flies exposed to 4°C will select for cold-resistant populations and assess heterochromatin. As ENH flies do not show improved survival under heat stress, cold stress resistance will be tested next. Current findings suggest that enhanced heterochromatin is associated with resistance to cold but not heat. After optimization, dye-labeling assays quantified food intake in PEV flies and showed increased food intake in ENH flies compared to controls. This potentially explains their increased survival during starvation and links factors controlling feeding behavior with heterochromatin-mediated silencing. While these physiological changes appear connected to heterochromatin function, the underlying gene or pathway mediating this effect remains unknown.

(F) #47 Multiple Anti-Seizure Medications Quality Improvement Project

Avery Wegmann, Dr. Sarah Weatherspoon, Dr. James Wheless, Dr. Nir Shimony

Faculty Sponsor: Will Eckenhoff, Chemistry

Epilepsy is a common neurological disorder characterized by recurrent seizures. Antiseizure medications (ASMs) are the first line treatment for epilepsy. Patients who continue to have seizures despite two or more appropriately chosen and dosed ASMs are considered intractable, and non-pharmacologic interventions such as surgery are considered. This study identified 225 patients on two or more ASMs at the time of their most recent neurology outpatient appointment at Le Bonheur Children's Hospital in Memphis, Tennessee to describe their clinical features and determine a quality improvement based pathway to expedite their evaluation for surgical intervention in the Epilepsy Monitoring Unit (EMU).

Descriptive data including demographic and epilepsy factors were extracted from patients' electronic medical records. Of the 225 patients: 79 were seizure free and 151 patients had been evaluated in the EMU within the past three years suggesting optimized neurologic management. However, 82 patients were identified with intractable epilepsy who had not had recent evaluation in the EMU within the past three years, representing a cohort who would benefit from further expert evaluation in the EMU to determine if they are surgical candidates.

(F) #48 Evaluating School-Based Support for Children with Chronic Tic Disorders and Tourette Syndrome in Urban and Rural Environments

Mallory Wenk, Winston Wolters, MD, Robin Jack, MD, Sapna Shah, MD, Tracee Ridley-Pryor, DNP, Shalini Narayana, PhD, Madison Owens Shunte

Faculty Sponsor: Kate LeCroy, Biology; Robin Jack, MD, Le Bonheur Children's Hospital Department of Neurology

Objectives: Chronic Tic Disorders (CTD) and Tourette Syndrome (TS) affect 1 in every 100 school-aged children in the United States. Yet, many studies regarding these patients utilize clinician assessments and parental reports, not the patients themselves. This study's purpose is to examine the perceptions of pediatric patients with CTD or TS and their parents regarding difficulty navigating the school environment. **Methods:** Two surveys were developed, one for patients with CTD/TS and the other for parents or guardians. They ask how parents and patients perceive the child's performance in school and whether they feel supported by school staff, teachers, and peers regarding the child's diagnosis. Another factor examined is whether there are differences in the perceptions of school support between urban and rural schools. **Results:** Preliminary results indicate pediatric patients with CTD/TS in urban and rural areas experience common challenges in school functioning and difficulties in peer relationships; however, families surveyed in rural areas report higher levels of school-based support than their urban counterparts. **Conclusions:** Collecting additional responses to these surveys will provide clinicians with more data on the obstacles children with CTD/TS encounter in school environments, and a better foundation for developing appropriate interventions to support their success in school.

POSTER SESSION #2

2:45 pm – 4:15 pm

BCLC

#1 Characterization of Novel Catechols to Further Characterize the Substrate Space of L-DOPA Dioxygenases

Hannia E. Antunez, Joe Hane, Keri Colabroy, Katherine Hicks, Larryn Peterson

Faculty Sponsor: Larryn Peterson, Chemistry; Dr. Keri Colabroy, Muhlenberg College; Dr. Katherine Hicks, SUNY Cortland

Dioxygenase enzymes are potent catalysts that cleave highly stable catecholic rings, whose inherent stability renders them resistant to degradation. These rings are present in dopamine and numerous other biologically important molecules. L-DOPA dioxygenase, which participates in pathways associated in the biosynthesis of the antibiotic lincomycin, can accommodate several dopamine derivatives at the 6-position. Expanding our understanding of the substrate scope of this enzyme therefore requires the investigation and characterization of novel catechol derivatives containing modified tails with varying steric and electronic properties. In this work, novel catechol derivatives, such as 5-(2-hydroxyethyl)benzene-1,2-diol (HOPE), were synthesized and characterized to evaluate their potential interactions with L-DOPA dioxygenase. Preliminary work with the enzyme demonstrated that HOPE was an inhibitor, and efforts are underway to crystallize it in the protein. High-performance liquid chromatography was used to analyze compound stability and degradation, while cyclic voltammetry was employed to determine redox potentials. Additionally, pKa studies were conducted to assess how protonation state may influence substrate binding. These physicochemical properties provide insight into factors that govern substrate recognition and binding to L-DOPA dioxygenase.

(F) #2 Developing and validating a QUEST-based method to measure odor detection thresholds

Lindsey Barnes, Yasmeen Abunasrah, Anthony Matejicka, Sumay Frueh, James Howard, Laura Shanahan

Faculty Sponsor: Laura Shanahan, Psychology

Odor detection thresholds vary across individuals, and they decline with age and in some disease states. Thus, accurate and efficient methods for quantifying these thresholds are essential. Currently, the staircase algorithm is applied almost universally to navigate stimulus intensity steps in odor detection threshold tasks, but the QUEST algorithm is a more flexible and efficient alternative. QUEST is routinely implemented to measure detection thresholds in the visual domain, but there are only two studies along these lines in the olfactory domain, both of which utilize odorized pens for stimulus delivery. Here, we develop and validate a QUEST-based method to measure odor detection thresholds with a computer-controlled olfactometer. More specifically, participants strived to detect a weak odor among odorless foils in a 3-alternative forced choice task, where QUEST directed the stimulus intensity trajectory to be maximally informative. Next, participants completed a similar odor detection task based on the more established method of constant stimuli. We found that the QUEST approach yields a threshold output that is comparable to that from the method of constant stimuli, despite requiring far fewer trials. This suggests that the method is an accurate and expedient tool, which could be leveraged in olfactory research and clinical settings.

#3 Identification of Novel Genes Important for Cln3 Cell Division in *Saccharomyces cerevisiae*

Willow Blythe, Yzziane Dsamou, and Sharika Sivakumar

Faculty Sponsor: Mary Miller, Biology

Properly regulated cell division is important and can be a key step to cancer development when dysregulated. A critical commitment point in cell division is the Start checkpoint (G1/S). A key player in

this checkpoint is the G1 cyclin Cln3, which activates the cyclin-dependent kinase to trigger a transcriptional response required for commitment to the cell cycle. This function of Cln3 requires movement of the protein into the nucleus and is dependent on the Cln3 nuclear localization signal (NLS). A genetic screen was carried out to identify genes important for the Cln3 NLS-dependent nuclear import. We hypothesized that the genes identified in the screen are important for full-length Cln3's ability to support growth and division. To test this hypothesis, we conducted colony formation assays to determine the function of Cln3 in the presence and absence of genes identified in this screen. Our data supports a role of these genes in Cln3-dependent cell division and shows specificity to Cln3. These data are interesting given that they identify novel genes important for Cln3 activity and are highly conserved in human cells, so they may play a role in tumor progression when mutated.

#4 The Effect of "Rethink Stress" Metacognitive Mindset Intervention on Threat Stress Perception and Snack Intake Following a Social Stressor

Jacqueline Boyanchek, Olive Bratcher, Anna Callender, Elena Gentry, Areej Khan, Shifa Qureshi
Faculty Sponsor: Rebecca Klatzkin, Neuroscience

Stress is a universal aspect of human experience. Although stress tends to induce preferences for comfort foods over healthier foods, the stress-eating relationship is highly variable. Stress appraisals and stress mindset impact the stress response and may contribute to this variability. A positive stress mindset (i.e., stress is enhancing) may protect against the maladaptive effects of threat stress appraisals (i.e., perception that the demands of a stressor exceed resources). The goal of the current study was to determine if the impact of stress mindsets on stress appraisals has downstream effects on stress-eating. Undergraduate females (n = 19) were randomly assigned to one of two conditions where they watched four short videos: an intervention or a control group. The "Rethink Stress" Mindset Intervention group watched videos supporting the importance of mindsets in shaping health, performance, and stress, while the control group watched videos supporting natural scientific phenomena. Participants then underwent the Trier Social Stress Task, rated how much they felt they had the resources to meet the demands of the stress, and underwent a snack food taste test. Intervention participants reported decreased perceptions of threat and ate numerically, but not statistically significantly, less M&Ms compared to women in the control group.

#5 Characterizing novel fluorescent reporters of heterochromatin mediated silencing **Narjis Alabes and Ethan Cheng**

Faculty Sponsor: Liam Hunt, Biology

Position Effect Variegation (PEV) is a form of heterochromatin-mediated epigenetic silencing in which a gene placed near heterochromatin becomes variably inactivated across cells. Traditionally, PEV studies in *Drosophila melanogaster* rely on white gene, where mosaic eye pigmentation reflects stochastic silencing. However, this system restricts visualization of epigenetic silencing primarily to adult eye tissue. This study aims to establish novel fluorescent reporters that allow detection of heterochromatin-mediated silencing in additional tissues. To achieve this, we replaced a heterochromatin-localized white gene with a red fluorescent protein (RFP) reporter driven by the 3xP3 promoter. RFP expression was examined in transgenic fly lines and compared with control lines where the same reporter was inserted in euchromatin. Fluorescence microscopy revealed RFP expression in several tissues, including the brain, hindgut, and anal pads. Importantly, mosaic RFP patterns were observed in the anal pads and in the brain, indicating cell-to-cell variation consistent with epigenetic silencing caused by heterochromatin proximity. In contrast, control lines with euchromatic insertions showed more uniform reporter expression. These findings demonstrate that fluorescent reporters can serve effective alternatives for visualizing PEV outside the adult eye. Future work will investigate modifiers of variegation and test GAL4/UAS-based reporters for studying heterochromatin-dependent silencing.

#6 Imaging parton evolution with Three-Point Energy Correlators in pp collisions at the LHC **Ada Collins**

Faculty Sponsors: Greg Vieira, Physics; Dr. Rithya Kunnawalkam Elayavalli, Vanderbilt University Department of Physics

High-energy collisions, such as those observed by the Compact Muon Solenoid (CMS) experiment at the Large Hadron Collider, produce showers of hard scattered quarks and gluons, known as jets. The complex structure of jets holds information on parton evolution and aids in improving our understanding of quantum chromodynamics (QCD). Three-point energy correlators (E3C) relate the energy of three particles and their spatial configuration within the jet and provide a robust method of quantifying jet substructure. Projecting E3C into the cartesian plane visualizes different triangle shapes that contribute to a jet's geometry and encourages a more intuitive understanding of how the jet evolves in vacuum and in heavy ion collisions. Preliminary results using proton-proton collision data from CMS are presented, studying projected and full E3C differentially in jet transverse momentum and jet radius. These studies help us understand QCD and also serve as a useful reference for larger systems, including proton-lead and lead-lead collisions.

#7 Building Community within the PTO: How One PTO Does Just That **Hannah Davis**

Faculty Sponsor: Laura Kelly, Educational Studies

Parent-teacher organizations (PTOs) are often utilized as means of closing funding gaps that local, state, and/or federal funds did not cover. Yet, it is important to note PTOs are notably dominated by white, middle- and upper-class parents, who often have more time and resources to give than other parents, which makes it harder for minority parents to participate, communicate the needs for their child, and find community within their child's school district. While this is crucial to keep in mind, my research aims to cover the gap in literature covering what PTOs are doing right to create inclusive communities. I use three sources, an interview with a PTO president, a PTO Welcome Packet, and emails between the PTO president and other families, from an elementary school in the Memphis Shelby County School (MSCS) district to highlight how one socio-economically diverse school PTO aims to close their most prominent gaps. The results highlight how some PTOs are trying to eliminate barriers, but that many of the barriers are systemically intertwined.

(F) #8 AI-Assisted Development of an Interactive Platform for Insights on Some Combinatorial Games

Aayan Pratim Deb and Soumitro Shovon Dwip

Faculty Sponsor: Eric Gottlieb, Mathematics and Statistics

In summer 2025, we developed an interactive platform for playing a suite of combinatorial games on integer partitions. We describe the process by which we used to develop the necessary code. We used several AI models in domains with which we had little familiarity to speed up the development process. Apart from multiplayer capabilities, the most notable feature we implemented was the "analysis-mode" feature. This feature was instrumental in simulating results for further academic investigations of the games, in particular the "Corners" game. This data allowed us to formulate a number of conjectures, some of which we subsequently proved. We will describe some of the games and the results that we find most compelling. Emphasis would be on what new opportunities embedment of AI could open up in research.

#9 The Effects of Story Prompts and Rounds on Types of Peer Comments Elicited in Story-Sharing Circles

Olivia Freeman, Eeve Corbin, KK Sowers, and Akshitha Natarajan

Faculty Sponsor: Kiren Khan, Psychology

Personal narrative skills play a critical role in early childhood cognitive and social development. This study investigates how peers scaffold one another's narratives through follow-up questions and comments during daily story-sharing circles. Participants were recruited through the Summer Success Program, a four-week intensive kindergarten readiness program focused on early academic and social-emotional skills. Using a matched-control design, 20 participants between the ages of 4 and 5 were balanced across four storytelling circles on key variables, including age, gender, baseline narrative skills and levels of extraversion. Children's questions and comments were coded for different levels of scaffolding, ranging from simple repetition to clarification, requests for information, and requests for opinions or evaluations of story content. We hypothesized that the types of peer questions and comments would vary across storytelling rounds (Round 1 vs. Round 2) and emotional prompts (stories about a time they felt sad, scared, or frustrated), with a shift toward higher levels of scaffolding over time. Results demonstrated increases in peer comments and questions across rounds, particularly those referencing emotions, opinions, and perspectives. These findings highlight the potential of peer-focused storytelling activities as effective approaches for fostering children's narrative and social-emotional skills.

#10 Synthetic Seed Features for Classification Augmentation using Generative Adversarial Networks (GANs)**Mallory Goldstein and Chathurika Abeykoon****Faculty Sponsor: Chathurika Abeykoon, Data Analytics/Mathematics and Statistics**

Accurate classification of seed species and varieties based on morphological characteristics-such as area, perimeter, compactness, shape, and kernel dimensions-is essential for applications in agriculture, seed conservation, and biodiversity research. However, the limited availability of labeled seed datasets, particularly for underrepresented species, poses a significant challenge for training robust machine learning models. To address this limitation, this study proposes the use of Generative Adversarial Networks (GANs) to generate synthetic seed feature data for dataset augmentation. The primary objective is to mitigate class imbalance by enriching existing datasets with realistic synthetic numerical features, thereby improving the performance and generalization capability of seed classification models. A Conditional GAN (CGAN) is trained on seed morphological attributes and geometric features while conditioning the generation process on seed species labels. In addition, a classification Wasserstein GAN with Gradient Penalty (CWGAN-GP) is implemented to enhance training stability and produce more realistic feature distributions. This framework provides a scalable approach for overcoming data scarcity in seed classification tasks, with potential applications in agricultural automation, seed bank management, and ecological research.

#11 The Story of Soil Pollution in Memphis**Alivia Griwatch and Ava Tighe****Faculty Sponsor: Kate Shields, ENVS**

The goal of our project is to expand and challenge the notion of "pollution", as it is not limited solely by air data. We also hope to see how it impacts both people and place in understanding the environmental injustice at hand. Our research question(s) may be: How does soil pollution coincide with population demographics in Memphis? How could community efforts address soil pollution? How does the environmental justice movement in Memphis overlook soil pollution? The data we plan to use comes from a community member who collected soil data from various sources to bridge the gap between community and academia. We will visualize the role that soil plays in the story of pollution in that highest levels often coincide with the lowest income and Black or minoritized neighborhoods in Memphis.

#12 Developing an Arabidopsis protoplast system to assay epistasis in chromatin remodeling pathways

Henry Hohn, Jonathan Fitz Gerald

Faculty Sponsor: Jonathan Fitz Gerald, Biology

Given the time required to generate stable transgenic plants, many laboratories are increasingly using protoplast-based systems to rapidly test gene function. We previously identified a genetic interaction between CHR23, a SWI/SNF-type chromatin remodeling ATPase, and CHR7, a CHD3-type chromatin remodeler related to the PICKLE/PKR2 family, in the regulation of seed size in *Arabidopsis thaliana*. These proteins belong to distinct chromatin remodeling families that regulate gene expression by altering nucleosome organization. We hypothesize that the observed genetic interaction arises from antagonistic activity between these remodelers or from epistatic regulation of shared transcriptional targets. To test this hypothesis, we are optimizing a protoplast-based transient expression system. Our approach is to express 35S::CHR7-GFP and 35S::CHR23-GFP fusion proteins in their reciprocal mutant backgrounds. Protoplasts expressing the GFP-tagged proteins will be isolated by fluorescence-based sorting and subjected to RNA-seq analysis to identify changes in downstream gene expression. These experiments will help determine whether CHR7 and CHR23 interact antagonistically or epistatically in regulating transcriptional programs associated with seed size.

#13 Do territorial frogs form dominance hierarchies in groups?

Phil Nye, Sarah Westgate, and Kallen Huth

Faculty Sponsor: James Tumulty, Biology

When competing for limited resources, individuals of a species form "territories" or a fixed area where one individual maintains sole access to resources by excluding other individuals. Other species, those in limited spaces, form dominance hierarchies where one individual has priority access to resources while other individuals remain in subordinate roles. Thus, if territorial animals occupy the same space, they could form dominance hierarchies. Mimic poison frogs (*Ranitomeya imitator*) are a territorial species specifically unique in forming monogamous pair bonds, with both parents caring for offspring. In nature, *R. imitator* use vocalizations to defend territories, but their territorial behavior is relatively unknown in captivity. This study aims to examine whether *R. imitator* form dominance hierarchies when placed into small mixed-sex groups in an enclosure mimicking their natural habitat. If so, we expect only one male per group to call and mate with females. Furthermore, removing the 'dominant' male frog should cause a new dominant male to emerge within the group. To test this, multiple mixed-sex groups, each with five frogs, were housed in different enclosures. Male dominance was tracked based on vocalizations during observational periods, noting the individual calling and how frequent they call, and reproduction and tadpole carrying.

#14 Investigation of protein-protein interactions of the Rho-family GTPase RhoA with PKC orthologue PkcA and scaffold protein PaxB with regulator protein Hof1 in *Aspergillus nidulans*.

David Jackson, George Fisher

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

The focus of this research is to understand protein-protein interactions in the filamentous fungus of small GTPase proteins and binding targets in the filamentous fungus *Aspergillus nidulans*. Five GTPase proteins are encoded by the genome of *A. nidulans*, and projects within our lab have demonstrated subcellular localization patterns for all of these. The particular interactions that we are interested in are between the Rho-family GTPase RhoA and the *A. nidulans* orthologue of Protein Kinase C (PkcA), alongside the scaffold protein PaxB and the cytokinesis regulator protein Hof1. Previous research provides phenotypic evidence of interaction, motivating the use of the Y2H procedure with vectors pGBK and pGAD to understand these two sets of proteins. After performing a double transformation into yeast, the separate pairs underwent plus/minus histidine tests to identify activation of the HIS3

reporter gene in yeast, which is indicative of protein-protein interaction. To further understand the interactions of these proteins, we have performed site-directed mutagenesis on RhoA, forcing it to be constitutively active. We have also performed a CAAX box deduction that has delocalized the protein. Currently, we have begun performing strategic truncations of PaxB to identify specific regions that might interact with Hof1.

(F) #15 After The Bell Rings: New Media As Supplemental Educational Resources

Jasmine Jeffries

Faculty Sponsor: Joy Brooke Fairfield, Media Studies

The complete revocation of federal funding to PBS Kids has sparked numerous conversations over the last year about the necessity of educational media as a whole. Is it possible for new media- that is, television and video games- to be an effective educational resource for children? Over 700 pages of scholarly writing over 30 years overwhelmingly say 'yes'; while there are no substitutes for teacher learning, new media has been proven to promote critical thinking skills, retention of course modules, language acquisition, and social-cultural understanding in both children and young adults. Scholars have even proposed that, if the positive trends that have currently been identified in the research of educational new media continue, then it is highly likely that new media could even be used to close the gap between children and learning benchmarks. In cities like Memphis, where the vast majority of students are not meeting these benchmarks, new media would become one of the most accessible and reliable supplemental educational resources. By identifying the history of educational new media and the presently established merits, limitations, and faults, research can then be focused on if and how real-world implementation can further support adolescent learning.

#16 Picture This: Associations between Mental Imagery and Big Five Personality Domains, Facets, and Items

Naomi Sharp, Hanna Hu, Isobel Letizia, and Ryan Johnson

Faculty Sponsor: Kailey Lawson, Psychology

A robust literature connects personality to cognition; however, there is little work linking personality traits and mental imagery, or the cognitive capacity to represent visual information without external stimuli. We used data from a large sample of participants recruited via Prolific (N = 600) to examine correlations between self-reported mental imagery (assessed via the Vividness of Visual Imagery Questionnaire [Marks, 1973] and the Spontaneous Use of Imagery Scale [Kosslyn et al., 1998]), and Big Five personality domains, facets, and items from the BFI-2 (Soto & John, 2017). People with more vivid and more spontaneous visual imagery tended to be more extraverted, agreeable, conscientious, emotionally stable, and open-minded. The effect sizes were largest for Extraversion (particularly Energy Level) and Open-Mindedness (especially Creative Imagination); patterns were much more complex at the facet- and item-level compared to the domain-level. We discuss possible mechanisms underlying these associations and consequences for personality correlates of memory and language use.

#17 Ensemble Perception of Social Status

Lee Jones

Faculty Sponsor: Matt Weeks, Psychology

Ensemble perception is an important aspect of social psychology, involving the rapid extraction of a group's summary information. Ensemble perception can be used to perceive others' socioeconomic status. Socioeconomic status is important in the perception of others because it can be indicative of one's location in a social hierarchy. Moreover, the race of individual targets can impact the participant's subjective rating of an ensemble. The current study is interested in understanding and analyzing the differences in status ratings of ensembles composed of white and black individuals. A key mechanism in this study is the amplification effect, where particularly salient members in the ensemble either greatly

increase or decrease the perception of the ensemble's average social status. When controlling for the perceived status of each image, high-class black ensembles were rated significantly higher than their white counterparts. Understanding the mechanisms influencing this rating difference is key to how race impacts the ensemble perception. The ensemble perception of social status is a notable aspect of social psychology because it highlights how people perceive a group's socioeconomic status, shedding light on their biases and internalized judgments.

(F) #18 Effects of Social Context on Ethanol Self-Administration in Wistar Rats

Ryan Kenar, Camille Young, John Marendes

Faculty Sponsor: Rebecca Klatzkin, Psychology; Dr. Brendan Tunstall, UTHSC, Department of Pharmacology, Addiction Science, and Toxicology

Alcohol Use Disorder (AUD) affects millions of people yearly, imposing a societal burden. Despite decades of research, treatments remain limited, possibly because current preclinical models of AUD do not capture key features of human behavior. For example, alcohol consumption appears influenced by social context in humans and rodents, but this factor is most often ignored in preclinical behavioral neuroscience. To model social influence of alcohol drinking in rats, we designed a modified operant chamber allowing ethanol self-administration in social dyads, and compared their behavior with non-social controls. Adult male and female Wistar rats were trained to self administer ethanol (10% w/v; FR1 schedule; 2-h sessions) and tested in three phases: (1) within-subject social vs. non-social sessions, (2) between-subject social vs. non-social sessions, and (3) between-subject, high-concentration ethanol sessions (66% v/v). Male rats consumed significantly more alcohol in social sessions across conditions, while females only initially showed this effect. These group differences were strongest in the between-subject, high-concentration ethanol phase. Together, this work evidences a method for studying the impact of social context on operant behavior. Incorporating social context into preclinical models of behavioral disorders may improve their predictive validity in developing effective interventions.

#19 Modeling the Probability of n Clonal Rosettes in a Bromeliaceae Genet - A Combinatorial Approach

Layla Lammers

Faculty Sponsor: Erin Bodine, 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 on these populations.

#20 Investigating interactive domains of the protein Hof1 in *Aspergillus nidulans*

Jen Long, Audrey Zmaj, Faith Gbeneneh, Emily Trejda

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

The purpose of this study is to identify interactive domains of the protein Hof1 in its relationship with a binding partner, PaxB. Both Hof1 and PaxB are essential for cytokinesis and septum formation in the filamentous fungus *Aspergillus nidulans*. In our current work, Hof1 has been truncated into two separate

parts using PCR, labeled Hof1-A and Hof1-B. We hope to demonstrate interactions in these truncations by utilizing the yeast-two-hybrid (Y2H) system.

#21 Investigating protein-protein interactions of small GTPase proteins in *Aspergillus nidulans*

Jen Long, Audrey Zmaj

Faculty Sponsor: Terry Hill, Biology; Loretta Jackson-Hayes, 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*. Small GTPases function as molecular switches which regulate a variety of cell functions via their interaction with downstream effectors. The genome of *A. nidulans* encodes six predicted GTPases. Within this project, our recent interest has been the potential interaction of Rho-family GTPase RhoA and the formin protein SepA. We demonstrate a positive interaction between RhoA and the N-terminal half of SepA using the yeast-two-hybrid (Y2H) system. Furthermore, we show a stronger interaction when RhoA is modified to truncate the membrane-localizing CAAX sequence and when it is modified via site directed mutagenesis to create a constitutively active protein. For further study, we have truncated the CAAX sequences of the remaining five GTPases and we are in the process of creating constitutively active versions of each, with the goal of examining their relationship with SepA and other potential binding partners.

#22 A new approach for verifying CAR(1) models

Abby MacLean

Faculty Sponsor: Eric Gottlieb, Mathematics and Statistics; Ibrahim Abdelrazeq, Mathematics and Statistics

This research provides a framework for a new statistical test to verify if a stochastic process can be modeled as a CAR(1) process. Verification methods for this model exist; however, they are not robust under parameter estimation. This research will describe a novel method of verification for the CAR(1) model that is more robust than previous versions. This methodology will estimate the noise from a CAR(1) model using integrated residuals and test them for white noise behavior. Residuals behaving as white noise is a necessary condition for a process to be CAR(1). Simulations will verify the power and accuracy of these methods with varied parameters and white noise processes. We prove the validity of our estimator using an L^2 proof. We find that our estimator gives better rejection rates on the margin and more accurately estimates residuals compared to previous methodologies. We include an application to the S&P 500.

#23 Segmenting super sniffers: A comparative study of nasal turbinal morphology in domestic dog breeds

Lorenzo Martinez, Nicholas Hebdon, Kelly Diamond

Faculty Sponsor: Kelly Diamond, Biology; Dr. Nicholas Hebdon, Baylor University

Domestic dogs (*Canis lupus familiaris*) have been selectively bred for diverse purposes, including tracking, fighting, herding, and companionship. Some breeds, such as bloodhounds and beagles, are classified as scent hounds because of their remarkable olfactory acuity. However, the morphological mechanisms underlying these superior olfactory abilities remain unclear. The canid snout houses thin and tortuous bones called turbinals that support mucous-covered epithelium where particle filtration occurs and olfactory transduction begins. These functions correspond to two structurally distinct regions: the maxilloturbinals, associated primarily with respiration and filtration, and the ethmoidal turbinals, which are linked to olfaction. We predicted that breeds classified as scent hounds would possess proportionally greater ethmoidal turbinal surface area than non-scent breeds, potentially increasing the number of olfactory receptor neurons and expanding chemosensory sensitivity. To test this, we used μ CT scans of dog skulls to generate quantifiable segmentations of nasal morphology. Turbinal cross-sectional area investment was compared along the snout relative to total snout length

across breeding groups. The posterior region of the snout exhibited proportionally greater cross-sectional area across breeds, suggesting greater investment in olfactory structures than respiratory ones. Regional peaks in turbinal area differed among groups, which may help explain variation in olfactory performance among dog breeds.

#24 Investigating the Role of Rap1 during Embryonic Nervous System Development

Maia Vong, Lila Saunders, and Jacob Musicante

Faculty Sponsor: Tanushree Pandit, 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 sensory stimuli while generating motor responses. 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 neocortex. 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 results indicate that Rap1 is broadly expressed across the spinal cord, including in spinal commissural axons, the floor plate, dorsal root ganglia, and ventral motor axons. These findings suggest that Rap1 may play a role in progenitor identity and neuronal migration. 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.

#25 Bilingual Book Clubs: The Intersection of Relevance and Trauma in Immigration Stories

Andrea Nguyen

Faculty Sponsor: Laura Kelly, Educational Studies

This project examines how children developed ideas and responded to texts about immigrant experiences. Book club discussions took place over 12 sessions featuring 19 bilingual 4th graders and 2 bilingual immigration picture books. These discussions were then recorded, transcribed, and collaboratively analyzed using tools of qualitative data analysis such as analytic memos and coding. As students read, they made connections to current policies, relating the immigration enforcement of nearly 100 years ago to the ICE agents we see today under the Trump administration. Students also linked race to immigration enforcement, identifying the target of exclusionary actions as Mexican and confronting the tension between ethnic and racial classifications. Lastly, discussions also reveal that students were grappling with their current immigration realities, some requesting to switch book themes as past historical events evoked anxieties about their present experiences.

#26 Bioinformatic assessment of non-native fungal pathogens in mason bee population declines

Shawn Paik and Kate LeCroy

Faculty Sponsor: Kate LeCroy, Biology

While introduced, managed bees confer significant pollination benefits to agricultural systems, introducing non-native species into new ecosystems also poses a risk of co-introducing pathogens alongside them. Pathogen spillover to wild, native bees may then drive native bee species declines. We examined a case of co-introduced mason bee species (Hymenoptera: family Megachilidae, genus *Osmia*) and fungal pathogens (Onygenales, genus *Ascospaera*) from Asia into North America. We have documented declines of six native mason bee species in Eastern North America with the concurrent introduction, establishment, and proliferation of congeners *Osmia cornifrons* and *O. taurus*. These non-native mason bees brought along multiple fungal species to North America, including *Ascospaera*

fusiformis and *A. naganensis*, which have been documented in the nests of native mason bees, including the declining *Osmia georgica*. Using a controlled larval bioassay experiment, we tested the pathogenicity of these two introduced *Ascosphaera* species on native *Osmia georgica* and non-native *O. cornifrons* by feeding them fungal spores. Our specific research goal for the academic year was to complete high-throughput DNA sequence analyses of fungal (ITS) and bacterial (16S) symbionts to confirm treatment efficacy and underlying microbial diversity of control and treatment categories.

#27 Perceptions of Infidelity in AI Behaviors and the Influence of Attachment Style

Lucy Paul, Sierra Peters

Faculty Sponsor: Sierra Peters, Psychology

Infidelity is a behavior widely considered morally wrong; despite this, many people infringe upon the culturally agreed-upon boundaries of a romantic relationship (Mark & Haus, 2019). Myriad research demonstrates that infidelity is robustly associated with negative outcomes (e.g., relationship dissatisfaction and dissolution; Daly & Wilson, 1988). Nevertheless, no work to date has explored the implications of sexual and romantic interactions with Artificial Intelligence (AI) chatbots for infidelity processes. In my study, I aimed to identify and describe this phenomenon using a census-matched national sample of 1,029 individuals recruited via Cloud Research. My first goal is descriptive; I aim to identify (a) the percentage of people that have interacted with AI in a romantic or sexual manner, (b) the percentage of people that would consider these behaviors infidelity, and (c) the percentage of people who do or would engage in mate guarding behaviors aimed at protecting their relationship from these AI interactions. My second goal is predictive; I aim to examine individual differences associated with engaging in these behaviors and perceiving them as infidelity. For instance, I will explore attachment insecurity, given the association with infidelity risk (Russell et al., 2013) and perceptions of relationship threats (Overall et al., 2015).

#28 BrainPALS: A Randomized Control Trial of a Responsive Parenting Intervention to Support Healthy Brain Development and Self-regulation in Toddlers Born Preterm

Eleanor Pratka, Dana DeMaster, Kelly Vaughn, Johanna Bick, Susan Landry

Faculty Sponsors: Katherine White, Psychology; Dr. Dana DeMaster, The Children's Learning Institute at UTHealth Houston

The neural circuitry that underlies children's stress response, learning, and emotional regulation is influenced by both caregivers and early childhood social experiences. We tested the Play and Learning Strategies (PALS) parenting intervention to assess its ability to prevent and treat neurological and executive functioning issues in prematurely-born toddlers. We implemented a randomized control trial to analyze the effects of parent participation on toddlers', aged 14-32 months, brain development and behavioral outcomes. Parents were randomly assigned to either receive the PALS or an active control curriculum and were coached through 9 weekly remote sessions. Toddlers underwent pre- and post-test MRI, EEG, and behavioral testing. PALS increased caregiver responsiveness during behavioral tasks. Additionally, high parental support and responsiveness significantly increased toddler social engagement as well as mean frontal lobe and anterior cingulate gray matter volume of extremely preterm children. Furthermore, caregiver responsiveness predicted child attentional engagement via anterior cingulate white matter integrity. Parental support may aid socioemotional and cognitive development by reducing gray matter volume deficiencies in extremely preterm toddlers. Implementing interventions to facilitate quality parenting could potentially help prevent and treat neurological and psychiatric diseases in extremely preterm toddlers.

#29 Identifying developmental pathways for evolution of the novel avian voicebox

Rabbani Rasha Rhythm and Evan Kingsley

Faculty Sponsor: Evan Kingsley, Biology

The origin of novel traits is an interesting evolutionary puzzle and the syrinx is a novel organ in birds that is an ideal system to explore that problem. While all other tetrapods use a larynx to vocalize, birds uniquely use a syrinx to serve the same purpose. Previous work has shown that there exists deep homology between the larynx and the syrinx, despite being separate organs that derive from different embryonic tissues. We explored the early development of the syrinx using gene expression and chromatin accessibility data from the mesodermal and endodermal components of the embryonic chicken airway. We combined those data with estimates of evolutionary acceleration and conservation to identify genomic regions of evolutionary relevance, and then used transcription factor binding enrichment and gene set enrichment analyses, identifying candidate regulatory elements that underline key steps in syrinx development. The shortlisted regions represent targets for cis-regulatory reporter and spatio-temporal gene expression experiments.

#30 The Role of the Ventral Pallidum and Kappa Opioid Receptors in Decision-Making With a Delayed Punishment

Erin Riley and Zach Mikkelson

Faculty Sponsors: Jason Haberman, Neuroscience; Dr. Nicholas W. Simon, University of Memphis Department of Psychology

Insensitivity to punishment is a hallmark of many psychiatric disorders, including substance use disorder and pathological gambling. The neurobiological processes underlying sensitivity to delayed punishment, which is frequently underestimated compared to immediate punishment, remain unclear. A brain region that may contribute to this decision-making is the ventral pallidum (VP), which is involved with both reward motivation and punishment avoidance. A subset of VP neurons express kappa opioid receptors (KOR), which play a key role in aversion and punishment sensitivity. We investigated VP/KOR involvement in sensitivity to immediate and delayed punishments. Decision-making was assessed using the Delayed Punishment Decision-making Task (DPDT), which reveals that rats, like humans, discount delayed punishment. Inactivation of the VP increased sensitivity to punishment in the DPDT across all punishment delays, indicating that the VP plays a critical role in decision-making involving punishment sensitivity. Systemic administration of a KOR agonist had no effect on punished choice. Finally, infusion of a KOR agonist into VP increased punished choice, whereas infusion of a KOR antagonist into VP had no effect, suggesting that VP KORs modulate sensitivity to punishment. Collectively, these experiments suggest VP KORs as a potential therapeutic target to improve decision-making in substance use and other disorders.

#31 Optimizing animal husbandry for research on the social behavior of a monogamous poison frog

Kate Robinson

Faculty Sponsor: James Tumulty, Biology

Studying animal species in laboratories requires attention to both animal welfare and creating conditions that facilitate research. Amphibian husbandry provides challenges in cultivating healthy and happy frogs while encouraging reproductive behavior. Our lab studies the mimic poison frog (*Ranitomeya imitator*), which has complex social and reproductive behavior, including monogamous breeding pairs, territoriality, and biparental care. Creating some unique challenges for husbandry. My goal is to identify the qualities of husbandry of mimic poison frogs that improve their fitness and facilitate behavioral research. Specific challenges include: (1) creating habitats that minimize stress and allows them to exhibit natural social behaviors for study, (2) providing artificial pools for egg and tadpoles, and foliage and leaf litter to promote natural hiding behaviors, (3) and minimizing potential interactions between frogs in neighboring tanks. I am evaluating the effectiveness of husbandry conditions by observing the frequency of natural social behaviors such as calls, breeding, and the growth and survival of tadpoles. Preliminary results indicate husbandry conditions are conducive to the expression of natural social

behaviors, and frogs are reproducing successfully in the lab. Through the practice of keeping *Ranitomeya imitator*, continued refinement of husbandry methods will improve the future of amphibian care more broadly.

#32 The Influences of Familiarity and Relatedness on Cooperation in a Paper Wasp

Paul Ross, Piper Dedek, Bella Nicolini

Faculty Sponsor: James Tumulty, Biology

Social cooperation refers to behaviors where individuals of the same species interact, communicate, and work together to achieve mutual benefits. *Polistes exclamans*, a species of paper wasps, demonstrates varying degrees of cooperation based on the number of foundresses (aka "queens") per nest. The focal point of this research is to determine if familiarity and relatedness have an influence on wasp cooperation. To do this, we captured *Polistes exclamans* from various nests in the fall and overwintered them in the lab in small groups comprised of either related or unrelated wasps. Overwintering is a seasonal process where mated foundresses enter a hibernation-like state before reemerging in the spring to form new nests. After overwintering, the wasps were divided into three groups: relatives overwintered together, unrelated wasps overwintered together, and unrelated wasps not overwintered together. These groups were video recorded and observed for aggressive and cooperative behaviors. Finally, the groups were put into long-term enclosures to measure cooperative nesting and nest development. Theory and prior research suggest that both relatedness and familiarity will reduce aggression and promote cooperation.

#33 Star Formation and Black Hole Accretion in $z \sim 3$ "Step" Protocluster Galaxies

Savannah Russell, David Rupke, Caroline Bertemes, Dominika Wylezalek

Faculty Sponsors: David Rupke, Physics; Dr. Caroline Bertemes and Dr. Dominika Wylezalek, Astronomisches Rechen-Institut, Zentrum für Astronomie, Ruprecht-Karls-Universität Heidelberg

The Extremely Red Quasar J1652 at $z \sim 3$ is surrounded by a massive and dense protocluster ($13.3 < \log M_{\text{halo}}/M_{\text{sun}} < 13.8$). We modeled JWST/NIRISS spectra of 14 galaxies in the possibly-merging protocluster. With grism GR150, NIRISS provides low-resolution spectra from 1.3-2.2 μm . We used q3dfit, a program designed to fit JWST spectra of galaxies. In the rest frame wavelength range containing the Balmer lines, we combined stellar population synthesis models to estimate the ages of the stellar populations. Most of the protocluster galaxies show strong emission lines, so we also fit [OII] 3726, 3729 Ångstroms, H β , and [OIII] 4959, 5007 Ångstroms. We used line ratios to distinguish between black hole accretion and star formation, and to estimate metallicity. Most galaxies are consistent with star formation, but some show additional AGN activity. We then compared the results from q3dfit to those from the grizli software and found that the results are on average consistent, but with significant variation from object to object.

#34 Comparing Gait Kinematics of the Aye-aye

Zaha Sarwar and Kelly Diamond

Faculty Sponsor: Kelly Diamond, Biology

Found in the forests of Madagascar, the endangered aye-aye spends much of its time foraging for food. These odd primates are nocturnal and spend around 80% of their nights scavenging. With their keen sense of hearing, rodent-like teeth, and a specialized middle finger aye-ayes are able to catch insect larvae from inside tree trunks. Due to the large amount of time spent foraging in trees, aye-ayes are predominantly arboreal animals but occasionally walk on the ground. This study examined the forelimb kinematics of aye-ayes walking on a flat surface, representing terrestrial locomotion, and a rounded surface, representing an arboreal locomotion. Limb angles were compared between surfaces and among individuals in the study using the semi-automated tracking tool DeepLabCut. These results are part of a

larger study that also compares contact surface area between surfaces. This project will provide greater insight to how these animals utilize their forearm limbs among different parts of their habitat.

#35 Assessing the Impact of Gate Delay and Duration on the Slope Phase Accumulation (SPA) Method of Ultrasonic Bone Assessment

Waverly M. Schrauwen, Catherine N. Prabish, Sidharth Loganathan, and Brent Hoffmeister

Faculty Sponsor: Brent Hoffmeister, Physics Laboratory for Ultrasonic Studies (PLUS)

Ultrasonic backscatter techniques are being developed to detect changes in bone density caused by osteoporosis. To analyze the backscatter signal, a gate is used to select a portion of the signal for analysis. The goal of this study was to investigate how gate duration and delay affect the correlation between bone density and the newly developed backscatter method called Slope Phase Accumulation (SPA). Ultrasonic data were retrospectively collected from 55 cube-shaped bone specimens from the femur. The data was analyzed using 2, 3, and 4 microsecond gate durations and 2, 3, and 4 microsecond gate delays. Results indicate that longer gate durations and delays produce higher correlations between SPA and bone density.

#36 Applying the Shifting Standards model to the Christian-Science Stereotype

Dana Shala, Rylyn Cornwell, Lilia Russell

Faculty Sponsor: Matt Weeks, Psychology

Research on the Shifting Standards Model (SSM; developed by Monica Biernat) demonstrates that stereotypes can subtly alter evaluative standards. According to SSM, people judge targets relative to expectations for their social group: objective measures tend to reveal stereotype-consistent gaps, whereas subjective evaluations can mask those differences through within-category comparison. The present research examines how stereotypes linking religiosity and science shape evaluations of students. Nonreligious participants with STEM backgrounds reviewed profiles of Christian or nonreligious students that varied in academic performance (High vs. Mixed) and included objective indicators (ACT, GRE) and subjective outcomes (competence). Guided by SSM, we predicted larger gaps favoring nonreligious students on objective metrics and smaller gaps on subjective ratings. In our first task, however, results did not follow the expected SSM pattern. High-performing students were rated more positively overall, and nonreligious students received higher evaluations, but no interaction emerged between measurement type and student religiosity. Bias appeared across both objective and subjective measures, suggesting subjective ratings did not mask stereotype effects. We propose that the recruitment-style, between-category evaluation context constrained within-category comparison. A second task removing recruitment framing shows preliminary patterns more consistent with SSM, highlighting task context as a key boundary condition for stereotype expression.

#37 Living Longer but Reproducing Less? Reproductive Effects of the ENH Allele in *Drosophila*

Alina Sikandar, Nina Brown

Faculty Sponsor: Liam Hunt, Biology

Artificial selection can help identify genetic variants that influence lifespan, but these changes may come with biological trade-offs. In this study, we investigated a genetic variant known as the ENH allele, which enhances heterochromatin and has been linked to longer lifespan in male flies. Previous research also suggests that males carrying this allele may have improved survival under stress. The aim of this project was to determine whether ENH heterozygote males have reduced reproductive capacity compared to SUP control males. To test this, we developed both competitive and non-competitive mating assays. In the competitive assays, ENH males reproduced in the presence of rival males, allowing us to assess how well they compete for mating opportunities. In the non-competitive assays, we measured the total number of offspring produced by a single male within a defined reproductive period. Together, these methods provide a clearer picture of reproductive success under different conditions. As

a result of this work, we established a reliable protocol for measuring reproductive performance in ENH and SUP flies. If ENH males are shown to produce fewer offspring, future studies will examine testis histology to determine whether reduced sperm production explains this difference."

#38 What's left behind: using microscopy to measure pollen digestion in mason bees

Lakshmi Alla, Mackenzie Soldano, and Kate LeCroy

Faculty Sponsor: Kate LeCroy, ENVS

Pollinators depend on floral resources for nutrition at critical points in their life histories, but the quality of those resources can be highly variable. For solitary bees, pollen provisions serve as the primary source of protein and other essential nutrients for developing larvae. However, evaluating how well wild bees utilize pollen nutrients has been challenging because existing methods require lethal sampling or provide limited insight into digestion. Here, we develop and apply a microscopy-based protocol to evaluate pollen digestion in mason bees (Hymenoptera: Megachilidae, genus *Osmia*). Using frass samples collected from 325 mason bee nests originating from 63 sites across Virginia in 2019 through a community science network, we examined pollen grains remaining after larval digestion. Samples were stained using Alexander stain and analyzed under light microscopy to assess pollen grain structure and the degree to which grains had been broken down during digestion. This approach allows us to quantify digestion quality and infer nutrient uptake of pollen by both native and non-native *Osmia* species, as well as dietary generalization vs. specialization. These tools will help clarify differences in nutritional ecology among species and improves our understanding of how floral resource quality influences bee health and pollinator community stability.

#39 The longevity and heterochromatin promoting ENH allele maps to chromosome 2L 34A-B indicating a possible loss of function of one of 5 genes in the region

Talia Takahashi, Sasha Angelkov, Chittu Ali

Faculty Sponsor: Liam Hunt, BMB

Artificial selection using Position effect Variegation (PEV) previously identified an Enhanced Heterochromatin (ENH) allele associated with increased lifespan in *Drosophila Melanogaster*. ENH has dominant effects on heterochromatin-mediated silencing but recessive lethality and the allele maps to the 2nd chromosome. This study aims to identify the chromosomal location of the ENH allele by the use of genetic complementation testing where virgin female flies with ENH allele were crossed with male flies containing defined second chromosomal deficiencies. Failure to complement due to lethality of transheterozygotes indicates the ENH allele is a loss of function in the deleted chromosomal region. Approximately half of chromosomal deficiencies have been tested and failure to complement was observed in the region spanning cytogenetic bands 34A-B. In addition, this deficiency fails to complement a previously uncharacterized *E(var)8* allele, *E(var)8* also fails to complement ENH, suggesting these are disrupting the same genetic locus. Furthermore, 5 genes within cytogenetic band 34A-B will be tested to determine their roles in regulating heterochromatin-mediated silencing by PEV phenotype using the *GAL4/UAS* system to cause loss of gene function. If we observe that loss of function of one of these genes enhances heterochromatin-mediated silencing this would implicate the gene responsible for the ENH allele.

#40 Computational Study of Trimethyl(trifluoromethyl)silane's Reactivity and Atmospheric Behavior

Dai Long Tran, Ramesh Sapkota

Faculty Sponsor: Ramesh Sapkota, Chemistry

Fluorinated silane compounds are widely utilized in a various industrial applications and surface-modification techniques due to their ability to form stable surface coatings and their inert properties. However, little information is available on the reactivity of these compounds. In order to understand the

chemical behavior of fluorinated silanes, trimethyl(trifluoromethyl)silane ((CH₃)₃SiCF₃) was selected as a model compound based on its simple molecular structure and stable tetrahedral geometry around the silicon atom. The molecule has a highly stable and electron-withdrawing CF₃ group, which is known for its ability to influence the electronic properties of Si-CH₃ bonds and thus affect its reactivity. Computational methods were used for understanding the reaction pathways and determining rate constants for the reaction of (CH₃)₃SiCF₃, especially its interactions with radicals such as Cl and OH.

#41 Documenting the mason bee species of southeastern Louisiana with community scientists

Avery Wegmann, Mackenzie Soldano, and Kate LeCroy

Faculty Sponsor: Kate LeCroy, Biology and Environmental Science

North America is home to approximately 4,000 bee species, yet the geographic distributions and natural histories of many species remain poorly documented, particularly in southeastern United States. To address this gap, we investigated mason bee communities (Hymenoptera: Megachilidae, genus *Osmia*) in Southeastern Louisiana, focusing on species occurrence and differences between urban and rural environments. Using standardized trap nests ("bee hotels") deployed in Orleans, Jefferson, St Charles, St Tammany, and Tangipahoa parishes from late February through June 2025, we collected nests with the assistance of 33 community scientists. Following field collection in June, developing bees overwintered through January 2026. A set of x-ray images taken in July allowed us to track developmental progress within sealed nest cells prior to adult emergence. From January through April 2026, bees were sampled for further DNA extraction and sequencing of bacteria and fungi. Our surveys documented *Osmia* species across the region and revealed the presence of *Osmia simillima* Smith, 1853, a species not previously recorded from Louisiana. These findings highlight the value of coordinated community science and approaches for improving better knowledge of mason bee distributions in an understudied landscape.

#42 Developing hCAS9 editing in *Arabidopsis thaliana* to target chromatin remodeling complexes

Maya Williams

Faculty Sponsor: Jonathan Fitz Gerald, Biology

Targeted gene knockout in plants has been limited by the low frequency of homologous recombination. The advent of CRISPR/Cas9 genome editing techniques now enables efficient generation of targeted mutations in plant genomes. We have adapted the GoldenBraid synthetic biology platform to generate CRISPR/Cas9 constructs targeting the chromatin remodeling genes CHR7 and CHR23 in *Arabidopsis thaliana*. Our construct builds upon a previously generated DsRed seed coat reporter that enables visual identification of transgenic seeds. A human codon-optimized Cas9 (hCas9) expression cassette driven by the Cauliflower Mosaic Virus 35S promoter and terminator is generated to combine with this reporter and guide RNAs targeting CHR7 and CHR23. The DsRed reporter facilitates rapid identification of heterologous T1 transgenic seeds, while subsequent segregation in the F2 generation enables recovery of non-fluorescent individuals that have lost the transgene but may retain CRISPR-induced mutations. To facilitate rapid genotyping, each target site selected contains a restriction enzyme recognition sequence. Mutations generated through nonhomologous end joining (NHEJ) can be detected using cleaved amplified polymorphic sequence (CAPS) markers. This strategy enables efficient identification of edited alleles following segregation of the transgene. Together, this system provides a streamlined workflow for generating and detecting targeted mutations in chromatin remodeling genes in *Arabidopsis*.

#43 Investigating selective *H. pylori* eradication through Complex I inhibition alongside standard of care antibiotics

Anna Wright, Christine Dunn, Raj Tangallapally, Shelby Anderson, Nicole Vita, Victoria Loudon, Anu Arya, Royce Conlin, Ida Lister, Jasmin Portelinha, Mike Lafleur, Richard Lee

Faculty Sponsors: Larryn Peterson, Chemistry; Dr. Richard Lee, St. Jude Department of Chemical Biology and Therapeutics

H. Pylori is a bacterium in which overgrowth encroaches upon the stomach's mucosal lining, inducing conditions such as MALT lymphoma and gastric adenocarcinoma, leading the WHO to classify H. pylori as a class I carcinogen. Frontline treatment consists of broad-spectrum antibiotics which can disrupt the gut's microbiome due to a lack of target specificity. Overprescription of antibiotics has led to rising rates of antimicrobial resistance, necessitating the investigation of novel antibiotics with improved target selectivity. Because the bacterium relies solely on the electron transport chain (ETC) to produce ATP, targeting respiratory Complex I of the ETC could allow for the development of antibiotics with selective H. pylori activity. Our lab has identified a lead compound which compromises respiratory Complex I, selectively killing the bacterium. As the current standard of care includes concurrent administration of frontline antibiotics, it is crucial to examine the compatibility of this mechanism of action with existing treatments. A series of checkerboard assays were conducted to analyze the effectiveness of our Complex I inhibitor alongside FDA approved antibiotics such as bedaquiline, clarithromycin, amoxicillin, and tetracycline. Results were processed using the BRAID package in R to determine whether combinations could be classified as antagonistic, additive, or synergistic.

#44 Visual Adaptation Shifts Animacy Judgements Across Photographic and Cartoon Faces

Logan Wu, Jessica Huang, and Jason Haberman

Faculty Sponsor: Jason Haberman, Psychology/Neuroscience

Our visual system recognizes faces across diverse depictions, from photographs to cartoons and caricatures. Despite this invariance, we are highly sensitive to whether a face appears real. We asked whether realness is explicitly coded by the visual system using an adaptation paradigm. In Experiment 1, we generated interpolated morphs from 'real' to 'cartoonish.' Participants (N=27) first adapted for 45s to a single identity in either photograph or cartoon form, and then categorized whether a subsequently presented morph (between 20%-80% real) appeared more like a photograph or a cartoon. Each trial included a 3s top-up adaptor. Participants completed four blocks (two blocks with a photograph adaptor and two blocks with a cartoon adaptor). Results revealed a stark shift in 'realness' thresholds - participants were more likely to call a morph real following adaptation to a cartoon, and vice versa. We replicated this pattern in a second experiment (N=23) while varying morph identity randomly across seven identities. This confirmed that whatever features confer a sense of realness from a face remain consistent across different identities, even though other physical features may differ. Overall, our results show that animacy or 'lifelikeness' is an adaptable feature explicitly coded by the visual system.

#45 Trump's Immigration Policies and Impacts on Latino Youth

Kai Yang

Faculty Sponsor: Earl Wright, Anthropology and Sociology; Laura Leisinger, Anthropology and Sociology

Since December 2025, the Department of Homeland Security has raided countless Latino communities in Minnesota, arrested and deported nearly 3000 people. The escalation of DHS deportation not only raised concerns about the security and wellbeing of Latino population living in U.S. but also make their lives unpredictable. In this paper, I examine the implications of President Donald Trump's current immigration policies on Latino young adults living in Memphis. Through the theoretical lens of structural violence, I explore the policies' impacts on Latino youth's living experiences with a primary focus on the mental wellbeing, likelihood of experiencing race-targeted discrimination and access to public services. I use qualitative research method to uncover the long-lasting effects of Trump's immigration policies on Latino young adults' daily life experiences. I gathered data by conducting in-depth, semi-structured interviews with 15 Latino young adults in Memphis. Through these interviews, I discovered that Trump's current immigration policies have significant impacts on Latino youth's lives in

terms of mental health, chances of experiencing racial discrimination and access to social services. These findings unmask the struggles and needs of Latino communities in Memphis, providing useful information for local immigrant advocacy groups and immigration centers to better assist local Latino communities.

#46 Investigating the Formation of Odd Radio Circles (ORCs): The Galaxy Environment of ORC1

Sikandar Zaheer, David Rupke, Alison Coil

Faculty Sponsor: David Rupke, Physics; Alison Coil, Department of Astronomy and Astrophysics, University of California at San Diego

Odd Radio Circles (ORCs) are enormous, faint radio structures first discovered in 2019, whose origins remain a subject of active debate. Most ORCs have a central galaxy whose distance implies a diameter of several hundred kiloparsecs. In this project, we investigated the environment of ORC1 using an optical data cube from the MUSE instrument. We conducted source identification, visualization, and segmentation analysis with SAOImage DS9 and photutils. We performed preprocessing, background subtraction, and spectral extraction with astropy, and applied q3dfit for spectral modeling to separate stellar continua from emission lines and measure galaxy properties. Through this workflow, we assessed whether galaxies within the ORC1 field are associated with the ORC or are simply background objects. Preliminary results indicate a significant number of red galaxies clustered around ORC1, suggesting a possible group or cluster environment. This work provides a foundation for expanding our analysis to existing MUSE data cubes of ORCs 1, 2, 3, and 5.

#47 Translating a MATLAB EEG Processing Pipeline to Python for Neurologic Modeling **Sophia Zamora**

Faculty Sponsor: Addison Schwamb, Computer Science

The brain's electrical activity undergoes drastic changes during cardiopulmonary arrest. Continuous EEG (CEEG) monitoring data is a valuable tool for understanding the mechanisms by which brain activity is changing throughout time. This program may provide life saving measures to pediatric patients through more sensitive detection of seizures and other brain pathologies. This project translates an existing MATLAB-based CEEG signal processing pipeline into Python. The original provided MATLAB pipeline reads EEG data in a variety of proprietary file formats and converts it into a more universal .MAT or .CSV file. Additionally, the pipeline performs several key preprocessing steps: 1) applying a standard clinical bipolar montage (LB-18.1) that computes 19 bipolar EEG channel pairs and their 3D spatial midpoint positions, 2) filtering signals and removing electrical noise, and 3) normalizing signals using median subtraction and median absolute deviation scaling. The transformation from MATLAB to Python will recreate these steps using NumPy, SciPy, and MNE-Python. Translating this codebase to Python improves accessibility and reproducibility of the research as Python is open-source and widely used in the neuroscience and computer science communities. Additionally, translating this pipeline into Python will allow for better integration with existing modeling frameworks created in Python.

A

Abeykoon, Chathurika, 63
Abramson, Zachary, 46
Abunasrah, Yasmeen, 60
Adams, Sydney, 54
Afriyie, Abena Afrakomah, 28, 31
Agrawal, Misha, 51
Alabes, Narjis, 61
Alejandre, Olivia, 18, 36
Aljafari, Dania, 55
Alla, Lakshmi, 73
Alli, Chittu, 73
Anderson, Shelby, 74
Aneji, Kosi, 20
Angelkov, Sasha, 73
Antunez, Hannia E., 60
Arshad, Muhammad, 42
Arya, Anu, 74
Aslam, Suha, 18, 42
Azhar, Muhammad Aleem, 27
Azizbekova, Aigerim, 43

B

Bagga, Puneet, 45
Bailey, Cecilia, 23
Balink, Astrid, 30
Bamikole, Oluwaferanmi, 24
Barcan, Max, 45
Barclay, Cate, 9
Barnes, Lindsey, 60
Bass, Megan, 24
Bassard, Katherine, 12
Bene, Edina, 22
Benedetto McNulty, Lu, 43
Berkey, Mira, 51
Bertemes, Caroline, 71
Bhatia, Drishti, 33
Bick, Johanna, 69
Bigelow, Gordon, 12
Blaich, Daniel, 10
Blankenship, Carole, 6, 7
Blob, Richard W., 52
Blythe, Willow, 16, 60
Boateng, Lexi, 22
Bodine, Erin, 53, 66
Boswell, Marshall, 12
Boyanchek, Jacqueline, 61
Boyd, Isabella, 17
Bratcher, Olive, 61

Bronze, Connor M., 25
Brooks, Lai, 57
Brown, Henry Hobbs, 43
Brown, Nina, 72
Bryant, Grady, 6
Buendia, Caroline, 44
Bui, Jennifer D., 25
Butler, Molly, 8

C

Callender, Anna, 61
Camarena, Victor, 45
Campos, Yvan, 56
Carleton, Camille, 11
Cassius, Amanda G., 44
Chakraborty, Kasturee, 45
Cheng, Ethan, 61
Chowdhury, Naisha, 19
Chung, Karis, 19
Coil, Alison, 76
Colabroy, Keri, 60
Coleman, Ella, 15, 16
Collier, Sienna, 10
Collins, Ada, 62
Conlin, Royce, 74
Coonin, Victor, 6
Corbin, Eeve, 62
Cornwell, Rilyn, 72
Crabtree, Eli, 44
Cracraft, Sophie, 13
Crider, Katelynne, 38
Cronin, Lizzy, 27
Crouch, George, 47
Crutcher, Adaria, 45
Cullen, Daniel, 15, 16

D

D'Souza, Sarah, 45
Danforth, Nisse, 6
Davis, Hannah, 62
De Nucci, Gilberto, 26
Deb, Aayan Pratim, 62
deCordre, Marina, 31
Dedek, Piper, 71
DeMaster, Dana, 69
Diamond, Kelly, 43, 44, 48, 52, 55, 67, 71
Dolgoy, Erin, 31, 32

Dougherty, Kelly Ann, 43
Dsamou, Yzziane, 60
Dunn, Ava, 45
Dunn, Christine, 74
Dwip, Soumitro Shovon, 62

E

Eagleton, Ben, 30
Eckenhoff, Will, 46, 49, 50, 51, 58
Elayavalli, Rithya Kunnawalkam, 62
Eldridge, Howie, 44
Elsky, Stephanie, 12
Embry, Everett, 35

F

Fairfield, Joy Brooke, 35, 36, 65
Farley, Colin, 27
Farooq, Aimen, 22
Fernatt, Lilia F., 25
Fincher, LeeAnn, 20
Fisher, George, 64
Fitz Gerald, Jonathan, 53, 64, 74
Flake-Dockery, Aaliyah, 22
Folz, Sarah, 46
Fornetti, Lucy, 33
Freeman, Livy, 55
Freeman, Olivia, 46, 62
Fridman, Paul, 27
Frueh, Sumay, 60

G

Gabriel, Jolie, 46
Gammill, Rachel, 54
Gangaraju, Rajashekhar, 56
Garcia, Adrian, 47
Garner, Lori, 19, 20
Gbeneneh, Faith, 66
Gentry, Elena, 61
Gilmore, Zach, 32
Gipson, Tanjala, 22
Gold, Lydia, 13
Goldstein, Jack, 47
Goldstein, Mallory, 63
Gorman, Max, 27
Gottlieb, Eric, 62
Gray, Jason, 11, 39
Greenway, Hannah, 8
Gregorovic, Sophia, 45
Griffith, Audrey, 38
Griwatch, Alivia, 63

Gropman, Andrea, 47, 48, 50
Gutowski, Maks, 44

H

Haberman, Jason, 48, 55, 70, 75
Haimes, Jasper, 47
Hale, Alice, 39
Hane, Joe, 60
Hankins, Jane, 46
Harris, Kadin, 24
Harter, Courtenay, 7
Hasty, Caroline, 17
Hatley, Mark, 51
Hay, Ainsley C., 29, 40
Hazelwood, Kate, 26
Hebdon, Nicholas, 67
Heckmann, Sarah, 48
Heidbreder, Audrey, 19, 48
Heitzer, Andrew, 46
Henager, Emma, 14
Henderson, Jordan, 27
Hibbs, Victoria, 28
Hicks, Katherine, 60
Hill, Charlotte, 58
Hill, Terry, 64, 66, 67
Hisham, Golam, 27
Hodgson, GraceAnne, 9, 11
Hoffmeister, Brent, 72
Hohn, Henry, 64
Hopkins, Jack, 51
Hossler, Peter, 29
Hostetler, Jonas, 49
Houser, Jozalyn, 20, 49
Howard, James, 60
Hu, Hanna, 65
Hua, Chia-ho, 26
Huang, I-Chan, 48
Huang, Jessica, 75
Hudson, Melissa M., 45
Hughes, Charles, 11
Hunt, Liam, 43, 56, 58, 61, 72, 73
Hutchison, Julia, 24
Huth, Kallen, 64

I

Ibarra, Enoch, 24
Ifft Decker, Sarah, 9, 10
Inaba, Hiroto, 45
Ismail, Haniyah, 50

J

Jaber, Hana, 49
Jack, Robin, 59
Jackson, David, 64
Jackson, Jeffrey, 9, 11
Jackson-Hayes, Loretta, 64, 66, 67
Jeffries, Jasmine, 65
Johns, Zach, 24
Johnson, Alexandria, 52
Johnson, Caroline, 33
Johnson, Ryan, 65
Jones, Lee, 65

K

Kalb, Vivian, 39
Kang, Guolian, 46
Karol, Seth, 45
Kawalek, Spencer, 14
Keller, Tait, 11
Kelly, Laura, 29, 62, 68
Kenar, Ryan, 66
Kennedy, Alyssa, 56
Khaksari, Kosar, 47, 48, 50
Khan, Areej, 49, 61
Khan, Kiren, 55, 63
Kianpour, Connor, 16
Kim, Suh Joon, 27
Kingsley, Evan, 69
Kirdis, Esen, 28
Kirlin, Phil, 22, 52
Klatzkin, Rebecca, 50, 61, 66
Knox, TezJioh, 23
Kostina, Sasha, 35
Krull, Kevin, 47
Kugele, Sean, 22
Kumar, Simran, 35
Kundu, Mandira, 45

L

Laakso, Agda, 23
Lafleur, Mike, 74
LaFrinere-Sandoval, Natasha, 48
Lambert, Trinity, 45, 57
Lammers, Layla, 66
Landry, Susan, 69
Lawson, Kailey, 7, 65
LeBlanc, Alex B., 25
LeCroy, Kate, 59, 68, 73, 74
Lee, Richard, 74, 75
Leisinger, Laura, 75

Letizia, Isobel, 65
Lewis, Granville, 45
Li, Han, 13, 14
Lister, Ida, 74
Loganathan, Sidharth, 72
Long, Jen, 66, 67
Longoria, Jennifer, 46
Lonien, Aidan, 27
Loprete, Darlene, 56
Loudon, Victoria, 74

M

Mack, Olivia, 29
Mackie, Ava, 57
MacLean, Abby, 30, 67
Maddox, Geoffrey, 47
Magilow, Madeleine, 6
Maheu, Marissa, 52
Mai, Trung, 24
Makowski, Liza, 49
Mansour, Sandy, 55
Marathe, Sandesh J., 49
Marendes, John, 66
Martinez, Lorenzo, 37, 67
Martins, Ricardo, 36
Matejicka, Anthony, 60
May, William, 58
McKinney, Charles, 10, 11
McKinnon, Peter, 45
McNeese, Anna, 6
McTigue, Erin, 8, 12
Medovich, Hilde, 40
Mikkelson, Zach, 70
Miller, Mary, 26, 51, 60
Modder, Kathleen, 50
Morais, Nina, 8, 9
Morris, Joshua, 25, 26
Mudigoudar, Basanagoud, 57
Muesse, Dhammika, 49
Murov, Milena, 50
Musicante, Jacob, 68
Mutchler-Lee, Wyatt, 22
Mwango, Faith, 50
Myers, Ella, 53

N

Nappi, Sophia, 55
Narayana, Shalini, 59
Natarajan, Akshitha, 62

Nath, Sathvik, 58
Navarrete, Miguel, 47
Ness, Kirsten K., 45
Newman, Kyle, 43
Nguyen, Andrea, 68
Nguyen, Hieu, 51
Nicolini, Bella, 71
Nisar, Sabah, 45
Nityanandam, Anjana, 43
Nwachuku, Adaugo, 22, 24
Nye, Phil, 64

O

Ogg, Cameron, 50, 51
Ogwo, Muna, 51
Oliveira, Jaqueline, 29, 30, 32, 33, 34
Oliver, Malcolm M., 44
Olufadi, Yunus, 46
Osoinach, Allen, 27
Osorio-Forero, Alejandro, 47
Ouyang, Ellen, 24

P

Paik, Shawn, 68
Pandit, Tanushree, 42, 45, 47, 48, 68
Park, Clara, 51
Parr, Erika, 53
Passafume, Kari, 57
Paul, Lucy, 69
Peng, Jamy, 42
Perez, Victor Lopez, 52
Pertuit, Emily, 52
Peters, Sierra, 53, 69
Peterson, Larryn, 25, 26, 42, 44, 49, 60, 75
Pfund, Rory A., 24
Phillips, Laurel, 12, 15, 16
Portelinha, Jasmin, 74
Potter, Brian, 46
Potter, Dana, 20
Poulter, Jessie, 53
Prabish, Catherine N., 72
Pramod, Riya, 53
Pratka, Eleanor, 69
Pruett-Miller, Shondra, 43

Q

Qureshi, Shifa, 61

R

Rai, Parul, 46
Rhythm, Rabina Rasha, 69
Ridley-Pryor, Tracee, 57, 59
Riley, Erin, 70
Risley, Amy, 28
Roach, MacKenzie, 23
Robinson, Kate, 37, 70
Rogers, Vanessa, 6
Rohrig, Peyton, 53
Ross, Catherine, 44
Ross, Paul, 71
Rupke, David, 71, 76
Russell, Lilia, 54, 72
Russell, Savannah, 71

S

Salley, Mac, 40
Sanders, Betsy, 22
Sapkota, Ramesh, 73
Sarwar, Zaha, 71
Satheesh, Saharsh, 45
Satterfield, Susan, 16
Saunders, Lila, 68
Scarborough Jones, Liam, 54
Schillinger, Eva, 53
Schoenfuss, Heiko, 52
Schrauwen, Waverly M., 72
Schuetze, Julia, 54
Schutt, Riley, 27
Schwamb, Addison, 58, 76
Seabolt, John, 13
Seetharaman, Amritha T.M., 56
Seigerman, Jack, 27
Shah, Sapna, 59
Shala, Dana, 72
Shanahan, Laura, 60
Sharp, Naomi, 65
Shelton, Sunni Jo, 7
Shen, Qian, 49, 57
Shestakova, Den, 35
Shields, Kate, 36, 37, 38, 39, 40, 41, 43, 63
Shimony, Nir, 58
Shin, Casey, 22
Shirley, Mikayla, 55
Shunte, Madison Owens, 59
Siddiqui, Ashar, 45
Sikandar, Alina, 55, 72
Simon, Nicholas W., 70
Sivakumar, Sharika, 60
Slankard, Bella, 9

So, Matthew, 42
Soldano, Mackenzie, 73, 74
Sowers, KK, 55, 62
Stanley, Kat, 56
Stevens, Bradley, 51
Stevens, Payton, 54
Stevenson, Camren, 24
Stewart, Harrison, 34
Sulaiman, Lamees, 56
Sullivan, Robin, 14
Sundt, Catherine, 14, 15, 17, 18, 19
Sunshine, Jacob, 11
Superdock, Matt, 23, 24, 27

T

Tahir, Umer, 24
Takahashi, Talia, 73
Tan, Samuel, 57
Tangallapally, Raj, 74
Tanner, Catherine, 15
Tate, Cyanne, 36
Taylor, Emma, 31
Taylor, Sarah, 23, 41
Temple, Michael, 45
Thapa, Shamiksa, 57
Thomas, Kristen, 43
Tian, Liqing, 53
Tighe, Ava, 63
Timm, Christopher, 18
Tran, Dai Long, 73
Trejda, Emily, 66
Trejo, Yesica, 23
Tricot, Victor, 28
Tumulty, James, 64, 70, 71
Tunstall, Brendan, 66
Tuvel, Rebecca, 12

U

Uh, Jinsoo, 26
Unda, Abril, 23, 58

V

Vaughn, Kelly, 69
Vieira, Greg, 62
Villamil, Daniel, 23
Virani, Kai, 34
Visvanathan, Raksha, 42

Vita, Nicole, 74
Vong, Maia, 68
Vyavahare, Yash, 58

W

Wakefield, Margaret, 32
Waters, Malik, 23
Weatherspoon, Sarah, 58
Weeks, Matt, 44, 45, 54, 57, 65, 72
Wefferling, Julia, 45
Wegmann, Avery, 58, 74
Wenk, Mallory, 59
West, Jade, 36
West, Kelly, 57
Westgate, Sarah, 64
Wheless, James, 58
White, Katherine, 46, 49, 54, 69
Whitten, Jack, 37
Willey, Dakota, 19
Williams, Brittany, 57
Williams, Maya, 74
Williams, Trevor, 24
Wolters, Winston, 59
Wright, Anna, 74
Wright, Earl, 75
Wu, Logan, 75
Wylezalek, Dominika, 71

X

Xue, Aida, 46

Y

Yang, Kai, 75
Yepuru, Maanasa, 58
York, Ava, 23
Young, Camille, 66
Yu, Shaolu, 35

Z

Zaheer, Sikandar, 76
Zakharenko, Stanislav, 43
Zamora, Sophia, 23, 76
Zheng, Karen, 23
Zhou, Xin, 52
Zmaj, Audrey, 66, 67