## April 25 Events

- Awards Convocation: 9:00AM, Hardie Auditorium
- Poster Session I & Lunch Reception, 11:30-1:30, Multisports forum of the Bryan Campus Life Center
- Oral Presentation Sessions: 1:30-6:00 PM, various locations
- Poster Session II & Closing Reception: 4:30-6:00 PM, , Multisports forum of the Bryan Campus Life Center

## Acknowledgements and Special Thanks

**Student Session Chairs**

- Allie Johnson ‘17
- Stephen Leavelle ‘14
- Jacob Long ‘14
- Schaeffer Mallory ‘16
- Maguerite McGowan ‘14
- Theodore Nollert ‘16
- William Roudabush ‘16
- Smith Stickney ‘14
- Phoebe Strom ‘14
- Brendan Tyler ‘15
- Jeffrey Warren ‘14
- Kristen Wendt ‘14

Robert Schatzer, Communications, URCAS program Cover Design
Charlie Kenny, Communications, Design and preparation of the URCAS program.
Justin McGregor, Communications, Online Abstract Submissions

**URCAS Planning Committee**

- Bette Ackerman, Associate Professor of Psychology
- Michael Collins, Assistant Professor of Biology
- Rhiannon Graybill, Assistant Professor of Religious Studies
- Amy Jasperson, Associate Professor of Political Science
- Han Li, Assistant Professor of Chinese
- Laura Luque de Johnson, Assistant Professor of Biology
- Dhammika Muesse, Visiting Assistant Professor of Chemistry
- Gail Murray, Associate Professor of History
- Steve Samaras, Assistant Professor of Commerce and Business
- Francesca Tronchin, Assistant Professor of Art
- Ann Viano, Associate Professor of Physics
- Jessica Abernathy, Department Assistant, Modern Languages and Literatures & Greek and Roman Studies
- Michelle Mattson, Professor of German, Chair URCAS Planning Committee

## URCAS 2014 Presentation Sessions & Locations

**11:30-1:30 pm**
*Poster Session I & Lunch Buffet*, multisports forum of the Bryan Campus Life Center
82 poster presentations from all divisions

**1:00pm**
*The Cauthen Competition* (-3:00pm), Evergreen Church

**1:30 pm**
*Directions and Transgression in the Ancient World* (-2:15 pm), Language Center
*Shelby Foote, the South, and the Civil War* (-2:45 pm), Buckman 200
*Economics I* (-2:30pm), Buckman 108
*Conservation and the Environment* (-2:15pm), FJB
*Quantitative and Computational Science I* (-2:30pm), FJC
*Art History: Renaissance* (-2:00pm), Clough 410

**2:00 pm**
*Literature, Policy, and the Cold War*, (-2:30pm), Palmer 205
*Public Policy and Law in Action* (-2:45pm), Buckman 216
*Ethnography at Home* (-4:10pm), Buckman 110
*Genetics, Biochemistry, and Molecular Biology I* (-3:00pm), FJA

**2:15pm**
*Art History: Contemporary Art, War, and Politics* (-3:00pm), Clough 417

**2:30pm**
*Mundane and Spiritual in the South* (-3:00pm), Language Center

**2:45pm**
*The Unbearable Lightness of Being Postmodern* (-3:15pm), Palmer 205
*Economics II* (-3:30pm) Buckman (108)
*Quantitative and Computational Science II* (-3:30), FJC

**3:00pm**
*Emancipation in Tennessee, 1861-1865* (-3:45pm), Buckman 200
*Media and Politics* (-3:45pm), Buckman 216

**3:15pm**
*Genetics, Biochemistry, and Molecular Biology II* (-4:45pm), FJA
*Research in Music* (-4:15pm), Clough 417

**3:30pm**
*Milton In and Out of Paradise* (-4:15pm), Palmer 205
*Querying Don Quixote* (-4:30pm), Language Center

**3:45pm**
*School Matters* (-4:45pm), Buckman 108

**4:00pm**

*Crisis, Violence, and Torture: French Colonialism in North Africa* (-4:45pm), Buckman 200
*Sociology and Urban Studies* (-4:45pm), Buckman 216
*Curb Fellowship Presentations* (-4:30pm), Hardee Auditorium/Palmer
*St. Jude Partnership Reception* (-5:15pm), McCallum Ballroom

**4:30pm**

*Theatre* (-4:30pm), Clough 417

**5:00pm**

*Untold Stories of Memphis* (-5:45pm), Buckman 200

**4:30-6:00 pm**

*Video Screening from Art 114*, FJB
*Poster Session II & Closing Reception*, multisports forum of the Bryan Campus Life Center
63 poster presentations from all divisions

**Table of Contents**

## HUMANITIES ORAL SESSIONS

## Directions and Transgression in the Ancient World
### Palmer Language Center
### Session Chair: Joseph Jansen

**1:30-1:45** *Born This Way: The Nature of Sin in Prophetic Literature*
**Tara Connors**
**Faculty Sponsor: Steven McKenzie, Department of Religious Studies**
Original sin, a doctrine used by several denominations of Christianity, is most commonly defined as the sinful nature that humanity is born with due to the fall of man committed by Adam and Eve. To many, the idea that humans are born in sin appears unjust. After all, Jesus never spoke of it. However, there is a history of inherited sin in the Bible. In the prophetic literature of the Old Testament, specifically several passages in 1 and 2 Kings, there is evidence of inherited, communal sin that sounds very similar to the doctrine of original sin. Solomon's son Rehoboam has his kingdom taken from him because of the sins of his father. The next ruler, Jeroboam, also sinned, and the inherited "sin of the house of Jeroboam" was born (1 Kings 13:34). Yaweh states that in Ahab's "son's days will [he] bring the evil upon his house" (1 Kings 21:29). Being born in sin due to the mistakes of one's ancestor seems to be commonplace in 1 and 2 Kings. Why was this seemingly unfair ideology used in ancient Israel, and why was a similar doctrine adopted by Christianity?

**1:45-2:00** *Representing the Roads of Rome*
**Luis Anthony Perez**
**Faculty Sponsor: Joseph Janson, Department of Greek and Roman Studies**
The ancient Romans at the era of Augustus had access to maps, though they were not used for navigation as the modern world uses them. For example, the Forma Urbis Romae in the Forum of Peace might have been a highly detailed map of the city at the time of Septimus Severus, but was not used as a viable method of navigating the city. On a much larger scale, the Peutinger map was a cross between a map and itinerairy. The maps were mostly used as a symbol of power and wealth. Those who had these maps usually displayed them publicly. Roman maps could not be used for navigation because of inaccuracies. The only viable alternative to the Roman public were itineraries. The Antonine Itineraries, for example, list most of the routes of the Late Republic as well as the stops, allowing merchants and other travels to find their way easily. Because of the low literacy levels in classical antiquity, the peasants who would need to travel would most likely have no idea how to interpret the itineraries. For those who needed to, knowing how to read the itineraries would let them have ready access to these itineraries.

**2:00-2:15** *The Sin of Jeroboam as an Etiology*
**Katie White**
**Faculty Sponsor: Steven McKenzie, Department of Religious Studies**
In the book of Kings, the two most infamous rulers are Jeroboam and Ahab because they commit the sin of Jeroboam. However, evidence suggests the author of the Book of Kings invented this sin as an etiology. Jeroboam's actions directly contradict the worship of Yahweh, much like Ahab's, as encouraged by his wife, but the writer never specifies the exact nature of the sin named for King Jeroboam's action. He does however; impose guilt on him and all future Kings of Israel who appear complicit in this sin. Jeroboam builds temples at Dan and Bethel. The author clearly takes issue with the location and iconography, as he does with Ahab's weakness, and his willful disobedience to Yahweh. These behaviors incriminate them and contextualize the end of their dynasties, and the eventual fall of Israel. Historical evidence makes these claims difficult to support though. Both kings gave their children Yahwistic names, cultic centralization comes about hundreds of years after Jeroboam's reign, and Ahab's rule was historically strong and politically advantageous. All this conflicting evidence further illustrates that the creation of the sin of Jeroboam was not factual, and emphasizes, that the book of Kings is itself, an etiology not a history.

## Shelby Foote, the South, and the Civil War
## Buckman 200
## Session Chair: Timothy Huebner

**1:30-1:45** *Shelby Foote: Making Sense of the Celebrity*
**Adrian Scaife**
**Faculty Sponsor: Timothy Huebner, Department of History**
This paper looks at the life and work of author and Memphian Shelby Foote. Beginning in 1949 he wrote six novels, as well as a three volume, two and a half million-word history of the Civil War. In 1990 he appeared numerous times on Ken Burns' PBS series, The Civil War, and subsequently became a modern-day "Civil War celebrity." This work draws from Foote's biography by Stuart Chapman, some of Foote's own works as well as his letters and diary entries, and an assortment of other related essays and interviews. The paper focuses on the contradictory aspects of Shelby Foote's life as an author, public figure, and father.

**1:45-2:00** *Shelby Foote's Fratricidal Conflict and Civil War Historiography through the Ken Burns' Series*◙
**Maddie McGrady**
**Faculty Sponsor: Timothy Huebner, Department of History**
Novelist-historian Shelby Foote, a Memphis resident until his death in 2005, greatly influenced popular conceptions of the Civil War through his appearances in Ken Burns' 1990 PBS documentary, The Civil War. Burns' eleven hour film, featuring about one hour of Foote's pseudohistorical anecdotes, reached 39 million viewers. In this paper, I first argue that racial strife at the end of the last century impacted the documentary's interpretation of the Civil War. Namely, Ken Burns offered a fratricidal, nationalistic outlook on the Civil War to an American people still shaken by the Vietnam War, the Rodney King beating, and numerous Civil War memorial controversies. Burns, in short, used an interpretation that emphasized regional homogeneity and a common national identity to comfort his audience. Furthermore, as the abundant fan mail in the Shelby Foote collection indicates, Foote himself gained widespread popular recognition following the series. With his charismatic drawl and war stories, Foot acted the part of the Southern gentleman and his personal fame demonstrated the nation's attraction to an Old South disassociated with slavery and racism. Foote too depicted the Civil War as an unnecessary war between brothers.

**2:00-2:15** *Shelby Foote: An Average Historian That Will Be Forever Remembered*
**Brooks Lamb**
**Faculty Sponsor: Timothy Huebner, Department of History**
Shelby Foote, a former citizen of Memphis, is widely considered one of the most prominent Civil War historians of all time. His trilogy, The Civil War: A Narrative, earned acclaim as one of the most exciting and in-depth works ever published on the Civil War. Further, his numerous appearances on Ken Burns' 1990 documentary The Civil War earned him celebrity status. He played his role as a Southern gentleman perfectly in the series, weaving together battle stories with his mellifluous drawl. Despite his success as a Civil War writer and television personality, I argue that Foote was only an average historian. Yes, he could recite facts and battle stories in his sleep. He could speak for days on end about anything related to the Civil War. However, his views never evolved. Foote's biographer, Stuart Chapman, pointed out that Foote essentially recited the same theories for over thirty years. This is seen in many ways, including Foote's treatment of African American soldiers and his adoration of Confederate General Nathan Bedford Forrest. Because Foote never challenged his beliefs, he should not be considered an outstanding historian. Rather, he should be remembered as a storyteller for the ages, a true American Homer.

**2:15-2:30** *"You Can't Get It Completely Out of You": Shelby Foote's Views on Racism*
**Grant Ebbesmeyer**
**Faculty Sponsor: Timothy Huebner, Department of History**
Shelby Foote, an author best known for his three-volume history The Civil War: A Narrative and his appearances on Ken Burns' nine-part PBS documentary The Civil War, held controversial views on race. Born and raised in the Mississippi Delta in the early twentieth century, Foote came from a family of Confederate soldiers and slave owners. However, despite this upbringing, he believed in the rights of African Americans and integration during the Civil Rights Era. Perhaps because he faced discrimination himself as a partially Jewish man, Foote empathized with African Americans; he wrote against segregation and was an outspoken critic of the post-1950s Ku Klux Klan. Regardless, Foote showed much less compassion toward African Americans of the Civil War and Reconstruction eras. He deemphasized the role of slavery in the Civil War in his Narrative, and overemphasized the role of the

controversial Confederate general Nathan Bedford Forrest. In one interview, Foote suggested that slavery was preferable to the troubles faced by African Americans post-emancipation. Although Foote empathized with African Americans of his own lifetime, he failed to understand the struggles faced by those of the Civil War and refused to accept the importance that emancipation played in the war.

**2:30-2:45** *Shelby Foote, the South, and the Civil War*
**Smith Stickney**
**Faculty Sponsor: Timothy Huebner, Department of History**
Tennessee was the last state to secede from and the first state to return to the Union during the American Civil War. In Tennessee during this time, the civil rights of African Americans formed central, controversial debates about the status of black persons within the state during and following the War. When the Constitution of the State Tennessee was amended on February 22nd, 1865 arguments for the institution of slavery and the right to "property in man" were silenced by a formalized constitutional rejection of their pro-slavery principles. The landmark cases that ushered in these changes to the state's constitution, and which may be used to argue that American Americans were more actively pursuing and judicially gaining recognition of their civil rights during this time include: Wharton vs. the State; Graves vs. Keaton; State vs. Davidson; Nelson vs. Smithpeter; Andrews vs. Page; and Gholson vs. Blackman. These cases not only shed light upon the prevalent issues during the period, related to African American civil rights, but also highlight the legal obstacles that African Americans faced immediately following Emancipation.

## Literature, Policy, and the Cold War
## Palmer 205
## Session Chair: William Roudabush

**2:00-2:15** *Failure to Intervene: Why the US Did Not Send Troops to China in 1949*
**Paul Domer**
**Faculty Sponsor: Seok-won Lee, Department of History**
The United States sent troops into East Asia twice to counter the spread of communism: first in Korea and then in Vietnam. Yet the United States did not intervene in China, even though that country's fall to communism was a major victory for the Marxist camp in the Cold War. Why, despite China's geopolitical importance, did the US not intervene as it did in other Asian countries? The answer lies in the skewed views and priorities American policymakers held regarding China. The popular image of the Chinese Communists was influenced by journalists who wrongly concluded that the Chinese variants were milder than their Soviet counterparts. On the other hand, American leaders held a negative view of the anticommunist leadership—a view based on the opinion of an ineffective military commander and contrary to the military facts on the ground. Moreover, the United States gave more emphasis on defeating the communists in Greece than they did in China. No ground troops were sent to Greece, but other forms of military aid were forthcoming to Greek anticommunist forces—not so in China. This Eurocentric approach, combined with the other factors, held back the United States forces even as communism triumphed in China.

**2:15-2:30** *Art and the Apocalypse: Norman Mailer and a New Understanding of the Cold War*
**Jeffrey Warren**
**Faculty Sponsor: Robert Saxe, Department of History**
Norman Mailer is the most important author most people have never read. Working both in fiction and non-fiction, Mailer's writings touched upon everything from women's liberation and politics to boxing. Although Mailer was awarded two National Book Awards and two Pulitzer Prizes, many of his works are out of print and remain unknown to students of history and literature alike. However, Mailer's work from 1957-1979 gives invaluable insight into the mind of the American living at the height of the Cold War, and reveals that fear of apocalypse permeated nearly every aspect of life in the United States. In my presentation, I will discuss some of Mailer's major works and philosophy, how they each relate to the looming prospect of nuclear apocalypse, and how Mailer's writings illuminate a new and invaluable understanding of the Cold War. I will furthermore illustrate how Mailer's work provides significant insights into the mind of the mid-20th century American, and I will conclude by exploring why Mailer's work remains out of print and understudied by juxtaposing his work and philosophy with one of his contemporaries, whose work is highly-valued and widely-studied, Mark Rothko.

## Mundane and Spiritual in the South
## Palmer Language Center
## Session Chair: Brendan Tyler

**2:30-2:45** *Controversy and Cohesion: 'Soul Food' and the Mainstreaming of Black Power*
**Phoebe Strom**
**Faculty Sponsor: Charles McKinney, Department of History**
The concept of 'soul food' is something taken for granted today, used to generically label African-American cuisine with little thought to its implications. What is overlooked in this understanding of 'soul food' is that until the early 1960s there was no such thing as 'soul food' per se. Borne out of black nationalism and explicitly linked to the Black Power movement of the 60s and 70s, 'soul food' represents a site of inter- and intraracial struggle over the definition of black American identity, a struggle intensified by growing divisions within the black community along the lines of class and gender. At the same time, however, the construction of racial authenticity through this culinary medium worked to popularize and moderate the polarizing politics of Black Power.

**2:45-3:00** *Indian Philosophy in Memphis in the late Nineteenth Century*
**Margaret Welch**
**Faculty Sponsor: Lynn Zastoupil, Department of History**
Before 1893, Vedanta, the philosophy of the Upanishads, remained limited to the land of India. Swami Vivekananda, a Hindu monk and a disciple of Ramakrishna, took upon himself the task of spreading the message of mysticism and spirituality. On September 11, 1893, the World's Parliament of Religions opened in Chicago for interreligious dialogue, with thousands of people in attendance. A group of religious leaders from both East and West stood close to hear one another speak about important issues troubling the world. During the event, Vivekananda introduced America to the Indian philosophy of Vedanta through raising interfaith awareness and expressing the value of universality; he did so through attempting to bridge cultural and traditional boundaries. Additionally, he travelled for three years to main centers of American culture, including Memphis, furthering his mission of enriching the religious consciousness of Americans through the Vedanta philosophy. In my presentation, I intend to explore the Vivekananda's visit in Memphis, addressing who he met in Memphis, as well as audiences and topics, and what his visit tells us about Memphis during the 1890s.

## The Unbearable Lightness of Being Postmodern
## Palmer 205
## Session Chair: Theodore Nollert

**2:45-3:00** *The Fratricide of David Foster Wallace: "The Marriage Plot" and the Battle For Literary Supremacy*
**Stephanie Berendt**
**Faculty Sponsor: Marshall Boswell, Department of English**
Jeffrey Eugenides wrote "The Marriage Plot" as a very self-aware marriage plot novel that serves as a commentary on the literary plot itself while embracing it. The novel employs the marriage plot as a way of playing on its inherent ideas, while at the same time offering a moving story for readers. This is more than Eugenides trying to find his place in the modern/postmodern literary world. It also acts as a conduit for his battle to claim a position as a contributor against his famous "brother" David Foster Wallace. The two main male characters, Mitchell and Leonard, have many of the same features, mannerisms, and attitudes as their real-world counterparts. The resemblances are too uncanny to be accidental.The relationship between the two of them can be seen as a representative parallel for the one between Eugenides and Wallace. The relationship plays out as a fratricidal drama, where Mitchell battles against Leonard for Madeleine's affections, and Eugenides himself battles Wallace for readership and literary supremacy.

**3:00-3:15** *The Resurrection of the Author: Authorship and Entertainment in Wallace's "Infinite Jest"*
**Alex Sterne**
**Faculty Sponsor: Marshall Boswell, Department of English**
In his 1993 essay, E Unibus Pluram, David Foster Wallace argues that postmodernism has run its course. He believes that because television, films, and other media have adopted the irony and self-reflexivity of postmodern fiction, literature must move in a new direction in order to connect with readers who have become chronic viewers.

He argues for fiction that rebels against the solipsism and cynicism endorsed by postmodernism; however, instead of outright rejecting postmodern techniques like irony and metafiction, he reappropriates them. Wallace's magnum opus, Infinite Jest, embodies this proposed literary movement. The novel revolves around, and shares its name with, an allegedly lethal film directed by James Incandenza. Critics often view Incandenza as a caricaturization of the textbook postmodern author. I argue that Wallace and Incandenza share a more intimate, fraternal relationship. Both are misunderstood artists who, through their respective oeuvres, pursue an antidote for the solipsism that is promoted by television and metafiction. Incandenza's film ultimately fails in its attempt to cure the postmodern condition; however, this failure demonstrates a crucial difference between viewing and reading. I argue that Infinite Jest succeeds in diagnosing and dissecting the postmodern condition, resulting in a novel that is simultaneously entertaining and liberating.

## Emancipation in Tennessee, 1861 -1865
## Buckman 200
## Session Chair: Phoebe Strom

**3:00-3:15** *Judicial Snapshots of Emancipation in Tennessee*
**Isabelle Campbell**
**Faculty Sponsor: Timothy Huebner, Department of History**
Tennessee was the last state to secede from and the first state to return to the Union during the American Civil War. In Tennessee during this time, the civil rights of African Americans formed central, controversial debates about the status of black persons within the state during and following the War. When the Constitution of the State Tennessee was amended on February 22nd, 1865 arguments for the institution of slavery and the right to "property in man" were silenced by a formalized constitutional rejection of their pro-slavery principles. The landmark cases that ushered in these changes to the state's constitution, and which may be used to argue that American Americans were more actively pursuing and judicially gaining recognition of their civil rights during this time include: Wharton vs. the State; Graves vs. Keaton; State vs. Davidson; Nelson vs. Smithpeter; Andrews vs. Page; and Gholson vs. Blackman. These cases not only shed light upon the prevalent issues during the period, related to African American civil rights, but also highlight the legal obstacles that African Americans faced immediately following Emancipation.

**3:15-3:30** *Making Freedom Real: Runaway Slave Advertisements in East Tennessee*
**Landon Webber**
**Faculty Sponsor: Timothy Huebner, Department of History**
Much of the inquiry into the process of emancipation in Tennessee has focused on the western or middle portions of the state, areas with large slave populations which fell under federal control relatively early in the war. Little attention has been paid to East Tennessee, a region which contained many strong supporters of the Union and yet was held by Confederate armies longer than West or Middle Tennessee. There were fewer slaves in East Tennessee, mostly working as household servants. This paper examines how slaves in East Tennessee secured their freedom and how frequently they supported or even fought for the Union army during the war. Advertisements posted by slaveholders for runaway slaves in the Chattanooga Daily Rebel and in Brownlow's Knoxville Whig, among others, are used in conjunction with the 1860 U.S. Census and with rosters of United States Colored Troops regiments and with registers of the former slaves living in contraband camps in Tennessee during the war. Ultimately, the paper adds insight to the places to which runaway slaves from East Tennessee attempted to flee and how many of them served or aided the Union army's efforts in the region.

**3:30-3:45** *The Individual Agency of Emancipation Surrounding Nashville, Tennessee*
**Taylor White**
**Faculty Sponsor: Timothy Huebner, Department of History**
My research seeks to discover how black agency during the Civil War Era manifested itself differently in the enslaved man's and the enslaved woman's fight for emancipation surrounding Nashville, Tennessee. My primary evidence focuses on interviews of ex-slaves conducted in 1929 and 1930 and published in 1945 by Fisk University. As a scholar, I intend to contribute to our knowledge of emancipation on the ground surrounding Nashville. As a humanitarian, I believe these phenomenal stories deserve to be told and hope my efforts might do them a small justice.

## Milton In and Out of Paradise
## Palmer 205
## Session Chair: Jeffrey Warren

**3:30-3:45** *The Exaltation of the "Lowly Wise" in Paradise Lost*
**Theodore Nollert**
**Faculty Sponsor: Scott Newstok, Department of English**
Readers have struggled to interpret John Milton's Paradise Lost since its publication. Attempts to label interpretations as 'correct' or 'incorrect' may seem to suffer from an under determination of values; however, we can assess the plausibility and rationality of interpretations advanced by Milton scholars and develop a more informed subjective experience of the poem as a result. My paper focuses on the roles of the Father and the Son, their relationship and a few relevant symbols. The purpose is to offer a guide—a 'how to read Paradise Lost' from a certain point of view, synthesizing numerous secondary sources and applying my inferences to the poem. As a result of my study, I present a reasonable inference of what one of Milton's intentions as poet seems to have been. Recognizing that we have no documents that record Milton's explicit explanation of the purpose of Paradise Lost, I seek to legitimize my view by presenting textual evidence which supports the 'guide' and holds a place, however insignificant, in the ongoing scholarly discussion of Paradise Lost and John Milton.

**3:45-4:00** *Sympathy for the Devil*
**William Roudabush**
**Faculty Sponsor: Scott Newstok, Department of English**
In Paradise Lost, man's first disobedience on earth parallels the fall of Satan with his infernal crew from heaven. Satan's insurrection stems from the Son's exaltation, and consequently his own degradation. Eve similarly rejects her hierarchical inferiority to Adam, and to God, by eating Eden's forbidden fruit. Like Eve, Milton's Satan induces deep sympathy. The nineteenth century invigorated criticism on the character of Satan in Paradise Lost. Percy Shelley concluded, "Milton's Devil as a moral being is as far superior to his God, as one who perseveres in some purpose which he has conceived to be excellent in spite of adversity and torture is to one who in the cold security of undoubted triumph inflicts the most horrible revenge upon his enemy, not from any mistaken notion of inducing him to repent of a perseverance in enmity, but with the alleged design of exasperating him to deserve new torments." My research examines this perspective of Satan, by illuminating the fiend's sentimentally complex, borderline human, characterization.

**4:00-4:15** *"Rightly Tempered": Virtue and Choice in Areopagitica, A Masque, and Paradise Regained*
**Genevieve Bettendorf**
**Faculty Sponsor: Scott Newstok, Department of English**
While Areopagitica offers Milton's most candid discussion of virtue, the verse narratives he crafts throughout his career as a poet expand on and illustrate these definitions he explores in prose. More specifically, Milton presents the Lady of his Masque as a close ancestor of the tempted Son of Paradise Regained. Though Stephen M. Fallon maintains that "it is all but impossible to hold together Milton's various comments on virtue and the virtues," I argue that Milton's comments on virtuous choice and what he terms "righ[t] temper[ance]" are, in fact, coherent and compatible. In his brief epic, Milton re-visions and re-presents the isolated Lady of his earlier Masque as the temptation-resistant, (auto) didactic Jesus of Paradise Regained. Yet this re-visioning is not a re-definition; rather, the Lady serves as a mortal ancestor of Milton's incarnate Son. Both serve as figureheads for Milton's fundamental belief in the human ability to choose virtuously: by living a "rightly tempered" life, we can participate in our own salvation.

## Querying Don Quixote
## Palmer Language Center
## Session Chair: Rachel Bauer

**3:30-3:45** *Food as it defined Spain's social class system in Miguel de Cervantes's Don Quixote.*
**Kalen Axam**
**Faculty Sponsor: Rachel Bauer, Department of Spanish**

In Miguel De Cervantes's legendary novel Don Quixote de la Mancha, the class system of Spain is a common theme. One way in particular that this theme is exploited is through the food and meals that the characters share throughout the novel. Many critics say how the dishes and the food in Don Quixote were some of the best and most influential in the entire world. They say that these very dishes helped to shape modern cuisine and the essential dishes of Spain. In my paper I plan to explore the theme of social classes through the food and the meals that the characters experienced and how all of these dishes shaped Spain's modern day cuisine.

**3:45-4:00** *Don Quijote: The Influence of Interactions*
**Rachael Ward**
**Faculty Sponsor: Rachel Bauer, Department of Spanish**
Symbolic interactionism, as characterized by sociologists, denotes that our perspective of the world is affected by our personal interactions. In Don Quijote by Miguel de Cervantes Saavedra the personality and actions of don Quijote has tremendous affects on several prominent characters: Sancho Panza, Sampson Carrasco, and the duke and duchess. Utilizing the theory of symbolic interactionism, I will examine how the interactions of don Quijote with Sancho Panza, Sampson Carrasco, and the duke and duchess influence the modification of social perceptions.

**4:00-4:15** *La locura en Don Quijote*
**Blake Piedrahita**
**Faculty Sponsor: Rachel Bauer, Department of Spanish**
Don Quijote, written in the early 17th century by Miguel de Cervantes, is widely regarded as one of the most important and well known works in the world of Spanish literature. The protagonist of the novel, don Quijote, who comes to believe, through reading many fictional books, that he is a knight, is joined on his travels by a man named Sancho Panza who is appointed by don Quijote to serve as his faithful squire. In the novel Sancho Panza has goals which are very remarkable for a man like himself who is a part of the lower class because he ultimately hopes to become governor of his own island. In the novel it is this greed for money, power and advancement in society which serves as his preeminent motivation for being don Quijote's squire. Even though his character changes significantly throughout the story, his greed remains his main motivator.

**4:15-4:30** *Virtue, Chivalry, and Morality: How Don Quijote Can Be Seen as a Religious Figure in Don Quijote*
**Grace Southworth**
**Faculty Sponsor: Rachel Bauer, Department of Spanish**
Don Quijote, by Miguel de Cervantes Saavedra, is considered to be a founding work of modern literature. It continues to be an enormously successful novel. For centuries, critics have analyzed the novel, wrestling with Cervantes' intertwining themes of madness, religion and heroism. In particular, scholars have examined Don Quijote as a novel filled with religious themes. These scholars believe Don Quijote is a religious hero or interpret him as a Christ-like figure, striving to help others. W.H. Auden and Miguel de Unamuno are two scholars at the forefront of this type of analysis of the novel. These scholars strive to show readers a Don Quijote that is a hero for everyone. Sancho Panza, Don Quijote's loyal squire, is a very important figure in the novel as well. Without Sancho Panza's voice of reason, readers would not be able to see as clearly the stark contrast between don Quijote's world and the real world. In this paper, I will examine how Don Quijote can be seen as a hero and a Christ-like figure using examples from the text. This perspective will further our understanding of the novel and cause readers to think about the novel in a new way.

## Crisis, Violence, and Torture: French Colonialism in North Africa
## Buckman 200
## Session Chair: Smith Stickney

**4:00-4:15** *What does Violence Solve?: An Examination of Feraoun's Changing Views of War*
**Matthew Hein**
**Faculty Sponsor: Etty Terem, Department of History**
This paper uses Mouloud Feraoun's Journal 1955-1962 to study how the French-Algerian war affected Feraoun's perspective on the necessity of revolution and violence, comparing him to other Algerian intellectuals Albert Camus and Frantz Fanon. The paper examines the reasons behind Feraoun's shift from an ardent supporter of violence to an advocate for any end to bloodshed. I will argue that Mouloud Feraoun's disenchantment with the FLN, the toll the war takes on combatants and civilians alike, along with the general devolution of society, makes Feraoun wish for

peace above all else. His life in the middle of the war forces him to lose the idealist view of Fanon and move towards the practical view of Camus. This occurs because Feraoun and Camus both have personal connections to the war and can see the havoc the war wreaks on individuals they know.

**4:15-4:30** *Identity and Crisis: Racism and French Colonization in Tunisia*
**Camilla Morrison**
**Faculty Sponsor: Etty Terem, Department of History**
Using the work of Albert Memmi, this paper investigates the nature of the French colonial system in Tunisia. It identifies racism as the both the fuel and the glue of this system, discussing how it functions in relation to the colonizers as well as how this system impacts the identity of the colonized. The system creates for Tunisians their identity as the colonized and then further warps this identity through the simultaneous destruction and reformation of its fundamental elements. Ultimately, this elicits a reaction from the colonized and forces them to make a choice about the manner in which they will exist in relation to colonialism and the colonizers.

**4:30-4:45** *Victory By Any Means: French Torture In Colonial Algeria*
**Harrison Donahoe**
**Faculty Sponsor: Etty Terem, Department of History**
The practice of torture and summary executions by French troops during the Algerian War of Independence have come to be seen as the defining characteristics of the brutal conflict. These practices and their justifications have had long lasting consequences on both Algerian and French society that continue to resonate today.

## Untold Stories of Memphis
## Buckman 200
## Session Chair: Dee Garceau

**5:00 -5:15** *Robert R. Church, Jr.: Memphis' Forgotten Civil Rights Leader*
**Katie Jakovich**
**Faculty Sponsor: Dee Garceau, Department of History**
This paper argues that Robert R. Church, Jr., through his political influence and his involvement in the NAACP, became an important civil rights leader, yet remains largely unacknowledged by historians. Using primary documents from the Church Family Papers, the paper establishes that Church was a crucial figure in the NAACP, helping to establish the Memphis branch, as well as other branches around the mid-South, and used his political power to fight for anti-lynching legislation and legal support for African Americans. Letters between Church and high-ranking NAACP officials, and his contact with Herbert Hoover and other United States Presidents prove Church to be a key figure in the civil rights movement of the mid-twentieth century, yet he remains unacknowledged and unheralded by historians and the public.

**5: 15-5:30***Mud Island as 'Local Color' Yielding Social Marginalization*
**Elizabeth McNeely**
**Faculty Sponsor: Dee Garceau, Department of History**
This paper argues that, in the years before 1965, discourse about the people of Mud Island minimizes the reality of economic and social impoverishment and instead casts them as colorful folklore. This approach is used to avoid difficult issues of social marginalization and other problems of public health that the Island's inhabitants faced. The "strange" inhabitants in the Mud Island community were viewed as sources of local color by newspapers, rather than investigate the dire situation of poverty in the community. This paper uses primary documents in the form of local Memphis newspapers, U.S. Census Records, and oral histories. The mid-twentieth century subsistence community on Mud Island has been largely unaddressed by historians. The community is a forgotten portion of Memphis history that was marginalized in its own time as well as in public memory.

**5:30-5:45**:*"We are Going to March Again": The Injunction Against Dr. King's April 5th March and the Fight to Lift It*
**Brendan Tyler**
**Faculty Sponsor: Dee Garceau, Department of History**
This paper examines the City of Memphis's injunction against the second march planned by Martin Luther King, Jr. in support of the sanitation workers' strike (April 1968). By examining the court orders, motions filed, affidavits, executive and legislative orders, defendants' attorney Michael Cody's written account, FBI reports, and newspaper articles, this investigation addresses why the City of Memphis sought the injunction; why the district court granted it; and why the ACLU and Dr. King fought the injunction. Said examination shows that the parties involved conveyed the injunction and the fight against it as a competition between practical concerns and legal rights; more specifically, the City of Memphis' stated reasons are partially based on pretext but also reflect genuine security concerns. Each party weighed both its ideals and practical considerations to determine their best course of action, elements which unified Memphis city officials but divided King and his supporters.

## SOCIAL SCIENCE ORAL SESSIONS

## Economics I
## Buckman 108
## Session Chair: Nick McKinney

**1:30-1:45** *A study of institutional factors impacting degree completion rates among students of Rhodes College*
**Dylan Ledbetter**
**Faculty Sponsor: Nick McKinney, Department of Economics**
This study attempts to identify institutional determinants of degree completion among students at Rhodes College. From data gathered from admissions and financial aid records, course registrations, athletic and campus organization rosters, and faculty and staff information, I compile a profile a student upon entry in terms of demographic admissions data, test scores, parents' academic histories, high school performance indicators, and a student's intended choice of major to allow projections of a student's predicted academic and social engagement. With particular emphasis on a student's first-year of enrollment, the identity variables that characterize an entrant's profile are then interacted with a student's institutional experiences such as selections and assignments of courses, major, and faculty advisor. From these interactions this study aims to identify salient and statistically significant institutional performance and engagement factors that augment and diminish a student's likelihood of degree completion. First-year faculty advisor assignments and instructor interactions are characterized through course registration data in order to assert and test the hypothesis that such assignments yield significant impact on the likelihood of degree-completion among students, and from these findings this study posits its primary goal, to offer practical insight into the optimization of first-year advisor matching among entering students.

**1:45-2:00** *Those that break the Honor Code, and those that uphold it: an analysis of incentives and rationality*
**Alyssa Harris**
**Faculty Sponsor: Nick McKinney, Department of Economics**
While there has been some economic analysis of cheating, the economic incentives that go into the decision of a student body that governs academic dishonesty and the responses to those decisions have been largely neglected. This likely stems from multiple obstacles to obtaining adequate data, including the confidentiality of the information and the small size of such data sets. Rhodes College is unique in that it has a large data set containing every case in the past twelve years that has come before its student run Honor Council. The Honor Council at Rhodes deals with cases in which an individual (or individuals) is alleged to have committed a violation of lying, cheating, or stealing. This paper looks to discern what types of students are more or less likely to commit a violation (and of what type and degree), and what sanctions are more likely to discourage recidivism. Furthermore, it takes into account the characteristics of the Council members themselves in order to detect any materialization of biases (such as gender and Greek/non-Greek) in the finding of an Accused student In Violation or Not In Violation, and in the sanctions given to an Accused found In Violation of the Honor Code.

**2:00-2:15** *Underage Drinking on College Campuses*
**Michel LeRoy**
**Faculty Sponsor: Nick McKinney, Department of Economics**
A significant liability for college administrators is the consumption and abuse of alcohol by their students. For Rhodes College specifically, over one hundred alcohol violations are given out per year for the abuse of alcohol. The violations are given to students whose drinking is not "legal, responsible, healthy, and reflective of [Rhodes] community values" (Student Handbook 19). There are two different levels of alcohol violations – level one and level two. A level one violation is typically for a student who is underage and gets caught consuming alcohol, therefore breaking the legal part of the policy. A level two violation is for students who are binge drinking, going to the hospital, or endangering others. Every year, about twenty percent of the alcohol violations given out are level two. In this paper, I am going to examine the data to see if there is a difference between the types of students who receive a level one violation versus a level two violation. I am also going to examine the effects of Greek affiliation, religion, service participation, gender, GPA, whether a student has eight am classes, and how difficult a student's classes are on whether or not a student receives an alcohol violation.

**2:15-2:30** *Rhodes College Admissions and Retention Prediction*
**Madeleine Esther**
**Faculty Sponsor: Nick McKinney, Department of Economics**
Student retention is commonly used as an indication of student satisfaction, and in turn institutional quality. In addition to promoting a strong image, high retention is best economically for the school, society, and individuals. It promotes increase human capital and increased profitability for the college. During the college admissions process a multitude of quantitative and qualitative factors are considered. I used regression based analysis to determine what admissions data is most influential in predicting retention and student success, with a focus on the first three collegiate semesters. By looking at standardized testing sub scores as opposed to best over score more aspects of retention can be explained. I found that most aspects currently considered during the admissions process are significant and important. Many factors that negatively influence retention are heavily qualitative and difficult to account for, however school contact and increased admissions interactions can help find students who are most fit to attend Rhodes College.

## Public Policy and Law in Action
## Buckman 216
## Session Chair: Anna Smith

**2:00-2:15** *Catalyzing Memphis Culture, the Broad Avenue Arts District*
**Chad Bohls**
**Faculty Sponsor: Anna Smith, Department of Political Science**
I am enrolled in Pols 460, public affairs internship, instructed by Anna Smith. I have been working for Broad Avenue Arts District community outreach and creative development teams. The District, a neighbor to Rhodes and in one of midtown's oldest neighborhoods, Binghamption, is undergoing a massive revitalization. The District currently provides an array of businesses from art galleries to restaurants to an adult social club, and hosts events such as art walks and street festivals. Looking to expand its scope and breadth the District is creating a new outdoor pavilion space to host a number of community events such as concerts, dances, and art walks. Throughout the planning of this revitalization, the District has had an affect well beyond that of the Biinghampton community. The District and its events attract the diverse collection of communities that make up Memphis. With its new projects and initiatives, the hope of the District is to be able to reach more community members, promote more Memphis art and culture. My participation in URCAS, as advised by Anna Smith, would include encompassing my internship experience, the dealings of the Arts District, and discussing the Memphis community and its culture.

**2:15-2:30** *Judicial Discretion: Identifying and Correcting Prosecutorial Misconduct*
**Elena Mosby**
**Faculty Sponsor: Anna Smith, Department of Political Science**
This paper will focus on the presence of prosecutorial misconduct that exists in the United States and the factors that contribute to this problem. Prosecutorial misconduct, however, is not equally present throughout the United States—different counties and states report larger numbers of prosecutorial misconduct per year than others. To determine the root causes of this problem, the study analyzes the structure of different prosecutor's offices in conjunction with

possible contributing causes to the problem. Political pressure associated with the nature of career advancement in criminal law could affect the behavior of prosecutors in and out of the courtroom. This is attributed to the emphasis of high conviction rates in our society and the importance of rulings by judges that will aid prosecutors in putting criminals behind bars. Are prosecutors and judges willing to sacrifice fair judicial proceedings to meet this societal pressure? How does this change during high profile cases that draw a lot of media attention? Should our system be amended to reduce the amount of political pressure that is put on prosecutors and judges? This study focuses on the roots of the abuse of prosecutorial discretion and how it can be resolved.

**2:30-2:45** *The Courtroom Experience*
**Marguerite McGowan**
**Faculty Sponsor: Anna Smith, Department of Political Science**
This semester I have been interning with Cornelius Bostick, a criminal defense attorney in Memphis. Throughout my time I have learned about the intricacies of the court system and had the opportunity to see trials in different levels of criminal and civil court. I have taken multiple law related courses during my time at Rhodes and this internship has given me the chance to expand my knowledge outside of the technical elements discussed in the classroom and explore the application of the procedures I have studied. I have spent time in almost every judge's court room, which has allowed me to develop a more acute awareness of the justice system's flaws and successes. In this presentation panel, I will be describing the experiences I have had in the court system and how these experiences have shaped my understanding of the legal system.

## Economics II
## Buckman 108
## Session Chair: Nick McKinney

**2:45-3:00** *The Effect of Aid to Education on GDP Growth*
**Kate Ivey**
**Faculty Sponsor: Courtney Collins, Department of Economics**The purpose of this paper is to examine the impact of foreign aid to the education sector on primary enrollment rates. Foreign aid is a highly debated subject among development economists due to the inconsistent nature of results regarding the returns to aid. I consider the amount of education aid each country receives and determine if this aid has a significant effect on education levels. I find that aid has a positive but very small effect on education and that education has an insignificant effect on GDP. These findings lead me to conclude that aid to education is not working the way donors have hoped and is perhaps being allocated inappropriately

**3:00-3:15** *Does Gender Equality Drive Global Competitiveness? An Econometric Analysis*
**Cara Phillips**
**Faculty Sponsor: John Murray, Department of Economics, Teresa Beckham-Gramm, Department of Economics**
My research examines the causal relationship between gender equality and global competitiveness using data from the Global Gender Gap Report and the Global Competitiveness Report in a two-stage least-squares regression analysis over the years 2006-2013. The Global Competitiveness Report categorizes its measures into those which are basic requirements for factor driven economies, those which are efficiency enhancers for efficiency-driven economies, and those for innovation-driven economies. The category into which a country falls is related to its level of development with the less developed countries still lacking in the basic requirements measures. In light of this, the potential policy implications of this research are strong: if gender equality is affects the pillars of the basic requirements, then gender equality will be a key policy initiative for less developed countries to advance to an efficiency-driven economy. The same logic applies for efficiency and innovation economies as well. If, on the other hand, gender equality affects pillars which span the differing economies, that indicates that gender equality continues to be an economic policy goal throughout a country's development. If gender equality does not, however, predict competitiveness, then that result will also inform public policy.

**3:15-3:30** *Explaining Variation in South Korean Attitudes toward South Korea's Bilateral Free Trade Agreements with the United States, China, and Japan*
**June Mi Elisha Kang**
**Faculty Sponsor: John Murray, Department of Economics, Steven Ceccoli, Department of International Studies**
When first signed in 2007, the Korea—U.S. Free Trade Agreement (KORUS FTA) was expected to obtain strong public support as many trade experts predicted economic gains for both countries. Contrary to such expectations, however, South Koreans displayed varying levels of support toward KORUS FTA when the official negotiations began in 2006. Therefore, the first part of this research is devoted to answering the following question: "what explains the variation in trade policy preferences among South Koreans to KORUS FTA signed in 2007?" This paper identifies trade policy preferences of individuals and empirically examines each individual's grounds for either supporting or opposing the agreement. The project then develops different hypotheses under each framework of rational choice, value framing, and national security. These hypotheses are then tested using the poll surveyed by East Asia Institute, JoongAng Daily, and the Chicago Council on Global Affairs in 2006. The second part of the research applies the same regression model to analyze the varying levels of support for Korea's bilateral FTAs with China and Japan. The national security framework is expanded to draw a holistic conclusion that explains the variation in South Koreans' attitudes toward Korea's bilateral FTAs with the US, China, and Japan.

## Ethnography at Home
## Buckman 110
## Session Chair: Julia Hanebrink

**2:00-2:10** *Ties That Bind: An Ethnographic Study of a Knitting Group*
**Aubrey Flowers**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
The "Sit and Knit" sessions at the Church Health Center on Union Avenue provide a unique cultural space, both within the confines of the wellness center that houses it and the wider Memphis community, to relax and enjoy the fellowship of others. In an effort to understand the impact this group has on its members, over the course of the past semester I have interacted with, participated alongside, and observed this circle of knitters in the spirit of ethnography—the bedrock of anthropological research. Over the clink of needles and the hum of gossip, I have caught a glimpse of the conditions under which social support networks can form and flourish, and the way compassionate gifts of time and generosity can bring a community together. Amidst a wider cultural backdrop of busyness and social fragmentation, such small groups provide potent models of the health-giving power of participating in a peaceful and meaningful activity with others.

**2:10-2:20** *Think Tattoos Are Trashy? Think Again: An Ethnography of Ronin Tattoo Shop*
**Isabel Steen**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Understanding and valuing other cultures is instrumental to living a diverse and fulfilling life. It is especially beneficial to understand the other cultures that comprise your own community. Through the use of observation, participation, and interaction, the ethnographic method enables this necessary deeper understanding of cultures often viewed as "others." In my ethnography, I studied the artistic culture of tattoos at Ronin, a tattoo shop on Broad Avenue. The owner and tattoo artist of Ronin is well established in the tattoo community with 15 years of experience. During my time at Ronin, I observed the recently opened establishment gain popularity under the leadership of a tattoo artist veteran. The tattoo artist is known for his incredible artistic ability and creativity, both of which attract clients from near and far who desire detailed and unique tattoos. My hope is that my study dispels the negative stereotypes that are often unfairly assigned to tattoo artists and their clientele, and presents the culture of tattoos as one of true art.

**2:20-2:30** *More Than the Absence of War: An Ethnographic Study of the Mid-South Peace and Justice Center*
**Meriel Jenkins**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
This semester, I have conducted ethnographic research at the Mid-South Peace and Justice Center, a non-profit organization which focuses on issues including homelessness, economic equality, transportation reform, and criminal justice reform in Memphis and the Mid-South. Ethnography is a type of anthropological study and requires

observation of a culture or "cultural scene." This allows the ethnographer to gain a deeper understanding of both the culture being studied and the ethnographer's own culture. Through my position as an intern, I was able to observe different facets of the Peace and Justice Center, and work with groups such as the Memphis Bus Riders Union and H.O.P.E (Homeless Organizing for Power and Equality). I was also able to understand more about how a non-profit organization functions and how the cultural scene of the Peace and Justice center operates. Through my ethnographic research, I learned about the unconventional office environment and direct contact with community members. I hope to demonstrate how these aspects of the culture enable the work that the Mid-South Peace and Justice Center accomplishes in the Memphis Community.

**2:30-2:40** *The Cat's Out of the Bag: An Ethnography of House of Mews*
**Alexandra McMillan**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Ethnography is a vital component to the anthropological and sociological fields. An ethnographer is required to immerse themselves in a cultural scene foreign to themselves, using the method of participant-observation to learn more about this new location. As an avid animal lover, House of Mews cat shelter offered a great opportunity for me—time to spend with animals as well as learning about the volunteer culture. I decided to fully engage myself in the scene by signing up to become a volunteer. Through my personal experiences as a volunteer, my observations, and formal and informal interviews, I found that being a volunteer at the House of Mews is an act of true dedication. Volunteer teams work every morning from seven until ten, making sure that the shop is clean, cats are fed, and everything is accounted for. Because this is all done before the shop opens, patrons may not realize what commitment these volunteers display. Without the enthusiasm and hours of work put in everyday, House of Mews would not be able to continue. It is important to highlight these persons, not only supporting their efforts, but to support House of Mews as well.

**2:40-2:50** *"You Have to Sustain Sustainability": An Ethnographic Study of the Roots Memphis Farm Academy*
**Liz Giraud**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Often, when addressing complex human systems, it is inappropriate for social scientists to limit themselves to a purely quantitative method of study. The ethnographic method of participant-observation provides a qualitative account of such complex systems in a relatable voice. Such methods proved invaluable in my attempt to gain a better understanding of the cultural scene at the Roots Memphis Farm Academy, a local urban farming program founded to better prepare small business owners for success. I collected data through personal observation of and involvement in the Farm Academy's weekly academic classes and "seed-starting" sessions, and also by conducting unstructured interviews. Roots Memphis encourages sustainable lifestyles through the Farm Academy's eight-month academic and two-year practical skills training process, producing adult students capable of initiating and sustaining a profitable small farm. Academic students create a "Whole Farm" plan by first asking themselves what they really value in life and, second, by determining a detailed business model that is built around and supports those life values. My presentation will explore how Roots Memphis assists urban farmers to overcome economic and environmental challenges, thereby making sustainability in our community just that: sustainable.

**2:50-3:00** *¡Viva la tradición! An Ethnography of the Latino Cultural Center of Memphis*
**Amanda Draper**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
The ethnographic method of participant observation enables social scientists to actively engage in cultural scenes, thus broadening our understanding of "others", both near and far. In order to better understand the experiences of local Spanish speaking immigrants, I utilized this method at El Centro Cultural Latino de Memphis or the Latino Cultural Center of Memphis (CCLM), located in Caritas Village in the Binghampton neighborhood of Memphis. The classes offered by El Centro serve an important purpose for immigrants since these classes serve as a creative and artistic space where adults and children can learn about, practice, and share their Hispanic cultural heritage. Another component of my ethnographic research took place during practices for Danza Azteca Quetzalcoatl de Memphis, a traditional Aztec dance group. Danza Azteca helps members establish their identities as descendants of the Aztec people and strengthen their spiritual connections to their ancestors through la danza, or the dance. Conducting this research, I hope to understand how the Center influences the perceptions and understandings of the cultural identities of participants, and while promoting awareness of Latino cultural richness and diversity within the larger Memphis community.

**3:00-3:10** *"This is My Stop" :An Ethnographic Study of the MATA Bus System*
**Jacob Powers**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Through the utilization of the ethnographic method of participant-observation, I gained a more intimate understanding and appreciation for the Memphis Area Transit Authority (MATA) bus system. Prior to this project, I had never ridden the bus, so I was unfamiliar with this cultural scene. Using the method of participant-observation, I situated myself within the scene as a bus rider so that I could observe the scene from the inside. As a bus rider, I observed the interactions between people as well as the effects of space and material culture on their behavior. Through my observations, I began to notice the rhythms and social norms of the bus system of Memphis . This presentation will discuss my experiences on the MATA bus system and focus on the social dynamics present within this community such as gendered interactions and the disparities in race and class.

**3:10-3:20** *Behind the Curtain: An Ethnographic Study of Performance and Outreach from inside Opera Memphis*
**Victoria Elliott**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Ethnography is an important part of social science that addresses systems of human interaction. Instead of using mere qualitative data, ethnography seeks to provide a qualitative view of cultural variation beyond our immediate subjective view. In implementing the ethnographic method of participant-observation, I looked beyond my preconceived notions and broadened my understanding of unfamiliar cultural phenomenon. This proved instrumental as I became embedded in the cultural scene of Opera Memphis, a non-profit organization founded to entertain and educate the local community. Data collection occurred through personal observation of weekly meetings and rehearsals of performances. Casual conversations supplemented this as spontaneous dialogue shifted to informal interviews. I discovered that Opera Memphis promotes entertainment and education by producing performances, delivering the Midtown Opera Festival, and hosting year-round educational programs. They connect with over 100 local organizations through these performances and outreach programs, reaching over 20,000 people yearly. The annual Opera Festival encourages this by asking what life values are treasured by the present community and which shows would develop these values. My intent is to uncover the production process which bridges the gap between the Memphis and the Opera community, making it accessible for the benefit of others.

**3:20-3:30** *Always Look on the Bright Side of Death: An Ethnographic Study of Death Midwifery*
**Regan Zehr**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Through the application of participant-observation, ethnographers are able to become acquainted with the nuances of cultural sites and discover what makes them unique. Participant-observation allows anthropologists to gain a better understanding and appreciation for the individuals they are studying, as it gives them the opportunity to play the role of members rather than researchers within a cultural scene. I employed this ethnographic method to shadow and apprentice with a local death midwife. I was exposed to the various ways in which she conducted her death midwife services, such as guiding monthly meetings regarding death, consulting with colleagues within related fields, and investigating other's methods of understanding the grieving process and recognizing one's eventual demise. All of these experiences have directed my attention to one of the central themes that pervades the field of death midwifery: that death does not have to be grim, but rather can be a fulfilling aspect of the human life cycle. This positive perception of death differs significantly from that of our society and has pressed me to ask: Why must funerals be so sad?

**3:30-3:40** *Running Local and Supporting Memphis: An Ehtnographic Study of Breakaway Running*
**Elizabeth Rockett**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
This past semester, I have had the privilege to conduct an ethnographic study at Breakaway Running, a local running store in Memphis. Located in Midtown, Breakaway Running has been serving Memphis and local runners since 1981. An ethnographic study allows researchers to study the "other" in an unfamiliar cultural scene through participant observation. This method of research provided me the opportunity to meet local Memphians, observe the cultural scene and learn about running. Breakaway is not just a store; it's a community. During my participation in this community, I gained a greater appreciation for the work Breakaway Running does for its customers and Memphis. The ethnographic study allowed me to experience the community of Breakaway Running and understand the role this store plays in the lives of local runners. In my presentation, I will present my ethnographic findings and further explain the influence Breakaway Running has in Memphis and the running community.

**3:40-3:50** *The Other Side of the Law: An Ethnographic Study of the Memphis Police Department*
**Laura Saggese**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
The ethnographic method, crucial to the disciplines of Anthropology and Sociology, assists people in learning about unfamiliar or foreign cultures through the use of participant observation. This method is beneficial by allowing individuals to look beyond their preconceived notions and develop an enriched understanding about various cultures. Learning about and appreciating different cultures is also important in understanding one's own life. This semester, I practiced the ethnographic method by observing and participating in ride-alongs with the Crime Scene Unit of the Memphis Police Department. These ride-alongs consist of traveling with an officer to various crime scenes to observe how they collect evidence, process the scene, and interact with community members affected by crime. Observing and interacting with these officers has allowed me to further investigate the complex and sensitive relationship between police officers and the community at large. I was able to learn about attitudes of the police towards the community they serve and subsequently the community's perceptions of the police. These ride-alongs have given me firsthand knowledge and a greater understanding of the criminal investigation process, and the complex and challenging roles crime scene investigators must play in Memphis.

**3:50-4:00** *Are You Woman Enough?: An Ethnographic Look at Memphis Roller Derby*
**Stephanie Kasper**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Although they might not get as much press as the Grizzlies or the Tigers, the fierce athletes of the Memphis Roller Derby League are proud to call the Pipkin Building at the Memphis Fairgrounds home. They play the growing sport of flat track roller derby, a thrilling full contact sport played by all-female teams on quad roller skates. This semester, the women of Memphis Roller Derby allowed me to conduct an ethnography of their league in order to learn more about the culture of roller derby. Ethnography is a research method of anthropology that involves diving deeply into another cultural world through participant observation. By attending and observing practices, games, and other derby events, I began to understand the rules of derby as well as the interactions and relationships among the team members. In this presentation, I will share some of my experiences and insights into this cultural world, particularly regarding the recruitment of new members and the do-it-yourself ethic of this volunteer run league. Hopefully I will be able to convey at least some of the skill, passion, and enthusiasm that characterize the women of Memphis Roller Derby that I have gotten to know during this project.

**4:00-4:10** *High Quality as a State of Mind: An Ethnographic Study of Whole Foods Market*
**Samantha Goodman**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
An ethnographic study allows for the integration of an anthropologist into another culture through a non-invasive method known as participant observation. Through observing the "other", anthropologists survey and acknowledge how different cultures interact and how their unique beliefs and values shape their interactions. My cultural scene is the newly renovated Whole Foods Market, located on Poplar Avenue. My first day of observation illustrated numerous unique characteristics of the store, which differentiates it from a traditional grocery. The Market is designed, staffed, and stocked to ensure that all customers receive the best care and the best quality of items. The Market's core values promote a united community, while also encouraging healthy, well-rounded lifestyles. Through my participant observation, I focused on the interaction between the customers and employees of the Market to provide substantial insight into how the store upholds its core values. Specifically, the Market prides itself on their knowledge of the origin of all their products. The Market offers their customers this knowledge to further assist them on making the healthiest purchases possible. My report provides a "taste" of how the Market reaches out to the Memphis community and how their core values resonate through their local and global community.

## Media and Politics
## Buckman 216
## Session Chair: Marguerite McGowan

**3:00-3:15** *Understanding The Daily Show: Effects in a New Media Environment*
**Jacob Long**
**Faculty Sponsor: Amy Jasperson, Department of Political Science**
The Daily Show with Jon Stewart has attracted skeptical attention from scholars, political commentators, and laymen for both its style and its apparent growing relevance in serious political discourse. As the relevance of more conventional gatekeepers, like broadcast news and newspapers, has receded in an environment of growing media choice, Jon Stewart has become a symbol of the many new sources citizens look toward for political information and commentary. While these changes are undeniable, what is far less clear is what consequences this new political environment will have on American democracy. On one hand, The Daily Show could seem to be part of a troubling trend towards trivialization and superficiality in politics that promotes disengagement, cynicism, and apathy via its entertaining style. On the other, it may provide a necessary check on corporate and political power while engaging otherwise disenchanted citizens with politics. I argue that there is more truth to the latter hypothesis. TDS aids democracy by acting as a gateway for non-participating citizens to begin attending to and participating in politics while also attracting an informed audience that uses the show for its checks on power, both political and cultural.

**3:15-3:30** *Beyond the Punchlines: The Effects of Postmodern Satire on National Political Culture*
**John McHugh**
**Faculty Sponsor: Daniel Cullen, Department of Political Science**
"The Daily Show with Jon Stewart" and "The Colbert Report" are widely viewed comedy television programs that focus primarily on national politics as the source for their humor and parody the basic structure of cable news shows. With each show averaging audiences of nearly two million viewers on any given night – numbers that rival or exceed viewership of traditional evening news programs – each has taken on a role of unprecedented influence, if only through the power of laughter. Neither program claims to aspire to any purpose other than entertainment, but several studies have shown that the impact of each show goes far beyond entertaining its viewers. Some of these multidimensional effects include an increased knowledge of political figures and world affairs, increased negative feelings toward certain politicians, the development of cynical views of news media, and lowered trust in the American political process. In light of these demonstrated impacts, it is necessary to consider the form of political humor used in these shows and to determine the extent to which they have the potential to impact national political culture.

**3:30-3:45** *Purity, the Media and Violence against Women in Guatemala*
**Ailsa Bryce**
**Faculty Sponsor: Amy Risley, Department of International Studies**
In 1996 Guatemala's brutal civil war finally came to an end. However the legacy of violence it left behind, especially violence against women, continues to plague the country today. The rates of gender-based violence continue to rise and a strong culture of impunity ensures that very few of the perpetrators are ever brought to justice. Scholars first used the term "femicide" to describe the murders of women taking place on the Mexican border but they have since applied the same term to the violence in Guatemala. While it is necessary to problematise this term, its existence speaks to the alarming scale of the problem. In the paper I will investigate the role both of Guatemalan institutions and of the media in allowing the violence to continue. Using a combination of primary and secondary sources I will seek to show how the media sensationalises the murders while creating narratives of beauty and purity that fuel the culture of impunity and use victim blaming to justify the violence.

## School Matters
## Buckman 108
## Session Chair: Elizabeth Thomas

**3:45-4:00** *The Value of Urban Debate: Shelby Debate Society and its Impact on Urban Education in Memphis*◙
**Kelly Johnson**
**Faculty Sponsor: Elizabeth Thomas, Department of Psychology**
Through the lens of my Student Fellowship with Shelby Debate Society during the spring semester, I will discuss mission of the Urban Debate League to provide improved educational opportunities in the form of structured policy debate for historically underprivileged students in Memphis. Urban Debate is not currently seen as a tool for educational reform, an irony in light of the fact that it is one of the only existing educational reforms that solves for academic achievement, regardless of race, poverty, or risk of dropping out. Major qualitative studies have found that debate participation is associated with improved academic performance for at-risk adolescents. The benefits of debate competition are far-reaching: it teaches the communication skills vital to educational reforms critical to success in a global society. Moreover, critical reading, writing, and oral communication skills have been found to enhance academic achievement, conflict resolution, and leadership skills- all of these included in the 'core competencies' education experts say children need for success in the 21st century. These skills find a near-perfect avenue of instruction via debate. Each student deserves the opportunity for intrinsically valuable experiential education. Urban debate allows for a method of intellectual self-discovery, for a pedagogy that motivates authentic inquiry in order for students to "own" their learning.

**4:00-4:15** *Examining Teacher Evaluation Policies and Implications for Effectiveness in Memphis and the State of Tennessee*
**Landon Webber**
**Faculty Sponsor: Marcus Pohlmann, Department of Political Science**
This paper examines a growing trend in education reform policymaking which has attracted much attention in national discourse on public education- teacher evaluation policy. Since the 1980's, a growing network of those invested in reforming and administering public education in the United States has consistently targeted the development and implementation of teacher evaluations based heavily on student and standardized testing data. Researchers have come to call teacher evaluations an essential component of the"ideology of school reform." In 2010, with funding from the Gates Foundation, inclusion in the Measures of Effective Teaching research project and support from state officials working on Tennessee's Race to the Top proposal, Memphis was positioned to serve as a national exemplar in evaluations, designing a system which relied heavily on teachers' student achievement data and principal's ratings of classroom performance in scoring teachers. Since then, the evaluation framework has been revised three times and applies countywide as a result of the recent merger with Shelby County Schools. This paper employs evaluation data, surveys, interviews and focus group discussions with teachers and principals to assess the effectiveness of these teacher evaluation policies and their implications for attracting high quality teachers to urban public schools.

**4:15-4:30** *Meta-communicative Awareness in Children's Stories about their Conflicts with Peers*
**Ellen Alpaugh, Tara Connors, Marsha Walton**
**Faculty Sponsor: Marsha Walton, Department of Psychology**
In the social world of middle childhood, characterized by promises, gossip, arguments, good-natured teasing and identity-threatening insults, the ability to talk about talk is an important skill for peer success. The developing ability to engage in reflexive thinking converges with social demands to focus attention on communication successes and failures. The result is an impressive leap in metalinguistic awareness. We examined 183 narratives by 3rd-5th grade children about their peer conflicts, and identified 781 occasions in which authors used speech act verbs or described communicative events. Metalinguistic markers increased significantly with grade, and 5th graders were more likely than younger children to use phrases describing discourse. Meta-communicative language was negatively related to self-reported loneliness and positively related for boys only to peer-preference and teacher-rated academic success. The cognitive development that underlies an ability to think reflexively and the social skills that underlie the ability to assert ones own interests among peers, to negotiate disputed interests, and to resolve, or to think productively about unresolved, conflicts converge in middle childhood and are accompanied by attentiveness to what people do with words. We argue that meta-communicative awareness is a key feature of the intersection of cognitive and social development in middle childhood.

**4:30-4:45** *Funding Shelby County Schools Differently*
**Rebekah Barr**
**Faculty Sponsor: Elizabeth Thomas, Department of Urban Studies**
Currently, the Shelby County School District funds its schools based upon student enrollment numbers. Based on the number of students that a school has, the principal of the schools is required to hire a certain number of teachers, assistant principals, and other staff through district-set ratios. However, in order to promote equity in funding across all schools as well as to give principals more autonomy in staffing decisions, I was asked by the district to survey various weighted-student funding models and then examine the feasibility of implementing one in Memphis. I examined different models in cities including Boston, New York City, and Denver to learn about the challenges and benefits each city experienced. The purpose of my project is to provide a way for each Memphis school with the same number of students to receive the same dollar amount regardless of teacher experience. This redistribution of funds will allow schools that previously could not afford to hire more experienced teachers to improve classroom quality across Memphis.

## Sociology and Urban Studies
## Buckman 216
## Session Chair: Jacob Long

**4:00-4:15** *Danny Thomas and St. Jude Children's Research Hospital: Reshaping Racial and Economic Dynamics in Memphis Healthcare*
**Noelle Schmitter-Schrier**
**Faculty Sponsor: Peter Hossler, Urban Studies Program**
This research project examines the impact of Danny Thomas on both the economic trajectory and racial dynamics of the city of Memphis. Thomas, along with some key associates, established St. Jude Children's Research Hospital in 1962. The creation of the hospital occurred during a period of tremendous social and economic transition within the city, a transition that Thomas and the hospital helped shape. The two most important influences that Thomas and St. Jude made on the city were (1) the reshaping of racial relations, and (2) increasing the economic success of Memphis as a central medical city. Thomas and the hospital reshaped racial relations by being the first integrated hospital in the South. By placing a strong emphasis on diversity, they empowered Memphis to desegregate restaurants, hotels, and businesses. Securing funding enabled St. Jude Children's Research hospital to lift financial burdens for all patients admitted. This attracted publicity that helped reshape people's perception of Memphis, increasing revenue. Examining the pivotal racial and economic transitions in Memphis will reveal the importance that Thomas and St. Jude Children's Research Hospital played in reshaping healthcare.

**4:15-4:30** *The Social Movement Cultural Dialectic: How Frames, Emotions, and Cultural Foregrounding Generate Meaning and Motivation Among Wage Theft Activists*
**Nathan Redman**
**Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology**
Utilizing qualitative methodologies and drawing on literature around social movements, culture, framing, and emotions, this article explores the dialectic meaning-making/motivation-generating process among a group of students, activists, and volunteers supporting a small nonprofit organization dedicated to fighting against Wage Theft and other forms of worker exploitation. In discussing the ways in which these people have affected, and been affected by, this organization and its goals, I propose a new framework for understanding the dialogic interplay between social movements and their frames, culture and its narratives, and individual supporters and their foregrounds, their emotions, and their collective-action.

**4:30-4:45** *Drag Queens and Gender Performative Scenes: The Social Construction of Reality in Drag Culture*
**Leah Ford**
**Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology**
Using Judith Butler's work on gender performativity, drag is explored as a reaction to tightly constructed gender borders, using displacement and exaggeration to queer these borders. This transgression is not only a reaction to gender construction but also is inherently a critique of this construction. Despite drag's value in deconstructing these gender norms, drag also creates its own social reality. Through academic study and short-term ethnography, I have

worked to examine drag's construction of social reality. Using the lens of Berger & Luckmann's theory of the social construction of reality, the paper studies drag pageantry as an institutionalization of drag culture with its own tightly constructed views of gender. The phenomenon of drag mothers is then observed as socialization into a constructed gender role which is then internalized. I participated in drag culture by planning and observing a drag show with both amateur and professional performers and an audience of mixed levels of familiarity with drag. This participant observation led to a deeper examination of drag's transgression of and simultaneous obedience to the world of gender.

## NATURAL SCIENCES ORAL SESSIONS

## Conservation and the Environment

**FJB**

**Session Chair: Stephen Leavelle**

**1:30-1:45** *Bacterial Assay of Calcium Oxalate Coating Found on Rock Art*◙

**Aaron Banks**

**Faculty Sponsor: Jon Russ, Department of Chemistry and Laura Luque de Johnson, Department of Biology**

Around the world, ancient pieces of artwork are found on cave walls and ceilings, along rocky outcroppings and below remote overhangs. All of these paintings have managed to remain preserved for thousands of years due to a thin calcium oxalate coating, accumulated over centuries. The question that remains is how this coating forms on many different types of surfaces across the planet. In order to research the possibility that this coating is produced by a bacterial process, twenty samples from Southern Texas and the Oxtotitlán site in Southern Mexico were grown in R2B bacterial growth medium. The samples were then grown on an Agar and Peptone media in order to separate individual colonies. Currently, these individual colonies are being allowed to grow on the same agar and peptone media, but with the addition of one hundred grams of ground limestone per liter. This is to determine whether any of these species are capable of producing calcium oxalate from limestone. The oxalate concentration of each sample will be determined using FTIR spectroscopy. These bacterial species will then be identified using oil immersion microscopy, gram staining, spore staining and finally DNA analysis.

**1:45-2:00** *Avian Malaria in East Tennessee*

**Jackson Roberts, Alix E. Matthews, Alison A. Hanson, Vincenzo A. Ellis, Department of Biology, University of Missouri- St. Louis**

**Faculty Sponsor: Michael Collins, Department of Biology**

Parasites can directly and indirectly influence the dynamics of ecological communities through their effects on host behavior, host fitness, trophic interactions, and energy flow. Avian malaria is caused by haemoparasites transmitted by dipteran insect vectors. We took blood samples from 329 individuals of 42 species in eastern Tennessee in May 2013. We extracted DNA and used PCR to amplify a section of the parasite mitochondrial cytochrome b gene to detect positive infections, which were then sequenced. We found 144 individuals from 25 species infected with avian malaria. We discovered 27 distinct lineages: 13 Haemoproteus and 14 Plasmodium, and 13% of infected individuals had mixed infections. Generalized linear models show that across species, total malaria infection prevalence varies with sexual dimorphism, abundance, and nest type. Total prevalence did not vary with host species survival, individual age or sex, nest height, foraging height, or across sites. Prevalence patterns for Plasmodium differ from those for Haemoproteus. We conclude that malaria prevalence varies across species and is influenced by the ecological traits of its avian hosts. Interaction webs demonstrate that this system is complex, includes both specialist and generalist parasite lineages, and that host species vary in prevalence and richness of their haemosporidian parasites.

**2:00-2:15** *Fate of Haloacetic Acids in Bulk Sodium Hypochlorite Solutions*

**John W. Decker, Christina M. Henson, Dr. Gary L. Emmert, Dr. Paul S. Simone, Jr., Department of Chemistry, The University of Memphis**

**Faculty Sponsor: Jon Russ, Department of Chemistry**

Haloacetic acids (HAAs) are a class of disinfection by-products produced during the chlorination of drinking water. The HAAs have adverse health effects, and thus regulated by the United States Environmental Protection Agency. Most studies focus on the formation of HAAs in the drinking water distribution system after chlorination takes

place. However, recent research has shown that monochloroacetic acid (MCAA), dichloroacetic acid (DCAA) and trichloroacetic acid (TCAA), referred to as HAA3, are commonly present at the mg/L level in the bulk sodium hypochlorite solutions (bleach feedstock). The presence of HAA3 in the bleach feedstock means the HAA3 are dosed into the distribution system when using bleach feedstock for disinfection. Preliminary research has shown that HAA3 forms rapidly and decomposes slowly in the bleach feedstock solutions. However, the formation mechanisms of MCAA, DCAA and TCAA are unknown. Understanding the fate of HAA3 in the bleach feedstock can be determined by spiking concentrations of each HAA3 species into the bleach feedstock. The concentrations of HAA3 are then monitored using post-column reaction-ion chromatography with nicotinamide fluorescence. The procedures and results of these spiking studies for MCAA, DCAA and TCAA, along with the investigation of a chemical relationship between MCAA, DCAA, and TCAA will be presented.

## Quantitative and Computational Science I
### FJC
### Session Chair: Phillip Kirlin

**1:30-1:45** *An Introduction to Invariant Theory and its Applications*
**Joshua Cape, Hans-Christian Herbig, Charles University (Prague)**
**Faculty Sponsor: Christopher Seaton, Department of Mathematics and Computer Science**
Invariant theory is a branch of abstract algebra concerned with group actions on algebraic varieties. In particular, polynomial functions invariant under permutations of their variables are mathematically interesting both abstractly and in their physical applications. In this talk, I will introduce basic notions related to invariant theory. I will then discuss original research results related to applications of invariant theory on spaces modeling physical systems with fixed angular momentum. Specifically, I will demonstrate isomorphisms between singular symplectic quotients which do not depend upon the dimension of the underlying space.

**1:45-2:00** *Ultrasonic backscatter techniques for cancellous bone compared to microtomography parameters*
**Morgan Smathers, Joseph A. McPherson, Mark Sellers, Dr. Brent Hoffmeister**
**Faculty Sponsor: Brent Hoffmeister, Department of Physics**
Over 52 million Americans suffer low bone mass and at least 10 million suffer from osteoporosis. This study seeks to develop a dual gate ultrasonic technique for predicting bone quality as well as bone quantity. Ultrasonic pulses from a 5MHz transducer were propagated into regions of porous bone in 18 bone specimens from 1 bovine and 4 human donors. The dual gate technique considered the normalized mean of the backscatter difference (nMBD) which is the power difference between two gated regions of 2 μs each placed 1 μs apart over the returned signal. This ultrasonic parameter was compared to eight X-Ray MicroCT parameters describing bone quality and quantity. Among these are the Structural Model Index (SMI) and Relative Bone Volume (BV/TV). SMI grades the structure of a specimen based on its plate and rod characteristics, making it a bone quality characteristic. SMI produced an R value of 0.982 with nMBD. BV/TV, a bone quantity indicator, finds the ratio of bone volume in the total specimen volume, and showed an R value of 0.993 with nMBD.

**2:00-2:15** *Modelling the Zombie Apocalypse*
**Devin Cochrane, Joshua Berkey**
**Faculty Sponsor: Erin Bodine, Department of Mathematics and Computer Science**
Zombies have become popular enough in the media that the Center for Disease Control & Prevention (CDC) now has a webpage dedicated to preparing for the zombie apocalypse, despite the official statement they released in June 2012 denying the existence of zombies. To understand the dynamics of a potential zombie apocalypse, we simulated (three times) a real time zombie apocalypse restricted to Rhodes Campus through the popular residential campus game Humans vs. Zombies (HvZ). Data on the time of each tag (a conversion from human to zombie) were recorded for each simulation. We present a summary of the data collected from each simulation and use the mechanics of the game to design an agent-based model of the zombie apocalypse. The agent-based model was implemented in NetLogo, and the data collected from the Humans vs Zombies games was used to parameterize the model to simulate the conditions seen in the three "experiments." Using the agent-based model, we conducted several simulations to determine the likelihood with which humans would survive the zombie apocalypse.

**2:15-2:30** *Learning Motivations for Non-Player Characters in an Open-World Game*
**Rachel Elledge, Nate Condrey, Patrick McCusker**
**Faculty Sponsor: Phillip Kirlin, Department of Mathematics and Computer Science**
Unrealistic and unintelligent AI frequently plagues non-player characters (NPCs) in video games, often causing navigation problems, inflexible decision-making, and irrational behavior. These issues can frustrate the player and hinder the player's immersion in the game. In order to explore this problem and work towards a possible solution, we modified the popular open world game Minecraft and attempted to create a motivation system and combine it with reinforcement learning, in hopes of making more rational NPCs that can learn from their experiences. The NPC motivation system consists of seven attributes modeled after motivations that naturally occur in animals and humans: anger, boredom, curiosity, fear, frustration, hunger, and satisfaction. The internal states of the NPCs and environmental factors influence the values of the variables in our motivation system. We hope that our system will be successful in making more complex and intelligent NPCs and improve the player's gaming experience.

## Genetics, Biochemistry, and Molecular Biology I
## FJA
## Session Chair: Allie Johnson

**2:00-2:15** *Exposure to ruthenium-based chemotherapeutic KP1019 induces a RAD9-dependent DNA damage response in S. cerevisiae.*
**Braden Taylor, Lindsey Bierle, Mary E. Miller**
**Pamela Hanson,Sydney Middleton, Department of Biology, Birmingham Southern College.**
**Faculty Sponsor: Mary Miller, Department of Biology**
The ruthenium-based Trans-[tetrachlorobis (1H-indazole) ruthenate (III)] (KP1019) has been shown to be a promising alternative to traditional platinum-based cancer therapies, exhibiting dose-dependent activity against a variety of explanted human tumors and preclinical tumor models, as well as low toxicity in phase I clinical trials. We have investigated Saccharomyces cerevisiae as a potential model system in order to further our understanding of the mechanism of action of KP1019. Transcriptome analysis of KP1019 treated Saccharomyces cerevisiae suggests that exposure to KP1019 induces a DNA damage response. Our goal was to determine if RAD9, a gene that codes for a DNA damage-dependent checkpoint protein, is required for the KP1019-induced DNA damage response. Using a variety of growth inhibition assays, we examined the effect of RAD9 deletion on sensitivity to KP1019. We found that S. cerevisiae cells were sensitive to the drug, and cells lacking RAD9 displayed more growth inhibition and higher drug sensitivity. Consistent with a role of Rad9 in the cellular response to KP1019, we find a DUN1 dependent induction of the DNA damage response protein, Hug1. In future studies we will further elucidate the role of other genes as they pertain to this DNA damage response.

**2:15-2:30** *MP2 and DFT analysis of the ligand selectivity of a sulfotransferase enzyme part 2: SULT 1A1*
**Hallie Weems, Diana Bigler, Larryn Peterson, Department of Chemistry**
**Faculty Sponsor: Mauricio Cafiero, Department of Chemistry**
We have studied the substrate selectivity of the sulfotransferase enzyme (SULT1A1) by identifying important protein-ligand interactions in the active-site through electronic structure calculations. The sulfotransferase enzymes (SULTs) catalyze the addition of a sulfate group to a variety of small molecules, including neurotransmitters and xenobiotics. This reaction can activate or deactivate bio-active molecules or change their pharmacokinetic behavior. A variety of ligands analogous to known substrates of the SULT were chosen for study. Docking and M062X/6-31G optimization of the ligands were used to find the structures of the ligand-protein complexes assuming a static active-site. Interaction energies between the ligands and the amino-acids of the active-site were calculated using MP2 and M062X with 6-311+g*; these energies can be used to determine the thermodynamic stability of the ligand in the active site. The addition of the sulfuryl group to the ligand depends on deprotonation of a phenol group on the ligand. Thus, pKa values were calculated for each of the ligands to determine the ease of deprotonation. Interaction energies and pKa values indicate different selectivity and comparison with experimental values is being used to determine which approach is most accurate. All calculations were run with and without implicit solvent.

**2:30-2:45** *SepG in Aspergillus nidulans encodes an IQGAP protein*
**Kristen Wendt**
**Faculty Sponsor: Terry Hill, Department of Biology**
Cell division (cytokinesis) proceeds by a variety of mechanisms, depending upon the evolutionary group under study. A long-standing mystery in fungal cytokinesis is the identity of the sepG1 mutation, reported by Steven Harris in 1994. Cells bearing the sepG1 mutation are unable to form crosswalls (septa) during division. We have succeeded in identifying SepG as Aspergillus nidulans gene AN9463, predicted to encode an IQGAP scaffolding protein, by mapping it to a specific region of Chromosome II using meiotic crossover ratios and sequencing several candidate genes in this region. The mutation in AN9463 is a G-to-A transition at position 5082 out of 5333 nucleotides, which is predicted to cause a substitution of arginine for glycine at residue 1637 of the 1737-amino acid product. The mutant phenotype can be complemented by the cloned wild type AN9463 allele. The GFP-tagged IQGAP colocalizes with actin and myosin during cell division. Although down-regulation of the gene under a regulatable promoter blocks septum formation, it does not prevent actin and myosin from associating as a ring in the initial stages of septation. Thus, we conclude that IQGAP plays a role in enabling the actin/myosin ring to contract in cytokinesis, but it is not necessary for ring formation.

**2:45-3:00** *Investigating the active site of LpxC in Gram-negative bacteria: Design and synthesis of natural substrate analogues*◙
**Sarah Malkowski, Allison J. L. Dewar, Christopher S. Grubb, A. Katherine Hatstat, Mauricio Cafiero, Larryn W. Peterson**
**Faculty Sponsor: Larryn Peterson, Department of Chemistry**
The influx of therapy-resistant nosocomial diseases has called for the development of novel therapies. Among the culprits are Gram-negative bacteria, which have an outer peptidoglycan layer that is important for bacterial virulence and pathogenicity. Lipid A is an integral component of lipopolysaccharide, which is part of the outer membrane. LpxC catalyzes the first committed step in the biosynthetic pathway of lipid A. Inhibition of LpxC would halt the synthesis of lipid A, resulting in a compromised outer membrane. This work focuses on investigating the active site of LpxC through the synthesis of natural substrate analogues that feature a nitrogenous base bound to a nucleoside and connected to a zinc-binding motif through various linkers. The design and synthesis of the analogues will be discussed.

## Quantitative and Computational Science II
## FJC
## Session Chair: Rachel Dunwell

**2:45-3:00** *MoodPlay: A Playlist Generator Based on Mood and Time Preferences*
**Alyssa Harris, Kory Yates, Matt McCaleb**
**Faculty Sponsor: Phillip Kirlin, Department of Mathematics and Computer Science**
With personal music collections becoming larger and more accessible than ever, there has emerged a greater need for automated playlist generators to ease the user experience. We have constructed a playlist generator, MoodPlay, that tailors the user experience by generating playlists based on user-defined moods and analysis of a user's habits based on the time of day. It builds upon the classic model of a playlist generator by allowing users to first define the "mood" themselves. This can be an emotion such as happy or sad, or an activity, such as "Running" or "Road trip." MoodPlay then allows a user to select the first track of that playlist, and uses artificial intelligence techniques in combination with user input, including upvotes and downvotes, to compute a playlist that will be tailored to that user's own musical preferences. The significant advantage of our algorithm is that it does not make any assumptions about which songs correspond to which moods. In addition to the user-defined moods feature, MoodPlay also incorporates an analysis of the user's listening habits based on the time of day. This feature is always active, so that even when a mood is not set the algorithm persistently plays the music the user wants to hear.

**3:00-3:15** *Deciding to Move Off-Campus: An Analysis of Students' Academic Performance*
**LeAnna Kent**
**Faculty Sponsor: Michael Sheard, Department of Mathematics and Computer Science**
In recent years, Rhodes College has not had enough housing for all students who desired to live on-campus. However, one might ask whether moving off-campus has a negative impact on a student's academic performance. My senior research seeks to examine these potential impacts, to determine if it would be beneficial to offer more on-

campus housing to students. Students' semester grade point averages (GPAs) are first analyzed at two time periods to determine if there is a significant difference between the two; these two periods are the semester immediately prior to moving off-campus, and the first semester off-campus. The trajectories of students' GPAs over time are also analyzed between groups. The goal is to determine if and how the act of moving off-campus has a direct impact on a student's academic performance and whether the types of students who choose to move off-campus are different in some fundamental way.

**3:15-3:30** *Contemporary Option Pricing Theory*
**Patrick McCusker**
**Faculty Sponsor: Rachel Dunwell, Department of Mathematics and Computer Science**
Stocks can be traded outright over exchanges, or they can be traded in the form of option contracts. A stock option is the right to buy or sell a stock at some point in the future for a set price. The option itself has a market value, and the Black-Scholes model is widely used by traders to obtain a theoretical value. This talk will review the Black-Scholes model and its derivation, as well as some involved concepts, including Binomial Option Pricing, Brownian motion, implied volatility, and stock price distributions. Additionally a comparison of empirical option data and values generated by the Black-Scholes formula will be demonstrated.

## Genetics, Biochemistry, and Molecular Biology II
## FJA
## Session Chair: Kristen Wendt

**3:15-3:30** *The maternally expressed GTPase ROP2 is a putative regulator of the imprinted plant formin AtFH5, suggesting a uniparental complex for the development of seed endosperm polarity in Arabidopsis*
**Phuong Le**
**Faculty Sponsor: Jonathan FitzGerald, Department of Biology**
Parental genomic imprinting (PGI) is a mechanism that produces parental bias in offspring gene expression, silencing either the maternal or paternal allele. When PGI is lost in either plants or mammals, size abnormalities suggest that maternal silencing maintains smaller offspring and paternal silencing promotes larger offspring. AtFH5 is a maternally-expressed, formin-homology activity that promotes actin-nucleation. AtFH5 is required for posterior development of the seed endosperm, linking PGI with the availability of resources available for offspring growth. However, not much is known about how AtFH5 is localized or activated. Using yeast two-hybrid, we identified a protein interaction between ROP2 and the cytoplasmic N-terminal region of AtFH5. In transgenic lines carrying an AtFH5-GFP fusion protein GFP localization was perturbed in pollen lacking ROP2. Interestingly, rop2 mutants displayed a seed defect that was traced back to early organization of the endosperm. Current work indicates ROP2 is similarly expressed from the maternal genome, but this regulation is independent of the Polycomb complex that silences paternal AtFH5.

**3:30-3:45** *The Arabidopsis small GTPase Rop2, a putative Atfh5 binding protein, functions in pollen tube growth and seed development*◙
**Breanna Durbin**
**Faculty Sponsor: Jonathan FitzGerald, Department of Biology**
The actin-nucleating formin AtFH5 functions in posterior development of the seed endosperm, potentially linking polarization of the early syncytial endosperm to the availability of maternal resources for embryo growth. The small-GTPase Rop2 was identified as an AtFH5 interacting protein by yeast-two hybrid. If Rop2 determines the location and activation of AtFH5, then rop2 mutants should display defects similar to atfh5 phenotypes, like endosperm dysfunction or improper pollen tube germination. Four rop2 insertional knock-out lines, 055328, 099470, 84187 and 855973, were obtained from the SALK collection. Both Rop2 homozygous and heterozygous mutant plant pollen, seeds, and roots were quantitatively and qualitatively analyzed. Homozygous rop2 SALK lines 055328 and 099470 showed more abnormal pollen phenotypes and greater seed size while two lethal heterozygous alleles, 84187 and 855973, displayed seed sizes similar to wild type but significantly less pollen germination. These results suggest that lines 055328 and 099470 represent weak alleles of ROP2 with overlapping function appropriate for epistasis analysis. rop2; atfh5 double mutants are being generated to describe the genetic interaction between these loci. Determining the role of association of these two proteins should give insight into other eukaryotic cell polarity pathways as formins are conserved across eukaryotes.

**3:45-4:00** *Determining the effect of intervening tissue on ultrasonic backscatter measurements of bone*
**Mark Sellers, P. Luke Spinolo**
**Faculty Sponsor: Brent Hoffmeister, Department of Physics**
Ultrasonic backscatter techniques may offer a useful approach for detecting changes in cancellous bone caused by osteoporosis. Cancellous bone, commonly referred to as "spongy" bone because of its sponge-like structure, is found at the end of long bones, joints, and the spine. Osteoporosis degrades the structural integrity of cancellous bone, which leads to an increased risk of fracture at the spine, hip, and joints, as these areas rely more heavily on cancellous bone for strength. Backscatter occurs when ultrasonic signals interact with the porous structure of cancellous bone and reflect back to the transducer. The goal of this study was to investigate the utility of a backscatter difference technique for clinical bone assessment. Measurements were performed on 25 cube shaped specimens of human cancellous bone using a 5 MHz broadband transducer. Measurements were also taken of the bone through intervening layers of cortical bone and a tissue-mimicking phantom to simulate a clinical environment. These results suggest that our backscatter analysis technique may be useful for clinical bone assessment purposes. The project described was supported by Grant Number R01AR057443 from NIAMS/NIH.

**4:00-4:15** *Synthesis of Dopamine Analogues and Analysis in a Human Cytosolic Sulfotransferase SULT1A3 Assay*
**Gabrielle Bailey, Noah S. Brown, Jennifer C. Rote, Sarah Malkowski, Diana Bigler, Mauricio Cafiero**
**Faculty Sponsor: Larryn Peterson, Department of Chemistry**
Human cytosolic sulfotransferases (SULTs) are enzymes that catalyze the transfer of a sulfate group from the PAPS cofactor to many endogenous substances and xenobiotic compounds, thereby regulating metabolism and aiding in excretion of these substances. The thirteen known SULTs can be further classified into families based on the substrates they act upon. The SULT1A1 sub-family targets phenolic compounds, like p-nitrophenol, while SULT1A3 has a strong affinity for catecholamines, including dopamine and serotonin. In addition, SULT1A3 preferentially sulfates dopamine at the 3-hydroxy position over the 4-hydroxy position, yet the reasons for this class of enzymes' substrate specificity and regioselectivity are poorly understood. To investigate the stereoelectronic factors that influence SULT1A3's substrate specificity, several dopamine analogues were synthesized with substituents of varying sizes and degrees of electron withdrawing and donating capabilities. An enzymatic assay with the analogues will help determine SULT1A3's efficiency and selectivity in sulfating these compounds.

**4:15-4:30** *An MP2 and DFT study of the selectivity of NADP binding sites for novel ligands*
**Rachel Sanders, Mauricio Cafiero**
**Faculty Sponsor: Mauricio Cafiero, Department of Chemistry**
Statin drugs moderate blood cholesterol levels by acting as competitive inhibitors for 3-hydroxy-3-methyglutaryl-coenzyme-A (HMG-CoA) reductase, thereby blocking the biosynthesis of cholesterol. Previous work in our group has focused on characterizing this enzyme's active site and designing novel ligands for this active site (J. Phys. Chem. B, 113, 14810, 2009; Computational and Theoretical Chemistry, 967, 171, 2011). In this work, we investigate the binding of small molecule inhibitors to the NADP binding site in HMG-CoA reductase. In order to target the cholesterol pathway, these inhibitors must be specific for the HMG-CoA reductase NADP binding site, thus we also examine the selectivity of a range of NADP binding sites in other enzymes, specifically alcohol dehydrogenase and isocitrate dehydrogenase. Comparisons are also made between the interaction energies of the novel ligands and NADP. Ligands in the enzyme binding sites (obtained from crystal-structures) are optimized with M06-2X/6-31G and counterpoise-corrected interaction energies were calculated using M06-2X and MP2 with the 6-311+G* basis set. The preliminary results show strong binding between our novel inhibitors and NADP binding sites, although selectivity for one particular binding site has not been achieved.

## St. Jude Partnership
## McCallum Ballroom
## Session Chair: Ann Viano

**4:15-4:30** *Bio-guided Natural Product Drug Discovery Platform Focused on All-Carbon Spirocenter Containing Molecules*◙
**Megan Hotard, Adaris Rodriguez-Cortes, Taotao Ling, Fatima Rivas, Department of Chemical Biology and Therapeutics, St. Jude Children's Research Hospital**
**Faculty Sponsor: Dhammika Muesse, Department of Chemistry**

Natural products remain a vibrant source of novel compounds that can serve as molecular probes or therapeutic agents. Of specific interest among biologically active terrestrial natural products are spirocycles, which are characterized by either a tertiary or quaternary carbon spirocenter. Intrigued by the potential of these natural products as potential wound healing agents, we began a campaign to isolate, characterize, and develop methodologies towards such spirocycle molecules. Herein, we disclose our findings featuring the natural product pteropodine, a pentacyclic oxindole with a spirocenter, as the inspiration to develop spirocycle methodologies. We have successfully isolated pteropodine from the plant Uncaria tomentosa and utilized this natural product as a potential lead. We also developed new methodologies to access these spirocycles after hypothesizing that a metal-mediated ene-type reaction could proceed under mild reaction conditions and tolerate a broad range of substituents to provide functionalized structures. The chemical reactions were carried out under inert atmosphere, monitored by thin layer chromatography, and analyzed by mass spectrometry and nuclear magnetic resonance. The biological properties of these compounds in a gap closure migration assay will also be presented.

**4:30-4:45** *The H5 Hemagglutinin Protein Confers the Ability of Highly Pathogenic H5N1 Influenza Viruses to Replicate Productively in Macrophages*◙
**Teddy Huerta, Shauna Marvin, Troy Cline, Joe Johnson, Erik Karlsson, Bradley Seufzer, Stacey Schultz-Cherry, Department of Infectious Diseases, St. Jude Children's Research Hospital**
**Faculty Sponsor: Laura Luque de Johnson, Department of Biology**
Highly pathogenic avian H5N1 influenza (HPAI) viruses are associated with severe respiratory damage and high morbidity and mortality in infected people. Due to the critical role that macrophages play in response to respiratory pathogens, investigating such viruses' ability to evade or exploit the innate immune response can provide greater insight into macrophage function at the host-pathogen interface. Unlike HPAI viruses, we found that the majority of influenza strains experience a block upstream of nuclear entry and viral transcription. However, the mechanism(s) of this block have yet to be fully elucidated. RAW264.7 macrophages and MDCK epithelial cells were infected with various influenza strains and viral localization monitored by confocal microscopy. Viral protein production was measured by western blot analysis and replication was quantified by qRT-PCR. We demonstrated that HPAI viruses overcome two blocks. The first block is early, as non-HPAI H5N1 viruses accumulated in LAMP1+ compartments. The second block occurs downstream of viral replication and prior to protein translation. Intriguingly, expression of the HPAI-H5 hemagglutinin (HA) on a non-HPAI-H5 virus by reverse genetics resulted in a productive infection suggesting that the HPAI-H5 HA sufficiently overcomes these cellular blocks. Future studies will focus on disseminating the molecular mechanism(s) of these blocks.

## FINE ARTS ORAL SESSIONS

## The Cauthen Competition
## Evergreen Church
## Session Chair: Leah McGray

**1:00-3:00**
Gladys Cauthen was one of the founding influences in the development of Rhodes' Department of Music. The Cauthen Competition is a soloist competition that is open to any Rhodes student taking applied music lessons, reflecting Cauthen's support of individual musicianship while studying at Rhodes. In addition to a monetary prize, the winner of each year's competition wins the opportunity to perform as the featured soloist with the Rhodes Orchestra in the following academic year.

Judging will begin at 1:00, with the final results announced at the end of the program, approximately 3 p.m. Rhodes community members are invited to come by and listen to these wonderful musical offerings.

## Art History: Renaissance
## Clough 417
## Session Chair: Schaeffer Mallory

**1:30-1:45** *A New Interpretation of Michelangelo's Rondanini Pietà*
**Xiaoyu "Edith" Zeng**
**Faculty Sponsor: Victor Coonin, Department of Art and Art History**
The intriguing nature of Michelangelo's last non finito, the Rondanini Pietà, makes it a work often eliciting romantic evocations instead of objective formal analysis. The work has been traditionally perceived as a sculpture depicting Virgin Mary holding the dead Christ, but this paper proposes a different interpretation of the subject matter. Focusing on factual evidence, including formal elements, Vasari's writings, notarial inventories, and other Renaissance artworks, my paper will demonstrate that the figure holding Christ is possibly not Mary but a male, identified as Nicodemus in the Deposition, and the sculpture is not a Pietà but an Entombment. Although Michelangelo never completely fulfilled his vision for the Rondanini, this possible interpretation of the standing figure as Nicodemus will provide a nuance to the understanding of Michelangelo's late artistic pursuits and spiritual devotions.

**1:45-2:00** *Michelangelo, Nicodemism and The Florence Pieta*
**Taylor Conrad**
**Faculty Sponsor: Victor Coonin, Department of Art and Art History**
The Florence Pietà was one of Michelangelo's final works. As such a prominent artist, there is much to be learned from each of his sculptures, especially one such as The Florence Pietà which Michelangelo was creating for personal reasons. There exist multiple interpretations of this sculpture, but here I propose another: that in order to obtain the most complete understanding of The Florence Pietà, it must be interpreted in conjunction with Michelangelo's affiliation with the Italian Nicodemism movement of the 16th century. It is through Michelangelo's association with prominent Nicodemists, as well as his own personal connection to the biblical figure Nicodemus, that The Florence Pietà can be best understood. To prove this interpretation, I look at the Nicodemist movement and what it stood for as well as what it wished to accomplish. I then investigate Michelangelo's relationship with Vittoria Colonna, a known Nicodemist, and how their correspondence supports Michelangelo's interest in Nicodemus the man, as well as the cause of the Nicodemist movement. Finally, I examine certain aspects of the sculpture itself in an effort to prove that with specific decisions, Michelangelo was visually illustrating the ultimate goal of the Nicodemists. In short, The Florence Pietà is a symbolic combination of things that Michelangelo was personally invested in during the later years of his life. From the troubling idea of death, to the noble desire of the Nicodemists to reform the Catholic Church, Michelangelo infused that in which he believed into one of his final sculptures. By interpreting The Florence Pietà in this way, we can more fully understand another part of Michelangelo's later years in an effort to build a more complete picture of the beloved Renaissance artist.

## Art History: Contemporary Art, War, and Politics
## Clough 417
## Session Chair: David McCarthy

**2:15-2:30** *The Two Fridas: A Search for Identity through Political Activism and Indigenous Culture*
**Allison Rogers**
**Faculty Sponsor: David McCarthy, Department of Art and Art History**
Frida Kahlo is often categorized as a Mexican surrealist painter, yet her work is better examined through a radical political and feminist framework. Though her accomplishments as a painter and an activist are often overshadowed by her sexual orientation and her disability, she was in fact a Communist who fought tirelessly for Mexican revolutionary and other anti-imperialist causes. In coming to terms with her identity as a Mexican artist, she incorporates implicit political messages into her paintings through Aztec symbols and indigenous styles of dress that serve not only as an embodiment of her identity, but as a feminist statement within a patriarchal culture. The use of these devices in her paintings indicates that her status as a political activist throughout her life should be considered equal to, if not more important than her identity as a bisexual and disabled woman, as these two characteristics often overshadow her work as an activist. However, her experience as a disabled woman, which is communicated in her paintings, can also serve as an allegory for the experience of all oppressed and disenfranchised Mexicans.

**2:30-2:45** *Martha Rosler: Bringing the War, and More, Home*
**Taylor Koczot**
**Faculty Sponsor: David McCarthy, Department of Art and Art History**
Martha Rosler's body of work includes two extremely similar series: representing the Vietnam War, House Beautiful: Bringing the War Home from 1967-72 and, representing the Wars in Iraq and Afghanistan, House Beautiful: Bringing the War Home, New Series from 2004-2008. These two series are a collection of photomontages featuring images from magazines combined with images of war zones. Scholarship on these two series commonly discusses them as two sections of the same project, the New Series often receiving only a cursory mention. The most basic message of Rosler's work in both series emphasizes United States citizens' responsibility for wars abroad and, while this theme dominates in both House Beautiful: Bringing the War Home and the New Series, her work also shows growth. In this essay I will make this progression evident through visual analysis of a selection of images from both series. Specifically, I will focus on changes in Rosler's New Series including a condemnation of the rich, a shift in viewer sympathies, and a change in audience.

**2:45-3:00** *"Apolitical is Bulls**t": An Anarchistic Art-Critical Reading of "War is Trauma"*
**Schaeffer Mallory**
**Faculty Sponsor: David McCarthy, Department of Art and Art History**
In 2010, Iraq Veterans Against the War collaborated with Justseeds Artists' Cooperative to create a portfolio of prints made by veterans and civilian-allies alike titled War is Trauma. The prints in War is Trauma depict and discuss PTSD, TBI, and MST, and were both showcased in experimental cultural centers and thoroughly wheatpasted across Chicago. The subject matter of the prints are unashamedly "political," inasmuch as they blatantly critique extant political entities and cultural mores. However, in this paper I argue that to conceive of art as operating along a continuum of "autonomous" to "committed" (in other words, apolitical to politically-entrenched) fallaciously presupposes art is capable of being apolitical, of detaching itself from the political environment from which it was produced. Rather, I propose reading War is Trauma through the lens of an anarchistic art-critical theory; one which analyses artistic production as a multidimensional negotiation with concentrations of power as they manifest in the the creative process, the subject-matter of the prints, their aesthetic makeup, the dissemination of the portfolio, as well as the very subject-position of the artists themselves.

## Research in Music
## Clough 417
## Session Chair: Vanessa Rogers

**3:15-3:30** *Musical Preference and the Psychology of Music*
**Frederick Lankford**
**Faculty Sponsor: Vanessa Rogers, Department of Music**
In this research study, I present the causation and qualities of musical preference on both an individual and collective basis as well as the role of music in our day-to-day lives. I will begin the presentation with explanations of the innateness of music from an evolutionary and developmental perspective, including the importance and necessity of rhythm in our mental development. I explain that music is not exactly necessarily essential to our survival, but it is as vital to our thriving as something such as sunlight. I will then describe how musical preferences are formed and what makes create their own musical preferences. Expectancy violation plays a great role in this formation of preference, and I will go into further detail on what that signifies and how composers violate our expectations through music. I will also explain the unconscious expectations of music that people obtain as they grow and develop. Finally, I will briefly summarize exactly how composers create music and the cognitive and subconscious processes that they go through when composing.

**3:30-3:45** *Applications of Music Therapy for Alzheimer's Disease and Autism Spectrum Disorder*
**Zach Wolfe**
**Faculty Sponsor: Vanessa Rogers, Department of Music**
Though there are many differences between Alzheimer's disease and Autism Spectrum Disorder, there is a common thread that binds them together. That is that for both there is no real cure, and the treatments used are simply to relieve symptoms and improve quality of life. This essay attempts to illustrate both the positive and negative outcomes of music therapy in relation to common treatments used for both disorders. Through comparing clinical

studies of medications, therapies, and alternative treatments with studies of music therapy, we will compare and contrast the different treatments. Along with this, there will also be a discussion of ways to fill the holes in the research of music therapy in each group. Though we know that music therapy can be effective for some people, there has not been enough research to firmly ground it as common practice. By looking at the current research, it will be possible to propose new studies to further our knowledge on how and when to use music therapy.

**3:45-4:00** *"The Woodman's Nut[?]": Deciphering the London Stage in 1814*◙
**Meredith Broadway, Courtney Ashley, Tea Rose Pankey**
**Faculty Sponsor: Vanessa Rogers, Department of Music**
Theatre in London in 1814 was wide-ranging and popular. Because theatre was the main form of entertainment in the nineteenth century, it was central to the lives of everyday Londoners. Managers creatively integrated various forms of entertainment; the circus, music, pantomime, dances, horsemanship, opera, Shakespeare, and aquatic performance and other strange pieces such as "War and Peace: A Comic Pantomime." This experimentation, coupled with patriotism and politics, provided a diverse night of entertainment for spectators in London. This presentation is the product of our interdisciplinary year-long research Fellowship. We will outline the difficulties of deciphering, analyzing, and indexing the information found in theatrical advertisements in The London Times. Our research has given us a glimpse into life in London in 1814.

**4:00-4:15pm** *The Church and the Rise and Decline of the Castrati*
**Premiese Cunningham**
**Faculty Sponsor: Vanessa Rogers, Department of Music**
Various primary sources show us that the presence of castrati—male eunuchs with voices which could reach as high as the soprano range—was especially significant beginning around the 16th century in Europe. Due to the Roman Church's rejection of the use of women singers during this period, the singing roles that would, under normal circumstances, have been delegated to women, were often times sung by young choirboys. The voices of castrato singers possessed an indisputably exotic element and their use grew seemingly attractive to composers. However, in the centuries that followed, Europe witnessed a serious decline in such performances due to heavy criticism of the Church's involvement, given the damaging biological and psychological effects castration presented on affected young males. Carlo Broschi (1705-1782), whose stage name was Farinelli, was perhaps one of the best known of such male singers; the 1994 film adaptation of his life gives insight into the increased popularity and fame achieved by castrato singers. The present research intends to highlight the performance careers of such artists such as Farinelli and to analyze the role of the Catholic Church in the castrati's presence in dominant forms of European culture (that is, opera). It is proposed that the popularity, as well as the decline, of such singers was due in part to the certain ideals held by the Church in regards to the sexual and religious appropriateness of the phenomenon.

## Curb Fellowship Presentations
## Hardee Auditorium/Palmer
## Session Chair: John Bass

**4:00-4:15** *Radio Free Memphis: The WLYX Story*◙
**Skyler Gambert**
**Faculty Sponsor: John Bass, Department of Music**
Over the course of this past summer as a Regional Studies Fellow I compiled a history of WLYX at Southwestern, the preeminent college radio station in Memphis from 1974-1990. Using primary interviews, donated photographs, and the Rhodes College archives as sources this essay chronicles the story of the station and its impact on our school and Memphis at large.

**4:15-4:30** *Echoes of Memphis and An Evening at Elvis'*◙
**Molly Whitehorn**
**Faculty Sponsor: John Bass, Department of Music**
Echoes of Memphis is a website that aims to tell and complicate the story of Memphis music—creating a living history that shows the diversity of current Memphis music and highlighting how influential Memphis music of the past remains. The site houses interviews with Memphis musicians, links to Memphis music in the news, and information on modern artists with strong ties to the city. Most interviews are done at the first home Elvis bought in Memphis on Audubon Drive. The house is also the home of a new web series, An Evening at Elvis', which features

house concerts alongside interviews with musicians. Both Echoes of Memphis and An Evening at Elvis' are sponsored by the Mike Curb Institute.

**4:30-4:45** *The Cypress Guitar Fellowship*◙
**Bobbie Donachie**
**Faculty Sponsor: John Bass, Department of Music**
The Cypress Guitar Club is an after school program sponsored by the Mike Curb Institute for Music, which has been in existence since 2010. Curb Institute Fellows manage the program, teach lessons twice a week, and serve as mentors for the students of Cypress Middle School. This year the club has performed at various functions at Cypress Middle School, written original music, and participated in a recording session. Members of the club also got to go on field trips to the Stax Museum of American Soul Music, The Gibson Guitar Factory, and participate in a master class with jazz guitarist Russell Malone. As a special treat, the Cypress Guitar Club will also perform as a part of this presentation!

On this session, students will share some of their experiences from the semester working with Mr. Bobby Rush and a special presentation will be made to him by the college.

Mr. Rush, Blues Hall of Famer and Grammy Nominee, served as the first Curb Visiting Scholar in the Arts during the Spring 2014 semester. The visit was sponsored by the Mike Curb Institute for Music to support its mission of further understanding the unique musical traditions of the South and their importance on history and culture.

Over the course of his residency, Mr. Rush has spent time with students and the campus community in various capacities. As a teacher, he visited Search and Life classes where he had discussions with first-year students beginning their academic journeys. He also met with music students to talk and answer their questions about the industry and his career. As a performer, he appeared as guest artist on *An Evening at Elvis'*, a student-produced house concert series filmed at Elvis' first house on Audubon Drive. And in April, he spent time rehearsing with the Rhodes Jazz Band and joined them as a guest artist on their spring concert at the Hi-Tone Cafe.

## Theatre: Senior Presentations
## McCoy Studio
## Session Chair: Julia Ewing

**4:15-4:30** *Senior Project Fellowship: New York Showcase and Memphis Cabaret*◙
**Corbin Williams**
**Faculty Sponsor: Julia Ewing, Department of Theatre**
This presentation is a showcase of the work done as a part of the Theatre Department's Senior Projects. After receiving a Rhodes Fellowship, Senior Corbin Williams was able to travel to New York City and participate in a Senior Showcase for top industry-level professionals as well Broadway agents, directors and casting directors. The Fellowship also helped to fund his final senior showcase here in Memphis, which incorporated songs, monologues and scenes into a piece that explored his journey and growth throughout his time at Rhodes. This presentation is a live performance of some of these pieces as well as an explanation of the Fellowship, the process in preparing for both showcases and the results that came from them.

**4:30-4:45** *"Are you there, Tony? It's me, Katie."* ◙
**Katie Marburger**
**Faculty Sponsor: Julia Ewing, Department of Theatre**
After being given the daunting task of finding a senior project that demonstrated a synthesis of my four years of knowledge as a Theatre major, I knew that I wanted to focus on performance. Thus, I created a project in two parts: the first that involved performing in an industry showcase in New York City that would prepare me for my post-graduate professional life in theatre, and the second being a solo cabaret performance of songs at Rhodes following the showcase, which would demonstrate the skills I've acquired over the past four years, as well as serve as a reflection of my experience as a Theatre major at Rhodes. (I also was very fortunate to receive financial support from the college as a Rhodes Fellow.) This project has provided me with great experiences and a lot of additional knowledge essential to anyone pursuing a career in the arts, and through this presentation, I hope to be able to share stories and reflections about my successful experience with the Rhodes community

## ART114 Video Screening
**FJB**
**Session Chair: Elizabeth Dagget**

**4:30-6:00**
**Michael Aucoin, Ilyssa Block, Phoebe Driscoll, Christine Farha, Justice Franklin, Jill Fredenburg, Emily Heine, Olivia Hopkins, Adam Lacerte, Lauren Levesque, Morgan McCullough, Sophia Osella, Elle Prewitt, Charlotte Tracy, Crawford Watkins, Shane Watson, and Jean Xiong.**

See short student films: narrative, documentary, experimental, animation, or any combination. Popcorn provided. Screening culminates with the announcement of the "Class Peer Award Winner for Best Film."

## POSTER SESSION I
**Multisports forum of the Bryan Campus Life Center**
**11:30am – 1:30pm**
**Poster numbers are listed with each title.**

**# 1** *Creating Amphibian Development Models*◙
**Joshua Mintz**
**Faculty Sponsor: Ben Butler, Department of Art and Carolyn Jaslow, Department of Biology**
The Rhodes Biology department owns a set of plaster models of early amphibian development that are valuable teaching tools for introductory biology and upper-level embryology. The models are now in poor condition from years of use and are no longer available for purc *Oxalate* hase. This project, part of a Rhodes Fellowship, involved creating two new sets of models from the originals using traditional sculpture casting techniques and the Rhodes Art and Art History Department's sculpture facilities. Silicone rubber molds were carefully made from the originals, and durable hydro-stone plaster casts were taken from those molds. The finished reproductions were then mounted on bases and hand-painted to match the originals. The result is two brand-new, accurate sets of models that will serve the needs of simultaneously taught biology courses and will last for many years. Documentation of the project, as well as the original models, the molds, and the finished reproductions will be displayed.

**# 2** *Vendor Sales of The Bridge: The Memphis Street Paper*
**Quynh Jacobs**
**Faculty Sponsor: Sarah Boyle, Department of Biology**
Entirely student directed and operated, The Bridge is the first street newspaper of Memphis that seeks to provide a stable income for those less fortunate. It's a chance for those who have experienced homelessness to raise awareness of urban issues and to share their own personal stories and experiences with the Memphis community. As the poverty level in Memphis continues to rise above 27.0%, it is becoming more and more difficult each day to find sustainable work. The Bridge supplies new and exciting opportunities in careers as vendors and as writers by contracting with the homeless and those who have been homeless. With many supporters from the local community and numerous volunteers, 100% of the profit of this paper is given to its diligent workers. By utilizing Geographic Information Systems (GIS), I analyzed the location trends of the vendor sales for the month of March. The research I collected from each vendor on the densities of sales at each location lends insight into where this paper thrives. Through examining transportation routes and popular urban areas, I hope to give the management team of The Bridge a resourceful guide to future prosperous locations for their vendors.

**# 3** *Participatory Photo Project*
**Hannah Chimowitz, Ellen Alpaugh, Nellie Moualeu, Rupa Vachaspati**
**Faculty Sponsor: Elizabeth Thomas, Department of Psychology**
Research has demonstrated that after-school programs that offer a safe and supportive environment for youth provide a healthy context for identity development (Sheldon, 2003). In an effort to create such a program, we collaborated with Story Booth, an after-school arts program in Memphis, Tennessee. The current after-school

photography project incorporates elements of participatory action research, which has been shown to empower youth (Youth Action Research Institute, 2004). Provided with digital cameras, students will develop skills in the art of photography through visual, oral, and written methods. In accordance with participatory research approaches, the project will reflect students' opinions and desires voiced throughout the program. The project will conclude with an exhibition of participants' work, open to the Memphis community. Our hope for this project is that participants start to feel more comfortable sharing their voices with the group, gain confidence in their artistic abilities, and become empowered to pursue their interests proactively. We will collect fieldnotes from our sessions to identify and analyze patterns that contribute to our program's success. We hope that our research will contribute to the literature on participatory work with youth as well as contribute to the future success of Crosstown Art's after-school programming.

## Humanities

**# 4** *Iphigenia at Aulis*
**Emily Tarr**
**Faculty Sponsor: David Sick, Department of Greek and Roman Studies**
I hope to present my reimagining of Euripides' Iphigenia at Aulis. I have divided the play into three sections and reworked these scenes in different time periods in order to attract a modern audience. With my designs, I hope to make this rarely performed tragedy one that could be more accessible to the average theatre-goer rather than exclusively the scholar. Additionally, I have examined whether the myth that this tragedy is rooted in is truly transferable from its original context to one entirely foreign. I have set the first scene in the mid-1800s American oil boom, and I have created a costume designs for Agamemnon and Menelaus as oil kings. The second scene is now set during the French Revolution, where I have designed masks for Clytemnestra and Achilles. The final scene has been set at the Buchenwald concentration camp, where I have created a set design. My presentation will determine to what extent these new settings and my designs have made this tragedy one that is accessible to a broader audience, presumably one who has entered the theatre with minimal background knowledge on this myth and will be viewing this play as a stand alone piece.

**# 5** *Deaf Family Literacy 3: Deaf Athletes in Hearing Sports*◙
**Chloe Meriwether**
**Faculty Sponsor: Lori Garner, Department of English**
The increasing media attention drawn by a recent Duracell commercial featuring the Seattle Seahawk's deaf football player exposes the more typical lack of deaf athletes in mainstream sports. While most people might assume that deaf athletes rarely participate in hearing sports because of trouble hearing or communicating, the issue has much more to do with the relationship between vestibular organs and auditory canals, which affect one's proprioception, balance, and motor skills (Jin, et al. 2010). To help compensate for possible deficits in motor skills, coaches and doctors tend to emphasize motor-skill development for deaf children, not only to refine these skills but also to create the sense of community that defines the Deaf world (Stewart and Ellis 1994). Movement of deaf athletes into hearing sports causes considerable debate. Much of the Deaf community claims such integration decreases Deaf social life and causes further isolation from society, while others argue that the integration "would mean the cultural recognition of the larger American Deaf community" (Edwards 2012). Thus, my research explores the causality for the small numbers of deaf athletes and the social impacts of integrating deaf athletes into hearing sports.

**# 6** *Deaf Family Literacy 2: Social, Medical, and Cultural Implications of Cochlear Implants*◙
**Joshua Muller**
**Faculty Sponsor: Lori Garner, Department of English**
The concept of rehabilitation after cochlear implantation, with its attendant implications of normality and abnormality, hearkens to the period where 'oral methods' education replaced 'manual methods' education in Deaf culture (Kermit 2012). From a medical perspective, the cochlear implant (CI) is a technical device "that can provide a sense of sound to a person who is profoundly deaf or who has severe hearing impairment" (Kermit, 2012). From a perspective defending Deaf culture, the implant is "a technology which attempts to 'cure' deafness by bypassing the outer ear through electrical stimulation of the auditory nerve" (Sparrow, 2005). The interest in 'curing' deafness via cochlear implantation has dramatically influenced Deaf education and the Deaf community for decades (Lee, 2012). My research explores the widespread desire to 'right' what many seem to consider an inborn 'wrong.' Critical debate revolving around the issue of implantation does not reflect a simple Hearing culture/Deaf culture, majority/minority

binary. Instead, it suggests that support for, or opposition against, CI surgery is a matter of both circumstance and belief, which varies from individual to individual. Bearing this in mind, I examine multiple viewpoints, including those of deaf teenagers who have experienced CIs firsthand (Wheeler et al., 2007).

**# 7** *Deaf Family Literacy 1: Training and Placing Qualified ASL-English Interpreters*◙
**Emma Harkins Tutor**
**Faculty Sponsor: Lori Garner, Department of English**
The international community was recently awakened to difficult challenges facing the Deaf when an unqualified man was hired to sign at Nelson Mandela's memorial (Dixon 2013). In the United States as well, the Deaf community has been struggling, particularly since the 1990s, to require certification of ASL-English interpreters before their services are made available to the public (Crawford 1996). The Americans with Disabilities Act (ADA) defines a "qualified interpreter" as one "who is able to interpret effectively, accurately and impartially both receptively and expressively, using any necessary specialized vocabulary" (Title II 35.104). While the ADA's definition empowers Deaf, as well as hearing, consumers to "demand satisfaction," it fails to provide "assistance to hiring entities (who are mandated by the ADA to provide interpreter services) in determining who is 'qualified' [before] services are provided" (RID Setting Standards 2013). As a result, "frequent mismatches occur between interpreter skills and the needs or preferences of Deaf individuals" (Marschark 2004). My research thus explores the importance of government support for the interpreting needs of the Deaf (Nelson 2000) as well as proposals for restructuring interpreter education programs according to RID standards to produce better qualified interpreters (Shaw 2009).

## Natural Sciences

**# 8** *Incorporating the Allee Effect into the Predator Population of the Lotka-Volterra Model*
**Elysia Hassen, Rebecca Olivarez**
**Faculty Sponsor: Erin Bodine, Department of Mathematics and Computer Science**
The Allee effect is a biological phenomenon defined as a positive correlation between a population and the individuals that compose the population. Thus, the stronger and more fit the individuals in the population, the larger the population grows. Therefore, in small populations experiencing lower reproductive and survival rates, the population size falls until it reaches extinction. Conservation strategies for threatened species can heavily depend on the population dynamics of that species, and upon its interaction with other species. We propose a model that adds the Allee effect to the predator population in the Lotka-Volterra predator-prey model, and examine the impact of the Allee effect on both the predator population and its prey population. Several numerical simulations are presented, and the model equilibria are determined. Uncertainty and sensitivity analysis is used to demonstrate the different qualitative types of interaction dynamics, how the dynamics of each population depends on the model parameters, and under what conditions each equilibrium is stable.

**# 9** *Whose Greenspace Is It Anyway? A Mixed Methods Approach to Evaluating Access and Usage of Greenspace in Southwest Atlanta*
**Roberta Moore, Merita Bushi, Macalaster College; Karineh Lohr, Salisbury University; Eric Main, Georgia State University; Francis Roberts-Gregory, SOARS and University of California Berkley; Dylan Harris, Department of Geosciences, Georgia State University; Timothy Hawt**
**Faculty Sponsor: Sarah Boyle, Department of Biology**
Community geography actively engages university and community partners in participatory research concerning a common geographical area of interest. Such research aims to contribute not only to the production of knowledge, but also to active social transformation. Working in collaboration with the West Atlanta Watershed Alliance, the scholars of the Georgia State University Community-Soil-Air-Water (CSAW) REU program funded by the National Science Foundation employed mixed methods research to examine factors that impact access to and usage of the Beecher Hills Lionel Hampton Nature Preserve (Beecher Hampton) in Southwest Atlanta, Georgia. The use of mixed methods in research enabled researchers to approach a multi-faceted question from a variety of perspectives to collect crucial data that would not otherwise be accounted for if employing only one method of data collection. A comparison of the data collected under each method corroborates the validity of the findings obtained via each methodology. The comparability in results obtained from surveys, interviews, and conversation at a community event leaves the scholars confident that safety concerns remain the largest barrier to park usage and that dialogue

between neighborhood residents concerning park activities resulted in increased interest in taking community action to address these safety concerns.

**# 10** *The Influence of Kinship on the Presence of Aggressive Behaviors Between Nile Hippopotamuses (Hippopotamus amphibius) in Captivity*
**Sunny Mattancheril, Roberta Moore, Sarah Boyle**
**Faculty Sponsor: Sarah Boyle, Department of Biology**
Kin relationships, familiarity between individuals, age, dominance hierarchies, and sex may all contribute to social interactions between hippopotamuses (Hippopotamus amphibious). The Memphis Zoo originally housed two related hippopotamuses, Julie (51 years old at the time of her death) and Splish (currently ~25 years old), during the beginning of behavioral data collections in August 2012. After Julie's death in March 2013, another unrelated hippopotamus, Binti (currently ~13 years old), was introduced to the exhibit in June the same year. In order to elucidate the role of kinship in social interactions between hippopotamuses, 382 hours of behavioral interactions were recorded via scan sampling at 2-minute intervals, as well as ad libitum sampling of agonistic behavior, and analyzed between the two pairs of hippopotamuses. Because relatedness is associated with increased inclusive fitness, we predict that kinship has the greatest effect on reducing the presence of aggressive behaviors between hippopotamuses. Our findings of social interactions between hippopotamuses in captivity can aid in determining groupings of hippopotamuses for zoos.

**# 11** *American Bullfrog (Lithobates catesbeianu): GIS Analysis of Population Patterns Across Shelby Farms Park in Memphis, Tennessee*
**Sara Rodriguez, Brooke Rose**
**Faculty Sponsor: Sarah Boyle, Department of Biology**
American Bullfrog (Lithobates catesbeianu): GIS Analysis of Population Patterns Across Shelby Farms Park in Memphis, Tennessee Faculty Sponsor: Sarah Boyle, Department of Biology The American bullfrog (Lithobates catesbeianu), a highly territorial frog species that reacts drastically to polluted habitats and waterways, represents an excellent environmental indicator at Shelby Farms. Using ArcGIS 10.1 software, we analyzed the population trends of bullfrogs from February to October of 2010 using data collected by Shelby Farms biologists. We looked at the relationship between population, time of year, and land coverage throughout the Shelby Farms area in Memphis, Tennessee. Using the coordinate data, we will construct a map that displays the location and density of American Bullfrogs in Shelby Farms during 2010. We will also examine land coverage and other factors such as the bullfrog population's proximity to human establishments. By looking at the population densities of the American bullfrog and how these densities fluctuate throughout the year and within different degrees of land coverage on our map, biologists at the Park can begin to explore possible factors that could be affecting the frog populations. Once the map of this species is completed, biologist at the park will be able to utilize these data for habitat restoration practices for the American bullfrog.

**# 12** *Exploring Suitable Habitat for Wild Tigers in Present-Day Southeast Asia*
**Jennifer Marshall**
**Faculty Sponsor: Sarah Boyle, Department of Biology**
Tigers (Panthera tigris) have low populations due to habitat fragmentation in the Southeastern countries in which they are native. Economic pressures have contributed to the growth of numerous Southeastern Asian cites, resulting in a decrease of coveted forest habitat. The purpose of this study is to determine the presence of suitable habitat based on present-day land cover. Maps will be constructed in the ESRI ArcGIS (10.1) program using satellite imagery and information about tiger populations from the International Union from the Conservation of Nature (IUCN). The intended results are that wild tiger populations are restricted to wildlife reserves and natural spaces that neighbor growing cities. Future research should work to advocate for the preservation of the natural habitat of tigers.

**# 13** *Examining Urinary Cortisol Levels of a Female Sumatran Tiger Using Enzyme Immunoassay*
**Jennifer Marshall, Jennifer Marshall, Rhodes College; Erin Loeding, Beth Roberts, Research and Conservation Department at the Memphis Zoo**
**Faculty Sponsor: Sarah Boyle, Department of Biology**
The primary objective of the current study is to examine the effect of an opportunistic potential-stressor on urinary cortisol levels of a female Sumatran tiger. Samples were collected 3 to 5 times a week before, during, and after an extended change in husbandry routine due to an unusually severe winter. Cortisol concentration will be measured using enzyme immunoassay and adjusted for water content using urinary creatinine concentration. Cortisol

concentrations (mean ± SD) for month before, during, and after the husbandry change will be compared. Urinary cortisol levels are expected to be significantly higher during the change in routine versus the months before and after. No difference is expected between the month before and month after. This data will help us to determine if urinary cortisol increases with change in husbandry routine, if it is measurable non-invasively, and give us a better understanding of the female's average baseline and peak cortisol levels.

**# 14** *Arboreal Mapping of the Memphis Zoo*
**Taylor Sieben, Mary DuBose**
**Faculty Sponsor: Sarah Boyle, Department of Biology**
The goal of this project is to develop a comprehensive map and catalog of the trees throughout the Memphis Zoo. As a continuation of previous research conducted by Rhodes students in the fall of 2013, this project involves geotagging each tree with a handheld GPS unit, measuring the diameter at breast height (DBH), and identifying the genus and species. Further background research, such as native or non-native status and botanical family, is also included in the database. So far, over 2,000 individual trees have been recorded, representing 97 species and 59 genera. Individual tree locations, species distribution and density, and tree diameter were mapped using Esri ArcMap 10.1 software. This research has implications for the Memphis Zoo's horticulture department as they create management strategies for the Zoo landscape. In an attempt to promote sustainability, they will be able to use this data to make more informed decisions about tree planting and removal and to increase the percentage of native trees within the Zoo campus.

**# 15** *Boronic Acid Derivatives of Suberoylanilide Hydroxamic Acid*
**Peter Ketch, Stephanie Smith, Emily Berenson**
**Faculty Sponsor: Kimberly Brien, Department of Chemistry**
Suberoylanilide hydroxamic acid (SAHA), otherwise known as vorinostat, is a histone deacetylase inhibitor (HDACi) that is approved by the U.S. Food and Drug Administration to treat cutaneous T-cell lymphoma (CTCL). Although it is orally active in low concentrations, vorinostat displays low selectivity in targeting cancer cells and has a short half-life. Based on recent research supporting the effectiveness of boronic acid compounds for use in drug therapy, the goal of our research is to synthesize the first boronic acid analogues of SAHA. Specifically, the new analogues will replace the hydroxamic acid functional group with an aminoboronic acid, a hydrazine boronic acid, a hydroxylamino boronic acid and a thiol boronic acid. These boronic acid suberoylanilides may more selectively bind the zinc cofactor of histone deacetylase (HDAC) and increase the effectiveness of the drug.

**# 16** *An MP2 and DFT study of natural substrate analog interactions in the LpxC active site*
**Allison Dewar, Sarah Malkowski, Larryn Peterson, Mauricio Cafiero**
**Faculty Sponsor: Mauricio Cafiero, Department of Chemistry**
In recent years bacterial infections have become more resistant to treatments, posing a challenge for both researchers and health professionals. It has become imperative that novel, effective therapies against these resistant bacterial infections be discovered. Gram-negative bacteria present an additional challenge due to the presence of a selectively permeable outer membrane. Among the components of the outer membrane is Lipid A, which is responsible for the growth and pathogenicity of Gram-negative bacteria. The enzyme LpxC is responsible for catalyzing the first committed step in the biosynthetic pathway of Lipid A. The inhibition of LpxC would therefore, prevent the production of Lipid A, and hence result in a corrupted outer membrane. Starting from a LpxC crystal structure with a natural substrate bound in the active site, we have docked several novel ligands in the active site. The structure for these ligand-protein complexes were optimized using m06l and the 6-31G basis set (and lanl2dz for zinc). Interaction energies for the ligand and protein complex were calculated using m06l and mp2 with the 6-311+G* basis set (and lanl2dz for zinc). Initial suitability studies were done to confirm that our model chemistry described the zinc binding in the protein appropriately. Lastly, results are compared to experimental data from biological assays.

**# 17** *MP2 and DFT analysis of the ligand selectivity of a sulfotransferase enzyme part 1: SULT 1A3*◙
**Diana Bigler, Larryn Peterson, Mauricio Cafiero**
**Faculty Sponsor: Mauricio Cafiero, Department of Chemistry**
We have studied the substrate selectivity of the sulfotransferase enzyme (SULT1A3) by identifying important protein-ligand interactions in the active-site through electronic structure calculations. The sulfotransferase enzymes (SULTs) catalyze the addition of a sulfate group to a variety of small molecules, including neurotransmitters and xenobiotics. This reaction can activate or deactivate bio-active molecules or change their pharmacokinetic behavior.

A variety of ligands analogous to known substrates of the SULT were chosen for study. Docking and M062X/6-31G optimization of the ligands were used to find the structures of the ligand-protein complexes assuming a static active-site. Interaction energies between the ligands and the amino-acids of the active-site were calculated using MP2 and M062X with 6-311+g*; these energies can be used to determine the thermodynamic stability of the ligand in the active site. The addition of the sulfuryl group to the ligand depends on deprotonation of a phenol group on the ligand. Thus, pKa values were calculated for each of the ligands to determine the ease of deprotonation. Interaction energies and pKa values indicate different selectivity and comparison with experimental values is being used to determine which approach is most accurate. All calculations were performed with and without implicit solvation.

**# 18** *The role of solvation in the binding of morphine, met-enkephalin, and other ligands to the acetylcholine binding protein and μ opioid receptor.* ◙

**A. Katherine Hatstat**
**Faculty Sponsor: Mauricio Cafiero, Department of Chemistry**

Neurochemical receptors are important targets for drug design. Two important aspects of ligand binding in these receptors include the attraction of the ligand to the active-site and the effect of displacing the waters of solvation. The effect of solvation is more thoroughly understood in hydrophilic active sites than in hydrophobic active sites. In order to investigate the effect of solvation on hydrophobic active-sites, we have studied ligand binding and water displacement in two hydrophobic active sites, the acetylcholine binding protein and the μ opioid receptor. We used crystal structures of these two proteins to obtain a model of each active-site. Morphine, cocaine, and met-enkephalin were docked in the active-sites, and these ligand protein complexes were then optimized using M062X/6-31g. Interaction energies between the ligands and the proteins were calculated using M062X and MP2 with the 6-311+G* basis set. The role of water was explored by placing explicit waters of solvation both in the empty active-sites and around the ligands. The energy required to displace the waters upon ligand binding was calculated using the same methods mentioned above. Preliminary results suggest that solvation plays a larger role than ligand-active-site attraction.

**# 19** *Avian malaria in Brazil's Madeira River basin*◙

**Alison Hanson, Emma G. Jackson, John L. Malanchuk, Mitch Trycta Rhodes College; Alan Fecchio Department of Biology, University of Missouri- St. Louis; Michael Collins, Rhodes College**
**Faculty Sponsor: Michael Collins, Department of Biology**

Avian malaria has become a model system for investigating host-parasite relationships, including the role of parasites in conservation biology, life history evolution, and coevolution. Avian malaria is caused by haempoparasites, Haemoproteus and Plasmodium, which are transmitted by the insect vectors Hippoboscid flies and Culicid mosquitoes, respectively. In order to examine the parasite-host relationships at a community level, avian blood samples were collected from July 2010 to June 2011 from the Madeira River basin in Brazil. We extracted DNA and used PCR to screen for the presence of parasites. We will amplify and sequence positive infections at the cytochrome b gene, and use that to identify parasite lineages. This investigation will help to reveal the complex interactions between various lineages of the parasites and their avian hosts. The prevalence of infection, determined here by the preliminary screening results, will be analyzed statistically to assess whether infection prevalence is related to ecological traits. Our efforts will add to the ongoing investigation of avian malaria, including the cataloging of new parasite lineages, and will shed more light on the interactions between haemoparasites and their hosts.

**# 20** *Changes in avian body sizes in response to climate change*

**Erica C. Blustein, Steven M. Badami, Rhodes College; Danny Bystrak, Patuxent Wildlife Research Center, Laurel, MD; George E. Relyea, University of Memphis, Memphis, TN**
**Faculty Sponsor: Michael Collins, Department of Biology**

The burning of fossil fuels and broad-scale land use changes are changing the Earth's climate, including increasing temperatures and changes in precipitation and severe weather patterns. Bergmann's rule predicts decreases in avian body size when temperatures increase, while severe weather is predicted to select for larger body sizes. We analyzed body size (wing length and body mass) data for >80,000 individuals of 68 species banded in the fall from 1980-2011 in Laurel, Maryland and examined regional climate data from 1895-2011. Mean summer (May-July) and winter (Dec-Feb) temperatures have increased since 1895. Mixed models demonstrate that wing length and body mass varies show a significant year*species interaction, indicating species-specific body size changes. Wing length significantly increased in 12 species and declined in two. Body mass increased in five species and decreased in one.

Julian date, age, sex, age*year and sex*year were significant predictors of body size. Statistical models provide weak evidence of a relationship between migratory patterns (residents, short-distance and long-distance migrants)and changes in body size and no evidence that body size changes vary with breeding range or population trends. Our findings indicate that avian species (and ages and sexes) have responded individualistically to climate change, not as a whole.

**# 21** *Reaction Diffusion System of Cancer Invasion*
**Rachael Ward**
**Faculty Sponsor: Rachel Dunwell, Department of Mathematics and Computer Science**
Cancer cells use glycolysis to metabolize glucose. However, this process expends more energy, and increases the level of acidity in the tumor-host microenvironment by producing excess H+ ions. Additionally, these harmful byproducts produced by glycolysis can significantly diminish the normal tissue. The reaction diffusion system of cancer invasion, models two processes: the temporal variance of the tumor-host microenviroment and the spatial spread of the tumor host interface while regarding excess H+ ion concentration and normal tissue. Alterations of the pH levels toward a more acidic state in the microenviroment causes the tumors to proliferate. This mathematical model assesses the effects of the acidic environment on the spread of the tumor tissue and the depletion of the normal tissue. The model is utilized to predict the crossover from benign to malignant growth of tumor tissue.

**# 22** *Fine scale mapping of Arabidopsis chromosome IV to identify natural variation in imprinted gene expression*
**Brandon Smith, Ellen Dahl**
**Faculty Sponsor: Jonathan FitzGerald, Department of Biology**
Polycomb group (PcG) complexes have been associated with cellular memory of positional identity during early development. The seed endosperm of Arabidopsis thaliana provides a simple model for understanding this role of PcG. In Landsberg erecta (Ler) and Columbia (Col) ascensions, the maternally expressed imprinted report gene AtFH5::H2B-RFP is expressed solely in the posterior chalazal cyst of the endosperm. Silencing of the reporter in the anterior and peripheral endosperm requires PcG function. Interestingly, when Ler and Col are crossed, segregants carrying the AtFH5 reporter exhibit a range of phenotypes from no RFP expression to expression throughout the endosperm similar to PcG loss of function. We have constructed a Ler x Col mapping population in the background of a homozygous reporter to isolate and characterize the genes responsible for Polycomb targeting. A Ler inhibitor has been mapped to the southern end of chromosome IV. Fine scale mapping and candidate searches are being used to identify the causative gene(s).

**# 23** *An actin gene mutation affects cell morphology in Aspergillus nidulans*
**Annie Hohlt, Ben Haugen**
**Faculty Sponsor: Terry Hill, Department of Biology**
We have identified a novel mutation in the filamentous fungus Aspergillus nidulans, which impairs cell shape and growth rates at temperatures that are optimal for the wild type strain. The mutation was mapped to the right arm of Chromosome I via meiotic crossover ratios in crosses involving strains showing the mutant phenotype and strains bearing previously mapped mutations. Specifically, the mutation exhibits a ca. 26% recombination frequency in crosses involving the yA2 allele, ca. 11% in crosses involving proA1, ca. 5.5% in crosses with lysF51, and ca. 0.6% in crosses with pabaA1. After sequencing several genes in the region of genomic DNA that was predicted by these recombination rates, we identified a mutation in the ActA gene (AN6542), which encodes the cytoskeletal protein actin. The mutation consists of a G-to-T base transversion at position 1603 (out of 1786 nucleotides), which is predicted to cause a lysine-to-asparagine substitution at conserved position 315 of the 375-residue gene product. ActA is the only gene predicted to encode an actin protein in A. nidulans. Work is currently underway to determine the effects of this mutation upon a range of other proteins and processes in which actin is known to participate in A. nidulans.

**# 24** *Ultrasonic bone assessment using a time domain backscatter analysis technique*
**P. Luke Spinolo, Mark Sellers**
**Faculty Sponsor: Brent Hoffmeister, Department of Physics**
Osteoporosis is a major health risk to both men and women over the age of 50. Current diagnosis is mostly performed using x-ray devices to measure bone density, but ultrasound could offer a safer, cheaper, and more portable alternative. Because through-transmission of ultrasound signals is not feasible at typical osteoporotic fracture sites (e.g., hip and spine), it is necessary to develop a new method of measuring density using backscattered ultrasonic signals. One challenge involves errors caused by intervening tissues that lie between the transducer and

the region of bone selected for measurement. We have developed a method that seems to be relatively insensitive to these errors. The method involves a time domain analysis of two different portions of the backscatter signal. The resulting parameter, called "nBAR", measures the rms power difference between the two portions of the signal. In vitro studies find that nBAR is not significantly affected when intervening tissues are introduced between the transducer and bone specimen. In addition, nBAR is a normalized parameter that does not depend strongly on choice of gate location, duration or separation. As a bone assessment parameter, nBAR is found to correlate rather well with density, typically yielding linear correlation coefficients of 0.8.

**# 25** *A technique for measuring the density of cancellous bone using an ultrasonic imaging system*
**Catherine Miller, Morgan Smathers, Cameron Thurston**
**Faculty Sponsor: Brent Hoffmeister, Department of Physics**
Introduction: Osteoporosis is a degenerative bone disease that affects millions of Americans. Osteoporosis causes normally porous bone tissue, called cancellous bone, to become more porous and weak. It is possible that ultrasonic imaging systems may be used to detect changes in bone density (porosity) caused by osteoporosis. Methods: Ultrasonic images were acquired from 25 cube shaped specimens of cancellous bone in a water tank using a Terason 2000+ ultrasonic imaging system with a 5 MHz linear array transducer. Images were analyzed using an image processing program called ImageJ. Pixel brightness values were plotted as a function of depth in the images of each bone specimen. Pixel value gradient (PVG) was defined as the slope of the resulting graph. Results: PVG was negative for all specimens, and was found to decrease (become more negative) with bone density. PVG demonstrated a moderate but highly significant ($p < 0.001$) linear correlation with bone density ($R = -0.79$). Conclusion: Ultrasonic images of bone may be analyzed in ways that yield quantitative information about bone density.

**# 26** *Diagnosing osteoporosis with ultrasound: a frequency domain backscatter difference technique*
**Cameron Thurston, Catherine Miller Morgan Smathers Joseph McPherson Dr. Brent Hoffmeister**
**Faculty Sponsor: Brent Hoffmeister, Department of Physics**
Osteoporosis is a degenerative bone disease affecting the lives of roughly 10 million Americans. Annually, osteoporosis is responsible for 19 billion dollars in health care costs. Early detection of osteoporosis is critical for the treatment of the disease. The goal of this research is to develop a new ultrasonic technique for diagnosing osteoporosis. Measurements were performed by propagating ultrasonic pulses into specimens of human bone and receiving the returned "backscattered" signal. Backscatter occurs as the wave interacts with the porous interior of the bone tissue. Backscatter signals were acquired from 25 cube-shaped specimens of bone using a medical ultrasound system (Terason 2000+). Power spectra were determined from two different portions of each signal, and subtracted to measure the power difference. The power difference was found to correlate well with specimen density ($R > 0.8$). The results suggest that this frequency domain backscatter difference technique may be sensitive to changes in bone density caused by osteoporosis.

**# 27** *Phylogenetics and species delimitation of the southwest Australian endemic wildflower genus Anthotium (Goodeniaceae)* ◙
**Eden Johnson, Andrew Gardner, Rhodes College; Kelly Shepherd, Department of Parks and Wildlife (PERTH, AU)**
**Faculty Sponsor: Rachel Jabaily, Department of Biology**
A comprehensive phylogenetic analysis of evolutionary relationships among species of Anthotium, a genus of charismatic Goodeniaceae wildflowers, is presented. This research was conducted in part to provide accurate plant taxonomic data to the government of Australia to aid the process of describing and conserving these species, which currently have priority conservation status. The plants are endemic to the Southwest Australian Floristic Region (SWAFR), a global hotspot of diversity, which is home to extraordinarily diverse flora and fauna currently under threat from increased mining and urbanization causing habitat loss and fragmentation. The current study produced DNA extractions of multiple individuals from each of the four currently-recognized species from throughout their geographic range. Potentially new species were included from our major collaborator at the Department of Environment and Conservation for the State of Western Australia. PCR amplification of ca. 2500 basepairs of chloroplast spacer regions trnL-trnF and matK, and nuclear ribosomal region ITS, was sequenced, aligned and analyzed with phylogenetic programs. Results suggest Anthotium is divided into two major clades, and currently recognized species may not be monophyletic. Potentially one or more new species may be added to this small genus as a result of this work.

**# 28** *Getting into Shape: Morphometric Analysis of Floral Symmetry Variation in Goodeniaceae*
**John Menz, Andrew Gardner, Rachel Jabaily; Kelly Sheperd, Western Australian Herbarium- Department of Parks and Wildlife, Kensington, Western Australia, Australia; Spencer Willis**
**Faculty Sponsor: Rachel Jabaily, Department of Biology**
The Goodeniaceae is a principally Australian family of wildflowers, with its highest species diversity in the Southwestern Australian Floristic Province. The family displays diverse petal symmetry variation including actinomorphic, bilabiate, and fan-shaped flowers. This evolutionary liability may have been a key driver of diversification in the family. In this study, we used geometric morphometrics to characterize floral symmetry for 28 species of Goodeniaceae. Morphometrics uses homologous landmarks to allow for quantitative comparisons of the shapes of objects. While evolutionary developmental biology has adapted morphometric theory from fields such as archaeology and utilized it as a powerful tool for comparative analyses, most biological applications have thus far been limited to animal models. An average of 8.75 head-on photos of each species' flowers was taken in the bush, which were then digitally landmarked. Photo-specific variation was minimized by performing a Procrustes transformation and relative warps analysis using morphometric freeware. We sought to test intra- and interspecific variability of floral form to quantitatively define discrete floral morphological bins and to assess levels of correlation among the floral landmarks, allowing us to define potential developmental modules. Species were clustered into multiple discrete floral symmetry bins for future phylogenetic study. The majority of interspecific floral variation was determined through PCA analysis to be encompassed by landmarks on dorsal and lateral petals, with minimal variation within species. This study determined that geometric morphometrics is a viable method of objectively comparing and characterizing floral morphology.

**# 29** *Areas of origination and dispersal mechanisms of invasive plants in Overton Park*◙
**Alexander DeGenova**
**Faculty Sponsor: Rachel Jabaily, Department of Biology**
Overton Park is a 342-acre bottomland hardwood forest located within an urban-residential area of Memphis, Tennessee. Forests found in close proximity to urban areas are often strongly impacted by ecological disturbances, including invasive species introduction. An ongoing inventory of vascular plants for the Rhodes College herbarium (SWMT) found eighty-three plant species to be non-native, including eight known invasive species present in the park. Its frequent use by humans and the abundance of animal vectors (e.g. dogs, birds) increases the likelihood of seed and other propagate dispersal throughout the park, resulting in the introduction and spread of non-native and potentially invasive species to the park. Therefore, I hypothesized that the majority of invasive plant species in Overton have seeds that are dispersed by animals. Additionally, the similar climate of southeastern Asia leads to the popularity of ornamental Asian species for horticulture in the southeastern United States. From this, I also hypothesized that the majority of invasive plant species in the park would be Asian in origin. Ninety-one species were collected and categorized by species distribution and fruit type. I concluded that nine percent of these were invasive. Approximately forty-four percent of all non-invasive species found are also non-native. Sixty-four percent of invasive species had seeds dispersed by animals, and sixty-four percent of the collected invasive species were native to Asia, supporting the hypotheses. The identification and documentation of invasive species found in parks like Overton is important, because conservation strategies are often relative to the invasive plants present in the target area.

**# 30** *Characterization of the intracellular C-terminal domain of the Aspergillus nidulans transmembrane protein SccA and the identification of candidate orthologues in Saccharomyces cerevisiae*
**Matthew Cannavo, Darlene Loprete, Loretta Jackson-Hayes, Terry Hill, John Musgrove, Erinn Ogburn, Jackie Ward**
**Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry**
Aspergillus nidulans is a well-characterized species of filamentous fungi used as a model organism in fungal research. The implications of Aspergillus research are great due to its prevalence in medical, agricultural, and biotechnological fields. Specifically, cell wall integrity (CWI) is an important aspect of fungal research due to its role as a target for antifungal drugs. This research focuses on the transmembrane protein termed SccA (AN4897). SccA is a 271-aa serine/threonine rich protein that localizes to the plasma membrane and is believed to be involved in the CWI pathway. Overexpression of SccA complements the calcofluour white (CFW) hypersensitive phenotype of the calC2 mutation in protein kinase C. This study aims to characterize the function of the intracellular C-terminal domain of SccA by creating several 10-aa C-terminal truncations of SccA in an A. nidulans strain with the calC2 mutation (R78) to determine at which point hypersensitivity is complemented. In addition, this study attempts to identify potential SccA orthologues in yeast. Two potential candidates, Wsc1 and Mid2, are known S. cerevisiae

stress sensors that have similar structures to SccA and show similar involvement in the yeast CWI pathway. These genes were transformed into R78 to determine if either resulting phenotype matched the SccA phenotype.

**# 31** *Neural activity in behaviorally relevant brain regions of the male Brown Anole (Anolis sagrei) after social behavior encounters*
**Shelley Choudhury, Jacob Hartline, Alexandra Smith**
**Faculty Sponsor: David Kabelik, Department of Biology**
Presently, the neural mechanisms behind social behavior are poorly understood. Determination of type of behavioral output is dependent on the activation/inactivation of specific 'target' nodes in the social behavior network. This study examined neural activity in neurotransmitter target sites involved with aggression and courtship in brain regions of male Brown Anole (Anolis sagrei) lizards. Activity was examined using immunohistochemical detection of Fos (an immediate early gene product indicative of recent neural activity). Sites were identified based both on previous studies and their strong ties to social behavior, and include: preoptic area, bed nucleus of the stria terminalis, amygdala, anterior hypothalamus, lateral septum, and medial septum. We hypothesize that differences in activity in these areas correlate with behavior differences in appetitive and consummatory behavior for both courtship and aggression. A detailed map of behaviorally relevant neural activation throughout the brain would facilitate a better understanding of the behavior-brain relationship. In addition, correlations between target and source node activity can better illuminate neural connectivity pathways.

**# 32** *The regulation of social behavior: mesotocin and corticotrophin-releasing factor in the supraoptic and paraventricular nuclei of male brown anoles*
**Sumner Magruder**
**Faculty Sponsor: David Kabelik, Department of Biology**
Although some brain nuclei and signaling molecules involved in social behavior networks have been determined, social network complexity leaves much to be determined including the sources of these signaling molecules. This knowledge may explain the regulation of social decision making, such as whether to activate sexual or agonistic circuitry to a given conspecific. Amongst known signaling molecules oxytocin/mesotocin (OT/MT) and corticotrophin-releasing factor (CRF) mediate anxiolytic and/or anxiogenic effects. However their relationship may be less dichotomous than simple counteraction. Sources of OT/MT include the supraoptic nucleus (SON) and paraventricular nucleus (PVN). Here CRF actually co-localizes with OT/MT in a subset of neurons. Immunohistochemistry and confocal microscopy were used to evaluate the number of neurons producing MT, CRF, and Fos, a marker of neural activity, as well as the co-localization of their combinations in male brown anole lizards (Anolis sagrei). Investigating the relatively simple social circuitry of lizards facilitates the comparative study of more complex avian and mammalian neural networks. Presented here are the preliminary results.

**# 33** *Increase in Protein Dube3a Could lead to Idiopathic Autism*
**Addison Jezek, Larry T Reiter, University of Tennessee Health Science Center**
**Faculty Sponsor: Gary Lindquester, Department of Biology**
Autism spectrum disorder in humans is characterized by impaired social interaction, reduced speech capacity, and repetitive behaviors. While the underlying genetic causes of autism are inherently complex, recent data suggest that approximately 3-5 % of autism cases are the result of maternally derived duplications of chromosome 15q resulting in increased dosage of the maternally expressed UBE3A gene in humans, known as Dube3a in flies. Our lab recently completed an unbiased proteomic screen for proteins in the fly brain that are directly affected by increased or decreased Dube3a levels (Jensen et. al (2013) PLoS One 8(4):e619522013). Here we show preliminary results of a suppressor/enhancer screen designed to supplement our proteomic screen and reveal Dube3a interacting pathways. Using the Bloomington DrosDel deficiency kit we began a screen for genes that can suppress or enhance a rough eye phenotype generated by over-expression of fly Dube3a using the eye specific GAL4 driver gmr-GAL4. We used two different UAS P-element insertion alleles of Dube3a, one which causes a very rough eye and one with a mildly disrupted eye at 25 °C. Flies from each allele (gmr-GAL4>UAS-Dube3a) were crossed to each of 346 DrosDel deficiency lines and the progeny of each cross was scored based on the intensity of the eye phenotype. Flies which showed either suppression or enhancement of the rough eye phenotype were confirmed and secondary crosses using smaller deletions or individual gene disruptions are being used for the secondary screen. We have completed 156 out of 346 (45%) of the primary crosses and have identified three deficiencies with phenotypes warranting secondary screen crosses to smaller deficiencies.

## Social Sciences

**# 34** *Role Readiness of Fraternity and Sorority Members*
**Jacqueline Marsh, Olivia Hebner, Brooke Tomlin**
**Faculty Sponsor: Dee Birnbaum, Department of Commerce & Business**
The on-campus organizations of Rhodes College are governed by rules put in place by both faculty and student authority figures. However, it is apparent that some rules are simply ignored by the members of these organizations. In our research team's experience, we have found that many rules are disregarded completely within Greek organizations. This has led us to question the limits of a fraternity or sorority member's zone of acceptance. Furthermore, as members of three different sororities on campus, we were curious to find out the variance in this behavior between different houses. In order to do this, we decided to test how far individual member's zones of acceptance extended when posed with morally questionable activities. Particularly, we incorporated questions into the public survey we made based on the by-laws of each organization that dealt with drug use, hazing, underage drinking, illicit monetary spending, and general rules, such as to attend weekly meeting. From the results, we analyzed the role readiness, or willingness to comply with the requests of an authority figure, existent or failing to exist in each situation and attempted to provide the reason for its presence or absence.

**# 35** *Legal-Rational Authority at Rhodes College*
**Alex Schultheis, Christine Corbette, Austin Dickson**
**Faculty Sponsor: Dee Birnbaum, Department of Commerce & Business**
Legal-Rational authority stems from a theory of bureaucracy created by Max Weber in which he claims that organizations are structured so that employees are evaluated according to impersonal criteria, such as merit. Employees carry out their supervisor's instructions through their obligation to their supervisor's position, not to the supervisor as a person. These established rules aim to make authority "impersonal, objective, and based on equality." Given that Rhodes College emphasizes community over the bureaucratic process, we attempted to investigate the extent to which the subordinate's relationship to his/her supervisor at Rhodes is based on impersonality and/or close personal relationships. We created questionnaires to gather information pertaining to this relationship at Rhodes.

**# 36** *The relationship between job attitudes and employees' intent to remain in an organization*
**Autumn Baker**
**Faculty Sponsor: Dee Birnbaum, Department of Commerce & Business**
Nursing students that are involved in externships have a unique opportunity to gain field experience before working full-time after graduation. This opportunity can be rewarding in that it prepares the students for the real world of nursing and allows the students to gain valuable clinical experience before entering the nursing profession. In my research, I looked at fifty-one nursing school students' externship surveys to see if there is a relationship between occupational commitment, organizational commitment, job satisfaction and the intent to stay in the organization where the externship was completed. I tested my hypothesis that the job attitudes of nursing students predict whether they will stay in the same organization where they completed their externships or change organizations after receiving a BSN.

**# 37** *Nursing Shortage: Why Aren't Nurses Graduating?*
**Takel Avery, Dee Birnbaum, Courtney Collins**
**Faculty Sponsor: Dee Birnbaum, Department of Commerce & Business**
This study seeks to identify the causal factors of the shortage of nurses in the healthcare industry. To do so, the study will investigate the reasons individuals do not continue in the Bachelor of Science in Nursing (BSN) program through graduation. This study holds constant demographic factors already known to have an effect on program turnover while examining various attitudes such as the students' expectations for rewards and their commitment to the profession. The study also looks at the time spent to attain the BSN as a predictor of whether the student will graduate.

**# 38** *Student Zone of Acceptance in the College Classroom*
**Josh Jerles, Will Posey, Brendan Rogan**
**Faculty Sponsor: Dee Birnbaum, Department of Commerce & Business**
Drawing from the research of Barnard, as well as March and Simon, this survey studies the extent to which college students construct their zone of acceptance according to their relationship with the professor. We examined the extent to which students were willing to do assigned readings, while asking them how they liked their professor. This information was correlated with the students' GPA's to determine any significant factors.

**# 39** *Impact of Realistic Job Preview on Levels of Job Satisfaction Amongst the Rhodes College Faculty and Staff*
**Olivia Menick, Jacob Johnson**
**Faculty Sponsor: Dee Birnbaum, Department of Commerce & Business**
Abstract In recent years, organizations and firms have increased their interest in analyzing the different components of recruitment in the hopes of maximizing the output of their human resources. One of the key foci has been to examine the effects of a realistic job preview (RJP) on different components of the post-hiring process, namely job turnover and performance. However, there has been a lack of research pertaining to the direct effects of a realistic job preview on employees' job satisfaction. This study examines how the realistic job preview impacts levels of job satisfaction using the faculty and staff at Rhodes College as a sample. The researchers hypothesize a positive correlation between realistic job previews and job satisfaction except when unpreviewed positive facets of the job enhanced the overall satisfaction. Results showed a significant correlation between previews with higher levels of accuracy and levels of job satisfaction.

**# 40** *Discovering Trends in Liberal Arts Colleges using Organizational Sets*
**Alex Abdo, Andrew Ehinger**
**Faculty Sponsor: Dee Birnbaum, Department of Commerce & Business**
Developed by Caplow (1964), an organizational set is derived from commonalities between entities. Inspired by the concept of potentially irrelevant characteristics affecting the prestige of academic institutions, the authors conducted a study to evaluate commonalities within the organizational set of Top 100 liberal arts colleges that are not quantified by the ranking criteria of U.S. News and World Report. Based upon institutional rankings in U.S. News and World Report, high, medium, and low prestige groups were formed. The authors used Caplow's theory and discovered commonalities within each prestige group through extensive analysis of the institutions within them.

**# 41** *A Look Inside the Home of Man's Best Friend*
**Eve Schmidt**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
In order to gain a holistic understanding of the overpopulation and abuse problem of animals in Memphis and Shelby Country it is necessary to participate in first hand observations in the culture where this problem is trying to be improved, and hopefully eliminated. Over the course of this semester I was given the opportunity to study any cultural scene in Memphis as a requirement for a class I am enrolled in entitled, "Ethnography at Home." I chose to observe the inner workings of the Humane Society of Memphis and Shelby County. The purpose of my ethnographic research was to participate in and observe the many activities, events, and behaviors that occur within the facility. The Humane Society consists of one multi-purpose building that includes the business headquarters, animal education for community members, housing for animals that need to be adopted, a vet clinic, and an intake center. Over the bark of dogs and the soft purrs of cats I caught a glimpse of how the staff and community members of Memphis have created a safe and trusting environment for the animals, as well as the people who care about them.

**# 42** *TIRRC, A backyard voice for those unheard: An Ethnographic Study of the Tennessee Immigrant and Refugee Rights Coalition*
**Ann Louise Richardson**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Ethnographic methods allow us to observe and appreciate unfamiliar cultures. Participant observation helps create an understanding of the intricacies of the organization being observed. The purpose of my ethnography on the Tennessee Immigrant and Refugee Rights Coalition (TIRRC) is to explore the many aspects of the organization, from education classes to community outreach to fighting for legislation to create equality for immigrants and refugees. My focus is on the cultural scene within the TIRRC community, specifically the Mid-South region office and staff. I observed many aspects of this organization, including community meetings, "Know Your Rights"

educational meetings, and collaborations with other local non-profit organizations. Through this ethnography, I hope to illustrate the way TIRRC creates awareness and education on these important issues for immigrants and refugees, and highlight the vital role this organization plays in the Mid-South.

**# 43** *Empowering the Vagina: An Exploration of SisterReach*
**Kenneishia Wooten**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Ethnography is a vital tool used by anthropologists in order to examine unfamiliar cultures that are considered to be "other." Using the ethnographic method of participant observation, I immersed myself into the culture of SisterReach as a volunteer in order to gain a more concise understanding of the organization. SisterReach is an organization that caters to young African American women in the heart of Midtown in Memphis. Located on Madison Avenue, SisterReach assists these women by helping to improve their awareness of Sexual Health and Reproductive Justice. Because of my interest in Sexual Health and education, I chose SisterReach in order to understand how this organization operates within Memphis. Throughout my research, I participated as a volunteer of the Choose2Wait program by assisting in planning the Youth Rally, gathering feedback about the Comprehensive Sex Ed Bill, and attending Saturday morning SisterReach Youth Ambassador meetings. My presentation will examine the culture of SisterReach and its fight to educate African American women and girls about their bodies, sexual health, and Reproductive Justice. Specifically, I will focus on how Choose2Wait impacts the community, the struggles of a grassroots organization, and how the African American community culture influences the organization.

**# 44** *Cutting and Coloring to the Classics: An Ethnographic Study of Dabbles Hair Company*
**Devon Lee Shiland**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Ethnography allows us to discover the nuances of a specific subculture within our society through observation. One unique subculture in Memphis is the locally owned hair salon. The sensory aspects and portfolio of haircuts in these salons come together to create a special experience for the client. One of the more distinctive salons in Memphis is Dabbles Hair Company, the location where I conducted my ethnographic research. An eccentric Midtown favorite, Dabbles' clients and employees are of all ages and personalities. The salon mixes the past and the present of Memphis, combining the Elvis relics throughout the salon and the vinyl music seamlessly with the edgy, modern decor. I situated myself as an observer in both the waiting room and the styling room in order to gain a more holistic view of the sometimes drastic physical transformations that occur at Dabbles, as well as the interactions between hair stylist and client. This relationship is unique in that it only occurs a few times a year, and yet our deepest secrets sometimes unearth themselves during the hours in the styling chair. My presentation will explore these intimate, yet distant, relationships.

**# 45** *A Confection Connection: An Ethnographic Study of La Michoacana Paletería y Nevería*
**Judith Denham**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
The discipline of ethnography allows a researcher to gain a broader understanding of another culture through the methodology of participant observation. Through participant observation, an ethnographer is able to become deeply familiar with a culture through active participation and simultaneous observation of his or her cultural group. In order to utilize the methodology of participant observation, I chose to frequent the cultural scene of La Michoacana Paletería y Nevería, a Mexican ice cream parlor located on Summer Avenue in Memphis, Tennessee. At first glance, La Michoacana seems secluded within the Hispanic community due to the constant Spanish discourse between the employees, its numerous Spanish-speaking customers, and the menu comprised of traditional Mexican desserts and snacks. However, after observing the scene for a few weeks, trying countless sweets, and becoming acquainted with the staff, I realized that this charming, family-run business is truly intriguing because of its service-minded attitude that extends beyond Summer Avenue to the rest of Memphis. Their involvement in various, citywide events has fostered a long-lasting relationship with the Memphis community. La Michoacana is special because it is a diverse cultural center, serving people from a variety of racial and socio-economic backgrounds. Thus, this local favorite acts as a bridge between lives that would never otherwise touch.

**# 46** *One Woman at a Time: An Ethnographic Study of Mother-Friendly Birthing Services in Memphis*
**Jazlyn Phelps**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Zoleka Birth Services is an organization run by a local Memphis doula. She works in the community by providing doula services, non-medical care before, during and after birth, and educating people on mother-friendly birthing options. I use the ethnographic method and specifically participant-observation to work with the doula and other related organizations. These methods provide a close, detailed look into the inner workings of this scene. Other organizations that I worked with included the Birthing Rights Working Group and BirthMemphis which host meetings, classes, and events in various public and private locations throughout the city. My research started by learning the ins and outs of the Memphis birthing rights cultural scene and examining the lenses that shape the views of those who work in the area. An emergent theme that I observed was the importance of race and the lack of resources for African-American women in the area. The doula that I work closely with is one of the few Black doulas in the region and is working to minimize the prevalent racial disparities. My hope for this presentation is to bring to light the mother-friendly birthing rights movement that is growing in Memphis.

**# 47** *Grit, Grind, and Get Moving!: An Ethnographic Study of the Grizzlies Grannies and Grandpas Dance Team*
**Julie Hertzman**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
The ethnographic method allows us to study different cultures and cultural scenes in order to better understand how the people in these spaces interact with one another and experience the world. The process of participation observation involves full engagement with the culture of study. Examining a group for an extended period of time permits one to appreciate other cultures through the eyes of an insider. I have conducted my ethnography on the Grizzlies Grannies and Grandpas Dance Team throughout the past semester, immersing myself in their practices and observing their performances. Through my study, I explored the different motives of participation of the team members and the struggle to maintain an active lifestyle as we age. After spending time with the Grannies and Grandpas, I have seen the commitment they put forth in order to stay active and to possess the ability to change the entire vibe of an arena merely through a two-minute dance. My presentation will explore how this dance team not only provides a source of entertainment for Grizzlies fans, but also generates a unique way to stay physically active while providing an opportunity for middle aged and elderly people to be a part of a team.

**# 48** *Sugar and Spice: An Ethnographic Study of Evelyn & Olive*
**Carlissa Lovette**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Evelyn & Olive is a small, ethnic restaurant that is located in an area that is not quite downtown but not quite mid-town of Memphis on Madison Avenue along the Trolley Line. The restaurant is a mixture of Southern American and Jamaican food as a representation of the culmination of the owners' backgrounds. To understand what has allowed this restaurant to thrive in this area, I used the ethnographic method as a tool to observe this scene. Participant observation is a method used by anthropologists and sociologists to gain a better understanding of an unfamiliar culture. By immersing myself into the culture of Evelyn & Olive, I have come to understand what makes this restaurant so unique. Evelyn & Olive is a special restaurant that allows everyone who comes in the doors to feel like they are home with their Southern hospitality and soothing Jamaican music. My presentation will focus on how Evelyn & Olive creates a space that is comfortable for everyone who comes through the doors.

**# 49** *Discovering Another World Inside of Otherlands*
**Kelsi Garson**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
The ethnographic method, specifically participant observation, allows anthropologists to identify cultural nuances and social patterns through immersion within a particular cultural scene. The cultural scene I chose to participate in and observe this semester is Otherlands Coffee Bar, a coffee shop located in the heart of Midtown Memphis. This local coffee shop has a gift shop located inside of it, live music on the weekends, and a full menu for breakfast and lunch. The décor in the coffee shop is very colorful and eccentric, playing into the cool and unique vibe of Midtown Memphis. The material, cultural, and social environments of Otherlands Coffee Bar are the foci of my study. By immersing myself within this cultural scene I discovered that Otherlands is a space where Memphians come not just to meet, work, shop, hear music, or get a tasty dose of caffeine; it is also a space where Memphians come to create and experience community comfortably.

**# 50** *Welcome to the Jungle: A Study of the Day-to-Day Workings of the Memphis Zoo*
**Emily Hoch**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
The ethnographic method holds three important purposes: to transform the strange into the familiar, to understand "what humans are up to," and to help expand the understanding of cultural variation. Ethnography employs fieldwork techniques like participant observation, interviews, and focused discussions to acquire information on the group being studied as well as immerse the ethnographer into the culture. Founded in 1906, the Memphis Zoo has served as an important cultural site for tourists and locals alike. For my ethnography on the Memphis Zoo, I positioned myself as a volunteer and a visitor in order to observe and participate in the behind-the-scenes, as well as to experience the zoo from the perspective of the public. The overall goal of my study was to examine the various perceptions of the zookeeper profession, the relationship between the members of the zoo community, and to discover what it takes to keep a zoo running. The Memphis Zoo is a cultural institution for this city, and it is my hope that my ethnography will demonstrate the dedication of the zoo staff and volunteers and provide them with the recognition they deserve.

**# 51** *All You Need is Jazz: An Ethnographic Study of The Center For Southern Folklore*
**Maura Angel**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
The anthropological method of participant-observation helps develop an understanding of the beliefs and values of a culture different from our own. The Center for Southern Folklore has spent over 75 years dedicated to preserving, educating, and sharing the music and art of the Memphis/Delta Region. The Center functions as a museum, gallery, and performance hall. For the past semester I have practiced the ethnographic method by volunteering at the Center for three hours each week. While volunteering I have made purposeful, detailed observations of the cultural art scene. Through hands on experience I was able to observe the on-going efforts it takes to run a non-profit. A part of this process is working with other community members to support one another's stores, through publicity and the selling of their products. My presentation will focus on the development of a community network and its utmost importance to the Center. Through my time as a volunteer I observed The Center for Southern Folklore's special ability to bring a group of diverse individuals from all over the world, together to share in blues and jazz music.

**# 52** *A Realm of Refugees: An Ethnographic Analysis of the Refugee Empowerment Program*
**Sanhitha Valasareddy**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
In order to develop and understand aspects that compose our Memphis culture, an ethnographic field study can be used to observe the people that experience it anew. By engaging in participant observation at the Refugee Empowerment Program (REP) in the Binghampton community, I was able to employ the ethnographic method to gain insight into the experiences of refugees and REP volunteers. REP is a non-profit organization that offers free English language classes for refugees along with other services aimed to help refugees settle into Memphis life. The volunteers teach classes with women and men from countries such as Syria, Somalia, and Burundi. The students incorporate their own culture and help each other grasp the material, while their language similarities and backgrounds create friendships and cliques in the classes. Along with fostering a refugee community, REP forms close relationships between the volunteers and the refugees. Through interviews and observations of the classes, I have come to better understand the role REP plays in the lives of the refugees, and how volunteers' appreciations of other cultures are transformed.

**# 53** *Old Habits Die Hard: The Ethnography of a Health Movement at the YMCA*
**Allycia Kleine**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
The YMCA is more than just a fitness center; it is a movement. It is an organization that bands together to strengthen individuals and communities. Through the three focuses of youth development, healthy living, and social responsibility, the YMCA works to strengthen peoples' bodies, minds, and souls. The Memphis Fogelman Downtown branch of the YMCA offers an assortment of techniques in an attempt to improve exercise and eating habits and better the healthy living culture of Memphis communities. Some of these methods include individual workouts, personal training sessions, and aerobics classes, as well as wellness evaluations and nutrition counseling. In addition to examining the overall efforts of the Fogelman YMCA, this ethnography focuses on the specific methods used by the department of Health Innovations. This department conducts a variety of educational programs

that spread health awareness and promote healthy habits and lifestyle choices. I used the ethnographic method of engaging oneself in a culture because it allowed me to study and learn about the YMCA in a short amount of time. Through participant-observation I was not only able to witness, but also experience the work that it takes to kick bad habits and change a culture to improve lives.

**# 54** *Let's Talk about Sex: An Ethnographic Study on Reducing Stigma from inside a Reproductive Health Center*
**Lucy Galloway**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Often in our society, sex is condemned as something highly taboo. Because of this adverse perspective many teens and adults go without the proper education needed to responsibly govern their own sexual and reproductive health. This social issue is exactly what the mission of Choices: Memphis Center for Reproductive Health is working to deconstruct in Memphis, from its Midtown location and beyond. As Social Media & Special Projects Intern for the clinic I have had the privilege of working directly with the center's public media operations as well as helping to promote its biggest fundraising event of the year, a condom fashion show entitled "Condomonium." No matter what project Choices has planned for Memphians, the ultimate goal is to educate and inform people on sexual health. Using the Ethnographic method of participant-observation I have engaged with staff members and volunteers on a weekly basis, allowing me to see what truly makes this independent, non-profit organization grounded in human rights so successful: passion. I intend to show that, through feministic drive and determination, the clinical and administrative staffs at Choices have accomplished their mission by completely transforming the way reproductive health care is perceived and provided in our community.

**# 55** *All Vaped Up: The Culture and Community of Electronic Cigarettes*
**Devin Craft**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Traditional cigarettes become more stigmatized with each passing year, and most people who smoke cigarettes do not seek out groups of cigarette smokers for their primary social ties. Alternatively, e-cigarette use, or "vaping," is extremely social, with groups of over 250 people meeting in Memphis each month to talk about vaping, build and buy electronic cigarettes and accessories, and meet other people with similar interests. This presentation is about ethnographic research conducted at an electronic cigarette store in Memphis. The ethnographic method includes extensive observation, immersion in a cultural scene, and interviews with people intimately familiar with the site. This research seeks to answer questions about the culture surrounding vaping as well as the roles played by the people who occupy the scene. Additionally, I will focus on aspects of emotional involvement in nicotine addiction. It is rare to meet a smoker who is happy to have an addiction to nicotine, and people frequently turn to e-cigarettes out of desperation to quit smoking. The employees at the store and members of the vaping community share the struggle of nicotine addiction, and because of this they frequently serve as pseudo-counselors for people trying to quit smoking cigarettes.

**# 56** *A Dog Ate My Field Notes: An Ethnographic Study of Overton Bark*
**Betsy Dee**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Overton Bark is a new dog park across the street from the Brooks Museum and Levitt Shell in Memphis, TN. Hollywood Feed, a historic feed and pet health store, and the Overton Park Conservancy created Overton Bark as a space for local residents and Overton Park patrons to bring their dogs. To some park visitors, the dog park may only appear filled with wet-nosed, bright-eyed, and excited dogs. However, amongst the enthusiastic bustle of Overton Bark, I have observed much more interesting and complex interactions between dog owners. I explored dog park culture through ethnographic participant observation, where as the researcher, I immersed myself in the activities of the dog park. This method allows me to particularly focus on Overton Bark's socialization process, how individuals and dogs learn to fit in with their surrounding environment. By observing the body language, behavior, and interactions between dog owners, I plan to explain the socialization process of Overton Bark's specific dog park culture.

**# 57** *One Puff Ain't Enough: An Ethnographic Study of Royal Hookah Café*
**Leah Ford**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Royal Hookah Café is a new hookah bar located in Bartlett which provides a relaxed social atmosphere for smoking hookah. The intricate Middle Eastern-style furniture and decorations combine with American music to create a

unique blend of cultures while patrons speak both English and Arabic. I have studied Royal for the past semester using the ethnographic method, where I have immersed myself in the bar's scene to learn about its culture. Ethnography allows an anthropologist to learn about another cultural scene and to ultimately reflect back on their own cultural scenes with a fresh look. Utilizing participant observation, I positioned myself as a regular patron by smoking hookah while observing the bar's every day customs. Through this positioning, I have learned about how different cultures interact with and influence each other. My presentation examines how Royal creates a cultural scene of social cooperation within our American society that is largely racially and culturally divided.

**# 58** *Home Sweet Where?: An Ethnography of Ekata Designs and Nepali Refugees in Memphis*
**Summer Preg**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
The United States has doubled its number of refugees from Nepal in just this past year (30,000 to 60,000). In Memphis, the first refugee family from Nepal arrived in 2008, and the community has been slowly building ever since. Over the course of this semester, I have inserted myself into the day-to-day work of Ekata Designs, a local small business selling jewelry made by refugees. This has helped me gain entree into the homes and lives of the refugees community. I have done so in order to understand the ramifications of displacement and re-settlement. Using the ethnographic method of participant observation, which allows me to foster relationships through participation in their everyday lives, I explored several cultural scenes: the single workroom which constitutes Ekata, an apartment complex that houses many Nepali refugees, as well as various markets where the jewelry is sold. I played many roles in these scenes, from jewelry model and seller, to friend and advocate. My hope is that by better understanding how Ekata designs helps at-risk populations at this small scale, I can learn how to translate this to the greater population and make the transition process smoother for future refugees.

**# 59** *TIRRC, A backyard voice for the unheard: An Ethnographic Study of the Tennessee Immigrant and Refugee Rights Coalition*
**Margo Richardson**
**Faculty Sponsor: Julia Hanebrink, Department of Anthropology & Sociology**
Ethnographic methods allow us to observe and appreciate unfamiliar cultures. Participant observation helps create an understanding of the intricacies of the organization being observed. The purpose of my ethnography on the Tennessee Immigrant and Refugee Rights Coalition (TIRRC) is to explore the many aspects of the organization, from education classes to community outreach to fighting for legislation to create equality for immigrants and refugees. My focus is on the cultural scene within the TIRRC community, specifically the Mid-South region office and staff. I observed many aspects of this organization, including community meetings, "Know Your Rights" educational meetings, and collaborations with other local non-profit organizations. Through this ethnography, I hope to illustrate the way TIRRC creates awareness and education on these important issues for immigrants and refugees, and highlight the vital role this organization plays in the Mid-South.

## Bio 141

**# 60** *Effects of Increasing Environmental Salinity on Duckweed Growth*
**Emily Lichtenberger, Maddie Russo, Rajiv Heda, Kayla Tinnon**
**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 61** *Same-Sex Interaction between Crayfish*
**Kris Baker, Brooke Bierdz, Caitlin Pettman, Annie Yungmeyer**
**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 62** *Does Leaf Distribution have an Effect on Stomata Density?*
**Morgan Bonnin, Alexus Rias, Claire Carr, Paul Schifani, Mark Armour**
**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 63** *The Effects of Size on Aggressive Behavior in Crayfish*
**Yoonkeong Chi, Phillip Curtis, Emily Jordan, Michael Gipson**
**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 64** *Effect of Female Presence on Male Aggression*
**Sehrish Khan, Alexis Smith, Amanda DellaGrotta, Drake St. John, John Gulbin**
**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 65** *The Effects of Cytokinin on the Surface Area Growth of Duckweed*
**Ladd Caballero, Olivia Hughes, Jennifer Park**
**Faculty Sponsor: Sarah Boyle, Department of Biology**

**# 66** *The Effect of Sex Ratio on Agonistic Behavior in Crayfish*
**Rebecca Cole, Sara Goldsholl, Alaina Grundy**
**Faculty Sponsor: Sarah Boyle, Department of Biology**

**# 67** *Effects of Differing Decibel Levels on Agonistic Behavior in Crayfish*
**Bailey Kramer, Regan Perrodin, Kayla Shorten, Maria Yousuf**
**Faculty Sponsor: Sarah Boyle, Department of Biology**

**# 68** *Effect of Shelter Availability on Agonistic Behavior between Same-Sex Crayfish*
**Ian John, Katie Keller, Swati Pandita, Chelsey Thompson**
**Faculty Sponsor: Sarah Boyle, Department of Biology**

**# 69** *Crayfish Substrate Color Preference*
**Liam Coyle, Luke Embury, Aaron Lynch, Emily Rife**
**Faculty Sponsor: Sarah Boyle, Department of Biology**

**# 70** *The Establishment of Male Crayfish Hierarchy through Urine Signaling*
**Nalan Callonas, Anum Khan, Mallory Morris, William Nicolson**
**Faculty Sponsor: Sarah Boyle, Department of Biology**

**# 71** *Uptake of high heavy metal (lead) concentrations by duckweed (Lemna sp.)*
**Chasity Scott, Dan Tran, Shu Yang**
**Faculty Sponsor: Michael Collins, Department of Biology**

**# 72** *How Does the Level of Serotonin Affect Fighting and Who Wins Between Male Crayfish*
**Carmen McCleland, Tasha Heller**
**Faculty Sponsor: Michael Collins, Department of Biology**

**# 73** *The Effect of Size on the Dominance Coefficient of Male Crayfish*
**Sarah Ferguson, Rejina Fahhoum, Anania Woldetensaye**
**Faculty Sponsor: Michael Collins, Department of Biology**

**# 74** *Effects of Environment on Agonistic Behavior of Female Crayfish*
**Saniya Rashid, Robbie Bohrer, Nathan Powell, Allie Johnson, Joseph Gross**
**Faculty Sponsor: Michael Collins, Department of Biology**

**# 75** *The Effects of Varying Doses of Caffeine on Crayfish Behavior*
**Sara Smith, John Selman, Adam Putnam, Zainab Atiq**
**Faculty Sponsor: Michael Collins, Department of Biology**

**# 76** *Substrate Preference of Crayfish when Placed in Mud and Charcoal Environments*
**Erica Carcelen, Elise Lowry, Rachel Nelson, Danielle Wilson**
**Faculty Sponsor: Michael Collins, Department of Biology**

**# 77** *Analyzing Agonistic Behavior and the Circadian Rhythm of Crayfish According to Time of Day*
**Isabelle Mulder, Alex Boss, John Wancowicz, Conner Tipton**
**Faculty Sponsor: Michael Collins, Department of Biology**

**# 78** *Stomata Openings at Different Light Exposures*
**Helen Carmody, Madeline Davis, Casey Means, Jessica Rogowiec**
**Faculty Sponsor: Michael Collins, Department of Biology**

**# 79** *Crayfish Aggression in the Presence of Novel and Habituated Food Sources*
**Pryce Michener, Cooper Manley, Jamie Crowley**
**Faculty Sponsor: Michael Collins, Department of Biology**

**# 80** *The Effect on Stomata Aperture of Leaves Treated with Different Concentrations of Potassium Solution*
**Garrett Minor, Omid Taghavi, Maddie Towne**
**Faculty Sponsor: Michael Collins, Department of Biology**

**# 81** *Aggressive behavior decreases in hungry crayfish regardless of the presence of limited food*
**Sylvie Sontheimer, Morgan Wilkins, Ritika Mazumder, Mary Crowell**
**Faculty Sponsor: Michael Collins, Department of Biology**

**# 82** *Male Crayfish Will Have More Confrontations in a Neutral Environment than Female Crayfish Due to Their More Antagonistic Behavior*
**Angel Mercado, Ali Ayyoub, Aquil Muhammad**
**Faculty Sponsor: Michael Collins, Department of Biology**

## POSTER SESSION II
## Multisports forum of the Bryan Campus Life Center
## 4:30-6:00pm
## Poster numbers are listed with each title.

## Natural Sciences

**# 1** *Screening a Diverse Collection of Marine Actinomycetes Produces Interesting Metabolites with Antibacterial, Antifungal, and Anticancer Activity*◙
**Autumn Demonbreun, My Tran, Robin Lee, Fatima Rivas, Richard Lee, Department of Chemical Biology and Therapeutics, St. Jude Children's Research Hospital**
**Faculty Sponsor: Terry Hill, Department of Biology**
Patients treated for cancer at St. Jude are often immunosuppressed during treatment and are prone to bacterial and fungal infections that may become life threatening. Most of the current drugs that are used to treat these infections were developed from natural products produced from soil actinomycetes for which resistance has emerged. It is hypothesized that novel compounds to treat infections can come from untapped marine actinomycetes. The goal of this project is to perform a pilot study to evaluate the quality of the Nereus marine actinomycete library and to generate a library of extracts to be used for antimicrobial and anticancer screens. Forty-five marine actinomycetes were cross-streaked against a panel of prominent hospital acquired pathogens. Based on antimicrobial activity, four marine organisms were selected for extraction and fractionation. Microbroth assays confirmed activity was retained and cytotoxicity was tested against two leukemia cell lines and HepG2 cells. We found that these four species of marine actinomycetes produced fractions with distinct activity against Leukemia cells, Candida albicans, and Acinetobacter baumannii. The marine organism Streptomyces sp. 40002 is of most interest to our lab because it has good activity against C. albicans and lacks cytotoxicity. Structural determination of the active compound is underway.

**# 2** *Investigating the Roles of N-glycosylation in Drosophila Smoothened*
**Ashley Truong, Suresh Marada, Stacey K. Ogden, Department of Biochemistry, St. Jude Children's Research Hospital**
**Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry**
The Hedgehog (Hh) signaling pathway plays an important role in various aspects of invertebrate and vertebrate development and adult tissue homeostasis. In humans, alteration of pathway activity results in disorders ranging from birth defects to cancers including basal cell carcinoma and medulloblastoma. Because the Hh pathway is

conserved from Drosophila melanogaster to human, Drosophila serves as a useful model system to interrogate mechanisms of Hh signal transduction. Using the D. melanogaster model system, we analyzed N-linked glycosylation of Smoothened (Smo), a G-protein coupled receptor (GPCR) that functions as the signal transducer of the Hh pathway. Several predicted N-glycosylation sites exist in Smo, and preliminary studies have shown that Smo is highly glycosylated on these sites. In this study, we tested the hypothesis that mutation of a glycosylation acceptor site from Asparagine (N) to Glutamine (Q) individually and/or in combination would have an effect on Smoothened activity and trafficking. We tested activity of mutants with a single N-Q change and focused on sites that we predicted to play important roles in Smo. Implementing various biochemical and cell biological techniques, we show that NQ mutants have significant effects on Smo N-glycosylation and Hh pathway activation.

**# 3** *Inhibition of Human Carboxylesterases by β-lapachone Derivatives*◙

**Julianna Chen, M. Jason Hatfield, Philip M. Potter, Department of Chemical Biology and Therapeutics, John C. Bollinger, Department of Structural Biology, St. Jude Children's Research Hospital**
**Faculty Sponsor: Mauricio Cafiero, Department of Chemistry**

Human carboxylesterases (CE) metabolize numerous clinically used drugs including Tamiflu, Lunesta, Ritalin and the anti-cancer agent CPT-11 (irinotecan). Hence, the distribution and levels of these enzymes may have a significant impact on the efficacy of these agents. Additionally, inhibitors of these proteins may have utility in modulating drug toxicity. Using screening approaches, we have identified a panel of CE inhibitors based upon an ethane-1,2-dione scaffold. These compounds are potent and can modulate drug metabolism in vitro. One ethane-1,2-dione analogue, β-lapachone, isolated from lapacho tree, is a potent inhibitor of human CEs. Therefore, two series of β-lapachone derivatives were synthesized using either aniline or phenol as reactants, and their inhibitory activity was assessed in biochemical studies. Our results indicate that the Ki values for the phenol analogues are lower than the former, indicating that these represent better enzyme inhibitors. Furthermore, the crystal structures of selected analogues have been determined, and these results may inform the development of future CE inhibitors. Finally, the selectivity of these compounds towards the different human CE isoforms is under assessment. Overall, results from these studies will allow the design of novel compounds that can be used to modulate drug toxicity.

**# 4** *Scoliosis And Other Long-Term Complications Of Radiation Therapy In Pediatric Cancer Patients With Chest Wall Sarcomas*◙

**Rajiv Heda, Meghan E. Brown, Matthew J. Krasin, Department of Radiological Sciences, St. Jude Children's Research Hospital, Memphis, TN**
**Faculty Sponsor: Terry Hill, Department of Biology**

Pediatric cancer patients who are treated with radiation therapy are at risk for long-term complications. Patients with chest wall sarcomas who received radiation therapy to the chest are at risk for specific long term effects on organs including bone, lung, thyroid and heart. It is hypothesized that radiation dose is related with specific late effects including scoliosis and pneumonitis. 20 pediatric patients with chest-wall sarcomas (IRB approved SJ trial) were analyzed to correlate organ radiation dose, clinical factors and the risk of subsequent late effects (scoliosis, pneumonitis, hypothyroidism). Dose to the spine, lung, thyroid and heart was calculated from the radiation treatment plan. Follow-up evaluations included clinical examinations, imaging (MRI, CT, X-Rays), and laboratory studies. The range of scoliosis identified on follow-up imaging ranged from 0 to 64 degrees (median 11.8 degrees). No correlation was identified between radiation dose to the spine or tumor size and degree of scoliosis. Degree of surgery and tumor distance from the spine did not correlate with scoliosis. Radiation pneumonitis was not correlated with mean dose or volume of lung receiving 24Gy. Other late effects will be evaluated. CONCLUSIONS: Neither scoliosis or pneumonitis were correlated with radiation dose.

**# 5** *Expression, Refolding, and Purification of Bone Morphogenic Protein 4 (BMP4) for Potential Use as an Anticancer Agent*◙

**Emily Hayward, Krystal Herline, Cristina Guibao, Jie Zheng, Department of Structural Biology, St. Jude Children's Research Hospital**
**Faculty Sponsor: David Kabelik, Department of Biology**

Transforming growth-factor-β (TGF-β) is a family of proteins that utilizes signal transduction pathways to regulate development. Aberrant TGF- β signaling plays a role in heart disease, diabetes, asthma, and cancer. One TGF-β family member is the signaling molecule bone morphogenic protein 4 (BMP4). In a 2013 study, BMP4 was administered to mice with glioblastoma multiforme (GBM), an aggressive cancer with a high rate of relapse. After BMP4 treatment, 100 percent of the mice survived and the tumor did not recur in any of the mice, suggesting that BMP4 may have powerful roles as an anticancer therapeutic. My project aims to express BMP4 in Escherichia coli

(E. coli) to obtain a very active, pure form of the protein. Previously, our lab had developed methods for overexpressing BMP4 in E. coli. This study is currently utilizing multiple methods in an attempt to purify BMP4 into a stable and active form. One potential way to purify BMP4 integrates a previous study that successfully purified Drosophila Decapentaplegic protein (DPP), a BMP4 homolog. Other methods of purification are also being investigated in this study to obtain an active, stable form of BMP4 that can be further investigated as an anticancer agent.

**# 6** *Radiotracer Synthesis Modules for PET imaging*◙

**Lars Monia, Victor Amador, Radiological Sciences, St. Jude Children's Research Hospital**
**Faculty Sponsor: Ann Viano, Department of Physics**

Positron emission tomography (PET) is a medical imaging technique used to diagnose and monitor a broad range of diseases by measuring the gamma radiation emission of a trace radioactive molecule (radiotracer) injected into the patient's body. The radiotracer is prepared using specialized automated synthesis modules and short half-life radioisotopes produced in a cyclotron. The synthesis modules have to be placed in shielded fume hoods, called hot cells, and operated remotely to ensure the radiation safety of the workers. Modules are equipped with control software and intuitive graphic user interface to allow radiochemists to consistently manipulate microliter to milliliter amounts of reagents using highly specific sets of valves, pumps, heaters and sensors. Some tracers require an additional purification step via high-performance liquid chromatography (HPLC) to separate the fraction of interest from unwanted by-products of the reaction. However, most of the commercial HPLC instruments were not designed to meet the diverse set of restrictions of PET and those that do have restrictive prices or are embedded in synthesis modules. Our goal is to optimize the existing HPLC and synthesis modules for ease of use, maintenance and to better meet the high-performance demands of PET chemistry. Modifications range from redesigning the enclosure, upgrading outdated hardware to a total rework of wire harnesses and ultimately replacing their PLC-based controls with more flexible embedded controllers.

**# 7** *Comparison of Three Fitting Models for MRI-R2* Quantification in Transfusional Iron Overload*◙

**Xiao Bian, Axel J. Krafft, Ralf B. Loeffler, Claudia M. Hillenbrand, Department of Radiological Sciences, St. Jude Children's Research Hospital**
**Faculty Sponsor: Ann Viano, Department of Physics**

Patients with multiple blood transfusions will store excess iron in the liver and other organs which may become life-threatening if untreated. R2*-MRI is a non-invasive imaging method to monitor hepatic iron content (HIC). Here, the exponential decay of the MR signal is fitted which is significantly shortened in the presence of iron. Various R2* fitting approaches have been presented. However, a thorough comparison of the commonly applied R2*-data fitting models remains to be investigated. Hence, this study focuses on comparing three data-fitting models: (a) monoexponential decay with baseline subtraction model, (b) squared signal model, and (c) constant offset model. R2*-MRI data of 43 patients with both 1.5T and 3T MR examinations and liver biopsy were analyzed with these algorithms. HIC values calculated for each model were compared to each other and to corresponding biopsy results. We found that the offset model systematically generates the highest R2* values and that the baseline subtraction model yields the lowest R2* results. As the individual fitting models result in systematically different R2* results, correct LIC assessment is only assured as long as the clinically employed fitting technique matches the fitting approach used to generate the R2*-LIC calibration.

**# 8** *The Role of Conserved Domains in Acute Megakaryoblastic Leukemia Associated CBFA2T3-GLIS2 Fusion Protein*◙

**Taylor Wilson, Sharnise Mitchell, Cary Koss, Tanja Gruber, Department of Oncology, St. Jude Children's Research Hospital**
**Faculty Sponsor: Laura Luque de Johnson, Department of Biology**

Acute megakaryoblastic leukemia (AMKL) accounts for 10% of pediatric acute myeloid leukemia (AML) cases. AMKL is classified into two subgroups: AMKL found in patients with Down syndrome (DS-AMKL) and AMKL in non-Down syndrome patients (non-DS-AMKL). Patients diagnosed with DS-AMKL have a good prognosis, approximately 80% of patients being cured with current chemotherapy. Unfortunately, the prognosis for non-DS-AMKL patients is worse with only 14%-34% survival. We sequenced the transcriptome of 14 cases of non-DS-AMKL and identified a chimeric gene in 7 cases, comprising 27% of non-DS-AMKL patients. This chimeric gene results from an inversion event on chromosome 16 (inv(16)(p13.3q24.3)) that causes the fusion of two transcription factors, CBFA2T3 and GLIS2. Previous work has shown that the fusion protein increases self-renewal of hematopoietic progenitor cells. We generated several variants of the fusion that target conserved regions of both

CBFA2T3 and GLIS2. We will, then, use colony-forming assays (CFU) to assess the self-renewal of cells harboring CBFA2T3-GLIS2 variants. We hypothesize that cells containing the fusion variants will show decreased numbers upon re-plating as compared to cells harboring the un-mutagenized CBFA2T3-GLIS2. These experiments will identify the critical components within the fusion that are important for self-renewal and identify regions that can be targeted therapeutically.

**# 9** *Loss of ATM Cooperates with Kras to Promote Widely Metastatic Pancreatic Ductal Adenocarcinoma*◙
**Kathryn Roys, Yiannis Drosos, Beatriz Sosa-Pineda, Department of Genetics, St. Jude Children's Research Hospital**
**Faculty Sponsor: Mary Miller, Department of Biology**
Pancreatic Ductal Adenocarcinoma (PDAC) comprises more than 90% of total pancreatic cancer cases in America and is one of the most lethal cancers with a less than 5% five-year survival rate. PDAC arises in a linear histological progression through a series of pancreatic intraepithelial neoplasias (PanINs) with the oncogenic KRASG12D as the activating mutation. We have studied the role of ataxia-telangiectasia mutated protein (ATM), a kinase primarily activated as part of a DNA damage response (DDR), in PDAC initiation and progression. Using immunohistochemistry on murine models, we detected ATM and DDR activation in the early stages of pancreata expressing oncogenic KrasG12D. Moreover, both hetero and homozygous deletions of ATM alone yielded a healthy phenotype, but when paired with KrasG12D activation, ATM deletions accelerated PanIN formation and progression. Furthermore, mice with ATM deficiency and KrasG12D mutations developed highly metastatic PDAC at a young age. Western immunoblot analysis showed that in human PDAC cell lines, ATM and most of its downstream targets were present, suggesting that these cell lines do not represent familial PDAC that contain ATM mutations. We are currently using our novel mouse model to understand how ATM loss accelerates tumor formation and metastasis in this form of familial PDAC.

**# 10** *Role of the Sclerotomal Genes Shisa2 and pdgfrl in Hematopoietic Stem Cell Specification*◙
**Sarah Shore, Wilson K. Clements, Department of Hematology, St. Jude Children's Research Hospital**
**Faculty Sponsor: David Kabelik, Department of Biology**
Hematopoietic stem cells (HSCs) are self-renewing progenitor cells that produce all blood and immune cells during life, and are the clinically relevant component of bone marrow transplants. A better understanding of how HSCs are specified during development might inform attempts to produce HSCs in vitro, a key medical goal that is not currently possible. HSCs first arise from endothelial cells in the dorsal aorta of vertebrates. Our previous research showed that a secreted signaling molecule, Wnt16, is required for HSC specification. Wnt16 does not act directly on HSC precursors, but rather through a complex series of poorly understood relay signals. Wnt16 knockdown animals also have defects in the sclerotome compartment of the somite—which produces vascular smooth muscle cells that surround the dorsal aorta—suggesting that sclerotome genes might direct formation of the HSC specification niche or act as specification signals. We cloned two candidate sclerotome genes, shisa2, which encodes a putative antagonist of Wnt and Fgf signaling, and pdgfrl, which encodes a secreted homologue of the growth factor receptor Pdgfr, and confirmed expression by whole mount in situ hybridization. In gain-of-function analyses, shisa2 over-expression produced no phenotype, but pdgfrl overexpression yielded embryos with decreased head size and tail malformations, suggesting an ability to interact with signaling pathways that regulate head specification and convergence/extension, including the Wnt pathway. Interestingly a previous protein-interaction screen indicated that Pdgfrl physically interacts with the atypical Wnt receptor Musk. In the future, we will biochemically confirm Pdgfrl/Musk interaction during embryonic development, and examine the effects of pdgfrl knockdown on somite patterning and HSC specification. These studies will help to define the molecular factors that pattern the HSC specification niche.

**# 11** *Serendipity Leads to Novel Insights into Rules for Glycosylating Proteins*◙
**Fei-Lin Scruggs, Melissa Mann, Matthias Feige, Walid Awad, Linda Hendershot, Department of Tumor Cell Biology, St. Jude Children's Research Hospital**
**Faculty Sponsor: Mary Miller, Department of Biology**
The intercellular communication that is essential to multi-cellular life is dependent on cell surface and secreted proteins. In many cases this requires the glycans (sugars) that are attached to asparagine residues (N-linked) within an N-X-S/T sequence on the proteins as they enter the endoplasmic reticulum. The structure of these glycans also forms the basis of receptors for entry of pathogens, and consequently recognitions sites for attachment and the cellular machinery responsible are very well studied, which has led to some "rules" on the process. However, a chance discovery with an unusual substrate allowed us to obtain insights into the rules and exceptions for N-linked

glycosylation. We found that a protein we were studying, which had no serines or threonines (S/T), was glycosylated. This did not happened as it entered the ER (co-translationally) but instead occurred post-translationally, both of which are against the rules. This study focused on identifying the abnormal glycosylation site. We found the sugar moiety was added at an NEC sequence, which is less than the "required" 60 amino acids from the C-terminus. Research continues to identify structural features of the substrate that allow this to happen and the cellular machinery that participates in this abnormal glycosylation.

**# 12** *The Effect of Distractions on Chemotherapy Prescribing: Identifying and Reducing Errors in an Oncology Health Care Setting*◙

**Sarah Laves, Jonathan Burlison, Rebecca Quillivan, James Hoffman, Department of Patient Safety, St. Jude Children's Research Hospital**

**Faculty Sponsor: Laura Luque de Johnson, Department of Biology**

Purpose In an effort to reduce medication errors, contributing factors from the work environment have been explored, where interruptions and distractions have been highlighted. The purpose of this research was to identify and reduce distractions in a clinical workspace to reduce medication prescribing errors. Methods The Solid Tumor Clinic at St. Jude Children's Research Hospital, was the setting. An initial observation compiled a checklist of environmental distractions, and three subsequent hour-long observations were conducted. Additionally, a survey was created to identify the effects of distractions by type (i.e., self-generated, originating from people, and originating from non-human sources). To assess prescribing errors, 58 medication orders from the Solid Tumor Clinic that were modified, cancelled, or discontinued within 120 minutes of original submission were reviewed by two clinical pharmacists. Results On average, 287 distractions were observed per hour, and most prevalent were conversations, foot traffic, and doors. Survey results indicated 37% of respondents were "frequently" or "always" affected by distractions originating from people. 25 reviewed orders were errors and 13 would have caused harm had they reached the patient. Future Direction Multiple interventions, some of which have been successful in other studies are in the planning stages of implementation.

**# 13** *Phosphorylation state of erythrocyte protein Band 3 after binding of Plasmodium falciparum protein EBA-175 to Glycophorin A.*

**Roshan Rao, Tyler Harvey**

**Faculty Sponsor: Laura Luque de Johnson, Department of Biology**

Plasmodium falciparum, a protozoan parasite, causes 90% of malaria-related deaths in the world. Pathogenesis is caused by its invasion and replication in human red blood cells (RBC). Its primary invasion pathway involves the binding of the parasitic protein EBA-175 to the Glycophorin-A (GPA) protein of RBCs. Little is known about the molecular mechanisms that take place after EBA-175 binds to GPA. Our hypothesis is that a cytoskeletal rearrangement inside RBCs is triggered by EBA-175/ GPA binding. Cytoskeletal proteins of infected RBCs are known to have altered phosphorylation states. The aim of this study is to determine whether the phosphorylation state of the cytoskeleton protein Band-3 is altered by the binding of EBA-175 to GPA. To test this, a recombinant His-tagged ectodomain of EBA-175 (EBA-175 RII) was expressed and purified. The EBA-175 RII will be incubated with human RBCs and the phosphorylation state of Band-3 will be examined via western blot using anti-phosphotyrosine antibodies. These findings could lead to a better understanding of Plasmodium invasion of RBCs and identification of new drug targets for malaria control.

**# 14** *Morphological Characterization of Hemoparasites from Small Mammals Living in Forest Fragments in Paraguay*

**Aubrey Howard, Monali Lipman, Alisha Patel, Rhodes College; Noé de la Sancha, Department of Biological Sciences, Chicago State University; Pastor Pérez-Estigarribia, Zoologia, Universidad de Concepción, Chile**

**Faculty Sponsor: Sarah Boyle, Department of Biology and Laura Luque de Johnson, Department of Biology**

The effects of deforestation on biodiversity are poorly understood and can have dire health implications (e.g., stress, disease, and immunosuppression) on species that rely on forested habitats. Currently, intense deforestation is occurring in Paraguay's Interior Atlantic Forest, a region once rich in plant and animal diversity. In this study, we are examining the effects of deforestation and fragmentation on the health of small mammalian populations found within this region. During summer 2013, six forest fragments were sampled and blood samples were collected retro-orbitally or from the hearts of terrestrial and arboreal rodents and marsupials. In total, 134 samples were collected as blood smears. So far, 26 of the blood smears have been stained using a Giemsa staining protocol with 17 slides showing infections under standard light microscopy. The pathogens found have been morphologically classified as members of the Apicomplexa, Helminth, and Protobacteria phyla. Only three of the infected slides indicated co-

infections. The data from these blood smears will be used to answer questions about the impact of deforestation on mammalian health. By understanding the impact of fragmentation and deforestation, we hope to provide information that will help preserve the biodiversity of this region and assist with conservation management plans.

**# 15** *Trends in big cat behavior and exhibit usage in association with husbandry schedules*
**Stephen Leavelle**
**Faculty Sponsor: Sarah Boyle, Department of Biology**
Stereotypic behavior is a set of undirected, repetitive behavioral patterns that is exclusively associated with animals in captivity. The most common form of stereotypic behavior in captive carnivores is pacing, and occurrence of pacing has been observed to increase in conjunction with feeding times. Big cats at the Memphis Zoo are kept on exhibit until shortly before the grounds close, at which time they are allowed access to their housing facilities and receive food (hereafter referred to as end-of-lockout [EOL]). On differing days of the week I observed the lions, pumas, cheetahs, Sumatran tigers, and Bengal tigers during the two hours prior to EOL. I recorded the behavior and location of each visible cat at two-minute intervals. Trends in behavior and exhibit usage were constructed as correlations to the time approaching EOL. The results of this study will inform better management and enrichment practices for big cats.

**# 16** *Eau de Tigres: Effects of specialized scent enrichment on tiger behavior and physiology and visitor perception*
**Stephen Leavelle, Corinne Pisacane, Dr. Lance Miller, San Diego Zoo Global**
**Faculty Sponsor: Sarah Boyle, Department of Biology**
For animals in zoos one method of enhancing welfare is through environmental enrichment. Carnivores have a heightened sense of smell, but the effects of scent enrichment on carnivores in zoos have been tested in limited fashion. This study monitored the effects of a new species-specific scent developed by San Diego Zoo Global on six Sumatran tigers located at the San Diego Zoo Safari Park. Behavioral data were collected for three weeks without the scent enrichment and then for three weeks with the scent applied daily to the enclosure at randomized locations. Tiger fecal samples were also collected from each tiger for analysis of glucocorticoid levels. Between the control period and the experimental period, there were significant increases in the diversity of observed behaviors, the occurrence of exploratory behaviors, and the amount of exhibit area utilized by the tigers. However, the difference in glucocorticoid concentrations between conditions was not significant. Further experimentation is required to demonstrate whether this type of scent enrichment has similar effects over longer periods of time and whether it is effective when applied to tiger enclosures at other facilities. Similar scent enrichments might also be valuable tools for increasing behavioral diversity in other species.

**# 17** *Parks and Demography in Dallas County, Texas*
**Karen Hess**
**Faculty Sponsor: Sarah Boyle, Department of Biology**
Dallas County, one of the fastest growing urban areas in the United States, is known for its large business district and booming economy. However, there is less known about the parks in Dallas. Parks and open green areas are important to the ecological sustainability of a city as well as its aesthetic appeal. In order to qualify the importance of parks to Dallas County and its citizens, I mapped park locations using ArcGIS along with the population of Dallas in order to discover whether parks are located in areas that are more or less accessible to city-dwellers. Next, I mapped the park locations with the income levels in the surrounding communities to discover whether the parks cater to one social class over another. Finally, I compared the parks' locations and sizes today with the locations and sizes of parks in Dallas in the 1980s, while the city was growing even more rapidly than today, in order to determine whether or not Dallas is able to adapt to change effectively. With all of this mapped information, the success of the Dallas park system in serving the people of Dallas can be evaluated through time based on demographic features.

**# 18** *Riverside Blues: The Impact of Urban Sprawl on Shelby County's Waterways*
**Roberta Moore**
**Faculty Sponsor: Sarah Boyle, Department of Biology**
Urbanization leads to an increase in impervious surfaces, which prevents water from filtering into the ground. Instead, runoff accumulates in sewer systems, streams, and rivers, facilitating erosion and allowing for concentrated levels of pollutants to accumulate in urban waterways. The City of Memphis and Shelby County, TN. experienced great economic growth from 1990 to the present, and the city and county expanded to accommodate that growth. This study examines the impact this sprawling urban expansion has had on the quality of Shelby County's waterways. Using geographic information systems (GIS), I analyzed urban sprawl through the measurement of

changes in population density, average family income, and land use in Shelby County. I then compared the pattern of sprawl to changes in the concentration of pollutants, temperature, and pH in Shelby County's waterways to determine how these variables have responded to sprawl. Sprawling urban growth in Memphis and Shelby County correspond with the recent categorization of waterways outside of the Memphis city center as impaired by the EPA and with slight increases in water temperature and pH in most all of the county's waterways. Understanding the negative impacts of urban sprawl on waterways can lead toward improved municipal care of riparian corridors.

**# 19** *The effects of triclosan on microbial communities in Tennessee's Wolf River Watershed*
**Roberta Moore, Patricia Pyda**
**Faculty Sponsor: Mary Doherty, Department of Biology**
The Wolf River Watershed in Tennessee is used for industrial, recreational, and wildlife management purposes. However, less than thirty percent of the watershed is known to support these uses. The watershed resides in a predominantly urban environment and thus receives uncontrolled amounts of chemical run-off, which impacts the watershed's ability to sustain its natural and anthropogenic uses. Recent studies have shown that elevated concentrations of triclosan, a synthetic antimicrobial agent, discharged in urban waterways are correlated with the greater occurrence of antibiotic-resistant bacteria. The presence of antibiotic-resistant bacteria reduces aquatic diversity by decreasing algal populations, which disrupts the community food web. This study tested the impacts of triclosan on the Wolf River Watershed by collecting sediment and water samples from seven different sites situated along the river to determine microbial community composition and measure for the presence of triclosan as well as microbial adaptation to triclosan. These sites ranged from three urban areas, two suburban areas, and two rural areas. We predict microbial communities located in highly developed environments will be more homogenous and resistant to triclosan. Our research expands the study of the effect of triclosan on microbial communities in urban watersheds.

**# 20** *IDEOS: Fitting Infrared Spectra from Dusty Galaxies*
**Vincent Viola**
**Faculty Sponsor: David Rupke, Department of Physics**
We fit models to heavily obscured infrared spectra taken by the Spitzer Space Telescope and prepare them for cataloguing in the Infrared Database of Extragalactic Observables from Spitzer (IDEOS). When completed, IDEOS will contain homogeneously measured mid-infrared spectroscopic observables of more than 4200 galaxies beyond the Local Group. The software we use, QUESTFit, models the spectra using up to three extinct blackbodies (including silicate, water ice, and hydrocarbon absorption) and PAH templates. We present results from a sample of approximately 200 heavily obscured spectra that will be present in IDEOS.

**# 21** *GC-MS Analysis of Lipids Excavated From Michaels Shelter, Sewanee, TN*
**Madison Fuller**
**Faculty Sponsor: Jon Russ, Department of Chemistry**
Soil lipid analysis plays an important role in understanding the archaeological record at many sites. Certain areas are rich in organic matter that allow for chemical analysis to discover properties of the organics. Specific cases in archaeological sites the nature of the organic material can be used to determine the types of human activities were performed, including the types of food that was processed within a site. In our study, soil samples from the Michaels Shelter archaeological site located in Sewanee, TN were analyzed for fatty acid content. According to the archaeological record, a high abundance of hickory nut shells were found near the site, and archaeologists hypothesized that the nuts were processed within the shelter. We extracted lipids from the soils and converted the fatty acids into fatty acid methyl esters for analysis using gas chromatography–mass spectrometry (GC-MS). Trace amounts of certain fatty acid methyl esters were present in the extracts, specifically linoleic acid and oleic acid, which are the most abundant fatty acids in hickory nuts. Thus, it is likely that the site was used to process the nuts.

**# 22** *Social support, but not neutral non-support, attenuates both stress and pain following a cold pain task: Evidence for the implementation of social support alongside medical treatment regimens*◙
**Matthew Roberts, Rebecca Klatzkin, Liz Bigus, Allison Julien, LauraLee Madigan, Kathyrn Cyrus, Sierra Gaffney**
**Faculty Sponsor: Rebecca Klatzkin, Department of Psychology**
Due to methodological limitations in previous research assessing the anti-nociceptive and anxiolytic effects of social support, the present study examined the role of social support in the modulation of stress and pain in response to a cold pressor task (CPT). Female participants underwent the CPT alone (n=25), or with a confederate in the room

providing either no support (n=25) or verbal emotional support (n=26). Every 20 seconds during the CPT, participants rated their pain levels on a visual analog scale (VAS). After the task, participants also rated the intensity and the unpleasantness of their pain. Cardiovascular measures of heart rate (HR) and blood pressure (BP) were assessed both at baseline and following the CPT. Supported participants had attenuated delta (stress-baseline) systolic BP, $p<.001$, delta HR, $p<.001$, and reported less overall pain, $p<.001$, intensity, $p<.001$, and unpleasantness, $p<0.001$, compared to both control conditions. This study is the first to demonstrate that social support, not simply the presence of another person, attenuates both pain and cardiovascular stress in response to a laboratory pain task. Given the negative effects of stress on health and treatment outcome, these findings bear significant clinical implications for the incorporation of active social support alongside medical treatment regimens.

**# 23** *Are the effects of chronic life stress on acute laboratory stress dependent upon cortisol reactivity and emotional and restrained eating?*
**Katie DuBose, Kirby Rogers, Mary Ellison Sewell, Taylor LaPorte**
**Faculty Sponsor: Rebecca Klatzkin, Department of Psychology**
Obesity is an increasingly large problem in our nation today, and there are many contributing factors. The present study attempts to understand and combat this pressing issue. Our stress system is controlled in part by the hypothalamic-pituitary-adrenal (HPA) axis. When an acute stressor is presented, the HPA axis is activated and releases cortisol. This usually creates increase in appetite, which helps us understand the link between stress and eating. Based on previous findings in animals, there is current speculation on the existence of a chronic stress response network in humans. Studies have shown that regularly eating comfort foods, producing abdominal fat, lowers the acute stress response in chronically stressed animals and humans. Thus, we hypothesize that college females who have chronic stress will have greater body mass index (BMI), hunger, desire to eat, and blunted physiological stress responses following an acute stressor than those with low chronic stress. Our study is also seeking to shed light on the connection between this chronic stress response network and restrained eating. Under high emotional states, such as stress, people who show cognitive restraint towards food intake are more likely to eventually engage in overconsumption. Consequently, our second hypothesis is that effect of chronic stress on BMI, hunger, desire to eat, and physiological responses to acute stress will depend on restrained eating. With the findings of this study, we hope to create a better understanding of stress induced eating and how it contributes to the present obesity epidemic.

**# 24** *Design, Synthesis, and stability studies of LpxC natural substrate analogues in Gram-negative bacteria*
**Christopher Grubb, Sarah N. Malkowski, Larryn W. Peterson**
**Faculty Sponsor: Larryn Peterson, Department of Chemistry**
Finding new methods of treating Gram-negative bacterial infections is becoming increasingly important. It has been shown that lipid A, found in the outer membrane of Gram-negative bacteria, is important for bacterial virulence. This makes LpxC, the enzyme that catalyzes the first determined step in the biosynthetic pathway leading to lipid A, attractive for study. In this work, analogues of the natural substrate of LpxC have been synthesized in order to further investigate the active site and identify important interactions for inhibition. The analogues were designed to mimic the natural substrate by featuring a zinc binding moiety and a nucleoside connected by various linkers. The design, synthesis, and stability studies of these molecules will be discussed.

**# 25** *Walking in place using the Microsoft Kinect to explore a large VE*◙
**Preston Tunnell Wilson, Betsy Williams, Department of Computer Science; Kevin Nguyen, Pomona College; Kyle Dempsey, Department of Psychology, Mississippi College for Women**
**Faculty Sponsor: Betsy Sanders, Department of Mathematics and Computer Science**
One way to permit free exploration of any size virtual environment and provide some of the inertial cues of walking is to have the users "walk in place" (WIP). With WIP, each step is treated as a translation of a distance even though the participant remains in the same location. In our prior work, we had success in implementing a WIP method using an inexpensive Nintendo Wii Balance Board, and we showed that participants' spatial orientation was the same as normal walking and superior to joystick navigation. There were two major drawbacks of our previous WIP algorithm. First, our step detection algorithm had a half-step lag. Second, it was slightly annoying for participants to walk in place on the small board. Thus, the current work seeks to use overcome these limitations by presenting an algorithm to WIP using two Microsoft Kinect sensors. In this current work, we are interested in seeing how well users can explore a large VE by WIP with the Kinect (WIP-K). Since comparing these results to normal physical walking is not possible, we directly compare WIP-K to joystick navigation. Thus, this within–subject experiment compares subjects' spatial orientation as they navigate a VE.

**# 26** *Are the Effects of Chronic Life Stress on Acute Laboratory Stress Dependent upon Cortisol Reactivity?*
**Bhavna Kansal, Sarah Koehler, Lindsey Evans, Premiese Cunningham**
**Faculty Sponsor: Rebecca Klatzkin, Department of Psychology**
As the epidemic continues to grow globally, recent research has investigated the underlying mechanisms of obesity through studying the stress response system, regulated in part by the hypothalamic-pituitary-adrenal (HPA) axis. The HPA axis becomes activated in response to stress and releases cortisol, a hormone known to increase appetite. This helps to explain the phenomenon of stress-induced eating. There is evidence to suggest that this post-stress food consumption, which results in increased abdominal fat, may lead to a blunted response to acute stress in individuals with high levels of chronic life stress. Women who have high chronic stress have been shown to have greater body mass index (BMI), greater hunger, and increased desire to eat, as well as a blunted physiological stress response to an acute stressor than those with low chronic stress. In addition to attempting to replicate these findings, we also predict that the relationship between chronic stress and these variables will depend on cortisol reactivity to acute laboratory stress. We recruited 40 college women for this study and induced acute stress with a reliable mental stress task, collecting cortisol samples, blood pressure, and heart rate before and after the stressor. This study will emphasize the importance of exploring how the relationship between stress and hunger contribute to the present obesity epidemic.

**#26B** *Enzymatic Resolution of Amino Acids and Synthesis of Peptide Analogues from Scorpion Venom with Potential Antibiotic Activity*
**Adam Petraglia**
**Faculty Sponsor: Roberto de la Salud Bea, Department of Chemistry**
Venoms are complex mixtures of natural active compounds. Because of this activity, some components have been used as starting points for the design of new drugs for the treatment of diseases that have developed increasing resistance to traditional medicines.
In past experiments our group has synthesized a series of short (13 amino acids) analogues of four peptides found in the venom of two scorpions: Opithancatus madagascariensis (IsCT) and Buthus martensei Karsh (KmK). These natural peptides have antibiotic activity but, unfortunately, they also have highly undesired cytotoxicity to eukaryotic cells.
We are interested in the synthesis and activity of analogues of these venom peptides with unnatural amino acids. Because of the natural chirality of the peptides and the amino acids that form their primary structure it is necessary to obtain pure enantiomers (in our case, the L-enantiomer) of these non-natural residues. However, many syntheses form racemic mixtures of amino acids creating the necessity of separating both enantiomers before their introduction in the peptide sequence. In our group we have used different techniques for this separation. The most promising method is currently the enzymatic resolution after acetylation using swine acetylase. After finding the most effective procedure, we will continue to synthesize and separate racemates of the desired unnatural L-amino acids. Once these enantiomers are pure, they will be used for the synthesis of the desired peptides.

## Social Sciences

**# 27** *"I Still Wonder Why She's Mad": Children's Narrative Accounts of Anger*◙
**Bhavna Kansal, Elizabeth Giraud, Eliza Hendrix**
**Faculty Sponsor: Marsh Walton, Department of Psychology**
The process by which children come to share with others a way of talking about emotional experience is largely based on story-sharing traditions. As children come into middle childhood, they are called upon to provide narrative accounts for their own behavior, and to make explanations for the behavior of others that will make sense in their cultural communities. In this study, we conducted an exploratory and descriptive analysis of children's narrative accounts of anger, asking how and when children explain their own and others' anger and under what circumstances they use anger to explain their own and other's behavior. Using NVivo qualitative data analysis software, we examined 2,834 narratives from 7 corpora collected from elementary school children. Two independent coders identified stories in which the author explicitly or implicitly spoke about anger, or reported anger with no explanation. Our extensive findings invite the interpretation that socio-emotional maturity increases the likelihood that children will recognize a need to explain negative emotions and will have the narrative skills to include such explanations. Further qualitative exploration of our data will seek clues about cultural expectations that might

enhance the tendency of our less advantaged children or depress the tendency of our more advantaged children to accompany reports of anger with explanations.

**# 28** *"All she does is talk behind my back": Reports of Speech in Narratives by Elementary School Children*
**Talia Flantzman, Anna Stratton-Brook**
**Faculty Sponsor: Marsha Walton, Department of Psychology**
The goal of this study was to examine the ways that children report on their own and others speech in their personal narratives. We worked with a corpus of 374 narratives written by 362 3rd to 6th grade children attending a university-affiliated school. The children wrote personal narratives about a conflict they have had with a classmate and when a friend did not act like a friend. Using NVivo qualitative analysis software we identified every instance in the children's stories in which they used direct quotations (I said please give it back), indirect quotations (I told him I didn't want to play with him), mixed quotations (After school she told me why am I getting an attitude), or reports of speech acts (We talked over things and both apologized). We coded each instance of speech according to who the reported speaker was; self, child other, adult other, generalized other, self and other, and multiple child others. Preliminary findings indicate that older children used more direct and mixed quotation than did younger children. Ongoing investigations will look for differences in the way children report own versus others' speech, and for differences in the way they report adult versus child speech.

**# 29** *"She got even madder and started throwing things at us, so we threw back": A Qualitative Narrative Analysis of Children's Understandings of the Causes of Anger*
**Chigozie Emelue, Allison Miller**
**Faculty Sponsor: Marsha Walton, Department of Psychology**
Our work extends a 2013 study by Hendrix and Giraud of children's explicit and implicit expressions of anger. We focused on what kinds of events provoked children to talk about the causes and presence of anger. We worked with a corpus of 521 narratives collected in the Hendrix and Giraud study from youth in grades 4-6. Using Nvivo qualitative analysis software, we identified and coded children's narratives for whether they reported that physical, instrumental, relational, or psychological aggression was the cause of anger. Preliminary analyses showed that girls describing conflicts between girls were more likely to attribute anger to psychological aggression than to other forms of aggression. By comparison, boys, when talking about conflict between boys, were more likely to attribute anger to physical aggression than to other forms of aggression. Ongoing investigation will focus on what children say when they talk about the effects of anger.

**# 30** *"She was sorry and I said I'm sorry to and we shook hands and said let's be friends again": An Investigation of Apologies In Middle Childhood Narratives about Conflict*
**Elizabeth Collins, Allie Mayo**
**Faculty Sponsor: Marsha Walton, Department of Psychology**
The increased importance of peer interactions in middle childhood leads to more frequent peer conflicts that often need to be resolved with an apology. We were interested in studying the ways in which children talk about their use of apologies. Previous research has studied children's judgments of apologies when placed in hypothetical scenarios. The present study focuses on the apologies, or other forms of reconciliation, that children report in their narratives. We examined a corpus of 2,414 narratives about peer conflict written by children grades 3-6. From these stories we reliably selected over 200 in which children mentioned an apology or clear reconciliation. We used NVivo qualitative data analysis software, and identified 4 categories of events that provoked apologies in children's stories. We also classified stories based on whether the child reported that an apology was prompted by an adult or was spontaneously offered. Preliminary findings indicate that children in grades 3-4 were more likely to describe prompted apologies than children in grades 5-6, who reported more spontaneous apologies. Ongoing analysis will look for grade and gender differences in the events that provoked apologies.

**# 31** *"he was not just a ordinary kid, he was a selfish fifth grader": Descriptions of Self and Others in Children's Personal Narratives*
**Brooke Bierdz, Madison Tallant**
**Faculty Sponsor: Marsha Walton, Department of Psychology**
In middle childhood, peer interactions become the site for important development in psychological mindedness, including the ability to understand self and others in increasingly sophisticated ways. The present study examined children's spontaneous person descriptions by analyzing 775 narratives written by children in the 3rd, 4th, 5th, and 6th grades. Of those 775, we selected 231 stories that contained instances of trait attributions. These narratives were

then coded using NVivo qualitative data analysis software for usage of psychological, physical, and behavioral trait descriptions. A preliminary analysis of gender found that while boys and girls attributed traits with the same frequency, more negative traits were attributed to boys ("rude", "annoying", 'big fat know it all") than to girls ("REALLY good at acting", "prettiest", "nice"). Ongoing exploration will include investigating these gender differences to see if the types of trait attributions used to describe boys and girls differ depending on the gender and age of the author. In addition, we will qualitatively analyze a subset of imaginative and exceptionally literary descriptions ("bragging like a horse winning the Kentucy Dirby") and gendered trait terms ("stuck up no good girl") to gain insight into children's understanding of person descriptions.

**# 32** *"She was supposed to be my best friend": A Study of Children's Descriptions of Problems in their Friendships.*
**Andrea Davis, Guo Yan**
**Faculty Sponsor: Marsha Walton, Department of Psychology**
Although previous studies have examined friendships in middle childhood, few have used children's own words to study problems that arise in friendships. Using a corpus of 2414 children's personal narratives from grades 3 through 6, we investigated what children say when they discuss problems in their friendships. We identified a subset of 561 personal narratives in which children wrote about a friend. Using NVivo qualitative data analysis software we distinguished 4 types of problems reported most frequently: physical violence ('I was in a fight who was supposed to me be friend. He hit me in my eye'), sharing secrets ('I told my friend a secret and she told the whole class'), disagreements ('one time me and my friend had an argument on rather the lochness monster was real') and gossip ('I asked him what was the problem, and he said someone to me that you called me a bone head'). Continued investigation of the narratives will focus on age and gender differences in the way in which children describe conflict in friendship.

**# 33** *"When the Sun Sets…We Start to Worry:" Compromised Mental Health in Conflict Zones of Northern Uganda*
**Donya Ahmadian, Barron Boyd, PhD, Department of International Studies**
**Faculty Sponsor: Barron Boyd, Department of International Studies**
Previous research has examined the effects of reduced mental health and the staggering stigma of previous child soldiers in conflict zones. Northern Uganda currently holds the highest incidence rate of severe mental illness than any region in the world. With abductions rising over 3,4000, the Lord's Resistance Army, led by Joseph Kony, is responsible for over the suffering of thousands of families in the region. Upon return, these previous child soldiers face immense stigma and lack of aid in reintegration. Further, severe conditions of PTSD, depression, epilepsy, alcohol abuse, acute psychotic disorders and chronic psychosis are rampant and are constantly faced with a lack of facilities to address vital treatment needs. Although many positive initiatives have been placed, effective treatment programs remain exceedingly scarce. Struggling to treat thousands of patients, Northern Uganda faces a rising need for such psychological services to equip victims with holistic care, aimed to both assist in treatment of such disorders and in providing the proper tools necessary to begin life anew.

**# 34** *Retrospective Review of Dietary Intake in Children with an Autism Spectrum Disorder*
**Morgan Cantor, Michael Dole, LeBonheur Children's Hospital, University of Tennessee Health Science Center; Kathryn McVicar, LeBonheur Children's Hospital, University of Tennessee Health Science Center; Mark Corkins, LeBonheur Children's Hospital, University of Tennessee**
**Faculty Sponsor: Kim Gerecke, Department of Psychology**
Children meeting Autism Spectrum Disorder (ASD) DSM-IV criteria are characterized by impairments in socialization, language and communication, and restricted behavior repertoires. Many demonstrate restricted and repetitive diets. This experiment was done to determine how many children known to have ASD report restricted dietary intake. To do so, retrospective chart review was performed on University LeBonheur Pediatric Specialists, Inc. Pediatric Neurology medical records for two hundred and twenty-four children known to have an ASD listed as an International Classification of Disease (ICD) code. Eighty-six (38%) charts contained information about diet. Fifty-three (24%) commented on eating habits and noted a limited diet or being a 'picky-eater', which suggest that diet and nutrition are significant concerns for these patients. No difference in age between those with limited diets or picky eaters were noted ($p=0.15$). Though the impact of nutrition on early brain development has been well established, how ASD and restricted diets influences development in these children is unknown. Our pilot data suggests that many have restricted diets and that further studies of nutrition in these children may be warranted.

**# 35** *A novel closed-head model of mild traumatic brain injury caused by primary overpressure blasts to the cranium produces sustained emotional deficits in mice*
**Gy Won Choi, Scott A. Heldt, Andrea J. Elberger, Yunping Deng, Natalie H. Guley, Nobel Del Mar, Joshua Rogers, Jessica Ferrell, Marcia G. Honig, and Anton Reiner University of Tennessee Health Science Center, Department of Anatomy and Neurobiology; Tonia S Rex Univers**
**Faculty Sponsor: Kimberly Gerecke, Department of Psychology**
Many soldiers and athletes suffer from a variety of head injuries, from minor to major injuries. Frequently, they report emotional deficits, which impair them from daily functioning, without clearly diagnosable markers. In order to further examine the brain pathology, we have developed a closed-head model of traumatic brain injury caused by primary overpressure blast to the cranium in C57BL/6 mice. In this study, we found that light pressure (20~30 psi) blasts did not produce any obvious behavioral or histological evidence of brain damage. However, 50~60 psi blasts produced anxiety-like behavior in open field test, increased acoustic startle, delayed extinction of learned fear, increased contextual fear and depression-like behavior. Moreover, we found dispersed axonal degeneration in brain sections from 50~60 psi mice 3-8 weeks after the blast. Hence, our closed-head mouse model of traumatic brain injury by overpressure air blast to the cranium produced previously replicated emotional deficits in mice with more precise control in choosing the area of impact without major physiological complications that is often associated with TBI animal models.

**# 36** *From Hope to Health: A Look at the Cleaborn Homes HOPE VI Relocation*
**Annika Gage**
**Faculty Sponsor: Heather Jamerson, Department of Anthropology & Sociology**
This project will continue an ongoing evaluation of the implementation of a HOPE VI grant given to the Memphis Housing Authority intended to demolish and rebuild Cleaborn Homes. To evaluate the success of the project, it is critical to examine the effect that relocation has had on the quality of life of former Cleaborn residents and their progress toward "self-sufficiency." In order to do this, we will examine the physical and emotional health of former public housing residents and their potential impacts on employment outcomes in the formal labor market. First, we will consider emotional indicators of well being, as defined by Hong et al. (2012) as "Employment Hope," which captures: 1) feelings of empowerment and 2) a pathway toward obtainable financial goals. Second, we will examine how residents understand their own physical health and its effect on their employability. Lastly, we will investigate the potential mediating effect of HOPE VI-funded case management on physical and emotional health, as well as, employment. Our research design involves door-to-door interviews with approximately 25 former Cleaborn Homes' residents, who are currently utilizing Housing Choice Vouchers outside their original 38126 zip code.

**# 37** *Are the effects of chronic life stress on acute laboratory stress dependent upon emotional eating?*
**Elyse Smith, Katelyn Dagen, Paige Goemaere**
**Faculty Sponsor: Rebecca Klatzkin, Department of Psychology**
As college females often suffer from chronic stress, developing stress-related coping mechanisms over time, it is important to understand the physiological and psychological correlates of chronic stress. Specifically, stress triggers activation of the HPA axis, which releases cortisol, a hormone that increases appetite. Previous research has suggested the presence of a Chronic Stress Response Network (CSRN) in which habitual intake of large amounts of comfort food (contributing to obesity) lowers the subsequent acute stress response in those who are chronically stressed. A recent study found that a group of chronically stressed women showed blunted cortisol reactivity to a laboratory stressor and had greater body mass index (BMI), sagittal diameter, and emotional eating compared to a low chronic stress group. We intend to support the CSRN by showing that college females who have high chronic stress will have greater BMI, hunger, desire to eat, and blunted physiological stress response to an acute stressor than females with low chronic stress. Our research also investigates whether the relationship between chronic stress and the abovementioned psychophysiological variables will depend on emotional eating status such that only in the emotional eaters will chronic stress lead to blunted stress reactivity and greater BMI, hunger, and desire to eat. To test this hypothesis, our female participants completed the Trier Social Stress Test, which consists of a challenging speech and math task. Our findings will contribute to the growing body of research regarding the causes of obesity in America, hopefully leading to better-informed treatment and prevention efforts.

**# 38** *Examining the Contributions of Orthography and Phonology on Episodic Memory Retrieval*
**Olivia Menick, Emily Murphy, Celeste Lake, Lydia Garcia, Kendall Brennan, Lizzie Heo**
**Faculty Sponsor: Geoffrey Maddox, Department of Psychology**

Discovering ways to enhance memory retrieval is important for both researchers and the general public. Past studies have shown that presenting word primes that have orthographic and phonological overlap with the to-be-remembered item (e.g., "reel" when trying to remember "reef," form primes) can influence retrieval success when presented prior to the retrieval attempt (e.g., Logan & Balota, 2003) but not after the participant has attempted to retrieve the item (e.g., Maddox & Balota, in prep). Given these mixed findings, it was predicted that form primes would increase retrieval success to a greater extent when presented shortly after the retrieval attempt was initiated compared to conditions in which form primes were presented following a longer delay. To test this prediction, participants in the current study learned a list of word pairs (e.g., TREE-tent) and then completed a cued recall test (e.g., TREE - ????) in which a prime (e.g., tend) was presented following different time intervals during which the retrieval cue was presented (200ms, 300ms, 400ms, and 500ms). Discussion will emphasize the role of phonology and orthography in the episodic retrieval process.

**# 39** *Age-related Differences in the Benefits of Repeated Study and Retrieval Practice in a Value-directed Encoding Paradigm*
**Camille Smith**
**Faculty Sponsor: Geoffery Maddox, Department of Psychology**
Research suggests that spacing study events and retrieval practice improves long-term memory performance in young and older adults (e.g., Maddox, Balota, Coane, & Duchek, 2011). Moreover, younger and older adult memory performance appears to be modulated by the value of the to-be-learned materials in a way that often benefits older adult performance (e.g., value-directed encoding; Castel, Balota, & McCabe, 2009). To investigate the combined influence of value-directed encoding with spaced retrieval (Experiment 1) and study (Experiment 2), participants studied a list of word pairs. Each word pair was assigned a point value of three points (low value) or six points (high value), and participants would receive those points if they successfully recalled the pair on the final test. During the learning phase, word pairs were tested using cued recall or they were restudied immediately after the initial learning trial (Lag 0) or following four intervening word pair items (Lag 4). Participants completed a final cued recall test following either a 30 second or 15 minute delay. Results indicated a benefit in both age groups for high value pairs that received retrieval practice, but only young adults showed a benefit for high value over low value pairs that were restudied.

**# 40** *The Effects of Semantic Priming on Memory Retrieval*
**Megan Thursby, Adrienne Gab Samantha Goodman Makenzie Martin Rachel Shames**
**Faculty Sponsor: Geoffrey Maddox, Department of Psychology**
Past research suggests that unconscious processing of words can influence what an individual remembers on recognition (e.g., Jacoby & Whitehouse, 1989) and free response tests (e.g., Maddox & Balota, in prep). The current study extends on past research by examining how the time at which this unconscious processing occurs in the retrieval process influences what is remembered. Participants studied a list of word pairs (e.g. CHAIR-doctor) and then immediately took a cued recall test (e.g., CHAIR - ?????). On each test trial, the cue was presented for 200, 300, 400, or 500 milliseconds before a prime word was presented for 32 milliseconds. Primes were either the correct answer (e.g. doctor; identity prime) or a word related to the correct answer (e.g. nurse; semantic prime). Following the prime, the cue was presented again until the participants responded. Additionally, participants rated their confidence in their response. Overall analysis failed to reveal a difference between the two prime types or an influence of when the prime was presented. However, follow-up analyses revealed that cued recall was greater in the identity prime condition than in the semantic prime condition when participants were less confident in their responses.

**# 41** *Politeness Strategies in Expert Tutoring*
**Swati Pandita, Aubrey Schonhoff, Rhodes College**
**Faculty Sponsor: Natalie Person, Department of Psychology**
Understanding the tutoring process is important because tutoring is typically more effective than classroom instruction. One possible reason for this success involves the dialogue between tutor and student. Tutoring dialogue is more similar to normal conversation than the lecture format primarily used in classrooms. The purpose of this research is to illustrate how properties of conversation, specifically politeness strategies outlined by Brown and Levinson (1984), operate in tutoring sessions between tutors and students. The politeness strategies used by expert tutors and students were annotated in tutoring transcripts using Brown and Levinson's (1984) politeness categories. The analyses of super strategies indicated that tutors tended to rely mostly on Positive Politeness strategies; whereas students were more balanced in their use of Positive and Negative Politeness. Further analysis with higher order

strategy revealed that both tutors and students used politeness strategies to establish common ground, to be cooperative, and to avoid impinging on or coercing their dialogue partner.

**# 42** *Effects of Class Size on Student Achievement*
**Corey Lipschutz**
**Faculty Sponsor: Marcus Pohlmann, Department of Political Science**
In the context of education reform policy, class size is an often discussed consideration. Various previous studies in the field have provided conflicting arguments both for and against measures to reduce class size. While supporters of reducing class size have argued that class size and student performance possess a causal relationship, opponents have contended that investing into class size fails to past the muster of a cost-benefit analysis. This research seeks to closely analyze study designs in prior literature, particularly focusing on Eric A. Hanushek, in order to determine how conclusions were determined. Variables, controls, as well as study design limitations are evaluated. Through this assessment prior conclusions can be critiqued and study design modifications can be recommended.

**# 43** *Measuring Relationship Quality Through Participatory Research Strategies At Story Booth, an After-School Youth Arts Program*
**Samantha Anscher, Maria Branca, Abby Lewis**
**Faculty Sponsor: Elizabeth Thomas, Department of Psychology**
After-school programs have been recognized as spaces that develop youths' social skills, creativity, personal interests, self-esteem, and self-efficacy through meaningful activities. Research shows that the relationships formed at these after-school programs are a key component of both the programs' and their participants' success (e.g., Deutsch, 2008; Hirsch, 2005). This foundational study analyzes relationship quality at Story Booth, Crosstown Arts' after-school youth arts program located in Memphis, Tennessee. As part of our Psychology Senior Seminar course, we observe middle school students as they participate in a creative writing project with the help of program staff. Methods include field observations, informal interviews, a sharing circle, and relationship mapping; these participatory strategies engage the youths in the evaluation of their relationships both with the program director and each other. Our research goal is to provide the organization with tools that can be used for assessment in the future, including a survey that measures both the presence and quality of relationships at Story Booth.

**# 44** *Creative Voice in Crosstown Arts: An evaluation of the Photo Project*
**Zeina Soued, Noor Eltayech, Liz Marlowe, Rhodes College**
**Faculty Sponsor: Rubye Thomas, Department of Psychology**
Previous research shows that after school programs that foster healthy development of creativity allow deeper social and academic engagement as well as promoting overall well-being in students (Langhout, Collins, & Ellison, 2013; Vaughan, 2013). In this study, we will identify and analyze the different practices that promote creative voices in after school programs. Through partnering with the Crosstown Arts organization in Memphis, Tennessee, we were able to attend a photo project program and observe their curriculum. The study uses questionnaires, formal and informal interviews, and observations in order to asses the effectiveness of the program in inspiring and encouraging expression of creative voice from the students. We hope to develop a set evaluation for future students to distinguish key factors of a successful after school program, this evaluation would also point out weaknesses and problems, which would be further analyzed for solutions.

**# 45** *The Effects of White Privilege Awareness on System Defense, Descriptive System Justification, and Prescriptive System Justification*
**Allyson Topps**
**Faculty Sponsor: Christopher Wetzel, Department of Psychology**
White privilege is the unearned privilege that white people receive based on the color of their skin. This paper explores the effects of white privilege awareness on levels of system defense, and both descriptive and prescriptive system justification. System defense is defending the status quo by justifying the current system. Descriptive system justification examines how much a person agrees with the way the system actually functions, and prescriptive system justification measures the extent to which people agree with what the system should be. Eighty-two (82) white undergraduate students participated in a study to test their attitudes towards aspects of white privilege in two experimental conditions: Tim Wise's video The Pathology of Privilege and the White Privilege Game. Affirmation was also manipulated but failed to show any significant results. In addition, political affiliation was treated as a continuous variable ranging from democrat, independent, and republican. There were no significant effects for system defense. However, results revealed that political affiliation influenced a person's responses to the privilege

condition. Unfortunately, Republicans did not react to the game as expected. The game significantly increased their descriptive system justification compared to Wise and the control condition and decreased their prescriptive system justification.

**# 46** *Effects of Two Racial Privilege Educational Videos on PCRW Fear, PCRW Pride, and PCRW Empathy raising White Privilege awareness.*
**Mollie Newbern**
**Faculty Sponsor: Christopher Wetzel, Department of Psychology**
"White Privilege" is the advantage or benefit one obtains because of their white skin color. Most whites do not believe or realize the benefits they have due to the color of their skin. Without being aware of White Privilege, whites may believe in reverse discrimination meaning that they feel that they are being sold short of benefits. This is a mentality that would continue to keep nonwhites repressed by whites. I assessed the impact of educating white people about White Privilege. I compared two educational materials, a Tim Wise Video and a privilege game, to a control condition. I was interested in learning how White Privilege impacts three dependent variables from the Psychosocial Costs of Racism to Whites scale: PCRWpride, PCRWfear and PCRWempathy. The results concluded that the game was effective in decreasing pride and fear of nonwhites which did support the hypothesis. However, the empathy towards nonwhites decreased after playing the game. Self-affirmation also failed to reduce modern racism towards nonwhites.

**# 47** *Taboo Trumps Semantics During Picture-Word Interference*
**Sarah Koehler, Richard Collins**
**Faculty Sponsor: Katherine White, Department of Psychology**
Although it is well-established that emotion influences cognition, our understanding of emotion's effect on speech production is limited. The current study examined the effect of emotion on speech production using the picture-word interference task, where participants named pictures of objects (e.g., bed) in the presence of distracting emotional words. Previous research has shown that taboo distractors (e.g., semen) delay picture naming relative to neutral distractors (e.g., infant), suggesting that strong emotional words grab attention and interfere with speech production. Additionally, distractors that are semantically-related to the picture (e.g., couch) slow picture naming due to competition between the semantic distractor and picture name. This experiment investigated interference from taboo distractors in comparison to semantically-related distractors (e.g., couch). Participants named target pictures superimposed with semantic, taboo, or unrelated distractor words that were presented 150 ms before, simultaneously, or 150 ms after the picture was presented. The time of distractor presentation was varied in order to compare the time course of taboo interference with that of semantic interference. Furthermore, to investigate whether the interference from taboo trials carries over to subsequent trials, two filler pictures accompanied by unrelated distractors were presented after every target picture. Relative to unrelated distractors, both semantic and taboo distractors slowed picture naming at all three onset times, with greater slowing for taboo distractors. Slowing from taboo distractors persisted when naming subsequent filler pictures. These findings emphasize the theoretical importance of emotion and attention in speech production.

**# 48** *"It's Complicated, It's Fragile, It is Important": Analyzing the Relationships among Greek Life, Diversity, and Feelings of Inclusion on Campus*
**Sarah Koehler, Stephanie Kasper, Sydney Sepúlveda**
**Faculty Sponsor: Anita Davis, Department of Psychology/Associate Dean of the Faculty**
This project seeks to explore general feelings toward Greek life on Rhodes campus. The research investigates the degree to which Greeks and non-Greeks feel included on campus as well as the degree to which fraternity members are aware of problems related to diversity on campus. Twenty-five fraternity members were surveyed about their demographic information and views on diversity before and after attending a presentation of the data from the Campus Climate Survey. In addition, one hundred randomly selected members of the Rhodes student body were surveyed about their demographic information, feeling of inclusion on campus, and their perception of the role that Greek life plays at Rhodes College. This data should help provide a foundation for further discussion of the relationship between Greek life, diversity, and feelings of inclusion on campus.

## Fine Arts

**# 49** *Your Brain on Music: Classical Music Decreases Self-Reported Stress Levels, and Electronic Music Increases Brain Activity, as measured by EEG*
**Donya Ahmadian, Rachel Schmelzer, Sarah Shankle**
**Faculty Sponser: Harald Sontheimer, PhD, Department of Neuroscience**
Previous research has shown that music interventions provide significant therapeutic relief. We were intrigued by this effect of music on mood and its role in musical therapy, and were interested to see if this is reflected in brain activity. Concurrent and blood pressure readings allow to assess a persons overall state of alertness. We chose two musical pieces that were played for 2 minutes each, one calming, classical piece and one hyperactive, potentially arousing piece. We hypothesized that due to the contrast, differences in brain wave activity would occur, as measured by EEG. Brain wave activity corresponds with arousal and alertness, with different wavelength and amplitude ranges corresponding to different levels of brain activity. Blood pressure data would signify non-specific overall changes in alertness and arousal. Our results showed significant differences in wave frequency and amplitude ranges on EEG, as well as self-reported stress levels, albeit without significant changes in blood pressure, indicative of music's effect on brain activity. Implications of these results can help to understand how music affects mood, why students study best to certain music, and to further understand musical preferences. Most importantly, further research could aid in the field of music therapies.

**# 50** *Modern Harp Technology*
**Suzanne East, Petra Dhinakarn, Nicole Quinonez, Emma Vescovo, Kelly Dodson, Annika Wuerfel, Sidney Long, Erika Relyea**
**Faculty Sponsor: Gina Neupert, Department of Music**
In addition to being a beautiful object, the harp is a very complex instrument. There is a curiosity outside the harp world in understanding the technical aspects of this ancient instrument. Harpists often find themselve approached by others asking how the instrument works. By illustrating the various mechanics of a harp, it will demonstrate how the pedals operate, why the sound board is varied in shape and size, the purpose of the column, and answer many common questions. This will be illustrated through diagrams of each harp part and how the parts work. A written summary of how these parts complete this instrument will conclude this presentation

## Bio 141

**# 51** *A Higher Male to Female Ration in an Environment will Increase the Aggressiveness of an Individual Male Crawfish*
**Maren Mabanate, Meredith Noah, Katelyn Sanchez**
**Faculty Sponsor: Mary Doherty, Department of Biology**

**# 52** *The Difference in Number and Duration of Bouts between Female Native and Introduced Crayfish*
**Allie Baldassaro, Aubrey Blackstock, Erin Best, Hallie Weems**
**Faculty Sponsor: Mary Doherty, Department of Biology**

**# 53** *Does Duckweed Exhibit More Growth Under White Light or Under Different Colored Lights?*
**Liana Kahn, Luke Malanchuk, Koshy George**
**Faculty Sponsor: Mary Doherty, Department of Biology**

**# 54** *Does an Increase in Temperature Result in an Increase in Agonistic Behavior Between Male Crayfish?*
**Katie Matney, Anna Rodell, Haider Tiwana, Isabel Wittman**
**Faculty Sponsor: Mary Doherty, Department of Biology**

**# 55** *Effects of Gravel Color on Substrate Preference in Crayfish*
**Jessica Ealy, Prianka Bose, Rachel Cofield, Carolyn Dishuck**
**Faculty Sponsor: Mary Doherty, Department of Biology**

**# 56** *Stomatal Aperture of Available Plants are Significantly Altered by Change in Duration of Light Exposure*
**Myrna Sidarous, Alec Rhodes, Ryan Maguire, Dillon Cheney**

**Faculty Sponsor: Lynda Miller, Department of Biology**

**# 57** *Sex and Aggression: Observing Impact of Dominance Coefficient on Inter-Sexual Selection*
**Tyler Harvey, Nicole Quinones, Harris Short, Asad Ayub**
**Faculty Sponsor: Lynda Miller, Department of Biology**

**# 58** *Crayfish Show Significant Preference to One Substrate over Another*
**Bailey Battle, Lauren Sylwester, Christina DiFelice, Jingshi Chen**
**Faculty Sponsor: Lynda Miller, Department of Biology**

**# 59** *The Effect of UV Radiation on the Growth of Duckweed*
**Alex Stuphin, Sara Ewel, Bian Xiao, Matt Marvick**
**Faculty Sponsor: Lynda Miller, Department of Biology**

**# 60** *The Effect of Operant Conditioning on Crayfish Behavior*
**Calli Pinckney, Nicolette Glidden, Patrick Clark, Albert Vacheron, Sarena Fernandez**
**Faculty Sponsor: Lynda Miller, Department of Biology**

**# 61** *The Effects of Water Salinity on Duckweed Growth*
**Iman Abdulkadir, Grace Akange, Chigozie Emelue, Alana Heyrana, Maddie McGrady**
**Faculty Sponsor: Lynda Miller, Department of Biology**

**# 62** *The Effect of Substrate Quantity on Crayfish Substrate Preference*
**Piyush Kumar, Bryton Herlong, Spencer Regelson, Aashray Singareddy**
**Faculty Sponsor: Lynda Miller, Department of Biology**

**# 63** *Male Crayfish will be more Aggressive in Defending Preferred Substrate Against Other Males than Competing Against Females*
**Colton Miller, August John, Lindsey Conley, Patrick Leavey**
**Faculty Sponsor: Lynda Miller, Department of Biology**

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